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### Unexpected Life Found In The Ocean's Deepest Trench

By Christopher Joyce, npr, December 25, 2014

The Mariana Trench cuts a 1,500-mile incision in the bottom of the Pacific Ocean near the island of Guam. That's where an international team of scientists has just spent over a month sending probes down to the deepest place on Earth. The scientists were stunned by the amount of life they found there, including a fish species inhabiting the deepest depths. The bottom of the trench lies 7 miles below the ocean's surface. It's a place of perpetual darkness and freezing cold. To explore it, scientists aboard the research vessel Falkor dropped "landers" over the side. Each one is about the size of a large refrigerator and bristles with instruments and cameras.



The Falkor on Aug. 28, 2013. Schmidt Ocean Institute/Mark Schroppe

The landers use thick glass spheres full of air to provide buoyancy that controls their up and down movement. The spheres have to withstand pressures that would crush a human like a tin can. "If they crack, they implode in a microsecond," says biologist Jeff Drazen of the University of Hawaii, who is a senior scientist on the team. "And that sets off a shock wave like a stick of dynamite going off." And that's just what happened to one lander. The sphere's implosion was recorded by its microphone, and in those cold depths, the sound kept echoing along the trench. But the lander itself survived, as did all but one of the others. Once on the bottom, they waited and watched. And they

got some big surprises. "We saw the deepest living fish ever recorded," says Drazen. "Definitely something new. We took one look at the thing and were amazed — big, wide, winglike fins, this eel-like tail and this scalloped face. It was very unique." They nicknamed it the "ghost fish" for its almost translucent skin. It appears to be a new species of snailfish — living 5 miles below the surface. The landers also carried baited traps that drew fish to be videotaped. What the fish didn't eat was consumed by hordes of shrimplike amphipods. Other traps actually caught animals, including another new species of snailfish. Several were brought back up to the ship, though they didn't survive the decompression.

The reason the fish can withstand pressure that's thousands of times that at the surface is because of a special chemical in their bodies. Called trimethylamine oxide, it keeps the cell walls of the fish and amphipods flexible so they don't get crushed or infiltrated with saltwater. The scientists also wanted to know what lives in the sediment at the bottom. The sediment is made of decomposed ocean life that constantly drifts down from above like snow. The landers dug into the sediment and measured the respiration rate of microbes in it. Drazen says the results were astonishing. "The rates were really high; it was incredible. It was really cooking." All in all, the trench turned out to be a biological hot spot. Paul Yancey, a team biologist from Whitman College, says, "It's looking like there's a lot more life down there than we thought. You know, this is so far from sunlight that people thought there wouldn't be a lot of life down there, but there is."

Yancey says one reason appears to be the fact that the trench is truly the bottom of the planet. Things end up there the way they do at the bottom of a purse. "It's looking like these trenches might act like funnels to collect stuff from all over the oceans that is sinking down." The stuff that rains down to the seafloor sustains life on the bottom — *if* those creatures can adapt to the hostile conditions. Yancey says that's what biologists live for — the chance to find crazy new kinds of life. "I think the big picture is that there's so much about the planet we don't know yet," he says. "I mean, literally, we have better maps of the moon and even Mars than we do of most of the deep sea." Scientists will be back at the trench. The Schmidt Ocean Institute, which owns and operates the team's research vessel, is building a remotely operated vehicle that will be able to travel along the bottom. Then the scientists won't have to wait for deep-sea dwellers to come to them.

## **Marianas Trench Expedition Finds 'World's Deepest Fish'**

*Snailfish discovered below 5 miles deep*

By Richelle Agpoon-Cabang

SAIPAN, CNMI (Marianas Variety, Dec. 22, 2014) – The snailfish found at a depth of 26,722 feet [8,145m] in the Marianas Trench is believed to be the world's deepest fish, according to the blogsite of researchers who recently went on a 30-day expedition to the Marianas Trench. The Falkor Expedition involves a team of researchers led by Woods Hole Oceanographic's Tim Shank, chief scientists Jeff Drazen from the University of Hawaii at Manoa, and Patricia Fryer, a geologist also from UH. They used the Hadal Lander, the United Kingdom's deepest diving vehicle, to record more than 100 hours of footage. The expedition took place from Nov. 9 to Dec. 9 2014.

In a blog entry dated Dec. 6, 2014, the team said: "We have now discovered the Mariana Trench also has snailfish, in high densities at 7000 to 7500 m, and filmed down to 8075 m. However there are very few there, and we have seen no fish at deeper sites...." Then a snailfish was found at a depth of 26,722 feet. It had wing-like fins and an eel-like tail and was discovered gliding deep in the western Pacific Ocean, beating the previous record by 500 feet. The expedition aimed to explore large swaths of the world's deepest trenches to get a more complete view of what is there. Division of Fish and Wildlife Fisheries Research Section Supervisor Todd Miller, who is a close friend of Drazen, said the expedition is a gateway for more research and expeditions in the Marianas Trench.

"The exploration will definitely put the CNMI on the world scientific map for future research expeditions. The depths are so great, and very little is known of the geological and biological characteristics of the trench — one could compare expeditions to such depths as something like the expedition of a Mars rover." For more information, go to <http://www.schmidtocean.org/story/show/3494/>.

### **New Zealand decision on Experimental Seabed Mining should prompt PNG review**

By PNG Mine Watch, December 20, 2014, ACT NOW!

The decision by the New Zealand government to reject an experimental seabed mining proposal should prompt a review of similar plans in PNG says community campaign group, ACT NOW! "The New Zealand decision to rejected seabed mining in its exclusive economic zone is highly relevant to the proposed mining activity by Nautilus Minerals in the Bismarck Sea", says ACT NOW! Program Manager, Effrey Dademo. The NZ Environment Protection Agency found the mining would not promote the sustainable management of natural resources and there was considerable uncertainty about the scale of the potential effects on the environment and existing interests including those of indigenous Maori and the fishing industry. The EPA found that imposing stringent conditions, including a risk-based tiered adaptive management approach as proposed by the developer, on the proposed activity would not be sufficient to avoid, remedy or mitigate the adverse effects of the activity.

In principle the proposed mining in NZ was identical to what is proposed by Nautilus Minerals: the excavation of the seafloor, removal to a surface vessel for the separation of the ore and the returning of the unwanted materials to the seabed; although the minerals to be extracted in the two cases are different. ACT NOW! has written to relevant government departments in PNG enclosing a copy of the full NZ EPA decision and calling for a review of the application by Nautilus Minerals and a reevaluation of all licenses and approvals already granted. "We believe that as in the NZ case, the proposed mining activity by Nautilus Minerals will not promote the sustainable management of our natural resources as required by law and there are considerable risks to the environment and existing interests that cannot be sufficiently managed or controlled", says ACT NOW!.

### **Chairman: Ocean floor contains minerals**

The National, December 15th, 2014

By SHIRLEY MAULUDU

Nautilus Minerals Inc chairman Geoff Loudon believes that the bulk of minerals is under the ocean floor. "The ocean covers 70% of the earth's crust and another 10% with fresh waters. "So the land part of the earth isn't that much and yet that's where we get all of our minerals from. "As far as we can see and I personally believe, the ocean probably has got not only 70% of the earth's surface but probably 70% of the world's minerals storage," Loudon said. He said the company (Nautilus) and other companies as well made evaluations for quite a while now and they were aware that the bulk of minerals including copper, nickel cobalt, manganese, were actually in the deep oceans of the world. "We have to get down there and see whether we can access it, do it properly without messing the ocean up – and everything tells me we can do that. "We don't have to devastate any rainforest or do anything else. We simply bring this material to the surface. "Ocean mine can actually be environmentally friendly, we don't dump any waste in the ocean – we just take the materials away," Loudon added. He said the eyes of the world are on Papua New Guinea on this venture – the development of Solwara 1 project.

## **Nautilus, Petromin partner in Solwara 1 project**

Post-Courier, December 14, 2014

NAUTILUS Mineral Inc (Nautilus), the operator of the world's first seafloor mining and controversial, Solwara 1 Project in the waters of New Ireland Province says it remains focused on building the seafloor production equipment and vessels. The project which has attracted huge criticism from international, local environment campaigners, is expected to begin its construction in 2017. In a statement released last week, Nautilus said the focus of the Project will now be to complete the build of the seafloor production equipment and vessel so that Nautilus can make seafloor mining a reality. While announcing the release of its escrow funds of US\$113 (K290.48 million) to Nautilus, the company was reportedly excited to partner with the State Nominee, Petromin PNG Holdings Limited (Petromin) in the development of the new industry, which is anticipated to generate significant economic activity within the State and the impacted Province.

The company also announced that the joint venture between Nautilus and the nominee of Petromin's subsidiary Eda Kopa, in respect of the Solwara 1 Project, has now been formed. Under the terms of the agreement between the parties, Petromin has confirmed fully funded its 15% interest in the Solwara 1 Project up to first production. Nautilus chief executive Michael Johnston commented, "we are excited to have achieved completion under our Agreement and to formally commence our partnership in the Solwara 1 Project with the State's nominee, Eda Kopa (Solwara) Limited, a wholly owned subsidiary of Petromin. "We appreciate the continued support we have received from the State Nominee in reaching this significant milestone," he added.

Meanwhile, Sir Brown Bai, Petromin Board chairman told stakeholders and media last week; "Eda Kopa now stands ready, together with its joint venture partner and manager of the Project, Nautilus, to enter into the next stage of Solwara 1's life – the development stage. "Given the challenging circumstances surrounding this Project, I believe that Petromin has proven that it has the capacity and competencies to hold and manage even the most challenging of the State's resource assets, in a commercial sound and prudent manner. The solutions and agreements reached with Nautilus and reflected in the MEA and the joint venture documents were all discussed by Petromin, with not only its interests but also the interests of the State in mind, as the State is our Beneficial Shareholder," Sir Brown added.

## **Solwara 1 Project to kick off in 2017**

The National, 12th of December, 2014

THE development of the Solwara 1 project will kick off in the next three years, Nautilus Minerals chairman Geoff Loudon says. He said development of the project depended on the ships that will be used for the project. "The project depends on our ships. We've got contract for the ships and it will take 30 months to build the ship, another three months to put the equipment on for the mining and another three months for sea trial, so its three years to go," Loudon said. Last month, Nautilus announced that it had entered into an agreement for charter of a vessel to be first deployed for use at the Solwara 1 project. Marine Assets Corporation, a Dubai based marine solutions company which specialises in delivery of new build support vessels for the offshore industry, will own and provide marine management of the vessel. The vessel will be chartered to Nautilus for a minimum period of five years at a rate of US\$199,910 (K524,560) per day, with options to either extend the charter or purchase the vessel at the end of the five year period.

## **Arbitration proceedings between government, Nautilus ends**

The National, 12th of December, 2014

With the government sealing its 15% stake in the Solwara 1 project, it puts an end to arbitration proceedings between the PNG Government and Nautilus Minerals. This was according to a report released by the company last month. On March 29, 2011, Nautilus said the state had signed state equity option agreement (SEOA) and exercised its option to acquire a 30% stake in Nautilus' Solwara 1 Project. The following month, the company announced it was in dispute with the State as to the parties' obligations to complete SEOA and that it had initiated dispute resolution process provided for in SEOA. In October last year, the arbitrator issued an award in Nautilus' favour in respect of issues that were subject to notice of arbitration initiated by the State. The arbitrators' award included an order that the State comply with its obligations under SEOA to complete purchase of its 30% interest in the project and to pay 30% of all project expenditure incurred to date within a reasonable time of the award.

Nautilus then issued the PNG Government with a notice requiring completion to occur by Oct 23, last year. It estimated total amount payable by State at Oct 23, last year to be approximately US\$118.2 million (K310m) including interest. Nautilus continued discussions with the State following the expiration of date to complete, in February this year. In absence of the State's completing purchase of its 30% stake in the project, the company announced termination of SEOA. In April this year it was announced that Nautilus and the state signed an agreement, enabling the project to move forward toward production. The State in May satisfied its obligation under the agreement to secure funding for a decreased 15% share of the capital required to complete the development phase of the project up to first production, being US\$113m (K296m). These funds were placed in escrow until yesterday.

## **Communities say no to seabed mining**

Seraphina Aupong, EMTV via PNG Mine Watch 4 December 2014

Coastal communities are concerned that the government is not seriously considering their opinions and concerns when it comes to mineral resource plans in the country. The people of Karkar Island in Madang maintain their "NO to seabed mining" stance with Nautilus Minerals and the government. This comes amidst the PNG Mining and Petroleum Investment Conference which ended today in Sydney, Australia. In 2012, a petition to stop the advance of seabed mining in the country had the signatures of 9,200 Karkar islanders. The total signatures collected from Papua New Guineans and people all over the world reached 24,000 and this petition was handed to the concerned minister, Byron Chan. Rosa Koian from Bismarck Ramu Group, a member of the community coalition who presented the petition to Minister Chan, said to date, there has been no response from Chan to the communities regarding the petition. The only discussion they seem to be having is with Nautilus Minerals. People from Karkar Island still maintain their stance, saying the government should not leave them out when it comes to making decisions that will affect their livelihoods. People from coastal communities depend on fisheries resources for their daily survival and for commercial purposes. The Chamber of Mines and Petroleum are hosting their flagship biennial conference in Sydney. The theme, "PNG Resources – Expanding Horizons", speaks of the plans the PNG government has in breaking new grounds in the area of coal and seabed mining.

## **Fujian Mawei to build mining vessel for Nautilus**

Post-Courier, November 28, 2014

Dubai based Marine Assets Corporation (MAC) has entered into a Ship Building Contract with Fujian Mawei Shipbuilding, a Chinese company for the lump sum turn key Construction of the Nautilus Minerals Seafloor production mining vessel. The ship building is for the Nautilus' Solwara 1 Project off the Bismarck Sea between the waters of New Ireland and East New Britain Provinces. According to *subseaworldnews.com* this week, a signing ceremony was held at Mawei's shipyard for the execution of the shipbuilding contract for the Nautilus Minerals Seafloor production mining vessel. The signing follows the entry by MAC into a five year charter agreement with Nautilus Minerals on the 6th of November 2014. The contract requires MAC to complete the design – construction and delivery of the vessel to Nautilus by the end of 2017. Vessel design will be completed by Sea-Tech Solutions of Singapore. MAC, a marine solutions company based in Dubai, will own and provide the marine management of the vessel. The vessel will be chartered to Nautilus for a minimum period of five years, with options to either extend the charter or purchase the vessel at the end of the five-year period.

The vessel will first serve as the operational base for the joint venture to be formed by Nautilus and the State's nominee, Eda Kopa (Solwara) Limited, a subsidiary of Petromin PNG Holdings Limited to support the operations carried out by the joint venture to extract and transport high grade copper and gold material from the mine site. When completed, the vessel will measure 227 meters in length and 40 meters in width with accommodation for up to 180 people and generate approximately 31MW of power. All of the below deck mining equipment will be installed in the vessel during the build process to minimize the equipment integration to be completed following delivery of the vessel. The vessel is expected to be delivered by the end of 2017. MAC chief executive Robin Reeves stated, "we are very excited and pleased that Nautilus Minerals has entrusted this prestigious project to MAC and grasped the opportunity to work with MAC to conclude the long road Nautilus has travelled to reach this stage."

## **New Zealand: Chatham mining will 'destroy' rare seabed life**

LIAM HYSLOP, stuff.co.nz, 17/11/2014

Phosphate mining should not be allowed on the Chatham Rise as it will damage marine environments, environment groups say. The Environmental Protection Agency (EPA) has started calling final submissions at its hearing over the application by Chatham Rock Phosphate (CRP) to mine phosphates off New Zealand's coast. The Chatham Rise was an area of ocean floor to the east of New Zealand, stretching for 1000 kilometres from near the South Island to the Chatham Islands. CRP's proposal was to mine phosphate nodules in an 820sqkm area approximately 450km east of Christchurch, for which it already has a mining permit. In addition to its mining permit, CRP requires a marine consent under the Exclusive Economic Zone and Continental Shelf Act, which the EPA hearing will decide. CRP also sought to increase its area to more than 5000sqkm from the hearing. Today, Greenpeace, Kiwis Against Seabed Mining and the Deep Sea Conservation Coalition gave a joint final submission.

Lawyer Duncan Currie, acting for the groups, told the hearing the application was "premature" due to the lack of information in many areas. "The Environmental Impact Assessment was far from adequate. "There's a lot of information missing, but what we do know is that this mining will destroy virtually all life on hundreds of square kilometres of the seabed, including rare, vulnerable and endemic species." That could include damage to coral and high levels of toxic materials leaking into the sea, he said. The company had also overstated the benefit of the phosphates to New Zealand, since it will export 75 per cent of the mined phosphates, he said. Barry Weeber, of the Deep Sea

Conservation Coalition, said he had concerns about the ship CRP planned to use for mining. "The company that Chatham Rock Phosphate says will do the mining, Boskalis, will itself use a ship that's likely to be flying a flag of convenience – from Cyprus. "Boskalis has a history of breaching environmental consents. If its ship is flagged to Cyprus, as its other ships are, how will the EPA be able to control it in our waters?"

### **Nautilus closes in for Solwara 1 deep-sea project**

Post-Courier, November 16, 2014

NAUTILUS Minerals Inc, the Canadian based deep-sea explorer and operator of Solwara 1 project, last week announced its third quarter report ending September 30. Nautilus highlighted three major results in the report the company's agreement into vessel charter which satisfies intellectual property condition precedent to the agreement with the State's nominee – Petromin Papua New Guinea Holdings Ltd – and its advanced mechanical and hydraulic assembly of the auxiliary cutter and collecting machine continuing. The operator of the controversial mining project has reported that it has in cash K74.78 million and cash equivalents as at the quarter ending. "Having last month secured the intellectual property rights required by our agreement with the nominee of the Independent State of Papua New Guinea, we are delighted that we have recently secured a vessel charter with experienced vessel provider, Marine Assets Corporation," said Nautilus' chief executive officer, Mike Johnston. "We are now look forward to the signing of the shipbuilding contract," he said. The firm appreciates Eda Kopa (Solwara) Ltd's help.

### **Deep-sea miner Nautilus to charter ship as floating base**

Cecilia Jamasmie, Mining.com, November 6, 2014



Computer rendition of Nautilus' floating base.

Canada's Nautilus Minerals is leading the race to open the first seabed mine as the company announced Thursday it will charter a 227-meter-long (745-foot) ship as a floating base for its operations near Papua New Guinea. The Toronto-based company, which plans to mine copper and gold at its Solwara 1 project, said it will charter the vessel from Dubai-based Marine Assets Corp., which in turn plans to sign a contract with China's Fujian Mawei Shipbuilding Ltd. to design and construct the vessel. Following the first payment by Marine Assets under the shipbuilding contract, \$113 million will be released to the seabed miner from an escrow account. The amount was placed there by

Papua New Guinea as part of the government's purchase of a 15% stake in the project, located in the Bismarck Sea. The ship will accommodate as many as 180 people and is expected to be delivered by the end of 2017. The ship will accommodate as many as 180 people and is expected to be delivered by the end of 2017, Nautilus said. The Solwara 1 project, located in the minerals-rich Manus basin, was originally slated to begin production late last year, but long-dragged disagreements with the PNG government affected the original timeline. Nautilus, the first yet not the only one exploring the ocean floor for polymetallic massive sulphide deposits, it still expects Solwara to become the first project commercial deep-sea mining in the world.

### **Nautilus Enters Into Vessel Charter**

TORONTO, ONTARIO--(Marketwired - Nov. 6, 2014) - Nautilus Minerals Inc. is pleased to announce that it has entered into an agreement for the charter of a vessel to be first deployed for use at the Solwara 1 Project. Marine Assets Corporation, a marine solutions company based in Dubai which specialises in the delivery of new build support vessels for the offshore industry, will own and provide the marine management of the vessel. The vessel will be chartered to Nautilus for a minimum period of five years at a rate of US\$199,910 per day, with options to either extend the charter or purchase the vessel at the end of the five year period. The vessel will first serve as the operational base for the joint venture (*Solwara 1 JV*) to be formed by Nautilus and the Independent State of Papua New Guinea's (*State*) nominee, Eda Kopa (Solwara) Limited (*State Nominee*), a wholly owned subsidiary of Petromin PNG Holdings Limited, to support the operations carried out by the Solwara 1 JV to extract and to transport high grade copper and gold material from the Project site, in the Bismarck Sea of Papua New Guinea. Under the terms of the arrangement, MAC will enter into a contract with Fujian Mawei Shipbuilding Ltd., based in Fujian province in south-eastern China, to design and construct the vessel in accordance with Nautilus' specifications (*Shipbuilding Contract*).

The Shipbuilding Contract is expected to be signed by no later than 28 November 2014. A US\$10M deposit is payable by Nautilus to MAC following the payment by MAC of the first installment under the Shipbuilding Contract. A further charterer's guarantee of US\$18M will be provided to MAC by the Solwara 1 JV on the commencement of the charter of the vessel. When completed, the vessel will measure 227 metres in length and 40 metres in width with accommodation for up to 180 people and generate approximately 31MW of power. All of the below deck mining equipment will be installed in the vessel during the build process to minimize the equipment integration to be completed following delivery of the vessel. The vessel is expected to be delivered by the end of 2017. Mike Johnston, Nautilus' CEO, commented, "We are excited to achieve this significant milestone and secure a vessel contract with such an experienced vessel provider as MAC. We appreciate the continued support we have received from Eda Kopa, our joint venture partner, in reaching this milestone and, together with them, look forward to working with MAC and the shipyard in seeing the delivery of our first vessel and making seafloor mining a reality."

### **Lessons for PNG on the Precautionary Approach in experimental seabed mining**

Rakhyun Kim and Donald Anton, The Australian National University via PNG Mine Watch, October 29, 2014

The New Zealand decision under the EEZ Act teaches a number of lessons for other Pacific Island countries that have growing interests in deep seabed mining as a means of economic development. Papua New Guinea (PNG), for instance, has garnered attention for issuing a commercial deep seabed mining license to a Canadian company Nautilus Minerals. Nautilus is supposed to begin the world's first seabed mining operation on the PNG continental shelf in 2016 and, if successful, will



prove the technical and economic viability of seabed mining. Other Pacific Island developing countries are in the process of designing legal regimes to provide a favourable environment for foreign investment and satisfy those environmentally concerned. The concern is that these early movers are operating on a set of untested assumptions, namely that seabed mining will raise a significant amount of revenue to stimulate national economic development while preventing serious harm to the marine environment.

As illustrated in the Trans-Tasman Decision, however, there may be too many uncertainties at this stage with respect to effects on the environment as well as the economy. In the face of such uncertainties, international law dictates that states apply the precautionary approach in decision-making. Abstract: This short piece analyses a recent path-breaking decision by the Decision-making Committee (DMC) of the Environmental Protection Authority (EPA) of New Zealand. In Trans-Tasman Resources Ltd Marine Consent Decision (June 2014), the DMC considered New Zealand's first application for 'marine consent' for continental shelf seabed mining under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act). Download: <https://ramumine.files.wordpress.com/2014/10/the-precautionary-approaches-in-seabed-mining.pdf>

### **Vanuatu chiefs hesitant to approve deep sea mining**

Radio New Zealand, October 27, 2014

Vanuatu's National Council of Chiefs, Malfatumaauri, will not take a position on deep sea mining until after villages around the country have been consulted by the Government. The chief executive of Malfatumaauri, Jean Pierre Tom, says chiefs will make a resolution on the Government's proposed deep sea mining bill based on what the people want. Mr Tom says during the first round of consultations in Port Vila earlier this month, the members of the Malfatumaauri reserved their right to keep silent on the issue. However, our correspondent says most of them have reservations about the proposal for foreign companies to mine minerals from the seabed.

### **Drive to Mine the Deep Sea Raises Concerns Over Impacts**

Armed with new high-tech equipment, mining companies are targeting vast areas of the deep ocean for mineral extraction. But with few regulations in place, critics fear such development could threaten seabed ecosystems that scientists say are only now being fully understood.

Mike Ives, Environment 360 via PNG Mine Watch, October 24, 2014

For years, the idea of prospecting for potentially rich deposits of minerals on the ocean floor was little more than a pipe dream. Extractive equipment was not sophisticated or cost-effective enough for harsh environments thousands of feet beneath the ocean's surface, and mining companies were busy exploring mineral deposits on land. But the emergence of advanced technologies specifically designed to plumb the remote seabed— along with declining mineral quality at many existing terrestrial mines — is nudging the industry closer to a new and, for some environmentalists and ocean scientists, worrying frontier. More than two-dozen permits have been issued for mineral prospecting in international waters. And in April, after years of false starts, a Canadian mining company signed an agreement with the government of Papua New Guinea to mine for copper and gold in its territorial waters. That company, Nautilus Minerals, plans to begin testing its equipment next year in European waters, according to the International Seabed Authority (ISA), a regulatory agency established in 1994 under the auspices of the United Nations. A Nautilus spokesman, John Elias, said the plan is to award a construction contract in November for a specialized mining vessel. "All other equipment has been manufactured and is in final assembly," he wrote in an email.

Chief among critics' concerns is that seabed mining will begin without comprehensive regulatory oversight and environmental review. They say dredging or drilling the seafloor could potentially obliterate deep-sea ecosystems and kick up immense sediment plumes, which could temporarily choke off the oxygen supply over large areas. And powerful international companies, they add, could take advantage of the lax or non-existent review and enforcement capabilities in many small island nations of the Pacific Ocean — precisely where seabed mineral deposits are thought to be highly concentrated. “Communities are concerned that our governments don’t know enough about the ecology or the implications” of seabed mining, said Maureen Penjueli, coordinator of the Pacific Network on Globalization, a Fiji-based non-profit that has tracked seabed prospecting in the region since 2009. “We haven’t seen much benefit from land-based mining, let alone fisheries or tourism — and here we are entering a new frontier.”

But industry proponents say no extractive industry is free of environmental impacts, and that only a fraction of the seabed covered by exploration permits would actually be mined. Companies and governments, they say, are carefully studying both deep-sea ecosystems and emerging mining technologies in order to prevent or mitigate ecological damage. “We are committed to using ecologically sound, deep-seabed mineral recovery methods,” said Jennifer Warren, the regulatory director at UK Seabed Resources, a subsidiary of the U.S. defense giant Lockheed Martin’s British arm. “Toward that end, we are working closely with research institutions and scientists to understand any potential environmental impact of commercial recovery efforts.” Gaining that kind of understanding is a work in progress. As late as the 1950s, the deep sea was still viewed as a dark and barren place with little or no biodiversity worthy of protection. But in the 1960s, new sampling technologies prompted the discovery of new deep-sea species, and by the late 1970s, scientists had discovered bacteria that could thrive amid hydrothermal vents in deep, volcanically active regions. Those bacteria are turning out to be food for a number of “beautiful and strange” invertebrates, according to Cindy Van Dover, a marine biologist at Duke University. By the early 1990’s, scientists were speculating that the deep sea played host to as many as 10 million species of small invertebrates.

It is amid this awakening to deep-sea biodiversity that interest in seabed mineral mining is heating up. While investing in seabed-mining operations remains comparatively expensive, “the equation is turning,” according to Michael W. Lodge, legal counsel with the ISA. “People are starting to think that upfront investment is worth it for the long term payoff.” The ISA has issued seven new seabed exploration permits this year, Lodge noted, bringing its global total to 26, stretching across an area of international waters roughly the size of Mexico. Nautilus Minerals’ planned operation in the territorial waters off Papua New Guinea, however, is widely expected to be the world’s first commercial-scale deep-seabed mine. Several neighboring countries have begun to issue export permits — and in some cases, are drafting seabed-specific mining legislation. New Zealand has also been weighing applications for two seabed mines in its waters, which would target iron sands and phosphate, respectively.

In an email message, James Hein, a geologist with the U.S. Geological Survey and the president of the International Marine Minerals Society, a non-profit organization linking industry, government, and academic institutions, suggested that the global rush to mine so-called “rare earth” elements — which are used to manufacture cellular phones, wind turbines, solar panels, electric cars and other applications — is a key driver in moving the industry forward. Other sought-after resources include sulfide minerals — a source of precious metals like silver, gold and copper — that accumulate around gaps in the seafloor where chemical-rich fluids leak into the ocean at temperatures nearing 1,000 degrees Fahrenheit. The Nautilus Minerals project in Papua New Guinea plans to mine a sulfide deposit by cutting the seabed with a remote-control machine that is 26 feet tall, 42 feet wide, and 55 feet long. According to the company, the ore will be extracted with an “associated suction mouth” and pumped to the surface — a distance of about a mile. Manganese nodules — palm-sized chunks of rock containing copper, nickel and cobalt — are also prized, and in shallower areas, min-

ing companies plumb for rocks containing phosphates, a key ingredient in agricultural fertilizers. “The process itself is essentially a large vacuum cleaner on the end of a hose,” said Chris Castle of Chatham Rock Phosphate, the company behind the phosphate-mining application pending in New Zealand.

Here and elsewhere, however, environmental battle lines are now being drawn. In June, a New Zealand court, citing environmental concerns, riled the mining industry by rejecting a proposed plan for an iron sands mine about 15 miles off the coast of the country’s North Island. The company behind the proposed mine, Trans-Tasman Resources, says it has spent over seven years and more than \$50 million studying the potential impacts. An appeals hearing is scheduled for next March. Meanwhile, the New Zealand advocacy group Kiwis Against Seabed Mining has argued that the mines would pose risks to iconic mammals — including blue whales and Maui’s dolphins — that outweigh any potential economic benefits. Castle, Chatham Rock Phosphate’s project director, said the environmental impacts on the seabed would be far less than those that fishing trawlers regularly inflict. But Les Watling, a biology professor at the University of Hawaii at Manoa, argued that sediment plumes from the phosphate mine could stress or kill an entire species of local coral, *Goniocorella dumosa*, leading to wider impacts because the coral’s branches are a habitat for smaller organisms. And Liz Sooten, a zoologist at New Zealand’s Otago University, said the sounds from seabed mining in that area could damage or destroy the hearing of blue whales, causing them to flee and perhaps even beach themselves.

Ultimately, the exact impacts of deep-sea mining in New Zealand or beyond won’t be entirely clear until the mines actually open, said Phil Weaver, a geologist and the coordinator of a three-year project called Managing Impacts of Deep Sea Resource Exploitation, which launched in 2013 with a \$11.4 million grant from the European Commission. “We need to put in place some criteria and protocols which will at least try to control those impacts based on available information.” In March, the ISA began soliciting public comments for its first-ever Mineral Exploitation Code. A voluntary environmental code drafted by the International Marine Minerals Society in 2001 will inform the new ISA document, according to Hein, the society’s president. David Billett of Britain’s National Oceanography Centre, who sits on the ISA’s legal and technical commission, said environmental matters are “regularly raised” at the committee’s meetings, and that the ISA has strict guidelines for the sort of ecological data that prospective miners must collect along seabeds. Still, individual countries are free to choose their own regulatory approaches to seabed mining, and permits in the South Pacific have already been issued in waters that cover an area the size of Iran, according to the Deep Sea Mining Campaign, an international coalition of non-profit groups.

A 2010 study in the journal *Marine Policy* said the “absence of a clearly defined regulatory regime” in international waters was encouraging seabed prospectors to pursue projects in territorial waters, where legal risks were smaller. It named Tonga and its neighbor Papua New Guinea as two countries that would struggle to balance economic development against the need to protect marine ecosystems. Environmental groups are watching carefully as the Nautilus Minerals project gathers speed in Papua New Guinea. The company says its mine will not contaminate coral or fisheries, and Jonathan Copley, a prominent marine ecologist at Britain’s University of Southampton, has said that the project’s design appears to be environmentally sensitive. Yet Nautilus and other international firms have other mining applications scattered across the South Pacific, and Van Dover of Duke University said scientists’ biggest concern is the cumulative impacts of multiple mines opening in the same area. “A single mining event — at the scale of a single hydrothermal vent field — would be no worse than the most extreme natural disturbance,” Van Dover said in an email message. “But multiple mining events in a region in a short period of time — i.e. within a decade — would be unwise without good environmental knowledge of the ability of the system to recover.”

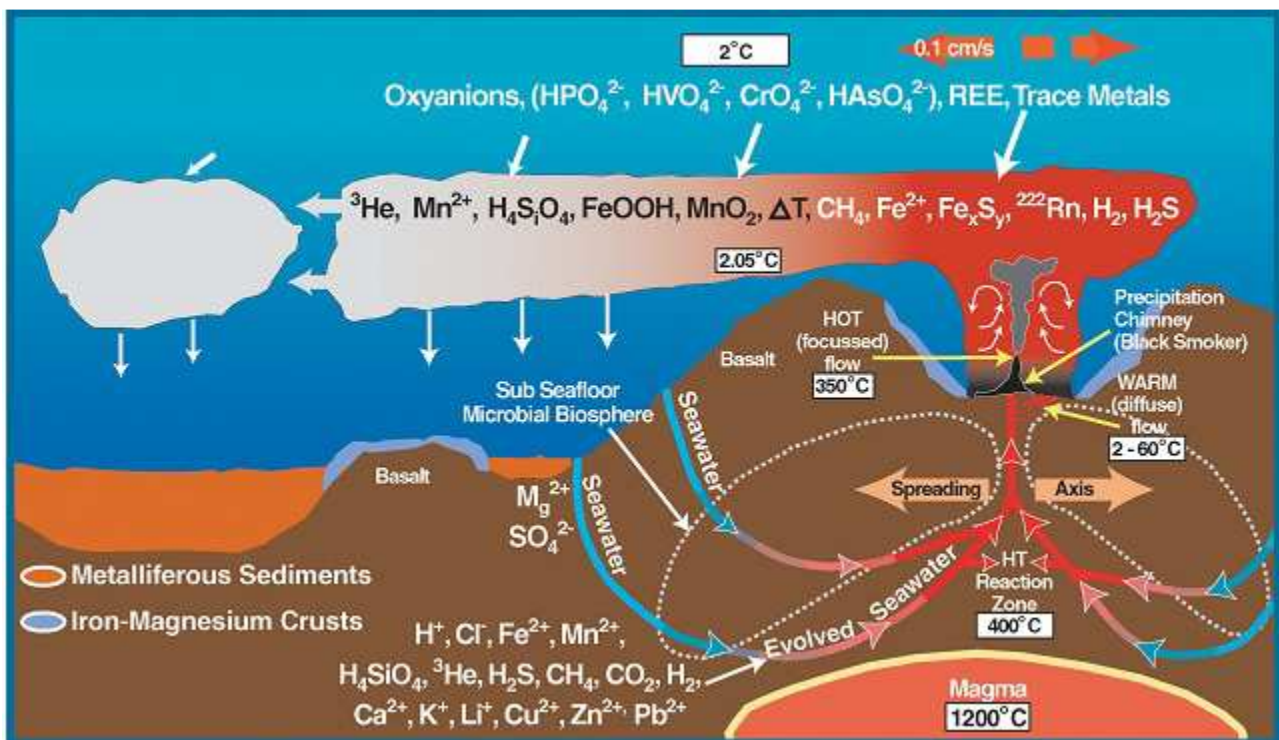
## Nautilus satisfies intellectual property condition precedent

Post-Courier, October 24, 2014

Nautilus Minerals Inc. (Nautilus), the operator of the world's first seabed operator in Solwara 1 Project in the Bismarck Sea this week announced that the Company has satisfied the first of the two conditions precedent to its agreement with the nominee of the Independent State of Papua New Guinea to secure certain intellectual property rights. The company said in a statement that in May 2014, the company announced that following the State nominee, Eda Kopa (Solwara) Limited, paying US\$113 million (K284.6 million) into escrow for its 15% interest in the Solwara 1 Project up to first production, Nautilus was to secure for the State's nominee certain intellectual property rights and the charter of a Production Support Vessel in order for the escrowed funds to be released. Nautilus chief executive officer Mike Johnston commented: "Nautilus is pleased it has satisfied the first of the conditions precedent by securing the intellectual property rights required by the state and is now one step closer to securing the release of the escrowed funds. "Discussions remain on track with potential vessel partners to obtain a suitable vessel arrangement within the time frame required under the agreement, which will see the funds released from escrow."

## Vanuatu Prepares for Deep Sea Mining

By MarEx, The Maritime Executive, October 23, 2014



The Republic of Vanuatu has commenced a national consultation program on a draft Deep Sea Minerals Policy.

Past studies in Vanuatu's waters have revealed the presence of massive seafloor sulfide deposits within its exclusive economic zone, which could contain significant quantities of copper, gold, zinc, silver and other commercially viable minerals. The presence of such minerals could present a potential economic opportunity for Vanuatu if deep sea mining activity is properly conducted and balanced with appropriate environmental, legal and financial management. The draft Policy sets out Vanuatu's vision and strategic goals in relation to its deep sea minerals, and will form the basis for future drafting of laws in line with the policy. The draft policy has been prepared by the Ministry of Lands with advice from the Deep Sea Minerals (DSM) Project: a partnership between the Secretariat of the Pacific Community (SPC) and the European Union (EU). The DSM Project works to assist

15 Pacific Island countries to improve governance and management of their deep-sea mineral resources, including through the development of national policies and laws.

The DSM Project places great emphasis on the importance of a consultative approach, and encourages all governments to involve concerned citizens in decisions that may affect natural resources and the environment. The DSM Project is providing technical and financial support to the government of Vanuatu to conduct this important consultation exercise and will continue to work with Vanuatu's multi-stakeholder National Offshore Minerals Committee, which includes the Vanuatu Association of Non-Governmental Organisations (VANGO), as they progress this work. While PNG made news for being the first country in the world to issue a licence for deep-sea mining, more and more Pacific Islands countries are getting approaches from companies interested in exploration and exploitation of deep-sea minerals. The questions that arise are—what are the risks? What are the benefits? What do Pacific Islanders need to know to make the right decisions here?

Many islanders have learnt, the hard way, the consequences of not knowing what they were getting into with mining and unsustainable development—phosphate mining on Nauru perhaps being the most dramatic example of a mining boom...and then a bust. Is deep-sea mining different? Time is critical, says Dr Jimmie Rodgers, Director-General, Secretariat of the Pacific Community (SPC): “Is it urgent? Is it important now? Yes! Because multinationals are not going to wait to give Pacific Islands countries time to look at all the studies, environmental analysis, before they come in—they push in.” Over 300 exploration licences have been granted in Pacific Islands countries like Solomon Islands, Vanuatu and Tonga. In the Pacific, most of the mineral deposits considered profitable to mine are known as Seafloor Massive Sulfides (SMS). Some countries have manganese nodules and cobalt-rich crusts on the seafloor, mining of which are likely to have greater environmental impacts than SMS. For instance, nodules, small lumpy concretions that form over millions of years as metals from the seawater and seafloor sediments precipitate around a core, which may be a shark tooth or rock fragment. Nodules cover a significant area of the sea floor and contain minerals such as manganese, copper, nickel and cobalt.

Minerals are also found around hydrothermal vents—places where very hot fluid (around 400 degrees Celsius) that carries minerals comes into contact with cold sea water (around two degrees Celsius), resulting in the precipitation and deposition of minerals on the seafloor. The “chimneys” that form around the vents are the direct result of the accumulation of minerals on the seafloor over time. Companies are now chasing these natural phenomena in the Pacific Islands region and other parts of the world ocean. Deep-sea minerals have a use in everything from mobile phones to metal alloys, renewable energy technologies and batteries. Papua New Guinea's Nautilus minerals venture was halted in 2012 after disagreement over government's equity and benefits. Meanwhile, projects now go ahead in Sudan, Saudi Arabia, New Zealand and other countries. The companies and scientists are quick to point out the consequences of sea mining versus land mining are different—land mining can produce more than 99 percent waste and less than one percent ore. Waste materials when exposed for an extended period of time produce acid by the reaction of sulfide minerals with fresh water and oxygen, as well as liberated heavy metals that can pollute the environment.

In SMS mining, sulfide in waste materials cannot react with the alkaline seawater hence acid cannot form in the ocean. SMS due to the small size of the mineral rich deposits do not produce as much waste as land mining, or leakage of minerals into the environment. On the other hand, as deep-sea mining is new, some are skeptical of claims it will have minimal impact on the environment. As part of the work of SOPAC (the Applied Geoscience & Technology Division of SPC) which provides technical support and advice to Pacific Islands countries, the division has been assisting countries to improve technical capacity, community involvement and government management of deep sea mineral resources. One of the elements of the Pacific Deep-Sea Minerals Project, started in

2011 with funding from the European Union, is that it recommends national policies and laws before any mining takes place.

### **Seabed mining risk to New Zealand's unique marine life: scientist**

Xinhua, October 13, 2014

WELLINGTON, Oct. 13 (Xinhua) -- Seabed mining around New Zealand's volcanic exclusive economic zone (EEZ) areas could destroy unique underwater ecosystems and have profound effects on sea life, a leading marine biologist warned Monday. Professor Jonathan Gardner, of Wellington's Victoria University, said the active geological nature made parts of the EEZ, which totaled about 5.7 million square kilometers, of great interest for the mining of seabed minerals. One such area was the Kermadec Volcanic Arc, where breaks in the submarine crust of the Earth's surface allowed cold seawater to enter into the rock, where it was heated, Gardner said in a statement. The hot water, containing metals such as gold, copper, silver, zinc and rare earth elements, was forced out of the ground to form chimney-like hydrothermal vent systems, called seafloor massive sulphide deposits, which were potential sites of future mining activity. Associated with the deposits were well-developed and often unique biological communities that would be damaged or destroyed by mining.

"Initial assessments of global mineral wealth from the seafloor put the value of these resources well into the trillions of dollars. Increasing world demand for minerals, plus technological advances, have combined to make deep-sea mineral extraction a possibility right now," he said. Large areas had been licensed for prospecting as far back as 2002 and research, funded by the government and by industry, was identifying and characterizing the location and extent of mineral deposits. "Based on the size and economic potential of mineral deposits, the mining industry suggests that one in every 10, or perhaps one in every 20, seafloor massive sulphide deposits may be economically viable and therefore mineable," he said. "Because vent sites may act like 'stepping stones' for dispersal of animals along a ridge, it is crucially important to understand the impact of mining activity at each site. The loss of an individual site to mining activity may have profound consequences on the stepping stone model of connectivity among vent sites if animals cannot disperse beyond it." Further debate was needed in New Zealand so that informed decisions could be made about the balance between exploitation and conservation that the country wished to pursue, said Gardner.

### **EU continues to push experimental seabed mining in the Pacific**

PNG Mine Watch, October 13, 2014

#### **National Seabed Minerals Management Board launched in Marshall Islands Secretariat of The Pacific Community – SPC**

The Government of the Republic of the Marshall Islands (RMI) formed an Interim National Seabed Minerals Management Board (INSMB) on 2 October 2014. The board members, consisting of a small team of government officers and non-governmental representatives, are tasked by Cabinet to develop national policy and law for the appropriate governance of the nation's deep sea resources. The Board will receive financial support and technical assistance from the Deep Sea Minerals (DSM) Project: a partnership between the Secretariat of the Pacific Community (SPC) and the European Union (EU). Old tales of treasure at the bottom of the ocean did not sound so fanciful in Majuro two weeks ago, when INSMB held its inaugural meeting to discuss the precious metals known to exist in the nation's deep seabed.

INSMB Chairperson Rebecca Lorennij (Secretary for the Ministry of Resources and Development) thanked those at the meeting: 'The RMI government and its people would like to thank SPC and the EU through the SPC–EU DSM Project for the ongoing support provided during the past few years.

The INSMB will now progress further with the national policy on deep seabed mining and the Seabed Management Bill before approval by the RMI government, a prerequisite to establish responsible governance and management of these resources.’ ‘I am delighted that the government of the Republic of the Marshall Islands, in partnership with the SPC–EU DSM Project, has established an Interim National Seabed Minerals Management Board. This is an important step for RMI. The right governance structure for deep sea mining needs to be in place before any exploration or extraction starts.

Credible policies and actions that safeguard the socio-economic and environmental interests of its current and future generations must be formulated and adhered to. Meaningful participatory mechanisms whereby citizens, civil society, private sector and the media can have a role in the development and monitoring of deep sea mining policies will be critical. Respecting people’s views is important on such a complex subject as deep sea mining,’ said Mr Andrew Jacobs, Head of Delegation of the EU for the Pacific. Deep seabed mining has not yet occurred anywhere in the world, but Nautilus Minerals Inc., a Canadian-listed company operating under licence in Papua New Guinea’s waters, is likely to commence mining within the next few years. Other companies are exploring seabed sites across the Pacific, and China, Russia and Japan have interest in international waters just outside of Marshall Islands’ maritime jurisdiction.

One reason for this commercial interest in the deep seabed is the pursuit of alternative sources of ‘rare earth elements’, essential components for high-tech applications, and green technology – such as wind turbines and solar panels – that are not readily available on land. Past studies in Marshall Islands’ waters reveal the presence of ‘cobalt-rich crusts’: rocky deposits that gradually built up over millions of years on the flanks of subsea mountains. These crusts are thought to contain in-demand metals such as cobalt, nickel, copper and platinum – and rare earth elements. The methods to extract the crusts from the seafloor have not yet been developed. Underwater mining at thousand-metre depths is not only a technological challenge, but also raises general environment concerns. Deep-sea environments are some of the least explored territory on the planet. States have made international commitments to protect and preserve the ocean, and conserve its biodiversity.

Accordingly, any deep-sea mining activity will need to balance the interest in economic gains with environmental sustainability. SPC–EU DSM Project Legal Advisors Hannah Lily and Marie Bourrel, present at the meeting, congratulated the Board Chairperson Rebecca Lorennij and other board members for their thoughtful discussions. The SPC–EU DSM Project worked with the Marshall Islands Attorney General’s Office to prepare the draft policy and law that will form the basis of the board’s discussions. The project will also provide support to the board to hold public information-sharing and consultation events over the coming months, to inform the Marshallese people about the issues and to hear their views about whether and how Marshall Islands should engage with the emerging deep-sea industry.

## **Seabed Mining In The Cook Islands Subject Of USP Presentation**

*Geography, mining methods, effects on marine life/environment discussed*

By Emmanuel Samoglou

RAROTONGA, Cook Islands (Cook Islands News, Oct. 2, 2014) – Environmental factors from any potential seabed mining activities in the Cook Islands were the focus of a presentation held at the University of the South Pacific last night. Gerald McCormack, Director of the Natural Heritage Trust, delivered his talk titled "Cook Islands nodules: Some environmental considerations", which included a visual presentation on seabed geography, possible mining methods, potential effects on marine life, and recommendations. With the environment his primary concern, McCormack said he wanted to focus specifically on the Cook Islands and its own unique ocean ecosystem – as opposed

to other potential seabed mining locations such as New Zealand or Papua New Guinea, which he says bear few similarities to the nation's situation.

While conducting research, he said he concentrated on the South Penrhyn Basin – an area he describes as " ... the most dense area of nodules in the world" - located north of Aitutaki, east of Suwarrow, and south of Penrhyn. Assuming an annual harvest of one million dry tonnes per year – enough nodules to cover an area the size of the surface of Rarotonga – McCormack said one particular area within the South Penrhyn Basin contains enough material to keep miners busy for at least 100 years. The next densest area in the zone has enough nodules for a further 80 years of mining. "I really want people to understand how massive this operation is," he said. McCormack said the nodules are resting on the ocean flooring, which would remove the requirement to dig. Despite their convenient location, he is convinced that mining activity would harm, even kill, all the animals that live in the cold, dark confines of the ocean floor – a desolate landscape five kilometres below the water's surface. 'Benthic Macrofauna' is the term used to describe some of the animals found at those depths. They consist of roughly nine different species and range in size from 0.3 mm to 4 cm long. McCormack said it is likely these animals will get run over or sucked up by mining machinery.

Apart from these creatures, a lack of nutrients creates an undersea environment that contains little life, he said. He quotes a German study which described the zone as "impoverished", "not very diverse", and with a low density of animals. "There is very little biodiversity down there," he said. "Nevertheless, we should preserve it." Also of concern are possible effects on the country's migratory whales. McCormack said steps need to be taken to ensure sound from mining activities will not interfere with whales and their unique communication systems. To protect the South Penrhyn Basin's marine life, he proposes the adoption of an "ecosystem approach", which entails the establishment of a biodiversity protection area (BPA) prior to the commencement of any mining. McCormack said the protective area should be located "upstream" from mining activities, and kept "pristine".

The establishment of such a zone would require further data on the direction and speed of the ocean current at the depth of the sea floor, and a survey of marine life would need to be taken by any company licensed to undertake mining activities. The purpose of the BPA would be to have a prototype area, with hopes that the mined regions could revert to how they appeared prior to the harvesting of any nodules – and without any reduction in biodiversity. Also prior to the beginning of mining, McCormack said stakeholders should agree to a set of practices and methods, such as the "Sustainable Seabed Mining" guidelines established by England's University of Southampton. Seabed mining should be a "totally ecologically clean operation," said McCormack. "My presentation is to show Cook Islanders how this can be done properly."

### **Pacific People United Against Seabed Mining: UN Told**

*Solomon Island doctor calls for moratorium until regulations in place*

By Daniel Namosuaia

HONIARA, Solomon Islands (Solomon Star, Sept. 30, 2014) – Pacific Indigenous peoples have voiced their united stand against any proposed seabed mining. Solomon Islands Dr Samson Viulu who spoke on behalf of the Pacific indigenous peoples made it clear before world leaders during the UN General Assembly in New York. He said its important to halt any plans to carryout seabed mining in the pacific. Dr Viulu said inhabitants of the Pacific treat and relies on their marine environment as the most important resource supporting their livelihood. "The people of the Pacific seeks to obtain a moratorium against any seabed mining activities in the Pacific until such time that national governments establish relevant institutional, proper regulatory, legal, monitoring, enforcement and



fiscal frameworks involving indigenous peoples," Dr Viulu said. He stressed that national governments must establish proper frameworks in a meaningful, participatory manner throughout the process including but not limited to maximum benefit sharing mechanisms and compensations.

"Since the marine environment is source of islanders' livelihood, the Pacific urges full commitment from all UN member states to achieve the goals outlined in the outcome document by the Open Working Group on Sustainable Development Goals." He urged the full participation of indigenous people in the implementation process of these goals. Dr Viulu made special mention of the unsustainable practice of overfishing and request developed states to take total responsibility to manage the demand and ensure indigenous peoples have access to fisheries and marine food sources now and in future (sustainable fisheries). He said these issues are closely linked with Climate Change (CC). "Pacific indigenous people are gravely concerned with the lack of any tangible progress made on climate change mitigation by member states since the Kyoto protocol expired in 2012," Dr Viulu said. He pointed out that there are real sad stories of internally displaced people due to climate change.

### **Miner's seabed study 'flawed'**

The National, 24th of September, 2014

THE environmental impact statement (EIS) released by seabed miner Nautilus Minerals has errors and does not consider contaminants carried directly to land by water, a scientist claims. Dr John Luick, an oceanographer, said in his report on physical oceanographic impact assessment in July, that: "The primary risk to the local people was from shoreward movement of surface waters, which would carry contaminants with them. "At typical ocean speeds, the surface currents, if they were shoreward, would carry contaminants to the coast in a day or two. "The EIS contained no information, either from data or from global models, to enable anyone to assess the risk to reassure the local people." Luick claimed that the Nautilus EIS had:

- No presentation of currents in the upper 250 metres of the sea despite a major surface operation involving transfer of material from the processing ship to barges;
- No firm basis for assessing the risk of pollution of the seafloor, plants and animals and the islanders near New Ireland;
- No presentation of the surface wave climate; and
- Inadequate analysis of the oceanographic data
- Model results not supported by accompanying sensitivity studies.

Luick says he has had 20 years in projects-related to ocean monitoring, tidal analysis and hydrodynamic modelling.

### **Deep sea gold rush is a 'game-changer', says Templeton's Land**

By Atholl Simpson, citywire global, 19 September 2014

After years of negotiations and false starts the controversial deep sea mining initiative is close to a breakthrough after a deal was struck with Papua New Guinea. Canadian company Nautilus Minerals has entered a partnership with the country to start digging up areas of the seabed off its shoreline at a depth of 1,500 metres to extract ores of copper, gold and other precious metals. Mining expert Stephen Land of Franklin Templeton says the advances being made in this industry will prove significant for precious metal supply and for mining investors. 'It has the potential for real exploration and development upside compared with onshore areas where everything has been picked over fairly well,' says Land, who runs the Franklin Gold & Precious Metals fund alongside Fred Fromm. 'It's

not to say there won't be new onshore discoveries but you are unlikely to find a whole systematic game-changer like this,' Land says.

### **Rising from the abyss**

The United Nations' International Seabed Authority has now granted 30 exploration licences, most recently to state-owned and private companies from the UK, Germany, Brazil, Singapore and Russia, opening massive new regions of the ocean floor to potential development. In this race Nautilus Minerals, a company Land has been invested in for several years, is the closest to begin excavating. 'They are still a couple of years away from production but the advantage that these deep deposits have is that the grade is significantly higher. There is a lot more copper and gold per ton of rock, upwards of 10 or 20 times higher, than what we are chasing onshore at this point.'

'The other fascinating part is that we are operating often at over 2,000m of water depth and many of the onshore gold mines are working at 2,000m deep in the ground.' The challenges of using equipment at such depths are relatively similar for both types of operation, he says, and the oil and gas industry has already pioneered many techniques which the deep sea miners are using, such as remotely operated underwater vehicles (ROVs). 'But the real advantage to deep sea mining is you can come in, mine a relatively small area, get the best of the highest payback and move to another location. Onshore you have a deep shaft that is pretty much stuck there and you can only target the mineralisation around that shaft.'

### **Environmental impact**

The major stumbling block for the development of deep sea mining over the past few decades has been its undisputed environmental impact. Numerous studies have been conducted to better understand the role the deep sea plays in our global environment and how mining could disrupt this. A recent report published in academic journal *Biogeosciences* on the importance of the deep ocean entitled 'Ecosystem function and services provided by the deep sea', says mining is a major threat to this fragile environment. The report stated that large mining machines may directly impact large swathes of the sea floor, including hydrothermal vents essential to deep sea life, and send up a sediment plume that could potentially affect an even larger area. Land is aware of the controversy surrounding these new projects but says companies like Nautilus Minerals have been working alongside environmental groups to limit their impact as much as possible. 'They are operating under a microscope but they have also done a good job of inviting the environmental groups out on the exploration runs and there have been a lot of partnerships with them.'

'There certainly are some unknowns that you tackle when you move into an area like deep water mining, but the environmental impact is actually very shallow, you are really just touching the surface material on the ocean floor. 'When you compare it to the risks that are present in the oil and gas industry you could argue they are considerably less.' The California-based manager also said deep sea mining offers an interesting trade-off to onshore projects including open air mega pits. 'It is very costly to move a lot of material from those water depths so they are really just targeting the surface deposits. As a result the footprints of these deep sea mines are going to be very small, shallow pits within tightly constrained areas because the economics forces these companies to be very selective. 'This compares very favourably with where the mining companies are heading onshore in the next 20 years. They are excavating giant pits chasing after very low grade material, removing tons and tons of waste using lots of water, exposing rock that has strange mineralisation with the potential of it leaking out into surface water. Sub-sea mining as an alternative has some real appeal.'

## Maritimer Bergbau. Raubbau in der Tiefe?!

von Claudia Härterich, Netzwerk Arbeitskreis Rohstoffe Newsletter 6, 9. September 2014

Blue Atlantis, MIDAS, ROV Kiel 6000 – diese Begriffe, die klingen als seien sie einem Science Fiction Roman entnommen, sind die Schlagworte der deutschen und europäischen Pläne zur Förderung von mineralischen Rohstoffen auf dem Grund der Weltmeere. Bereits 2016 könnten diese Pläne Realität werden. Denn in diesem Jahr wird die *International Seabed Authority (ISA)*, die Verwalterin der Meeresböden der Tiefsee, erstmals darüber entscheiden, welche Staaten Förderlizenzen für den Rohstoffabbau in den internationalen Gewässern erhalten. Bis dahin hat sie noch viel zu tun, denn die gesetzlichen Rahmenbedingungen für den marinen Bergbau müssen erst noch geschaffen werden. Von Februar bis Mai 2014 führte die Behörde zu diesem Zweck eine Konsultation durch, bei der am Tiefseebergbau interessierte staatliche und privatwirtschaftliche Akteure dazu aufgefordert waren Stellungnahmen zur Frage der Ausgestaltung dieses rechtlichen Rahmens abzugeben.

Deutschland gehört zu den führenden Staaten bei der Jagd nach den Ressourcen aus der Tiefsee und bemüht sich schon seit mehreren Jahren darum, sich den Zugang zu diesen Rohstoffen zu sichern. Seit 2006 verfügt die Bundesrepublik über eine Lizenz zur Erkundung von Manganknollen in der *Clarion-Clipperton-Bruchzone* im Pazifik. Die Bundesagentur für *Geowissenschaften und Rohstoffe (BGR)* führt dort im Auftrag der Bundesregierung Explorationstätigkeiten durch. Mit dem Tauchroboter ROV Kiel 6000 werden die Manganknollenvorkommen am Meeresboden untersucht – vor allem in Hinblick auf ihre wirtschaftliche Nutzbarmachung. Seit 2011 ist die BGR zudem im Indischen Ozean aktiv, dort erforscht sie Metallsulfidvorkommen. Ende 2013 beantragte Deutschland bei der ISA für das betroffene Gebiet eine offizielle Explorationslizenz. Im Juli 2014 entschied die Behörde zugunsten des deutschen Antrags – sehr zur Freude des Koordinators der Bundesregierung für die Maritime Wirtschaft. Dieser erklärte anlässlich der erteilten Lizenz: "Für Deutschland ist der internationale Tiefseebergbau unter wirtschaftlichen Aspekten doppelt interessant: Erstens kann er zur Versorgungssicherheit Deutschlands mit Hochtechnologierohstoffen langfristig beitragen. Zweitens eröffnet er interessante Marktchancen für deutsche Hersteller von innovativer, umweltverträglicher Meerestechnologie." (BMWi 2014).

Die Vertreter/innen des maritimen Wirtschaftssektors sind die treibende Kraft hinter den Bestrebungen der Bundesregierung in diesem Bereich. Unter den Akteuren aus diesem Industriezweig nimmt die Gesellschaft für maritime Technik (GMT) eine zentrale Rolle ein. Sie vertritt die Interessen deutscher Unternehmen und Forschungseinrichtungen auf dem Gebiet der maritimen Technik gegenüber den politischen Entscheidungsträger/innen und setzt sich für eine politische Förderung der wirtschaftlichen Aktivitäten ihrer Mitglieder ein. Mit ihren Forderungen war sie bislang sehr erfolgreich. Im Jahr 2000 schuf die Bundesregierung das Amt des Koordinators für die maritime Wirtschaft, das beim Bundesministerium für Wirtschaft und Energie (BMWi) angesiedelt ist. Desse zentrale Aufgabe ist die Ausrichtung der alle zwei Jahre stattfindenden Nationalen Maritimen Konferenz der Bundesregierung. Dort diskutieren Vertreter/innen aus dem maritimen Wirtschaftssektor und Mitglieder der Bundes- und Landesbehörden die zukünftige Entwicklung und Ausgestaltung der maritimen Wirtschaft. Die dort von Seiten der Industrie an die Politik gestellt Forderungen wurden bisher zum allergrößten Teil von der Bundesregierung aufgenommen und umgesetzt.

Wichtige Weichen für die aktuellen Aktivitäten auf dem Gebiet des Tiefseebergbaus wurden bereits durch einen Bundestagsbeschluss aus dem Jahr 2002 gestellt, welcher vorsieht die weltweiten Märkte für Meerestechnik zu erschließen. Auf dieser Grundlage hat es sich die Bundesregierung seither zum Ziel gesetzt, den maritimen Wirtschaftssektor Deutschlands in seinem Vorhaben zu unterstützen sich zum internationalen Marktführer in diesem Bereich zu entwickeln. Dieses Bestreben der deutschen Politik mündete in dem 2011 veröffentlichten Nationalen Masterplan Maritime Technologien, der Deutschland als führenden Hochtechnologie-Standort für maritime Technologien im internationalen Wettbewerb etablieren möchte. Das Strategiepapier definiert die dafür notwendigen

Maßnahmen und bildet die Grundlage des weiteren politischen Vorgehens. Es identifiziert den Bereich der maritimen Technologien als einen Sektor, der durch Innovationen das deutsche Wirtschaftswachstum tragen kann und der hochwertige Arbeitsplätze in einem Zukunftsmarkt von großer strategischer Bedeutung schafft. Als zentrale Maßnahmen werden die Entwicklung eines Leuchtturmprojekts zu marinen mineralischen Rohstoffen, der Abschluss von bilateralen Kooperationen im Bereich mineralische Rohstoffe und der Aufbau einer Arbeitsgemeinschaft marine mineralische Rohstoffe (AMR) – bestehend aus den wichtigsten deutschen Akteuren aus Wirtschaft, Forschung und Verwaltung – definiert.

Die Verantwortung für die Gründung der Arbeitsgemeinschaft wird GMT, VDMA und BGR übergeben. Vor diesem Hintergrund erfolgte im April 2014 die Gründung der *DeepSea Mining Alliance* [1]. Der Verein soll als gemeinsame Plattform eine abgestimmte Interessenvertretung gegenüber Politik, Wirtschaft und Gesellschaft und ein effektives und konsortiales Auftreten in nationalen und internationalen Projekten unterstützen (DeepSea Mining Alliance 2014). Zu seinen wesentlichen Zielen gehören die Anbahnung von kommerziellen, technologischen und Forschungsprojekten sowie eine bessere Koordinierung aller nationalen und internationalen Aktivitäten für die Erkundung und Gewinnung mariner mineralischer Rohstoffe (DeepSea Mining Alliance 2014). Mit der Schaffung der *DeepSea Mining Alliance* erreicht das Vorhaben, der deutschen maritimen Wirtschaft einen Spitzenplatz im internationalen Wettbewerb zu ermöglichen einen neuen Grad der Koordination.

Das BMWi veranstaltete seit 2011 mehrere Workshops und Strategietagungen für Vertreter/innen des maritimen Wirtschaftssektors, unter anderem im Januar 2014 zum Thema “Potenziale des Tiefseebergbaus“. Dort kamen die Teilnehmer/innen darin überein, dass Deutschland nicht im Alleingang den Tiefseebergbau vorantreiben könne, sondern als Teil eines europäischen oder internationalen Konsortiums agieren müsse. Die Wirtschaftsvertreter/innen forderten, dass mit aktiver politischer Flankierung und massiver finanzieller Unterstützung ein nationales Pilotprojekt im Kontext eines internationalen Gesamtprojektes durchgeführt werden solle und dass gezieltes Marketing eingesetzt werden müsse, um der Skepsis der Bevölkerung gegenüber dem Tiefseebergbau zu begegnen (Projektträger Jülich 2014). Außerdem ist die Einrichtung eines ressort-übergreifenden Förderschwerpunktes für marine, mineralische Rohstoffe angedacht, an dem BMWi, BMBF und BMU beteiligt sein sollen.

Während sich die deutschen Unternehmen mit inhaltlich und finanzieller Unterstützung von BMWi und BMBF auf die Weiterentwicklung der Ausrüstung und Technologien für den Tiefseebergbau fokussieren, erklärte die Bundesregierung im Juni 2014 in ihrer Antwort auf eine kleine Anfrage der Linken, dass ein deutscher Tiefseebergbau derzeit nicht geplant sei. Es gäbe keine Bestrebungen, den Aufbau eines deutschen Bergbauunternehmens zur Erschließung von Tiefseeressourcen finanziell oder strukturell zu unterstützen (Bundesregierung 2014: 8). Auf die Frage, welche Bedeutung die Bundesregierung der Förderung von Tiefseeressourcen für die europäische Rohstoffpolitik mittel- und langfristig beimesse, antwortete diese, dass marine mineralische Rohstoffe als Ergänzung zu landgebundenen Vorkommen zu sehen seien, die zu einer Diversifizierung des Rohstoffbezugs und somit zur Sicherung der Rohstoffversorgung beitragen können (Bundesregierung 2014: 3). Während sich die Politik in der Öffentlichkeit eher vorsichtig zum Thema Tiefseebergbau äußert, treiben die GMT und andere Vertreter/innen des deutschen maritimen Wirtschaftssektors auch auf europäischer Ebene ihre Pläne weiter voran. Dort stoßen ihre Anliegen ebenfalls auf offene Ohren. Bereits 2007 wies das EU Generaldirektorat für Forschung und Innovationen auf die zukünftige Bedeutung von mineralischen Rohstoffen aus dem Meer hin und empfahl die Entwicklung einer europäischen Strategie für den Tiefseebergbau (Europäische Kommission 2007).

Im Herbst 2012 veröffentlichte die Kommission ihr Strategiepapier *Blue Growth - opportunities for marine and maritime sustainable growth*. Es bildet die Grundlage ihrer Initiative zur Erschließung

der ungenutzten Potenziale der Meere mit dem Ziel einer Stärkung des Wirtschaftswachstums und der europäischen Wettbewerbsfähigkeit. Marine mineralische Rohstoffe spielen in der Blue Growth Strategie eine wichtige Rolle. Dabei steht die Frage im Mittelpunkt, wie die EU die europäischen Unternehmen im internationalen Wettbewerb unterstützen kann um sicherzustellen, dass diese erfolgreich an den damit verbundenen ökonomischen Aktivitäten partizipieren. Als dafür notwendig wird der Zugang der Unternehmen zu einer sicheren Finanzierung identifiziert sowie das Ergreifen politischer Maßnahmen, um zu verhindern, dass die europäischen Firmen von anderen Wettbewerbern aus dem Markt gedrängt werden. Als weitere unterstützende Maßnahme wird vorgeschlagen, auf europäischer Ebene Forschungsvorhaben in dem Bereich Tiefseebergbau anzustoßen und zu fördern (Europäische Kommission 2012: 10). Ende 2013 begann mit *MIDAS* ein solches Forschungsprojekt. In dem 2016 endenden Projektzeitraum untersuchen Wissenschaftler/innen die Auswirkungen der Extraktion von mineralischen und energetischen Rohstoffen aus der Tiefsee. Dabei fokussieren sie nicht nur auf Manganknollen, Massivsulfide und kobaltreichen Eisenmangan-krusten, sondern ebenfalls auf mögliche Potenziale der Gewinnung von Seltenerdelementen aus dem Meer.

Darüber hinaus beginnt im Jahr 2015 das durch das BMBF angeregte dreijährige JPIOcean-Forschungsprojekt „*Ecological aspects of deep-sea mining*“ (Bundesregierung 2014: 10). Außerdem hat eine Gruppe bestehend aus 45 Unternehmen und Forschungsinstituten – 17 von ihnen aus Deutschland - unter der Führung der Gesellschaft für Maritime Technik (GMT) im Rahmen der Europäischen Innovationspartnerschaft Rohstoffe das Projekt *Blue Atlantis* eingebracht. Es sieht die Schaffung der weltweit ersten Tiefseebergbau-Ver-suchsanlage vor, die in den portugiesischen Hoheitsgewässern im Atlantik – nahe der Inselgruppe der Azoren - entstehen soll. Dort liegen vier bekannte Gebiete in denen es größere Ansammlungen sogenannter Schwarzer Raucher – die Quelle der begehrten Massivsulfide – gibt. Laut Projektbeschreibung gehen die Unternehmen davon aus, dort darüber hinaus auch Manganknollen und Kobaltkrusten vorzufinden. Neben der Konstruktion des Unterwassertestbergwerks soll im Rahmen von *Blue Atlantis* eine Studie zu den Voraussetzungen eines großflächig angelegten Tiefseebergbaus entstehen. Das erklärte Gesamtziel ist es, das europäische Know-how für die gesamte Wertschöpfungskette im Bereich Tiefseebergbau zu festigen. Projektbeginn ist 2015.

Parallel zu diesen bereits sehr stark auf eine wirtschaftliche Verwertbarkeit ausgerichteten Aktivitäten, hielt die EU Kommission im Zeitraum März bis Juni 2014 eine öffentliche Konsultation zum Thema Meeresbodenbergbau ab. Dort konnten sich Behörden, Bürger/innen, Unternehmen und zivilgesellschaftliche Organisationen aus den Mitgliedsstaaten zu Fragen der Rohstoffgewinnung in der Tiefsee und den nationalen Küstengewässern äußern. Diese Beiträge sollen – so die federführende Generaldirektion Maritime Angelegenheiten und Fischerei – die Kommission bei der Entwicklung ihrer Position zu diesem Thema unterstützen. Angesichts der in der Konsultation gestellten Fragen sowie der oben beschriebenen Aktivitäten, darf dieses Argument jedoch bezweifelt werden. Es entsteht vielmehr der Eindruck, dass sich bereits eine klare Positionierung zugunsten des Tiefseebergbaus herauskristallisiert hat. So ist es den Teilnehmer/innen der Konsultation zwar möglich, Bergbauaktivitäten im Meer grundsätzlich abzulehnen, der Hauptteil der Fragen zielt jedoch darauf ab zu klären, welche Hindernisse der Erschließung des Potenzials des Tiefseebergbaus im Wege stehen und wie diese beseitigt werden können.

Neben dem Blickwinkel auf die Chancen, die sich der deutschen maritimen Wirtschaft durch den Tiefseebergbau bieten, werden von Seiten der verarbeitenden Industrie und der für Rohstoffpolitik zuständigen staatlichen Behörden überwiegend positive Erwartungen an die Nutzbarmachung der Ressourcen auf dem Meeresgrund geknüpft. Aus ihrer Perspektive stellt der Rohstoffabbau im Meer eine mögliche Lösung für die von der Bundesregierung gewünschte Verringerung der deutschen Importabhängigkeit im Bereich zahlreicher mineralischer Rohstoffe dar. In ihrer 2010 veröffentlichten Rohstoffstrategie identifiziert sie die Diversifizierung der Rohstoffquellen für die deutsche

Wirtschaft als eine zentrale Herausforderung. Sie benennt in diesem Zusammenhang explizit die Rohstoffgewinnung in Tiefseeregionen als eine Maßnahme um dieses Ziel zu erreichen. Letzten Endes geht es in den Strategiepapier darum, sich die größtmögliche Kontrolle über den globalen Abbau der Rohstoffe zu sichern. Diese Sichtweise auf den Tiefseebergbau wird von einigen Forscher/innen geteilt und spiegelt sich in einem Zitat eines Mitarbeiters des GEOMAR – einer der bedeutendsten deutschen Einrichtungen auf dem Gebiet der Ozeanforschung – wider. Dieser beantwortete in einem im April 2014 im Spiegel veröffentlichten Interview die Frage nach den Risiken des Tiefseebergbaus mit der Gegenfrage: "Was ist besser? Erze aus Bürgerkriegsgebieten zu importieren oder die Rohstoffe selbst aus der Tiefsee zu fördern, mit modernster Technik und hohen Umweltstandards?"

Die mit dem Rohstoffabbau an Land verbundenen negativen Auswirkungen auf Mensch und Umwelt als Rechtfertigung für eine zukünftige Erschließung und Förderung mineralischer Rohstoffe aus der Tiefsee heranzuziehen, ist jedoch höchst fragwürdig. Die Hintergrundannahmen dieser Argumentation greifen zu kurz, um der Realität der weltweiten Gewinnung mineralischer Rohstoffe und ihrer Folgen gerecht zu werden. Zwar ist der Hinweis auf die Schäden, die weltweit – nicht nur in Bürgerkriegsgebieten – durch Bergbaukonzerne verursacht werden berechtigt, doch die hier vorgenommene Gegenüberstellung suggeriert fälschlicher Weise, alternativ dazu mineralische Rohstoffe aus der Tiefsee zu beziehen, würde die seit vielen Jahren bekannten und dennoch bislang nicht überwundenen Probleme lösen oder zumindest zukünftig vermeiden.

Anstatt sich mit diesen bereits an Land vorhandenen negativen Auswirkungen der Rohstoffförderung und den damit verbundenen Konflikten auseinanderzusetzen und diese in den Griff zu bekommen, wird versucht, sich neuen Gebieten zuzuwenden. Dies gleicht einer Flucht aus der Verantwortung und wirft die Frage auf, ob es sich dabei um den Versuch handelt, den Weg des kleinsten Widerstands zu gehen, indem man in schwer kontrollierbare und überschaubare Gegenden ausweicht anstatt sich einer Diskussion über die Grundproblematiken des hohen Rohstoffkonsums und des Abbaus mineralischer Rohstoffe zu stellen. Vertreter/innen der Zivilgesellschaft stehen dieser Vorgehensweise kritisch gegenüber. So forderte Francisco Marí von Brot für die Welt unlängst: "Die Gefahr, dass auf See dieselben Fehler wiederholt werden, die an Land zu Umwelt-, Klima- und Entwicklungskrise geführt haben, muss dringend abgewendet werden. Dies gilt insbesondere mit Blick auf die globale und entwicklungspolitische Dimension der Meerespolitik."

Im Mai 2014 veranstaltete ein breites Bündnis aus umwelt- und entwicklungspolitischen Organisationen in Bremen eine Konferenz zu den aktuellen Entwicklungen in der Meerespolitik. Dort wurde ein von 22 zivilgesellschaftlichen Gruppen unterzeichnetes Positionspapier verabschiedet, das ein internationales Moratorium für den Abbau von Erzen aus der Tiefsee fordert. Ein Sprecher des NABU sagte in diesem Zusammenhang, er halte den wirtschaftlichen Ausbau des Sektors Meer unter Anbetracht des derzeitigen schlechten Umweltzustands der Meere für äußerst fragwürdig: „Die EU-Initiativen den Tiefseebergbau voran zu treiben sind auf Grund mangelnden Wissens über die Tiefsee nicht mit dem Vorsorgeprinzip zu vereinbaren und somit bis auf weiteres zu stoppen.“ Greenpeace hatte bereits 2013 ein internationales Moratorium für den Rohstoffabbau in der Tiefsee gefordert und den Staaten vorgeworfen, die langfristige Nutzbarkeit der Meere kurzfristigen finanziellen Interessen zu opfern (Greenpeace 2013: 16). Unterstützung erhielten diese Forderungen kürzlich auch von Mining Watch Kanada und der australischen Deep Sea Mining Campaign (siehe Counterview 2014).

Denn auch beim Tiefseebergbau kann nicht ausgeschlossen werden, dass Menschen in Mitleidenschaft gezogen werden, sei es direkt durch Umweltschäden, die bei der Rohstoffförderung in den Küstengewässern die vom Meer lebende Bevölkerung beeinträchtigen, oder indirekt durch vergiftete Meeresflora und –fauna, die ihren Weg in die Nahrungskette der Menschen findet. Die Risiken, die mit einem potenziellen Abbau von Rohstoffen in großen Wassertiefen einhergehen sind im-

mens, wie eine Gruppe von Forscher/innen aus Europa, Nordamerika und Australien in einem im Mai 2014 veröffentlichten Artikel in der Zeitschrift *Science* betont. Die Wissenschaftler/innen legen dar, dass die Wahrscheinlichkeit eines Unfalls durch den die Umwelt geschädigt wird, mit zunehmender Wassertiefe deutlich zunimmt. Welche Schwierigkeiten damit verbunden sind, angerichtete Schäden einzudämmen und diese unter Kontrolle zu bekommen, zeigt unter anderem die *Deepwater Horizon* Katastrophe, die sich 2010 im Golf von Mexico ereignete. Damals dauerte es mehrere Monate, bis es dem britischen Konzern BP gelungen war, ein in 1500m Wassertiefe gelegenes Bohrloch zu schließen und so den Ölausfluss ins Meer zu stoppen. Es stellt sich daher die Frage, ob die interessierten Konzerne in der Lage sind, den Risiken bei der Ernte von Manganknollen, dem Abbau von Kobaltkrusten oder von Massivsulfiden in ähnlichen oder noch größeren Wassertiefen in angemessener Weise Rechnung zu tragen. Dass sich die Lebensräume am Meeresboden von dem Eingriff durch das Ernten von Manganknollen nur sehr langsam erholen zeigt eine Studie, die im *World Ocean Review 2014* beschrieben wird. So wurde im *DISCOL* Projekt eine mehrere Quadratkilometer großer Bereich des Meeresbodens im Pazifik mit Versuchsgeräten umgepflügt und über mehrere Jahre hinweg immer wieder besucht. Dabei zeigte sich, dass es sieben Jahre dauerte, bis sich in den durchpflügten Gebieten wieder die gleiche Dichte an Bodenlebewesen eingestellt hatte wie zuvor. Einige Arten bleiben jedoch verschwunden (World Ocean Review 2014: 73). Welche Auswirkungen ein massiver und großflächiger Abbau von Massivsulfiden und Kobaltkrusten auf die Meeresflora und -fauna hat, ist bis heute unklar. Dennoch lassen Staaten und Konzerne nicht von ihrem Vorhaben ab, die Tiefsee für sich zu erobern.

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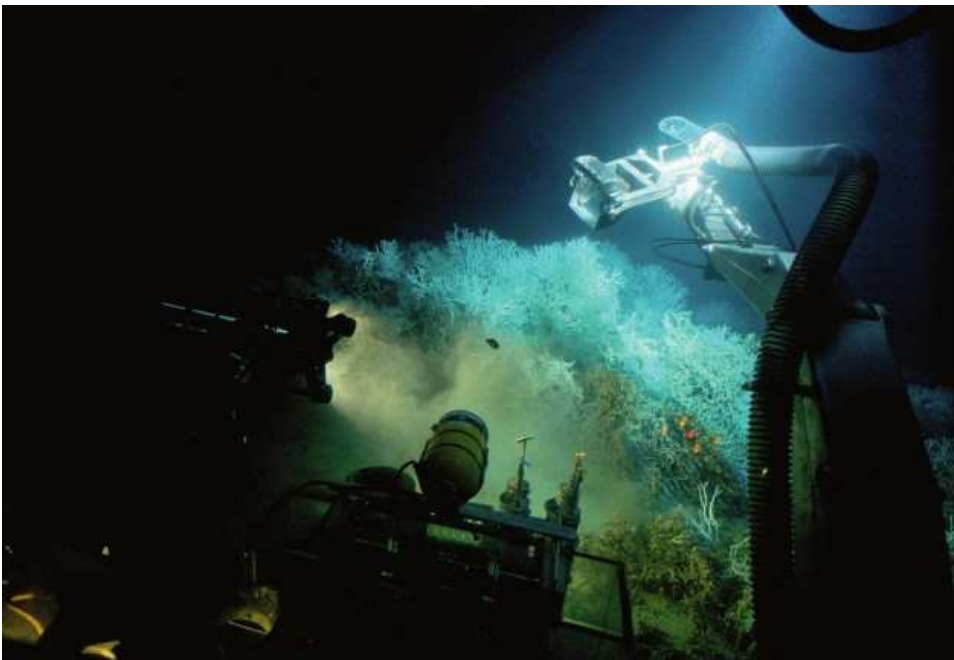
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[1] Zu seinen 17 Gründungsmitgliedern gehören BAUER Maschinen, Siem Offshore Contractors, Wärtsilä, die Reederei Harren & Partner, die IMS Ingenieurgesellschaft, die Klassifikationsgesellschaften DNV GL und Lloyd's Register, die Meerestechnikunternehmen EvoLogics, MBT, Hydromod Service und Develogic sowie die RWTH Aachen und die TU Clausthal-Zellerfeld.

## DAS LETZTE TERRAIN

Vieles deutet darauf hin, dass 2016 der Bergbau in der Tiefsee beginnt. Damit wird die Verfassung der Meere, das grösste Regelwerk der Menschheit, auf die Probe gestellt. Kriege drohen.

Von Anja Jardine, Neue Züricher Zeitung Folio, September 2014



Vorbei mit der Ruhe: Millionen unbekannter Lebewesen droht die Zerstörung. © arthowardphotography.com

Sein Ingenieur nennt ihn liebevoll Beasty. Und tatsächlich ist Beasty keine ordinäre Gesteinsfräse, sondern ein Roboter mit Spezialauftrag. 15 Meter lang, 4 Meter breit und gefertigt aus hochfestem Stahl, um eine 1700 Meter hohe Wassersäule auf seinen Schultern zu tragen, soll sich Beasty an untermeerischem Gestein zu schaffen machen. Hier herrschen ewige Nacht, Kälte und extremer Druck. Noch hockt Beasty in der Halle von SMD in Newcastle, doch glaubt man den Pressemeldungen des Auftraggebers Nautilus Minerals, nicht mehr lange. Seit ein paar Monaten hält das kanadische Unternehmen die Öffentlichkeit so minutiös über die Montage seiner drei Raupenfahrzeuge auf dem laufenden, als handle es sich um die Fertigstellung von Apollo 11 vor dem Mondflug. Bald werde es losgehen, so CEO Mike Johnston. Dann werden die Gesteinsfräsen ihren Sinkflug in der Bismarcksee vor Papua-Neuguinea antreten, das Dämmerlicht des Bathyal passieren, um in 1000 Metern Tiefe ins Abyssal einzutauchen, und wenn der Tiefenmesser 1700 Meter anzeigt, behutsam aufsetzen. Beastys Piloten hoch oben an Bord des Bergbauschiffes werden dann vermutlich Beastys Scheinwerfer einschalten und sich umschaun: auf der Metallsulfid-Lagerstätte Solwara 1.

### Erzfabriken der Unterwelt

Das erste Mal einen «Schwarzen Raucher» zu sehen sei für jeden Meeresgeologen atemberaubend, sagt Peter Herzig, Direktor des Geomar-Helmholtz-Zentrums für Ozeanforschung in Kiel. Es sei, als entdeckte man das Industriegebiet der Unterwelt: Qualmende, verrostet aussehende Schlotte, bis zu 15 Meter hoch, die aus verkrusteten Erdhügeln wachsen und scheinbar schwarzen Rauch ausstossen, der alles in einen geheimnisvollen Nebel taucht. Die amerikanischen Forscher, die im Frühjahr 1979 in ihrem U-Boot «Alvin», einer 7 Meter langen Konservenbüchse, stundenlang durch die endlose Einöde am Ostpazifischen Rücken gekurvt waren, trauten ihren Augen nicht, als sie in 2600 Metern Tiefe bei 21 Grad Nord plötzlich diese Rauchwolken sahen. Die Umgebungstemperatur stieg sprunghaft an. Und was war das? Als sie sich einem der Kegel näherten, sahen sie, dass es dort vor lauter Leben nur so wimmelte und wuselte. Es gab sie also doch, die Seeungeheuer. Eine schier unvorstellbare Menge bizarr anmutender Tiere grast an diesen Kaminen: durchsichtige Garnelen mit orange leuchtenden Organen, Kolonien weisser Krebse, in der Strömung wogende Wälder gelb-



licher Röhren, aus denen rote Federboas hervorragten, schwarze Muscheln, zuckende Borstenwesen, transparente Fische – eine überwältigende Artenvielfalt.

Dabei konnte ein Ort unwirtlicher kaum sein: absolute Finsternis, Temperaturen bis zu 400 Grad über den Schloten und ein hochgiftiges Milieu. Wovon ernährten sich diese Kreaturen? Inzwischen weiss man es: Die Tiere leben von Bakterien, die imstande sind, Schwefelwasserstoff in organische Verbindungen aus Kohlenstoff umzuwandeln. Nicht Photosynthese findet hier statt, sondern Chemosynthese. Diese Mikroorganismen sind Basis einer Nahrungskette, von der man bis dato nichts ahnte. Leben konnte also auch ohne Sonnenlicht entstehen, das war neu. Und jeder «Schwarze Raucher» schien seine eigene Bevölkerung zu haben: Auf Solwara 1 lebt zum Beispiel Alvini Conacha, eine haarige Schnecke, kugelförmig und keine Schönheit, aber immerhin hält sie 45 Grad aus. Auch die schwarze Schnecke *Ifremeria Nautili* grasht hier an den Schloten, ihr Name verrät, wer sie entdeckt hat: *Ifremer* heisst das grösste französische Meeresforschungsinstitut, *Nautilus* sein U-Boot.

Solwara 1 ist der vermutlich besterforschte Flecken Tiefseeboden auf dem Planeten. Es ist ein Streifen von 1,3 Kilometern Länge und 80 bis 200 Metern Breite. Schon ein Jahr nachdem die Erzlagerstätte 1996 entdeckt worden war, kaufte Nautilus Minerals eine Erkundungslizenz, seit 2011 besitzt das Unternehmen die Abbaulizenz, die erste ihrer Art weltweit. Inzwischen wurden rund um den Globus etwa 250 untermeerische Erzfabriken entdeckt. Sie bilden sich an submarinen Plattengrenzen. In der Bismarcksee stossen die Pazifische Platte und die Australische Platte aufeinander. Meerwasser dringt mehrere Kilometer tief in die Spalten ein und wird durch darunterliegende Magmakammern auf über 400 Grad Celsius erhitzt. Dadurch verändert sich seine spezifische Dichte, es steigt wieder zum Meeresboden auf, löst auf seinem Weg Metalle aus dem Gestein und tritt unter hohem Druck aus. Sobald es mit kaltem Meerwasser in Berührung kommt, fallen die grösseren Metallsulfidpartikeln aus und bilden einen hydrothermalen Schlot, während sich die feineren Partikeln in der Umgebung ablagern.

Die Metallgehalte der Erzablagerungen rund um die «Schwarzen Raucher» unterscheiden sich weltweit stark. Solwara 1 gehört zu den Filetstücken. Hier weisen die Erze nicht nur viel Kupfer und Zink auf, sondern vor allem Gold und Silber. Rund 15 Gramm Gold pro Tonne wurden hier gemessen, das ist etwa dreimal so viel wie in typischen Landlagerstätten. Der Silbergehalt liegt zwischen 100 und 300 Gramm pro Tonne – mit Spitzenwerten von sogar 642 Gramm. An Land finden sich höchstens 150 Gramm Silber pro Tonne. Da leuchten die Dollarzeichen in den Augen der Goldgräber. Sollten *Beasty* und seine Kollegen die Schlote und Hügel auf Solwara 1 erfolgreich zerlegen, wird es der Startschuss sein für eine weltweite Gewinnung mineralischer Bodenschätze aus der Tiefsee, da sind sich die Experten einig. Und das Begehren richtet sich nicht nur auf die «Schwarzen Raucher», sondern auch auf Manganknollen, die in 4000 bis 6000 Metern Tiefe auf dem Grund aller Ozeane liegen, sowie auf kobaltreiche Krusten an den Hängen untermeerischer Vulkane. Allein in der hohen See halten mehr als 25 Nationen und Unternehmen Erkundungslizenzen, überall laufen die Vorbereitungen auf Hochtouren. Doch Umweltschützer warnen: Ganze Lebensräume drohen unwiederbringlich zerstört zu werden. Die Tiefsee ist noch unerforscht. Wir wissen nicht, was wir da tun.

### **Mein Forschungsschiff, mein Tauchroboter**

Um das zu ändern, hat auch das Geomar in den letzten zehn Jahren aufgerüstet, Budget und Personal wurden deutlich aufgestockt. Erst im Juli wurde das lang ersehnte neue Tiefseeforschungsschiff «*Sonne*» getauft. Und in der Halle am Ostufer der Kieler Förde steht «*Kiel 6000*», der Stolz des Instituts, ein über Glasfaserkabel ferngesteuerter Tauchroboter, der 6000 Meter tief tauchen kann. Hier auf dem Trockenen üben die Piloten ihre Feinmotorik im Umgang mit den Greifarmen, indem sie einen Besen in einen Schirmständer stellen. Auch «*Jago*» ist grad da, ein bemanntes Tauchboot, das allerdings nur 400 Meter runterkann. Zudem verfügt das Geomar über eine wachsende Flotte an

autonomen Tiefseedrohnen, die die Meere durchstreifen, Daten erheben, den Boden kartographieren. «Wir produzieren Grundlagenwissen zu Fragen des Klimawandels, der Ozeanübersäuerung, der Naturgefahren wie submariner Rutschungen und Tsunamis sowie der Meeresrohstoffe», sagt Peter Herzig, «wobei wir auch für die nachhaltige Gewinnung von Rohstoffen Verantwortung tragen und unsere Entdeckungen nicht kommentarlos der Industrie zur Ausbeutung überlassen können.»

Ab 2004 fingen die Metallpreise an, so drastisch zu steigen, dass allein der deutschen Industrie Mehrkosten im zweistelligen Milliardenbereich entstanden. Besonders begehrt sind die seltenen Erden, eine Gruppe von 17 Metallen, die für viele Schlüsseltechnologien und elektronische Massenprodukte notwendig sind: Akkus, LED, Plasmabildschirme, Generatoren von Windanlagen, Elektroautomotoren und so weiter. Lagerstättenexperten gehen davon aus, dass sich der Bedarf an den meisten Metallen und Mineralien auch langfristig an Land decken lasse, nur für ein paar wenige Rohstoffe sehen sie Engpässe voraus: für Antimon, Germanium und Rhenium zum Beispiel. 2012 konnten weltweit nur 128 Tonnen Germanium gewonnen werden. Es wird für die Funktechnik in Smartphones, in der Halbleitertechnik und in Solarzellen gebraucht.

«Eigentlich haben wir alles an Land, das Problem ist die politische Verfügbarkeit», sagt Peter Herzig. «Immer grössere Lagerstätten gehören immer weniger Firmen in immer weniger Ländern.» Auf China entfallen zum Beispiel 97 Prozent der weltweiten Produktion von seltenen Erden, bei vielen Rohstoffen lasse sich die Bildung von Oligopolen beobachten. «Besonders problematisch ist die Versorgung aus politisch fragilen Staaten wie etwa Kongo, das 40 Prozent des weltweiten Kobalts produziert – unter sklavenhalterischen Bedingungen.» Und auch Spekulationen sorgen immer wieder für Verteuerung. 2006 stieg der Kupferpreis rapide an, nachdem die Chinesen grosse Mengen aufgekauft hatten, seit Anfang 2014 horten sie die mehrfache weltweite Jahresproduktion von Indium.

### **Wie Kartoffelernte vom Zeppelin aus**

Anfang der 1970er Jahre waren die Rohstoffpreise zum ersten Mal sprunghaft angestiegen. Der Club of Rome prognostizierte die Grenzen des Wachstums, und die Ölkrise machte anschaulich, was Knappheit bedeutet. Da erinnerte man sich in Europa und den USA an die seltsamen Knollen, die Seefahrer bereits Ende des 19. Jahrhunderts vom Meeresboden geholt hatten. Sowohl die britische «Challenger»- als auch die deutsche «Valdivia»-Expedition waren mit Gesteinsklumpen heimgekehrt, die aussahen wie verkohlter Blumenkohl. Schon damals hatte man festgestellt, dass sie metallische Verbindungen enthielten, vor allem Mangan, doch brauchte man es nicht. Nun also, ein Jahrhundert später, begannen zahlreiche Länder und Firmenkonsortien, darunter ein Zusammenschluss deutscher Industrieunternehmen wie der Preussag und der Salzgitter AG, nach den Knollen zu suchen. Sie wurden bald fündig: Im Nordpazifik zwischen Hawaii und Mexiko liegen die Knollen auf einer Fläche so gross wie alle Länder der EU zusammen dicht an dicht auf dem Meeresboden. Die Clarion-Clipperton-Zone wird heute als Manganknollengürtel bezeichnet. Doch auch im Südpazifik, im Perubecken und im Indischen Ozean sind sie zahlreich.

Und obwohl sie einfach auf dem Meeresgrund liegen, ist die Ernte kein Kinderspiel. Ein Geologe, der in den 1970er und 1980er Jahren dabei war, formulierte es so: «Es kam uns vor, als wollte man Kartoffeln von einem Zeppelin aus ernten – aus fünf Kilometern Höhe, bei Sturm und in stockfinsterner Nacht.» Die Ingenieure machten sich an die Arbeit: Von staubsaugerartigen Gerätschaften bis hin zu kilometerlangen rotierenden Schaufelketten wurde so manches ersonnen. Doch das Ergebnis blieb dürrtig, Schläuche erwiesen sich als nicht wasserdicht, Schwimmbagger versanken im Schlick, die Elektronik versagte. Zu unwirtlich der Raum, zu unzugänglich der Acker. Hinzu kam, dass sich die düsteren Prognosen des Club of Rome nicht bewahrheiteten; neue Erzlagerstätten in Kanada und Australien sorgten für Entspannung auf den Rohstoffmärkten, der Mensch kam auch ohne Manganknolle zurecht. Vorerst. Doch das internationale Interesse hatte eines deutlich ge-

macht, nämlich dass früher oder später eine grosse Frage würde beantwortet werden müssen: Wem gehören die Schätze auf dem Meeresgrund?

Eine Frage, die seitdem an Schärfe und Dringlichkeit gewonnen hat. «Ein Drittel der Menschheit lebt in Wohlstand, das zweite Drittel befindet sich in Reformstaaten, deren Entwicklung zu Wohlstand und Bildung im Gange ist. Der restliche Drittel verharrt ungeduldig in Unterentwicklung und Armut», schreibt Uwe Jenisch, Professor für Internationales Seerecht. «Man fragt sich, wie der Bedarf an Rohstoffen und Nahrungsmitteln der rasch wachsenden Bevölkerung in einer globalisierten Welt befriedigt werden soll, ohne dass es gewaltsame Verteilungskämpfe, Völkerwanderungen, Massenelend, und damit massive Sicherheitsprobleme geben wird.»

### **Gemeinsames Erbe der Menschheit**

Auf hoher See galt die oft besungene Freiheit der Meere. Der Holländer Hugo Grotius hatte 1609 mit seiner Schrift «Mare liberum» den Anspruch der Spanier und Portugiesen auf ein Monopol im Kolonialhandel zurückgewiesen und das Recht auf freie Schifffahrt und freien Handel verteidigt. Das Meer sei zu gross, schrieb er, und frei wie die Luft. Es gehöre niemandem. Anderer Meinung war John Selden, der 1635 die Doktrin des «Mare clausum» entwickelte, die die See in Interessensphären verschiedener Staaten aufteilte. Erst der holländische Jurist Cornelis van Bynkershoek fand 1703 die Formel für eine Art Kompromiss: «Die territoriale Souveränität endet dort, wo die Kraft der Waffen endet.» Kanonenkugeln flogen zu jener Zeit drei Meilen weit, mittlerweile wurde daraus die Zwölf-Seemeilen-Zone. Sie gehört zum Hoheitsgebiet eines jeden Küstenstaates. Jahrhundertlang galt also ein Flickwerk aus willkürlichen Hoheiten und Freiheiten, im Zweifel geklärt durch eine Seeschlacht. Doch bisher war es um Schifffahrt und Fischfang gegangen, nicht um unwiederbringliche Bodenschätze. Manganknollen wachsen in einer Million Jahren 1 bis 7 Millimeter. Einmal geerntet, sind sie weg. Also, wem gehören sie?

Ein kleiner Mann aus einem kleinen Land machte im November 1967 einen kühnen Vorschlag. Er hiess Arvid Pardo und war der Botschafter Maltas bei den Vereinten Nationen. Pardos Heimat war gerade aus britischer Kolonialherrschaft entlassen worden, wie viele Kolonien in jener Zeit. Die Reichtümer der Erde sollten fortan nicht mehr allein den Mächtigen überlassen werden, dieses Ansinnen war damals populär. Drei Stunden sprach Pardo vor der UN-Generalversammlung und machte eines sehr deutlich: nämlich, dass weder die Hoheit noch die Freiheit den Anforderungen der Zeit gerecht würden. Das eine brächte Zerstörung und Plünderung, das andere Revierkämpfe und die Gefahr neuer Kriege. Ein ganz neuer Ansatz sei notwendig: Die Ressourcen auf hoher See sollten zum Wohle aller genutzt werden, friedlich, gerecht und umweltschonend. Fünfzehn Jahre später, 1982, wurde der Tiefseeboden zum gemeinsamen Erbe der Menschheit erklärt. Das Seerechtsübereinkommen (SRÜ) gilt heute als Verfassung der Meere. Es ist das grösste Regelwerk der Menschheit und legt die Spielregeln für Schifffahrt, Fischfang, Erdgas und Erdölförderung, Tiefseebergbau sowie Meeresforschung und Umweltschutz fest.

### **Die Enterprise**

Dass es noch einmal zwölf Jahre dauern sollte, bis es 1994 endlich in Kraft trat, lag vor allem daran, dass die Staatengemeinschaft sich nicht einigen konnte, wie die Ressourcen am Meeresboden aufzuteilen seien. Pardos Idee war es, eine internationale Meeresbehörde zu schaffen, die eine Bergbaugesellschaft gründen sollte: die Enterprise. Die Gewinne sollten gerecht an alle verteilt werden. Die Industrienationen sollten Enterprise ihre Expertisen zu Maschinen- und Bergbau kostenfrei zur Verfügung stellen, zum Wohle aller. Die ehemaligen Kolonien und Entwicklungsländer ratifizierten das SRÜ sofort, die Industrienationen nicht. Erst nachdem man die Idee vom kostenlosen Technologietransfer fallengelassen und die Gründung von Enterprise auf unbestimmte Zeit verschoben hatte, konnte man sich auf Modalitäten für den Tiefseebergbau verständigen. Heute haben es 165 Nationen, darunter alle EU-Staaten, ratifiziert.

Das grösste Küstenland der Welt allerdings verweigert seine Unterschrift bis heute: Amerika. Präsident Obama würde gern unterzeichnen, die Republikaner sind dagegen. Das Prinzip, Wohlstand umzuverteilen, indem Lizenzgebühren an Entwicklungsländer gezahlt würden, sei ein Fass ohne Boden. Offiziere der Marine und der Küstenwachen weisen nun darauf hin, dass den USA in Zukunft nur das Militär bleibe, um Interessen in der hohen See durchzusetzen. Sie raten dringend dazu, dem SRÜ endlich beizutreten. Die Meeresbodenbehörde (kurz ISA für International Seabed Authority) hat ihren Sitz in Kingston, Jamaica. 40 Menschen aus verschiedenen Nationen arbeiten hier. Wer in der hohen See Rohstoffe fördern will, muss bei der ISA eine Erkundungslizenz beantragen und eine Gebühr von 500 000 US-Dollar entrichten. Privatunternehmen können nur zusammen mit einem Staat eine Lizenz beantragen, der ihre Tätigkeit überwacht und für sie haftet. In der Regel sind Staaten Lizenznehmer. Bis heute wurde in der hohen See noch keine einzige Abbaulizenz vergeben, bisher handelt es sich ausschliesslich um Erkundungslizenzen.

Für die Erkundung von Manganknollen schreibt das Regelwerk vor, dass ein Staat zunächst zwei wirtschaftlich gleichwertige Flächen von jeweils bis zu 150 000 Quadratkilometern für die Exploration beantragen muss, von denen die ISA eines für sich selbst auswählt. Diese «reserved area» kann entweder Entwicklungsstaaten zur Verfügung gestellt oder später von Enterprise genutzt werden. Das dem Staat zugeteilte Lizenzgebiet wird später noch einmal reduziert: Bis zum achten Jahr der Vertragslaufzeit muss die Hälfte des erkundeten Terrains ebenfalls an die ISA abgetreten werden. So erhält jedes Land maximal 75 000 Quadratkilometer zur Exploration. Darüber hinaus ist festgelegt, auf welche Art und Weise die Erkundung stattzufinden hat. Der Lizenznehmer muss die ISA laufend über seine Ergebnisse informieren und die Umweltverträglichkeit nachweisen. Die ISA hat die Möglichkeit, unabhängige Beobachter auf Forschungsschiffen der Lizenznehmer mitfahren zu lassen. China, Japan, Frankreich, Russland und Südkorea waren die ersten. 2001 beantragten sie Erkundungslizenzen für Manganknollen. Ebenso wie Bulgarien, Tschechien, die Slowakei, Polen, Russland und Kuba, die sich zur «Interoceanmetal» zusammenschlossen. Bis heute hat die ISA dreizehn Lizenzen für Manganknollen vergeben, zwei für Kobaltkrusten, vier für Massivsulfide.

### **Deutschlands 17. Bundesland**

Auch Deutschland hält seit 2006 eine Erkundungslizenz im Manganknollengürtel; die Geologen der Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) in Hannover nennen es scherzhaft das 17. Bundesland. «Wir haben ganz neue Nachbarn», sagt Michael Wiedicke von der Abteilung für maritime Rohstoffe. Im Süden grenzen die Lizenzgebiete von Tonga und Nauru an, im Osten liegt hinter einer «reserved area» Grossbritannien, und mit InterOceanmetal hat sich der Osten im Westen angesiedelt. Und alle sind gleich gross, was umso beeindruckender ist, als Nauru mit 20 Quadratkilometern Festland im echten Leben die kleinste Republik der Welt ist. Nauru unternimmt sein Abenteuer Tiefsee auch nicht ganz allein, sondern hat einen grossen, starken Partner gefunden: Nautilus Minerals.

«Ein paar Kollegen sind grad dort», sagt Wiedicke. «Sie wollen versuchen, dieses Mal eine etwas grössere Probe zu nehmen, etwa eine Tonne, um Tests für die metallurgische Aufbereitung machen zu können.» Eigentlich sei das nicht die Aufgabe der BGR, so Wiedicke. «Wir beraten die Bundesregierung in Fragen der Rohstoffsicherheit und suchen nach alternativen Quellen. Denn Deutschland ist in Bezug auf Metalle zu hundert Prozent importabhängig. Aber wir sind kein Akteur.» Länder wie Südkorea, China oder Indien betreiben das Projekt Tiefseebergbau generalstabsmässig von der Forschung bis zur technischen Umsetzung. In Deutschland finanziere der Staat zwar die Lizenz, aber danach «hoffe man auf die Selbstorganisation der Beteiligten». Doch die Industrie zögere, mit 100 Millionen in Vorleistung zu gehen, so Wiedicke. Zumal es in Deutschland keine grossen Player mehr gebe, sondern nur eine hochspezialisierte, aber höchst kleinteilige maritime Industrie. Deswegen werden sich jetzt Forschungsinstitute und Universitäten der Frage widmen, wie man das Metall aus der Knolle extrahiere.

### **Frische Baggerspuren am Meeresgrund**

Spätestens 2016 werden die ersten Staaten entscheiden müssen, ob sie das Wagnis Tiefseebergbau eingehen wollen, denn dann laufen die ersten Erkundungslizenzen aus. Entweder gibt man das Gebiet danach frei, oder man beantragt eine Abbaulizenz. Die Mitarbeiter der ISA in Jamaica arbeiten unter Hochdruck an der Fertigstellung des Mining-Codes für Manganknollen. Basis dieses Regelwerks sind die Erkenntnisse der Meeresforscher, die im Wettlauf mit der Bergbauindustrie das Ökosystem Tiefsee zu verstehen trachten. Wer und was lebt da? Welche Rolle spielen diese Biotope für das Leben auf der Erde? Was geschieht am Meeresgrund, wenn ein noch so behutsamer Hightech-Knollensauger die in Jahrmillionen entstandenen Metallklumpen grossflächig entfernt? Denn eines steht ausser Frage: Nicht nur die «Schwarzen Raucher» und die Hänge der Seeberge, sondern auch die öde anmutenden Ebenen der Tiefsee strotzen nur so vor Leben.

In der Clarion-Clipperton-Zone findet sich neben Seegurken, Tiefseegarnelen, Fischen und Schlangenternen auch die völlig unerforschte Welt der Mikroorganismen. Im Jahr 2000 hat eine internationale Forschergemeinschaft mit dem «Census of Marine Life» begonnen, einer Art Volkszählung der Ozeane. 240 000 Arten sind dort bisher erfasst, konservative Schätzungen gehen von insgesamt mindestens einer Million aus. Und niemand weiss, wie hoch der Anteil endemischer, also nur an einem Ort vorkommender Organismen ist. Eine deutsche Studie aus den 1990er Jahren hat gezeigt, dass es auf dem abgeernteten Manganknollengebiet nach sieben Jahren zwar zu einer Neubesiedlung gekommen war, doch deutlich artenärmer als zuvor. Deswegen schreibt das Reglement der ISA jetzt vor, dass die Äcker am Meeresboden mit Schutzzonen durchsetzt sein müssen, aus denen potentielle Immigranten einwandern können. 2015 wird eine Forschergruppe das Terrain erneut untersuchen und schauen, wie es dort 25 Jahre nach den Pilottests aussieht.

«Das grösste Problem werden die Staubwolken sein, die beim Pflügen aufgewirbelt werden», sagt Peter Herzig von Geomar. «Die Sedimente können sich nicht wieder absetzen, sondern werden durch die Strömung des arktischen Bodenwassers weitergetragen.» Solche grossflächigen Eintrübungen rauben Algen und anderen Planktonorganismen in den oberen Wasserschichten das Licht und zerstören die Lebenswelten am Meeresgrund. Inzwischen wurden zwar Erntegeräte mit Abdeckungen entwickelt, die diesen Effekt minimieren sollen, doch Kritiker bezweifeln die Wirkung. «Es ist so», sagt Herzig: «Die Organismen der Tiefsee sind selten und produzieren nur wenige Nachkommen. Dort unten geschieht alles sehr, sehr langsam.» Als Forscher 2007 das erste Mal wieder die Testgebiete der 1970er Jahre aufsuchten, fanden sie Reifenspuren im Sand, so frisch, als sei der Bagger erst gestern dort entlanggefahren.

Losgehen, da sind sich alle einig, wird der Tiefseebergbau auf Solwara 1 vor Papua-Neuguinea. Denn es gibt einen elementaren Unterschied zu den Manganknollen: Solwara 1 liegt nicht in der hohen See, sondern in der Ausschliesslichen Wirtschaftszone (AWZ) des Landes. Die AWZ ist ein Zwischenreich zwischen Küstenmeer und hoher See. In diesem 200 Seemeilen breiten Streifen darf allein der Anrainerstaat die Ressourcen ausbeuten. Dabei geht es um Fischfang, aber auch um alle Schätze, die der Meeresboden birgt: Erdgas, Erdöl, Gashydrate und Massivsulfide. Etwa ein Drittel des Meeresbodens unseres Planeten ist bereits Ausschliessliche Wirtschaftszone der Küstenländer. Beastys Werkeln unterliegt allein der Gesetzgebung Papua-Neuguineas.

### **Die Festlandsockel-Kommission tagt**

Seit einigen Jahren nun treibt eine ursprünglich als Ausnahme gedachte Regelung des SRÜ bizarre Blüten. Paragraph 76 erlaubt es einem Staat unter bestimmten geologischen Bedingungen, Anspruch auf den äusseren Festlandsockel zu erheben und damit seine AWZ von 200 auf 350 Seemeilen zu erweitern, sofern er beweisen kann, dass dieses Landmassiv unter Wasser geologisch zum eigenen Festland gehört. Mittlerweile haben 59 Staaten Anspruch auf das Kontinentalschelf angemeldet. Russland war der erste, dem dieser Schachzug in den Sinn kam: 2001 stellte es Antrag auf die

Erweiterung seines Sockels über den gesamten Nordpol, 2007 montierte ein russischer Tauchroboter siegesgewiss die Landesflagge in 4000 Metern Tiefe. Muskelspiele dieser Art werden häufiger. Das Gremium, das über all diese Anträge zu entscheiden hat, ist ein kleiner Trupp von Experten der Vereinten Nationen in New York: die sogenannte Festlandsockel-Kommission. 21 Geologen und Geophysiker aus 21 Ländern, gewählt für fünf Jahre, beraten darüber, wo ein Land anfängt bzw. aufhört. Am Ende steht eine Empfehlung, auf deren Grundlage ein Land die äussere Landesgrenze völkerrechtlich festschreiben kann. Einer dieser Experten für maritime Geophysik ist Walter Roest vom Ifremer, dem französischen Pendant zum Geomar, dreimal sieben Wochen pro Jahr verbringt er nun in Manhattan. In diesem kalten Frühjahr sass er tagein, tagaus mit sechs Kollegen im UN-Gebäude am Hudson River und diskutierte den Antrag Ghanas. «Das Problem ist, dass wir auch zwanzig Jahre nach der Unterzeichnung des SRÜ über grosse Teile des Tiefseebodens nur wenig wissen», sagt Roest in einer Mittagspause. So bleibe die Auswertung des Datenmaterials, das die antragstellenden Länder liefern müssen, auch eine Interpretationsfrage. «Zwar basieren unsere Empfehlungen allein auf geologischen Daten, aber der Festlandsockel eines Staates ist im Ergebnis ein juristischer Begriff, mit dem Rechte verbunden sind.» Ein heikles Unterfangen.

Russlands Antrag wurde 2009 abgelehnt. Seitdem hat Russland mehrere Expeditionen durchgeführt, um zu beweisen, dass der Meeresrücken in der Arktis seinen Ursprung unter seinem Hintern habe, noch dieses Jahr soll der Antrag erneut vorgelegt werden. Ende 2013 hat Kanada ebenfalls Ansprüche auf einen Sockel bis zum Pol angemeldet, und auch Dänemark möchte seinen nördlich von Grönland erweitern. «Diese Entwicklung ist eine Pervertierung der Ursprungsidee, die Tiefsee als gemeinsames Erbe der Menschheit zu betrachten», sagt Rüdiger Wolfrum, Richter am Hamburger Seegerichtshof, der dritten Säule des Seerechtsübereinkommens. Schon heute sind Küstenstaaten mit vorgelagerten Inseln klar im Vorteil gegenüber Binnenstaaten. Die in New York liegenden Anträge ergeben in der Summe noch einmal acht Prozent vom Kuchen. «Und wie das dort vonstatten geht, ist nicht seriös», so Wolfrum. «In der Kommission sitzen die Länder, die auch eigene Interessen haben. Im Ergebnis sind die Empfehlungen viel zu weitgehend.»

Tatsächlich hegt auch Frankreich ehrgeizige Sockelpläne. Schon heute verfügt das Land dank seinen vielen Überseeterritorien und Verwaltungsgebieten mit 10 Millionen Quadratkilometern über die zweitgrösste AWZ der Welt, gleich nach den USA. Roest war der Leiter des nationalen Sockelprogramms, und er sagt selbst: «Frankreich hat Interesse, ein Mitglied in der Kommission zu haben.» Selbstverständlich dürfe er nicht in einer Untergruppe mitarbeiten, die sich mit französischen Anträgen beschäftige, aber natürlich lerne man, wie die Kommission arbeite und wie man Anträge erfolgreich stelle. «Ich setze mich jetzt dafür ein, dass die Aussengrenzen vom Seegerichtshof kontrolliert werden können», sagt Rüdiger Wolfrum. «Jeder Mitgliedstaat des SRÜ soll klagen dürfen, wenn er der Meinung ist, eine Aussengrenze gehe zu weit.» Seit der Internationale Seegerichtshof vor 25 Jahren eingerichtet wurde – in einem imposanten Bau in Form einer Schiffsschraube im Hamburger Stadtteil Blankenese –, musste er erst einmal über Gebietsstreitigkeiten entscheiden. Bangladesch und Myanmar konnten sich nicht über den Grenzverlauf in der Bucht von Bengalen einigen. Die Zahl der Fälle werde mit Beginn des Tiefseebergbaus zweifelsfrei zunehmen, so Wolfrum – sei es zwischen der Meeresbodenbehörde und den Bergbauunternehmen oder auch unter den Bergbautreibenden. «Dieses Gericht ist das einzige, das verbindlich über Streitigkeiten in Bezug auf die Nutzung des Tiefseebodens der hohen See entscheiden kann.»

Um die Spratly-Inseln im Südchinesischen Meer zum Beispiel, eine aus Hunderten von kleinen Inseln, Atollen, Felsen und Sandbänken bestehende Gruppe, unter denen Erdöl vermutet wird, streiten sich China, Taiwan, Vietnam, Malaysia, Indonesien, Brunei und die Philippinen. 1988 kam es bereits zu einer Schlacht, bei der 70 vietnamesische Soldaten starben. Da sich die Philippinen als Kläger nicht der Gerichtsbarkeit des Seegerichtshofs unterworfen haben, wurde jüngst ein Schiedsgericht einberufen. Die Grenzverläufe zu ziehen scheint allerdings ein hoffnungsloses Unterfangen. Bei jedem Sandkeks im Meer muss zunächst festgestellt werden, was er ist: Insel, Felsen oder

Sandbank. Nur Inseln haben eine AWZ, Felsen haben ein Küstenmeer, Sandbänke haben gar nichts. Das grenzt an höhere Mathematik. Doch was wäre die Alternative? «2050 werden 9 Milliarden Menschen auf der Erde leben», sagt Peter Herzig vom Geomar. «Die Ozeane bedecken 70 Prozent der Erde. Ich fürchte, wir werden es uns auf Dauer nicht leisten können, nur an Land unser Unwesen zu treiben.» Quelle: <http://folio.nzz.ch/2014/september/das-letzte-terrain>

## **Tonga Enacts Region's First Seabed Mining Law**

*SPC calls Act 'not only a world first, but also a world best'*

WELLINGTON, New Zealand (Radio New Zealand International, Sept. 2, 2014) – Tonga says it's the first country to put in place regulations for managing deep-sea mining and seabed mineral activities. The Seabed Minerals Act 2014, which was prepared with assistance from the European Union and the Secretariat of the Pacific Community, has been gazetted. The Act provides for a vetting process of any project and public consultation. It also requires an environmental impact assessment and monitoring while the government will have new enforcement powers. The Deputy Secretary for Natural Resources, Taniela Kula, says the move is timely given the country's economic status. "It has changed the government's priority to focus on seabed minerals. We believe that this is the key or the window of opportunity for Tonga to support its economic growth. And we'll put our and commit our efforts into getting this vision or dream materialised." The SPC says the Act is not only a world first, but also a world best. It says Tonga has established a regulatory system, which prioritises the good governance and management of natural resources. There are three companies exploring mining opportunities in Tonga.

## **Tonga a world leader in seabed minerals law**

Secretariat of the Pacific Community, The Jet, September 01, 2014

*Friday 29 August 2014, Secretariat of the Pacific Community (SPC), Suva, Fiji* – The Kingdom of Tonga this month became the first country in the world to put in place a law that manages seabed mineral activities within its national marine space and under its sponsorship in international waters. Tonga's Seabed Minerals Act 2014 was prepared with the assistance of the Deep Sea Minerals Project a partnership between the European Union (EU) and the Secretariat of the Pacific Community (SPC) and 15 Pacific Island countries. The Act received Royal Assent from the King of Tonga on 20 August 2014. This pioneering law, championed by Tonga's Minister for Lands and Natural Resources and his staff, and led by the Kingdom's Attorney-General's Office, with SPC support, positions Tonga at the forefront of good governance for this emerging new industry.

Tonga, like Papua New Guinea, Fiji and Solomon Islands, has already received significant commercial interest in the seabed mineral potential within its national seas. Companies are currently conducting exploratory activities to learn more about Tonga's 'seafloor massive sulphide' deposits. These chimney like structures, formed by hydrothermal activity at the seafloor thousands of metres below sea-level, are being feted as a new source for metals in global demand (such as copper, zinc, gold and silver) – and, if mined, would bring a new source of revenue for Tonga. The industry is however an untested one: deep sea mining has not yet occurred anywhere in the world; its viability and environmental impact are yet to be determined.

Now, in Tonga, before any seabed mining can commence, the requirements of the Seabed Minerals Act must be followed. This includes a stringent vetting process by government of any new project proposals, and public consultation if mining is proposed. Environmental impact assessment and ongoing monitoring are legal requirements under the Act, and government is given enforcement powers in order to maintain compliance with required performance standards. The Act also highlights

the importance placed by Tonga on the protection and preservation of the marine environment, recognising the need to balance economic development for the people of Tonga against conservation of the biodiversity of the oceans.

Mr Taaniela Kula, Deputy Secretary for Natural Resources and the SPC-EU Deep Sea Minerals Project focal point in Tonga, thanked a wide range of stakeholders this week for their involvement in the law's development, which commenced in 2012, including government colleagues and partners in the private sector and civil society – with special thanks to the EU and SPC for the Deep Sea Mineral Project's assistance preparing an initial draft of the Act. European Union Ambassador to the Pacific Andrew Jacobs, upon receiving a copy of the Seabed Minerals Act 2014, commented: 'I wish to congratulate Tonga for this bold move, which will allow the Kingdom to effectively regulate and fully participate in deep sea mineral activities. The EU is pleased to have been able to contribute to this world premiere. Tonga is now equipped with a set of tools and regulations that will allow it to maximise the benefits of deep sea mining for its population.' Prof. Mike Petterson, the Director of SPC's Applied Geoscience and Technology Division, which hosts the SPC-EU Deep Sea Minerals Project, added his congratulations to Tonga for its great achievement:

'The Seabed Minerals Act 2014 is not only a world first, but also a world best! With this new law, Tonga establishes a robust and transparent regulatory system, which prioritises good governance of natural resources and environmental management in line with international best practice. With provisions that set a stable and predictable regime, with requirements for the precautionary approach, public consultation and 'free, prior and informed consent', and with the creation of a ring-fenced sovereign wealth fund for seabed mining revenue, through this Act, Tonga has struck a good balance between incentivising the investment that will bring Tonga new income, while protecting the long-term interests of the people of the Kingdom and the health of the oceans.'

Tonga's legislation follows closely the SPC-EU Deep Sea Mineral Project's 'Regional Legislative and Regulatory Framework' launched by Pacific Island Forum Leaders in 2012, and endorsed by all 15 Pacific members of the African, Caribbean and Pacific Group of States (ACP). Several other Pacific Island countries also have seabed mineral Bills under development, with SPC and EU support, and the Deep Sea Minerals Project is supporting a wide range of other deep sea minerals 'good governance' activities across the region, in response to the requests and individual needs of countries. Tonga will now continue to implement the SPC-EU Deep Sea Minerals Project, with awareness-raising programmes, and the development of further regulations.

### **Concerns over impact deep sea mining for copper, gold off Papua New Guinea will have on sea life** Lateline, ABC Australia, By Jason Om, 26 Aug 2014

A controversial mining project that involves ploughing the sea floor off Papua New Guinea (PNG) is set to begin amid concerns about its impact on the marine environment. Canadian company Nautilus Minerals plans to mine 1.6 million tonnes of copper and gold a year from the volcanic hot springs in the Solwara 1 deposit in the Bismarck Sea, in what is hailed as the first deep sea mining project in the world. The PNG government has a 15 per cent stake in the mine and is set to reap millions of dollars in royalties. Nautilus chief executive Mike Johnston said seafloor mining holds enormous economic potential for countries in the Pacific. "I think this is a real opportunity for these countries, particularly Tonga, Solomon Islands, Vanuatu [and] Fiji, where we've got licences," he told Lateline. "They have limited potential on land so seafloor mining gives them the opportunity to develop a solid mining industry which has a low environmental impact but produces a high-value product which can generate significant returns." But PNG campaigners and environmentalists remain sceptical about the company's assurances there will be little impact on sea life such as snails, shrimp and crabs. Remote-controlled machines will be sent down to churn up the sea floor and the



ore will be pumped back up to a ship. Part of the mining process also involves returning waste water containing elevated concentrations of metals and sediments to the bottom of the ocean.

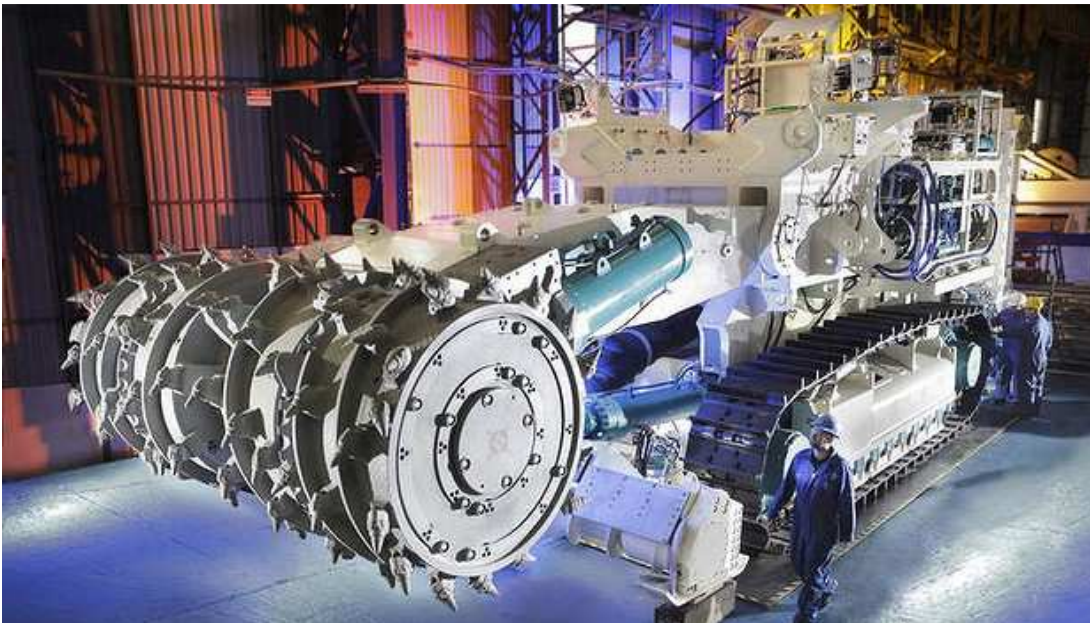
### **Project will lead to species extinctions: biologist**

One critic is former University of Alaska marine biologist Rick Steiner, who reviewed the project's environmental impact statement for a group of indigenous people in PNG. "We expect that there will be species extinctions caused by this project," he said. "I think ethically and morally we have to draw the line in the sand." He is particularly sceptical about the company's plan to relocate organisms by transplanting parts of their habitat. "It's sort of like if they're going to clear cut a forest. Would it be worth trying to save a few trees and replanting them and seeing if they will survive? It's worth a try. I think the chances of it succeeding is relatively small." In 1996, CSIRO scientists were part of an international team that discovered the Solwara 1 deposit and say knowledge about this deep sea environment is still largely unknown.

"There's a huge amount that we don't know about these environments," CSIRO geologist Dr Joanna Parr said. "There is a lot unknown about the interactions of the various species with each other, the life cycle and how the synergies go between the species." CSIRO geologist Dr Ray Binns doubts species will become extinct as a result of the mining. He previously worked as a consultant for Nautilus. Dr Binns said the volatile nature of the volcanic, hydrothermal environment means the system will restore itself within a few years and the organisms will return. "The mining's undoubtedly going to kill some animals. That will be a limited loss and the population as a whole will survive," he said. Nautilus plans to start mining at Solwara 1 in two years.

### **Seabed mining - from science fiction to reality**

Andrew Darby, Sydney Morning Herald, August 24, 2014



The 'bulk cutter' is built to make the world's first attempt at deep sea mining. *Photo: Nautilus Minerals*

On an engineering works floor in Britain stands a 250 tonne machine that promises to change the way we think about the seabed. It's built to mine the deep. On the front of the track-mounted "bulk cutter" is a formidable toothed drum designed to chew through heavily mineralised volcanic vents, 1600 metres below the surface of the Bismarck Sea off Papua New Guinea. Attached will be a system to collect and pump a slurry of copper and gold-bearing ore to a mother ship, for transfer and onshore processing. Nautilus Minerals chief executive Mike Johnston said from his Brisbane base that the unique machine had been built from existing cable trenching, mining and offshore oil and

gas equipment. "Basically all the existing technology is being put together in a different configuration," Mr Johnston said. Far from being science fiction, this newest frontier in mineral exploitation only needs adaptation. A quiet international rush is under way to stake out seabed claims, concentrating on the central Pacific.

Led by big businesses such as the US defence contractor, Lockheed Martin, it offers the dream of fortunes to poor island nations. At the same time, an environmentalist coalition is growing to halt the industry, and in this little known diplomatic space, the Australian government is well positioned to become a leading negotiator. "To me, it seems that Nautilus is bent on proving the concept - and I think they will," said ANU law professor Don Anton. "Given that they are working on the continental shelf, rather than much deeper on the abyssal plain, I think it will work," Professor Anton said. After protracted negotiation, Nautilus agreed to sell a 30 per cent share of the business to the Papua New Guinea Government for \$120 million this year. The company, whose main shareholders also include Omani and Cypriot interests, will next commission a purpose-built ship in a project expected to be ready to mine after 2016, and costing more than \$450 million. This is cheap, Mr Johnston says. "A similar size project on land, Ozminerals' Prominent Hill in South Australia, was built at a cost of \$1.8 billion." He said that while Prominent Hill covered 8000 hectares, the concentration of valuable ore was so great at Nautilus's Sowara 1 mine, that it would work a total area of 1.1 hectares.

Deep sea miners argue not only do they have less impact on the world around them, they don't need costly roads or bridges, and their environmental disturbance is naturally contained, because sediment plumes do not rise from the deep. "I can't understand why people are pushing for a moratorium on things," Mr Johnston said. "It's all very low-impact stuff." But with more than 1.5 million square kilometres of the Pacific sea floor now under leasehold, the Deep Sea Mining Campaign has called for the moratorium. "There is insufficient scientific data to understand the impacts of deep sea mining, there are no regulatory frameworks in place to govern mining operations and the capacity to enforce such frameworks does not yet exist," said the campaign's Sydney-based activist, Natalie Lowrey. "The issuing of exploration licences must cease until these issues are addressed." Professor Anton, who is leading a federally funded project examining the industry's effects on Pacific islands, said: "developing states look at it altogether differently".

Around the Cook Islands, for example, prospectors have already identified billions of dollars worth of cobalt, a metal highly prized for its hardness. Professor Anton also saw a pressing need to regulate the deep seas beyond national boundaries, where this year alone the UN's International Seabed Authority dispensed seven new exploration permits. Among them is the Lockheed Martin-owned UK Seabed Resources, which plans to explore a 58,000 square kilometre area of the Pacific for polymetallic nodules. Announcing this, British Prime Minister David Cameron claimed seabed mining could be worth £40 billion (\$71 billion). Australia is one of 21 nations on the seabed authority's governing council, yet it is doing no deep sea mining of its own. "There's not much going on in our waters because we are so terrestrially blessed," Professor Anton said. "That puts us in a position to take a robust leadership role in terms of environmental protection."

#### FACT BOX:

- Deep sea miners are looking for high-grade mineral deposits of gold, copper, nickel, cobalt, manganese and rare earths.
- Some of these minerals form in volcanic vents, others lie on the sea floor as fruit-sized nodules, formed over millions of years.
- While offshore miners may work in the 50 metres below the surface of the sea, deep sea mines start around 1500 metres and prospectors are now working at 4000 metres.
- They are working deposits on, or near, the sea floor, rather than drilling far below it.
- Regulations to mine the seabed of the high seas beyond national exclusive economic zones are

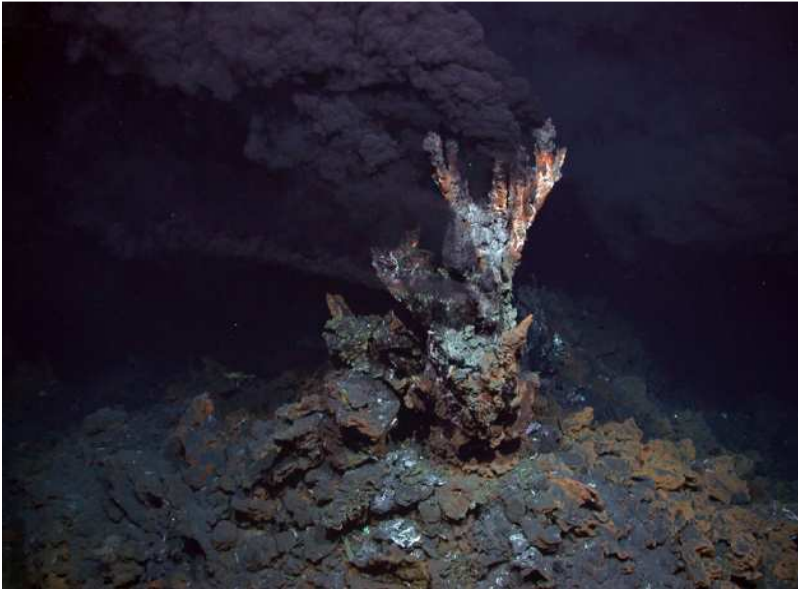
being developed by the UN's International Seabed Authority.

- It is issuing prospecting licences for areas of the central Pacific, south-west Indian Ocean, and mid-Atlantic.

### **Health check for deep-sea mining**

*European project evaluates risks to delicate ecosystems.*

Katia Moskvitch, Nature, 13 August 2014 Corrected: 15 August 2014



MARUM, University of Bremen, Germany

Marine communities living near mining targets such as hydrothermal vent fields might be at risk. As commercial plans to exploit mineral resources on deep-ocean beds gather pace, marine researchers are increasingly concerned about the damage such projects might cause to the sensitive and little-understood ecosystems that thrive there. Now, scientists are taking to the sea as part of a three-year, €12-million (US\$16-million) project designed to address these concerns and to develop a set of guidelines for industry.

The latest research expedition of the Managing Impacts of Deep-sea Resource Exploitation (MIDAS) programme returned to France earlier this month after exploring the Lucky Strike region of the Mid-Atlantic Ridge near the Azores islands. There, a research team began investigating whether plumes of particles that might arise from future mining operations near hot hydrothermal vents — often rich sources of metals — could affect the creatures that live there, such as deep-sea mussels.

“The goal of our experiment is to test the effects of sulphide particle deposits on the structure — composition, density, biomass, diversity — of the dominant hydrothermal fauna of the Lucky Strike vent field,” says Jozée Sarrazin, a deep-sea ecologist at the French Research Institute for Exploitation of the Sea (IFREMER) in Plouzané, France, who is leading the expedition. “It should help us to propose management strategies to help protect the unique fauna associated with high-temperature emissions on the sea floor.”

Resources such as polymetallic sulphides exist in large quantities around deep-sea hydrothermal vents. The idea of mining them was first mooted in the 1960s, but only now, with land sources declining and demand rising, is it being seriously explored. Although no mining projects are yet under way, Nautilus Minerals of Toronto, Canada, has received a green light from the government of Papua New Guinea to mine about 50 kilometres offshore in the Bismarck Sea, at a depth of 1.6 kilometres. Other concessions have been awarded in the eastern Pacific Ocean. Nautilus would use sea-

floor trawlers to cut or scoop up the deposits, which are then pumped up to a support ship. The effects of such mining are cause for concern. The operations may “severely damage” the sensitive biological communities that live near under-sea mountains, hydrothermal vents and mineral-rich nodules on the sea floor, says David Santillo, a marine biologist and senior scientist at Greenpeace Research Laboratories at the University of Exeter, UK. As well as the physical destruction of habitats, he adds, this type of mining could smother deep-sea species with suspended plumes of sediment. Species could also be disturbed by noise, light pollution and exposure to toxic metals and other chemicals released by the mining.

The severity of such effects depends on several factors, including the nature of the exploited resource and the method of extraction, says oceanographer Cindy Van Dover, director of the Duke University Marine Laboratory in Beaufort, North Carolina. But her biggest concern is the general lack of knowledge about sea-floor processes and the cumulative effects of multiple mining events. “If we get the environmental management wrong, we are unlikely to be able to fix our mistake,” she says. The MIDAS project, which began in November, is receiving €9 million from the European Union, and includes representatives from industry and non-governmental organizations. “We will try to identify the best ways to monitor before, during and after mining to determine the total impact and recovery of the ecosystems,” says Philip Weaver, managing director of Seascope Consultants in Romsey, UK, which is coordinating MIDAS.

Cruises to conduct experiments and sampling at depth form a core part of the project’s work. The IFREMER cruise, on the research vessel *Pourquoi Pas?*, was the first stage of a two-year experiment to test the effects of sulphide plumes. The research team weighed mussels found around hydrothermal vents at a depth of 1.7 kilometres and assessed their general health. Next year, they will return and mimic the effects of particle plumes on the mussels, monitoring their reactions — for instance, death, migration or increased numbers — with temperature sensors and cameras. The results of the tests will then be studied on shore. A second MIDAS study is currently simulating potential effects on marine life in the shallow waters of Portman Bay off the coast of southeastern Spain. An onshore mining facility dumped waste into the waters there for three decades, and the researchers want to assess how the waste affected the underwater fauna. “We want to see how metal-loaded plumes behave — how far they spread, how long it takes for them to settle and so on,” says marine geoscientist Miquel Canals Artigas of the University of Barcelona in Spain, who is leading the expedition. MIDAS will submit its report to the European Commission in November 2016.

### **The newest assault on the world’s oceans, deep seabed mining**

PNG Mine Watch, August 14, 2014

*NGOs from Australia, Canada and India are calling for an international moratorium on deep seabed mining in light of the International Seabed Authority’s (ISA) issuing of 7 exploration licences for deep seabed mining in international waters.*

Natalie Lowrey, spokesperson, Deep Sea Mining campaign: “The granting of these licences flies in the face of the precautionary principle. There is insufficient scientific data to understand the impacts of deep sea mining, there are no regulatory frameworks in place to govern mining operations and the capacity to enforce such frameworks does not yet exist. The issuing of exploration licenses must cease until these issues are addressed.”

The 7 new exploration licenses have been granted to: UK Seabed Resources, a wholly owned subsidiary of Lockheed Martin the world’s biggest defense company; the Government of India; Russian Ministry of Natural Resources; Brazil’s Companhia de Pesquisa de Recursos Minerais; Ocean Mineral Singapore; Germany Federal Institute for Geosciences and Natural Resources; and Cook Islands Investment Corporation.[1]

Sreedhar Ramamurthi, Chairperson, mines minerals & PEOPLE, India said: “The issue of deep sea mining is not just for scientists and mining companies, the debate has to be much bigger. Is it morally viable? Is it environmentally sustainable? What is going to happen to the waste? What are the economic, social and cultural impacts on local populations in the areas they want to mine? They are the same questions whether you are mining in the deep sea or on land.” “Currently the exploitation of resources, including the proposed exploitation of our deep seas, is dominated by politics and economics over environmental and social issues.”

Charles Roche, Executive Director, Mineral Policy Institute in Australia said: “Deep sea mining remains a highly speculative venture, undermined by a lack of understanding about both the questionable need for additional sources of metals and minerals as well as the potential impacts of underwater mining.” “Nation-states who have a strong involvement in the exploration and potential exploitation of our seabeds should also play a strong role in the development of greater marine protection.”

Catherine Coumans, Research coordinator, Mining Watch Canada said: “Organisations are also calling for a move to a circular economy where the emphasis is on resource efficiency, urban mining, long term product lives and strong repair, reuse and recycling policies. “It is imperative that we have an understanding about impacts before exploration or exploitation of deep sea mineral resources is permitted. That is why we are calling for an international moratorium on all deep seabed mining until marine park areas are established to protect deep sea ecosystems and risks are assessed and analysed.”

#### *Notes*

*[1] This brings the total of deep seabed mining exploration licenses granted by the ISA to 17. Twelve of these contracts are for exploration for polymetallic nodules in the Clarion-Clipperton Fracture Zone (Pacific Ocean) and Central Indian Ocean Basin. Three are for exploration for polymetallic sulphides in the South West Indian Ridge, Central Indian Ridge and the Mid-Atlantic Ridge. Two contracts for exploration-rich crusts in the Western Pacific Ocean*

## **PNG Offshore mining policy progressing**

The National, August 14th, 2014

By SHIRLEY MAULUDU

A draft policy for offshore mining is in place which will cater for seabed mining projects, Mining Secretary Shadrach Himata says. He said the draft policy would be brought before parliament for adoption first. “We do have a draft offshore mining policy. We hope to bring this to parliament for adoption by fourth quarter this year. Himata added that the draft policy was not yet a public document. “At this stage it is not a public document yet. “But consultation on this policy started in 2009,” he added. Himata made the statement after questions were raised to the Department of Mining following concerns by landowners of Solwara 1 project impact areas, stating that a sea mining act should have been in place before the government’s issuing of the licence to the developer.

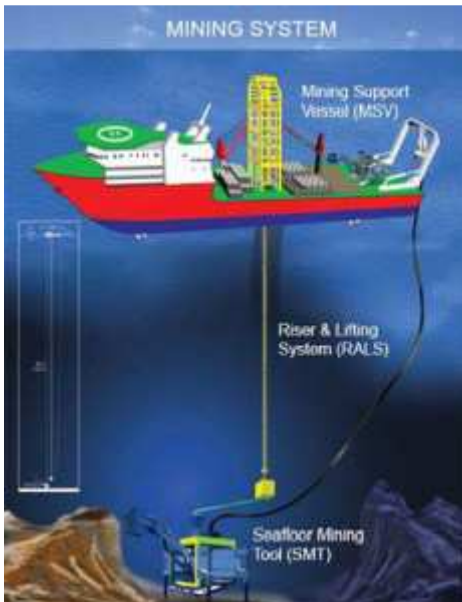
Meanwhile, Mineral Resources Authority managing director Philip Samar said during the time when the mining act was formulated, no one ever thought that a seabed mining project would occur. However, he said the current license issued to Nautilus Minerals for operation of Solwara 1 was catered for in that act. “The definition of “land” for mining purposes under the mining act 1992 includes the offshore area being the seabed underlying the territorial sea and as such mining activities can take place.” Therefore, he said that there was no question about the national government’s issuance of the various mining permits to Nautilus Minerals.

## Nautilus emergency plan tells only half the story

PNG Mine Watch, August 13, 2014

*Prospective Experimental seabed mining company Nautilus Minerals is trying to reassure the public about the safety of its proposed operations but is telling only half the story. No hazardous chemicals, no blasting and bio-degradable oils sound great... by why no mention of the 300 tonne remote controlled bulldozers that will be ripping up the seabed in a huge open-cut strip mining operation, creating massive clouds of dust and rock and destroying every living thing in their path? Come on Nautilus tell us the WHOLE story...*

Nautilus Minerals, the developer of the Solwara 1 Project is currently developing a Environment Management Plan and monitoring programmes for the project. According to Nautilus, this is a contingency plan to put to action just in case an unexpected incident occurs during the operation of the project that would require emergency response. However, Nautilus is committed to protecting waters and fish and will not use any hazardous chemicals during operation. Nautilus Country Manager, Mr. Mel Togolo said the operation will not produce tailings or neither waste will there be any blasting causing no concerns for wastes and damages to the environment. "All oils, fluids used in subsea equipment will be Biodegradable, so in the unlikely event there is a spill, the impacts are kept low," Togolo said.



In addition to this, Nautilus has also already carried out an extensive multi-stakeholder approach in preparing an Environmental Impact Assessment (EIA) and an EIS for Solwara 1 Project and was submitted to the Department of Environment and Conservation back in 2008. The assessment is to minimise environmental impact whilst maintaining overall biodiversity and ecosystem health and function. Meanwhile, things are moving closer to the commencement of operations with Nautilus currently in discussions with a short list of vessel providers to secure a suitable vessel for the seabed mining project. Togolo said the vessel will be similar to an off shore construction vessel and they intend to secure the arrangements for a vessel by early November following which they will have a clearer understanding of when operations will commence. Currently the Seafloor Production Tools are over 90% complete and the Raiser and Lifting System is over 50% complete.

## **Seabed miners sign with East New Britain government**

Freddy Mou, PNG Loop, Aug 8, 2014



Nautilus Minerals Ltd has signed an agreement with the East New Britain Provincial Government to strengthen the partnership between the two parties. Nautilus Minerals country manager Mel Togolo in a statement said the memorandum of understanding (MOU) signified the commitment to and the continuation of a positive working relationship between the ENB Provincial Government and Nautilus Minerals. “The MOU provides a framework for on-going cooperation between the ENB and Nautilus Minerals to achieve mutually beneficial outputs. “It is an understanding to strengthen dialogue between the two parties through the establishment of the East New Britain-Nautilus Minerals Working Group,” he said.

Mr Togolo said the group would act as the main point of contact between the provincial government and Nautilus Minerals in arranging meetings, sharing information and consulting with communities. Meanwhile, Nautilus Minerals’ president and CEO Mike Johnston said: “It was satisfying to firm up the relationship with ENB through the MOU and we look forward to working together.” The signing was witnessed by the East New Britain Provincial Government and administration staff and officers from Nautilus Minerals. Nautilus also maintain their working relations with the National Fisheries Authority on helping people understand that the project will not impact tuna stocks.

## **Solwara: Locals call for independent study**

The National, August 7th, 2014

A LOCAL from New Ireland has called for an independent environmental study to be conducted in the proposed areas of the Solwara 1 project impact areas. Technical advisor representing the land-owners William Bartley said Nautilus had been carrying out consultations, awareness and other environmental studies within the project impact areas. He said there has to be an independent study carried out by a separate group or individual. “Nautilus has been going alone and it’s not fair to us. “When you (Nautilus) are visiting the areas, bring along staff from the provincial and local level government offices, to go together so locals will see and believe that the developer is serious when are there with the state team. “It’s (Nautilus) been telling us about the good things. “Nautilus has not told me if there was going to be an environmental effect that was going to happen there and how the people were going to deal with that. However, Nautilus Minerals country manager Mel Togolo said government representatives had always gone along with the company during its visits and to carry out studies. “An extensive multi-stakeholder approach has been used in preparing the Environmental Impact Assessment (EIA) and the Environmental Impact Study (EIS) for the Solwara 1 Project. “The EIS was reviewed by DEC (Department of Environment and Conservation) and an

independent international consulting group engaged by the DEC over a six month period. “The EIS was then reviewed by the Environment Council, a group of leading PNG scientists who recommended to the Environment Minister to issue an Approval-in-Principle of the EIS in August 2009.

### **Nautilus Minerals wants more operations**

The National, August 7th, 2014

Nautilus Minerals holds many tenement applications in Papua New Guinea and intends to have operations in the country so long as there are minerals to produce, country manager Mel Togolo said. He said the Canadian company would keep operating depending on the level of minerals. “We intend to have operations in the county for as long we have minerals to produce and for as long as PNG wants and allow us to operate in their waters.” When asked if the Solwara 1 project will start operations anytime soon, Togolo said: “The vessel remains on the critical path for the company. “We intend to secure the arrangements for a vessel by early November following which we will have a clearer understanding of when operations will commence,” he said.

### **Solwara: ‘Come up with sea mining act’**

The National, August 7th, 2014

Local representatives from New Ireland have called on the National Government to come up with a Sea Mining Act. On Tuesday, Mathew Nelson questioned why a deep sea mining project like Solwara 1 had been granted licence to proceed, based on a land mining act. “How can you use a land mine act to approve a mining lease to mine in the sea? “Where is the logic behind this, national government? You must have the Seabed Mining Act, so that companies can do any explorations in the sea according to the seabed mining Act – there is no logic at all,” he said.

Another local William Bartley questioned how sections under the land mining act would apply to seabed mining projects. “When they approved Solwara 1 project, there was no seabed mining act in place. So how can they apply a land mine act to underwater mine and say we (landowners) do not own whatever’s under the sea.” Meanwhile, Nautilus Minerals country manager Mel Togolo said during FM 100’s Talkback Show recently that the project was legal. Togolo said “Our government has a very strong legislation, and if it was not legal, we would not have been allowed to mine. “Under our law, you have to apply for exploration licence.”

### **Nautilus deals with two governments**

The National, August 7th, 2014

By SHIRLEY MAULUDU

NAUTILUS Minerals country manager Mel Togolo says the seabed miner only has understandings with the East New Britain and the New Ireland provincial governments. He said the Canadian seabed miner signed a memorandum of understanding (MOU) with each of these provinces. He was responding to remarks made by locals from New Ireland stating they wanted to be a party in the memorandum of agreement (MOA). Togolo said there was never a MOA signed between Nautilus and any other parties. “Nautilus does not have an MOA with any of the governments. A MOA is a requirement of the legislation governing mining in PNG and establishes the framework for the project from an economic, social, employment and commercial standpoint.

He said an MOA was an agreement between the national and relevant provincial government(s) and it defined how benefits from the project, including royalties received by state, would be distributed.



“The purpose of the MOU in New Ireland and East New Britain is to provide a framework for ongoing cooperation between the East New Britain and New Ireland provincial governments and Nautilus Minerals to achieve mutually beneficial outputs. “It is an understanding to strengthen dialogue between the two parties through establishment of East New Britain-Nautilus Minerals working group and New Ireland-Nautilus Minerals working group. “The groups will act as the main point of contact between the East New Britain and the New Ireland provincial government and Nautilus Minerals in facilitating meetings, sharing information and consulting with communities. He said the MOU’s do not usurp the spirit and intention of MOA between the national government and the New Ireland and East New Britain provincial governments.

### **Togolo: Solwara is legal**

The National, August 5th, 2014

THE operations of seabed miner Nautilus Minerals is legal, country manager Mel Togolo said. Togolo maintained that the company would continue with its seabed mining operations. He made the remarks yesterday following comments by the public who raised concerns if Nautilus Minerals’ operations in New Ireland and East New Britain waters - for Solwara 1 project - were legal. “Our government has a very strong legislation, and if it was not legal, we would not have been allowed to mine. “But if you look at the Mining Act, section 5 or section 6, it allows for that and that was why we were granted the first marine license. “Under our law, you have to apply for the exploration license. The government looks at it and does its own due process and if it fits within our legislation, they (government) then give you an exploration license ... and that’s what the state did (to Nautilus Minerals for the Solwara 1 project). For us it is incorrect to say it’s illegal.

“The Mining Act today allows for exploration in the deep ocean,” Togolo said. Meanwhile, Togolo denied claims that the project will have effects on the marine life. “We have a delivery system which will ensure that there is no impact on the environment. We will not be blasting like what happens on land based mines. “We will be using cutting machines, which is different from blasting. We will not be using any toxic chemicals, and that’s the commitment we made to the community. “Instead, we will be using biodegradable fluids. We won’t be having any tailings,” he said. Togolo said the project is about 30 kilometres from the nearest point from West Coast of Namatanai and between 50 and 60 kilometres out of the port of Rabaul.

### ***Pressemitteilung***

#### **Weg frei für die weitere Erkundung von Rohstoffen in der Tiefsee**

Bundesministerium für Wirtschaft und Energie, 4.8.2014

Der Rat der Internationalen Meeresbodenbehörde hat auf seiner diesjährigen Jahrestagung in Kingston, Jamaika, den Antrag Deutschlands auf eine Lizenz zur Exploration polymetallischer Sulfide am Meeresboden des Indischen Ozeans gebilligt. Die Entscheidung der Internationalen Meeresbehörde vom 21. Juli 2014 ist ein wichtiger Meilenstein für die weitere Erkundung von marinen mineralischen Rohstoffen in der Tiefsee. Damit ist der Grundstein gelegt, dass die Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), die im Auftrag des Bundesministeriums für Wirtschaft und Energie die Explorationslizenz beantragt hat, in einem Gebiet südöstlich von Madagaskar gezielt Lagerstätten polymetallischer Sulfide am Tiefseeboden erkunden kann.

Der Koordinator der Bundesregierung für die maritime Wirtschaft und Parlamentarische Staatssekretär beim Bundesminister für Wirtschaft und Energie, Uwe Beckmeyer: "Für Deutschland ist der internationale Tiefseebergbau unter wirtschaftlichen Aspekten doppelt interessant: Erstens kann er

zur Versorgungssicherheit Deutschlands mit Hochtechnologierohstoffen langfristig beitragen. Zweitens eröffnet er interessante Marktchancen für deutsche Hersteller von innovativer, umweltverträglicher Meerestechnologie. Vor allem deutsche Mittelständler haben hier umfangreiches Know-how und nehmen technologisch einen Spitzenplatz ein. Neben den wirtschaftlichen Möglichkeiten spielt allerdings auch der Schutz der Umwelt eine entscheidende Rolle. Es ist deshalb besonders wichtig, dass bei der Erkundung des Meeresbodens nicht nur das wirtschaftliche Potenzial abgeschätzt wird, sondern auch umfangreiche Untersuchungen und Schutzmaßnahmen zum Erhalt der marinen Umwelt erfolgen, damit das Ökosystem der Meere als gemeinsames Erbe der Menschheit bewahrt wird."

Die Lizenz dient der Erkundung polymetallischer Sulfide am Meeresboden (in Wassertiefen von 2500 bis 4000 Meter). Polymetallische Sulfide enthalten neben hohen Buntmetallgehalten (Kupfer, Blei, Zink) auch Edel- und Spurenmetalle, darunter auch sogenannte Hochtechnologiemetalle. Die Lizenz hat eine Laufzeit von 15 Jahren und kann anschließend in eine Abbaukonzession münden. Sie tritt neben eine bestehende Lizenz zur Erkundung von polymetallischen Knollen im Pazifik.

### **Plenty of mistakes in Nautilus Environmental Impact Assessment**

PNG Mine Watch, August 4, 2014

Esteemed Oceanographer Dr John Luick has critiqued the physical oceanographic elements of the Environmental Impact Statement (EIS) for the proposed Nautilus experimental deep sea mining. He has published his findings as part of an article titled 'Physical Oceanographic Studies in Support of Environmental Impact Assessments for Proposed Mining: Part 4' (<http://austides.com/physical-oceanographic-studies-in-support-of-environmental-impact-assessments-for-proposed-mining-part-4/>)

Here is a summary of what he has to say:

What struck me on reading the Nautilus EIS was how many of the mistakes I had found in the Ramu Nickel EIS, were repeated. Nothing had been learned. Oceanographic field data is difficult and expensive to obtain. Careful planning is needed to ensure that key questions are addressed in the most efficient way possible. There is no one recipe to follow, and a properly trained, experienced oceanographer is needed to oversee the process. The Ramu Nickel field data and modelling had suffered as a result of following a more "cookbook" type approach. In my view the Nautilus EIS also made those mistakes. Some data was collected, some standard plots were drawn, and some modelling was done, but there was no sign of expert guidance. The analysis that was attempted, got it wrong as often as not — for example, plots which were said to show downwelling, actually showed upwelling.

The inadequate analysis was compounded by at least one mystery: a graphic in the EIS showed upper layer currents being measured. Yet no surface current data was presented. When I asked about it, Nautilus' response was puzzling — the surface data was not presented because the barge transfer was so well-engineered that there was zero risk of spillage. The primary risk to the local people is from shoreward transport by the surface waters. At typical ocean speeds, the surface currents, if they were shoreward, would carry contaminants to the coast in day or two. The EIS contained no information, either from data or from global models, to enable anyone to assess the risk to reassure the local people. There was, in fact, one indication in the EIS of surface currents — a single large-scale map which implied currents would carry contaminants to the open Pacific. However published research for the area shows surface currents in the opposite direction for much of the year. So instead of presenting their data, they chose to present a false map.

The risk of contamination becoming a threat is not non-zero. The two main factors for the Nautilus operation are probably surface currents and waves. Neither are addressed in the EIS. It would have been a simple matter to calculate and present a surface wave climatology for the local area, and to discuss associated risks for the barge transfer, but this was neglected. While the Solomon Sea is known to be calm relative to many other seas, no part of the ocean is always flat calm. With the Nautilus EIS modeling, here again, there were sad echoes of the Ramu Nickel fiasco, but in this case the problem was not so much with model resolution as lack of presentation of calibration and sensitivity studies. Without these, the quality of the modelling (which may have been quite good) cannot be judged.

I was told that the modelling had been assessed by a third party, i.e., that an independent consultant had been engaged by the PNG government for that purpose, and that their report had verified the original modelling. On my behalf, a local PNG citizen requested a copy of the report. He was told he could not have it, because it was a confidential government document. This seemed strange, since PNG taxpayers should have the right to see important supporting documents, so I inquired myself. I was told that an assessment may have been done, but that no written report had been produced — however, the modelling had been given an informal nod by the independent consultant. In other words, I was given the run around.

In conclusion, it would appear that the PNG government granted a 20-year operating permit to Nautilus on the basis of an EIS which provided:

- no presentation of currents in the upper 250 metres despite a major surface operation involving transfer of material from the processing ship to barges;
- no presentation of the surface wave climate;
- very inadequate analysis of the oceanographic data, including serious misinterpretations;
- model results unsupported by accompanying validation or sensitivity studies;
- no firm basis for assessing the risk of massive pollution of the local benthic environment or the risk to islanders on nearby New Ireland.

Part of the purpose of an EIA is to reassure the local people that the approvals process is open and based on the best available science. My conclusion is that this was not the case for the portion of the EIS I reviewed. Nautilus responded to this by saying that they had employed world-class scientists for the EIA. World class biologists, yes (see Footnote) — but as far as I know, not a single professional oceanographer. If Nautilus was willing to obtain the services of professional marine biologists, why did they not employ professional oceanographers to plan and manage the oceanographic fieldwork, do the analysis and modelling, and contribute their results to the risk analysis? CSIRO certainly has the resources to provide the sort of oceanographic expertise required. A recent case in New Zealand, involving CSIRO's sister organisation NIWA (National Institute for Water and Atmospheric Research) illustrates the point. This was the proposed Taranaki Sands offshore mining.

At one stage I was approached by a group for comment on the oceanography EIS. When told that the analysis and modelling had been done by NIWA scientists, including some names I know and respect, I knew without reading it that there was no need for my comments. A comparison between the NIWA EIS and the Nautilus EIS would doubtless provide a good illustration of my criticisms of the latter document. My hunch is that, a properly conducted oceanographic EIS might demonstrate that the proposed Nautilus experimental seabed mining would not pose a great and imminent threat to either the surrounding benthic community or the local islanders. But that is just a hunch. It would have been far better if a properly conducted oceanographic EIS, with an associated risk analysis, had been done in the first place. Instead, there is a long shadow over the EIA.

Footnote: I have spoken to a couple of the biologists Nautilus hired. It was a privilege and a pleasure, and I have the utmost respect for their integrity, but they were clearly unwilling to speak louder

than a furtive whisper on behalf of the rare and unique ecosystems they had studied. Need they really have been so concerned? Perhaps the company needs them at least as much as they need the company. And each biologist's silence leaves the benthic community with one less credible advocate.

*\* Dr John L Luick has over twenty years experience in projects related to ocean monitoring, tidal analysis, and hydrodynamic modelling. He has numerous publications and technical reports as well as wide experience in teaching, consulting, and shipboard observations.*

### **World Renowned scientists urges Pacific Leaders to be cautious with oceans exploration**

Makereta Komai, PACNEWS via PNG Mine Watch July 29, 2014



World renowned marine scientist, Dr Sylvia Earle has urged Forum Island Countries not to drop the ball on the sustainable management and protection of oceans and marine resources. She is delighted with the initiative of the Palaun Government to make 'Oceans' the theme of the 45th Pacific Islands Forum Leaders meeting in Koror, Palau this week. Dr Earle, who is the founder of Deep Ocean Exploration and Research and honored by Time magazine as the first Hero of the Planet was the keynote speaker at the Panel of Experts Monday convened by the Government of Palau to deliberate on the theme, "The Ocean: Life & Future." She urged Pacific Leaders to 'protect the oceans as if their lives depended on it.' "Only five percent of the oceans have been explored and the rest remains unknown. This therefore requires us to consider a cautionary approach if we are to explore what is in our oceans, said Dr Earle. Armed with knowledge and 'the use of latest technology, Dr Earle urged Pacific decision makers to 'explore with care' opportunities available in their exclusive economic zones before committing to exploration work

She qualified her cautionary approach saying 'if there is no ocean, there is no life.' Livelihoods of peoples in the Pacific rely heavily on the oceans and its resources. Addressing Pacific journalists here in Koror Saturday, Pacific Islands Forum Secretariat's director strategic planning & coordination, Alex Knox assured that Forum Leaders will make Oceans one of their priorities with an expected Declaration at the end of the weeklong Summit in Koror this week. "What we are trying to do at the regional level is put in place some coherence and build a single policy around Oceans so that we see Oceans not from a fisheries, conservation or deep sea mining lenses but as a single policy. To build coherence at the regional level, a broad coalition of all stakeholders involved in the work of oceans called the Pacific Oceans Alliance has been created to bring all the parties together to focus on oceans as a single sector, said Knox.

The Pacific Oceans Alliance to be launched at the 3rd United Nations Global Conference for Small Island Developing States in Samoa in early September is open to governments, civil societies, CROP agencies and development partners. “It was created to provide more coherence framework on how countries engaged around oceans. It looked at the institutions and policies around oceans. The Pacific Oceans Alliance came out of the Pacific Oceanscape regional policy pushed by Kiribati in 2010. One of the initiatives under the Pacific Oceanscape framework was the appointment of Tuiloma Neroni Slade as the first ever Oceans commissioner for the region. “The office of the Oceans Commissioner places strong political engagement within and outside the region on oceans issues.” “An Oceans Leaders Declaration will be issued at the end of the Summit.

It is a broad statement on Oceans where Leaders show their commitment to taking leadership on Oceans issues like they did in Majuro when Leaders made a declaration on climate change, said Knox. One of the challenges for Oceans is that there are many difference interests in Oceans both at the national and regional level. “Trying to bring some interests together will be quite challenging – that is why the Leaders Declaration is critical because it can start to drive a vision and change around the regional policy. “We can build resources and institutions around the regional framework. Unless there is money and people that can push it, it won’t happen. This Declaration will have the Pacific Oceans Alliance, the Oceans Commissioner and resources to support it. “We expect to have some form of annual report – like the annual State of the Oceans report to come out of this that will provide the basis for long term monitoring framework, said Knox.

### **‘New Gold Rush’ For Riches Takes Aim At Deep Ocean**

Intergovernmental body gives OK to seven new exploratory permits to hunt for deep sea minerals. Andrea Germanos, MintPress News via PNG Mine Watch, July 26, 2014



(Photo/jayhem via Wikimedia Commons)

A new gold rush for mineral riches lurking in the deep sea continues, as a United Nations organization has given the green light to seven new applications for exploratory seabed mining work permits. The International Seabed Authority, a Kingston, Jamaica-based body established under the UN Convention on the Law of the Sea and which controls activities relating to the seabed’s mineral resources, made the announcement of the new permits Monday. Firms from the UK, the Cook Islands and Singapore will be exploring for manganese, the government of India and a state German institute have applied to explore for polymetallic sulphides, while Brazilian and Russian entities are on the hunt for cobalt.

*BBC News reports:*

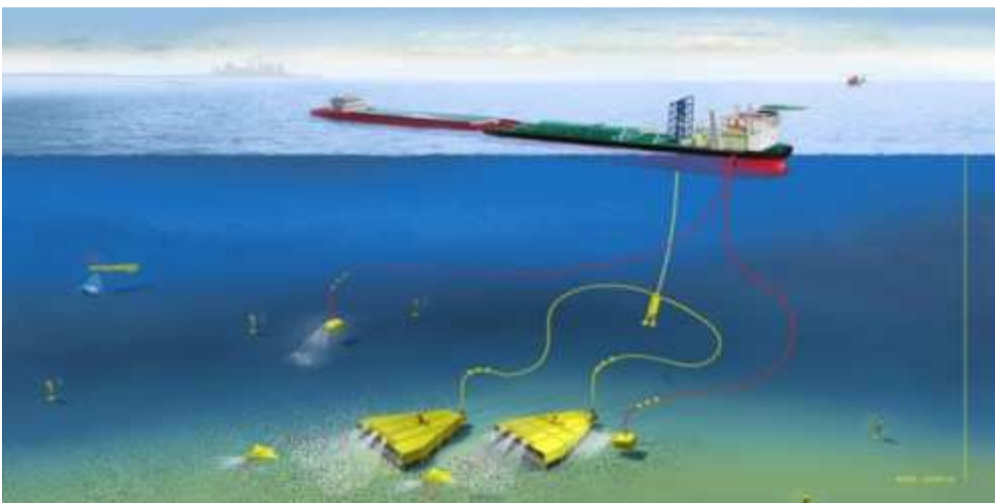
*This means that the total area of seabed now licensed in this new gold rush has reached an immense 1.2 million square kilometers under 26 different permits for minerals prospecting.*

Operations for the mining are set to begin by 2016, but the prospect of the resource grab in the little-explored deep sea has sparked ecological warnings. A report issued last year from environmental campaigning group Greenpeace International found that the prospective “large-scale industrial exploitation,” deep sea mining, “could have serious impacts on the ocean environment and the future livelihoods and well-being of coastal communities.” Ocean conservation organization Oceana also warned that it would “leave a permanent footprint on the marine environment.” A panel of scientists also sounded alarm earlier this year, stating that without “deep-ocean stewardship,” seabed mining could post serious environmental threats, and that many questions still remain about the exploitation. Yet the answer to one key question may be clear. “Will deep-sea mining ensure a healthy and productive marine environment in the long term? The undeniable answer is no,” Xavier Pastor, executive director of Oceana in Europe, stated last month.

### **Seven new exploration licences for deep sea mining**

International Mining via PNG Mine Watch, July 26, 2014

The International Seabed Authority (ISA) has recently issued seven more exploration licences to state-owned and private companies for mineral prospecting on the seafloor. Licences have been approved for the exploration of polymetallic nodules for UK Seabed Resources, Ocean Mineral Singapore, and the Cook Islands Investment Corporation as well as the Government of India, the Germany Federal Institute for Geosciences and Natural Resources, the Russian Ministry of Natural Resources and Brazil’s Companhia de Pesquisa de Recursos Minerias. Since 2001 ISA has issued 30 exploration permits for the Pacific, Mid-Atlantic and Indian Oceans. But the body stated that there has been increased interest of late with numerous private firms applying not only for mineral, but also for oil and gas extraction permits. The new licences take the total area of licensed seabed to 1.2 million km<sup>2</sup> under 26 different permits for minerals prospecting.



The attraction of deep sea mining is the high grade deposits which can be up to seven times the grades typically mined on the surface. Canada’s Nautilus Minerals is currently the most advanced in deep sea mining with seafloor production tools, and it finally has an agreement in place with the PNG government to move forward with its Solwara 1 gold, copper and silver underwater project, located in the Bismarck Sea. Michael Lodge, ISA’s Legal Counsel stated that “we are at the threshold of a new era of deep seabed mining”. However many environmental groups are passionate about preventing any development in seabed mining; with Greenpeace stating that seabed mining “poses a

major threat to our oceans.” Whilst it appears that deep sea mining is on the horizon, how far away commercial extraction is remains a mystery, with the conditions and rules for actual mining still to be negotiated with the ISA.

### **Taking a deeper look at seabed mining**

Australian National University via PNG Mine Watch, July 24, 2014



International law expert, Prof. Don Anton, pictured at the ISA's 20th Session.

An expert on the law of the sea from the ANU College of Law is continuing to explore the issues and impacts of underwater mining on a global scale during the 20th Session of the International Seabed Authority. Professor Don Anton, who is one of the leading international lawyers at the ANU College of Law, is part of an Australian delegation attending the International Seabed Authority's 20th Session in Kingston, Jamaica. The Authority, which brings together representatives from 160 member nations, was established under Part XI of the United Nations Convention on the Sea, and seeks to organise and control activities outside the jurisdictions of individual countries. This year's Session will discuss legal and technical reports on new applications for seabed exploration, and consider how to regulate the quickly approaching moment when states start mining the deep seabed that is the common heritage of humankind.

During his time at the ISA's 20th Session, Professor Anton will attend Council and Assembly meetings as a member of the Australian delegation, and will develop insights to support his research into the economic, social and environmental considerations deep seabed mining presented to developing countries in the South Pacific. "The issues being raised and explored at this year's Session hold considerable relevance for emerging economies in the South Pacific. "This includes not only understanding the revenue opportunities that deep seabed mining offers developing countries, but gaining clarity on how the environmental risks of such activities can be minimised and managed." Alongside providing examples of the approaches being taken by other member nations, Professor Anton said the ISA's 20th Session would help promote the interests of developing states seeking to engage in seabed mining, and identify other considerations of doing so, including the strategic alliances, public-private partnerships and cooperative arrangements that may be required. The 20th Session of the International Seabed Authority concludes on Friday.

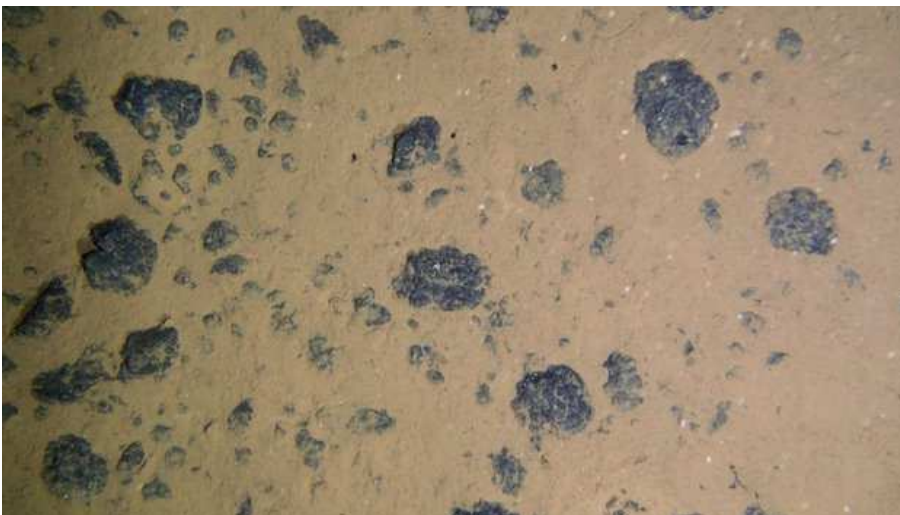
## Deep sea mining licences issued

David Shukman, BBC News, 23 July 2014

For decades, the idea of mining these deposits was dismissed as unfeasible. Vast new areas of the ocean floor have been opened up in an accelerating search for valuable minerals including manganese, copper and gold. In a move that brings closer a new era of deep sea mining, the UN's International Seabed Authority (ISA) has issued seven new exploration licences. State-owned and private companies from India, Brazil, Singapore and Russia are among those to land permission for minerals prospecting. One British firm, UK Seabed Resources, a subsidiary of the US defence giant Lockheed Martin, has secured exploration rights to an area larger than the entire UK.



This means that the total area of seabed now licensed in this new gold rush has reached an immense 1.2 million square kilometres under 26 different permits for minerals prospecting. Deep sea mining is a new frontier in the quest for the precious raw materials needed for modern economies but environmental groups have long warned of the potential damage to marine ecosystems. Mining the ocean floor was first investigated in the 1960s but only recently have technological advances - spurred by the oil and gas industry - and high prices for resources combined to make operations feasible. The ISA was set up to manage the exploitation of the ocean floor beyond territorial limits to prevent a free-for-all and has so far only issued licences for exploration. The first permits for exploitation could come in the next few years.



Nodules are a target for extraction - these small lumps of rock contain high proportions of metals



Michael Lodge of the ISA told the BBC: "There's definitely growing interest. Most of the latest group are commercial companies so they're looking forward to exploitation in a reasonably short time - this move brings that closer." Still to be negotiated are the conditions and rules for actual mining. A protocol to minimise the environmental impact is still being drawn up. And arrangements for royalties to be paid to developing and landlocked countries have yet to be settled - a basic principle of the ISA is that seabed riches should be shared globally. Two of the new licences - for German and Indian organisations - cover deep ocean ridges where hydrothermal vents have created potentially rich deposits. Dr Jon Copley of the University of Southampton, a marine biologist, has monitored the development of deep sea mining amid concerns about its possible effects on the natural world.



Construction of a seafloor mining machine was completed in the UK

"In total, about 6,000 km of mid-ocean ridge in international waters are now being explored for potential seafloor mining. In total, around 7.5% of the global mid-ocean ridge - the geological backbone of our planet - is now being explored for its mineral wealth. "Ridges are one of the three deep-sea environments where there are mineral deposits attracting interest, in this case for the metal ores that form at deep-sea vents along the ridges. "But those vents are also home to colonies of some species that aren't found in other deep ocean environments, which may make them susceptible to environmental impacts from mining." UK Seabed Resources (UKSRL) conducted a baseline environmental survey of its licence area in the Pacific last October.

It is hoping to extract so-called nodules from the ocean floor - small lumps of rock which contain far higher proportions of metals than ores found on land. Duncan Cunningham of UKSRL said the company remained "committed to environmentally responsible, transparent and commercially sound development of the area". He added: "We were extremely pleased to have had the opportunity to present details of our first environmental baseline cruise to the ISA and other stakeholders." The first seabed mine is likely to be in the waters off Papua New Guinea. In a deal arranged outside the ISA system, a Canadian company, Nautilus Minerals, plans to extract metals from a field of hydrothermal vents. The project was delayed for years by a dispute with the PNG government but terms have now been finalised and huge robotic mining machines are being constructed. 'Into the Abyss - Deep sea mining' will be broadcast on BBC Radio 4 on Wednesday 23rd July at 2100 BST and repeated on Tuesday 29th July at 1530 BST.

## **Nautilus Minerals Cleared To Begin Seabed Mining In PNG**

*Company completes dispute resolution with New Ireland*

WELLINGTON, New Zealand (Radio New Zealand International, July 9, 2014) – Papua New Guinea's mining minister, Byron Chan, says an experimental seabed mining project could pump 300 million kina, or 124 million US dollars, into the country's economy. The Canadian mining company, Nautilus Minerals, is set to begin mining the seabed off New Ireland in Papua New Guinea for metals, following a dispute resolution with the government there. It will be the first time metals, such as copper, will be mined from the seabed anywhere in the world. Papua New Guinea's mining minister, Byron Chan, says the government has negotiated a 15 percent stake in the project. "That's why I'm just managing this project, and guiding it along, and hope that my people, my district, my province also benefit from this project." Byron Chan says although seabed mining for metals is untested he believes the environmental impact will be minimal.

*[PIR editor's note: RNZI also reported that 'Chan, says he's confident his constituents have been adequately consulted as a planned seabed mining project overcomes another hurdle.']*

## **New Zealand: Seabed mining fight continues**

ELTON SMALLMAN, Waikato Times, 02/07/2014

Celebratory drinks turned sour for ocean campaigners after Trans-Tasman Resources (TTR) said it would appeal a decision against a massive iron-sands mining operations off the Taranaki Coast. Kiwis Against Seabed Mining (KASM) threw a party two weeks ago for supporters of the successful campaign to see off the mining giant. However, KASM chairman Phil McCabe woke yesterday to news worthy of a painful hangover. "We were 60 or 70 per cent expecting it," McCabe said. "They are a hungry bunch and they'll do anything they can to get what they want." KASM's two-year battle with the New Zealand-based mining company had taken a toll on members, but McCabe said they would pick themselves up and start again. "We all love the ocean and we don't want to see the ocean degraded and that's what gives us our energy. We'll follow it through to the end."

TTR applied for marine consent for an annual harvest of 50 million tonnes of iron-rich sediment over 20 years, 36 kilometres off the Patea Coast. A floating processing plant would separate 5 million tonnes of iron ore concentrate for export and the remaining spoil, about 45 million tonnes, would be dumped back to the ocean bottom. An Environment Protection Authority-appointed committee declined TTR's application, citing inadequacies and uncertainty in TTR's bid. McCabe said a core group had put their lives on hold to fight TTR's application and hundreds more helped. It had cost them money and time. "I've put my business on the backburner for two years and put 40 or 50 per cent of my work life to address TTR's proposal," McCabe said. "We haven't invited this and yet it has cost us considerably." The decision-making committee's finding had been comprehensive and the TTR application had not been up to speed, he said.

"The whole proposal is offensive and it's taken a lot of time from people's lives and caused a lot of undue stress and the company is keen on keeping that going." TTR's board said it would appeal the EPA decision on its application to mine iron sands in the South Taranaki Bight. The decision-making committee's ruling could be appealed only on points of law, but TTR chief executive Tim Crossley did not disclose the reason behind TTR's stance. "We have now studied the decision in detail with the assistance of our advisers and experts, and are confident that there are strong grounds for a successful appeal," he said. TTR had already spent more than \$60 million on exploration. TTR's objective was for substantial economic development of the region and to protect the environment, Crossley said.

## Miners seek to take the plunge

James Wilson, Financial Times (UK), July 2, 2014



Construction of the largest machine - the 310-tonne Bulk Cutter

Nautilus Minerals hopes a trio of machines being assembled in the northeast of England will foment a mining revolution on the other side of the world. The front of one of the 6m-high machines in subsea equipment maker SMD's works near Newcastle upon Tyne has a huge roller-like device, covered in points like a medieval cudgel. This 310-tonne, ivory-white monster is Nautilus's "bulk cutter" and the mining company hopes to deploy it, and other SMD machines, in an extreme environment: 1,600m below the Pacific Ocean, where it will tear through the seabed to mine gold and copper ore before pumping it to the surface. Seabed mining has long been talked about as having the potential to change the global supply of many minerals. Nautilus's machinery orders, and its search for a ship that will be the floating processing station for the ore that it mines, are a sign of its confidence that its project can meet the intended 2017 start date.

Canadian-listed Nautilus is "all the closer to making seafloor mining a reality", said Mike Johnston, chief executive, when the bulk cutter was completed this year. It comes after Nautilus resolved a dispute with the government of Papua New Guinea, which owns 15 per cent of the project and can acquire a further 15 per cent. But for all the excitement around seabed mining, this subsector of the resources industry continues to advance in fits and starts. Several decades of growing knowledge of the way mineral deposits have accumulated on ocean floors have still not yielded sustained efforts at exploitation by the world's most experienced mining companies, while adventurous smaller operators have struggled to overcome financial and environmental concerns. Trans-Tasman Resources (TTR), a New Zealand company, had its application to mine iron ore sands off the country's coast rejected on environmental grounds last week. And while Namibia is one of the few nations familiar with seabed mining – diamonds have been mined offshore for 50 years – the same country last year put a moratorium in place over proposed seabed phosphate mining.

In the mineral-rich subsea areas far from land, where the International Seabed Authority – a UN organisation – is responsible for the award of mining exploration licences, progress in seabed mining has been disappointing, says Nii Allotey Odunton, secretary-general. Thirteen years after the ISA began issuing licences – and with the first ones awarded expiring in 2016 – Mr Odunton wants more progress. Significant resources lie on the seabed. Closer to land, meanwhile, some alluvial sands yield sufficient mineral deposits – as is the case with Namibian diamonds. De Beers, the diamond company owned by Anglo American, mines these waters using "crawlers" on the seabed. Anglo is also a shareholder in Nautilus. Rising prices for many metals, and the falling quality of mineral deposits on land, make seabed deposits relatively attractive. In some cases seabed minerals are practically renewable, since they are extruded from the earth's interior directly into the ocean through hydrothermal vents. In the case of Nautilus's project, the miner says its resources have a copper grade of 7 per cent. In contrast, copper mines on land today often deal with grades below 1 per cent.

But environmental opposition is often strong. Critics say ecosystems would be affected by noise, light and sediment. Rejecting TTR's application as "premature", New Zealand's Environmental Protection Authority said a sediment plume about 50km long and up to 20km wide could be created. "The conditions proposed, while extensive, are not sufficient to give us the degree of confidence we needed to be able to grant consent," the authority said. TTR had wanted to mine in water up to 45m deep about 30km off the coast using seabed crawlers similar to those deployed off Namibia. A second New Zealand company, Chatham Rock Phosphate, wants authority approval for plans to mine phosphate in water 400m deep, 450km east of the country. "Our application cannot be compared with TTR's. It is for a different mineral, in a very different marine environment using different extraction methods," the company says. Shontel Norgate, Nautilus's chief financial officer, says seabed mining can be less intrusive than on land. "Not having to strip mountain tops or relocate communities – that becomes quite a compelling argument," she says.

Even if environmental concerns can be overcome, much of the economics of seabed mining is guesswork because so little has been done before. That makes it almost impossible for seabed miners to talk about being able to access economically viable reserves, rather than simply mineral resources. That, in turn, makes debt financing for seabed mining hard to obtain. Nautilus's plan is to rely on equity finance. For such reasons, says the ISA's Mr Odunton, it is important that deep sea mining starts to yield more tangible results so all participants can become more confident, rather than get bogged down in "years and years of marine research". Without more progress, drawing up a commonly accepted set of rules and accounting conventions to govern deep sea mining will be almost impossible, he says. "We are trying to push many [of the concession holders] to undertake some pilot mining work," he adds. "The biggest problem is nobody has ever done it before and everything becomes an assumption you are making . . . we know a heck of a lot more than we did before but I am trying to deal with the objective of mining profitably."

### **Nautilus' underwater miner begins construction**

AustralianMining, 26 June 2014, Cole Latimer

Nautilus Minerals seafloor miner's cutter has begun assembly this week. The last part of the Seafloor Production Tool (SPT), the auxiliary cutter, has begun assembly at Soil Machine Dynamics facility in the UK. The auxiliary cutter is designed as the pioneering tool which prepares the uneven seabed for the bulk cutter. These two tools gather the excavated material; the other, the Collecting Machine, will collect the cut material by drawing it in as seawater slurry with internal pumps and pushing it through a flexible pipe to the subsea pump and on to the Production Support Vessel via the Riser and Lift System. It will operate on tracks with spud assistance and has a boom mounted cutting head for greater flexibility. Speaking on this milestone, Nautilus CEO Mike Johnston said "we are pleased that the assembly of the AC, the third and final of the three SPTs has now commenced, with the arrival of the chassis at the SMD facility. The next milestone for the SPTs will be the commencement of Factory Acceptance Testing on the already assembled bulk cutter. "We look forward to reporting on this progress next month." The auxiliary cutter will weigh in at around 250 tonnes once fully assembled.

### **New Zealand no to seabed mining a cautionary tale for the Pacific**

ABC Radio Australia, 25 June 2014

*New Zealand's Environmental Protection Authority has torpedoed a proposal for the first seabed mining venture off the coast of Taranaki.*

Audio: NZ no to seabed mining a cautionary tale for the Pacific. Trans Tasman Resources had proposed mining for iron ore 22 kilometres off the coast. But the EPA said no, citing concerns about

the potential environmental effects and the effects of existing fishing and Kiwi interests. The decision raises questions about whether proposed sea bed mining projects across the Pacific could go ahead without causing environmental damage. Phil McCabe, chairman of KASM - Kiwis Against Seabed Mining, says the Taranaki project would have had a severe ecological impact.

McCABE: The marine environment is a very complex environment and this hasn't been done anywhere in the world on the scale of what the company was talking about here. And they hadn't done a strong enough base line study on what exists in the environment and therefore there was no way to predict what the impacts of the activity would have. So too much uncertainty.

ABBOTT: Is that a particularly fragile marine environment?

McCABE: It's a highly active marine environment, reasonably strong currents and a lot of wave action, so you wouldn't think in looking at it from a distance, you wouldn't think it's a particularly sensitive area, but even still, it's a certain environmental destruction that occurs when you undergo this activity. It wasn't acceptable in this case.

ABBOTT: The project for mining at Taranki was approved by the Ministry of Business Innovation and Employment, but knocked back by the Environmental Protection Authority. Is that the way things happen in New Zealand? The EPA has the final word on mining projects?

McCABE: Well yeah, there's two sort of parallel processes that occur, one is it moves through the petroleum and minerals of the government. It goes from a prospecting permit to an exploration permit, to a mining permit and those things there's not a public process for that side of it. The one that just got knocked by the EPA that for a marine consent to actually undergo, do the activity and that's where the public process comes in. And we saw the 99.5 percent of the submissions nearly 5,000 submissions were in Opposition, so it's clear that it was a socially and culturally offensive proposal.

ABBOTT: Is this the only proposal for seabed mining in New Zealand?

McCABE: No, there's the second ever application was lodged just a few weeks ago and it's just become publicly notified about ten days ago, I think it closes for submissions on the 10th. of July, and that's for a massive mine off the east coast of the South Island, on the Chatham Rise. They are looking at a 10,000 square kilometre area, where they would hope to mine 1,000 to 1,500 square kilometres in that area and they are looking for phosphate for fertiliser for our farms.

ABBOTT: Now, I imagine as Chairman of KASM, you would have done quite a bit of study on the prospects for seabed mining, as you say, it doesn't happen anywhere in the world. But the first project is going ahead, the Nautilus Mining Project off the north coast of Papua New Guinea. From what you know about seabed mining, do you believe the Nautilus Project will be safe?

McCABE: Safe for what is the question. It's the guaranteed destruction of an area where the mine. The real question is, is how big an area and what will the impacts be around the mining area? How big an area will those impacts be felt and I haven't looked at the Nautilus one particularly closely, but yes, that's for Papua New Guinea to decide.

The thing that really concerns me is I've watched that process over the last 18 months or so, is the lack from where we stood in New Zealand, it seemed that the people that are likely to be affected had very little knowledge about this proposal up until it had, to the point where it was consented. So I think that's an issue that many island nations will be facing now with governments looking at this as a way to boost economy is that the people on the ground that are facing the environmental consequences, they need to be informed more fully before the governments move ahead. And it's a bit scary that the SOPAC is setting down the framework for these companies to get consent before many people on the ground are even aware that this is a possibility.

ABBOTT: Phil, do you believe it's safe to carry out seabed mining with environmental controls that would be accepted by a group like the New Zealand EPA?

McCABE: We haven't seen a proposal that shows that and, as I said, it's guaranteed destruction and it's just what, what's acceptable to the nation, what level of destruction is acceptable to the nation for economic return.

All of these nations have Exclusive Economic Zones and they are areas that we have the right exploit for economic gain, but we've also got a responsibility to protect those areas and maintain the

integrity of the marine environment, so we really have to look at that and our view, KASM's view is that this moving too fast, while we've got the technological ability to mine the oceans, we don't feel that we have the scientific understanding to predict the long term effects. And we know that our oceans are in trouble on many levels, from overfishing and pollution and we think that there needs to be a slow walk towards this as a possibility, rather than the race that's going on right now.

**Presenter:** Brian Abbott

**Speaker:** Phil McCabe, Chairman, Kiwis Against Seabed Mining

### **Solwara 1 will go ahead**

The National, June 24th, 2014

THE Solwara 1 Project will go ahead as planned, Mining Minister Byron Chan said. During a visit to his electorate recently, he told locals in Namatanai to prepare themselves for spin of benefits which the project would bring. "As the minister for mining, but more so as your member for Namatanai, I pledge myself to protect and serve you and I urge you to prepare yourselves when the world's first undersea mining kicks off in the near future," Chan said. He thanked Prime Minister Peter O'Neill for having confidence in him to be appointed as the mining minister. Chan's electorate houses the Lihir gold mine, Simberi and now the seabed mining. He said the former Somare government, which issued the mining license to Nautilus Mineral Ltd over 10 years ago, did it without proper consultation nor without any benefits tied to the project for the host provinces, East New Britain and New Ireland.

"It is this government of O'Neill-Dion that the benefits derived from the Solwara 1 Project of our marine time provinces," Chan said. His visit to the area attracted people from the seabed mining areas including; Naujama, Panaras, Patlangmat, Bimun, Neliut, Nargaragalap, Kulot, Tembin, Kontu, Lamou, Ujana, Messi, Danu, Damplet, Kalili, Komalu, Konakagogo, Kokola and 20 other villages. Meanwhile, Chan delivered over 240 solar lighting units for eight west coast central LLG wards of which 240 families received the units. He delivered a school truck for Kolube Primary School at Konogogo village. The total solar lights delivered so far was 1410 to families from Konoagil, Namatanai, Matalai and Central LLGs respectively. The other LLGs which would later receive the solar lights to include Tanir, Nimamar and LLG's in Central Namatanai.

### **Seabed mine rejection 'sets precedent'**

Radio New Zealand, 19 June 2014

A Taranaki iwi says the rejection of a seabed mining project has set the precedent for any future applications. Trans-Tasman Resources had asked to mine for iron ore in a 66-square kilometre area of seabed 22km off the coast of Patea. It was the first ever proposal for that type of project. The Environmental Protection Authority says there was uncertainty about the potential of effects on the environmental and on existing fishing and iwi interests. Ngaruahine chief negotiator Daisy Noble said the decision sets the bar for any future proposals. She said it was significant as it showed others their concerns would be taken into account. Ms Noble said it had won the battle so far, but believed Trans-Tasman Resources will appeal the decision, and it has 15 days to do so. Meanwhile, southern Taranaki iwi Te Runanga o Ngati Ruanui says it's ecstatic with the decision to reject the project. Te Runanga o Ngati Ruanui Trust chief executive Debbie Ngarewa-Packer said it made extensive applications opposing the application because of the unproven and unsafe mining methodology. She said she was jubilant its concerns were listened to. Ms Ngarewa-Packer said although Trans-Tasman Resources had the opportunity to appeal the decision, the trust was confident it would not be going through with it.

## Mining sector in shock over seabed mining rejection

New Zealand Herald, Jun 19, 2014



Trans-Tasman Resources wants to mine iron sands kilometres off the coast of Taranaki. Photo / Getty Images

Mining industry leaders are in shock over the rejection of an application to mine ironsands from the ocean floor off the coast of southern Taranaki, and one is questioning whether the six month fast-track process administered by the Environmental Protection Authority is too swift for complex mining projects, where changes to plans are often a feature of obtaining consent. A decision-making committee (DMC) appointed by the EPA yesterday rejected TransTasman Resources' bid to mine up to 50 million tonnes of ironsands annually, of which 90 percent would be returned to the seafloor after extraction of titano-magnetite iron ore, which would be shipped to Asian steel mills and would have added around \$150 million annually to export receipts, TTR had argued.

TTR spent seven years and more than \$60 million before seeking the first ever marine consent under a new regulatory regime established for the Exclusive Economic Zone, the vast area of ocean between the 12 mile territorial waters limit and 200 kilometres from the New Zealand coastline, but was told by the DMC that its bid was "premature." The executive director for the minerals lobbyist Straterra, Chris Baker, said he was "struggling with a reaction other than shock." "I understand the level of uncertainty that the DMC identified as being too big an issue to allow them to say yes, but where do we go from here? We've never had a process that's so binary." With more time than is allowed by the EPA's six month process, Baker suggested conditions could probably have been agreed to allow the mining project to go ahead in what he described as "a barren ironsands wasteland", inhabited predominantly by sandworms, which have adapted to re-establish because rough seas in the relatively shallow waters routinely disturb the seabed. "They come back very quickly and we're touching a few percent of it anyway," Baker said.

The DMC was also concerned about the 50 kilometre by 20 kilometre sediment plume that mining would have created, and its impact on the productivity of the marine environment, since it would receive much less sunlight. Uncertainties about the environmental impact of the project were too great to grant a consent, the DMC concluded. "One has to ask the question: has the process let us down and not allowed adequate consideration of the uncertainties and the conditions that would allow these uncertainties to be dealt with," said Baker. He predicted TTR's dilemma now would be whether to appeal the decision on points of law or mount a fresh application, and whether its coterie of mainly Australian, American and New Zealand investors would have the appetite to spend more on a project that had been rejected once. TTR chief executive Tim Crossley has been unavailable for comment since yesterday's announcement, although the company issued a statement expressing "extreme disappointment" at the decision. The full EPA Decision 17 June 2014:

[https://ramumine.files.wordpress.com/2014/06/trans\\_tasman\\_resources\\_decision\\_17june2014.pdf](https://ramumine.files.wordpress.com/2014/06/trans_tasman_resources_decision_17june2014.pdf)

## **Governor calls for debate**

Post-Courier, June 18, 2014

THE proposal to mine the sea bed area between the west coast of Namatanai in New Ireland Province and East New Britain needs more public awareness and debate, says East New Britain Governor Ereman ToBaining Jr. Mr ToBaining said proper consultation with the coastal communities in East New Britain, more awareness and more debate must be done by the developer – Nautilus Minerals – which intends to mine the ocean area in the Bismarck Sea, 30km from the nearest coast and at a depth 1600 metres. The ENB Governor said this after inviting Nautilus Minerals chief executive officer Mike Johnson and his team to do a presentation before the East New Britain Provincial Executive Council (PEC).

This is a new approach initiated by Mr ToBaining to welcome developers keen to invest in East New Britain to present their products and make their intentions known to the PEC for debate and awareness or update on the progress of project already underway. Another developer which embraced the opportunity to give its progress was Tzen Group of Companies, the palm oil developer in Pomio and parts of Gazelle district. Mr ToBaining said his government holds the interest of the people and any project set to enter East New Britain Province must go through the PEC for debate and also to get views from the general public. He invited Nautilus Minerals to an open forum next month in Kokopo, and also the general public, especially those living along the coastlines where the intended mine is located.

## **New Zealand may kick start race to mine the ocean floor**

By Sonali Paul and Gyles Beckford, Reuters, Chicago Tribune, June 15, 2014

MELBOURNE/WELLINGTON (Reuters) - New Zealand decides this week whether to approve an underwater iron-ore operation that would likely become the world's first commercial metals mine at the bottom of the sea. A green light to allow New Zealand's Trans Tasman Resources Ltd to start iron-ore dredging off the country's west coast will encourage others looking to mine copper, cobalt, manganese and other metals deeper on the ocean floor but worried about regulatory hurdles. Along the Pacific Rim of Fire, as deep as 6,000 metres underwater, volcano crusts, "black smoker" chimneys and vast beds of manganese nodules hold promise for economic powers like China and Japan as well as many poor island states busy pegging stakes on the ocean floor. "A lot of people are watching the Trans Tasman Resources outcome," said Michael Johnston, chief executive of Nautilus Minerals, which is working on a deep-sea project off Papua New Guinea and is also in talks with New Zealand.

Other countries in the Pacific looking at underwater mining include Fiji, Solomon Islands, Tonga and Vanuatu, which have all issued exploration licenses. Cook Islands in the South Pacific plans to put seabed exploration licenses up for bids later this year. In the 750,000 sq km (290,000 square miles) of territorial waters around the Cook Islands are mineral nodules the size of potatoes to lettuce heads and rich in manganese and cobalt, a resource Imperial College marine geoscientist David Cronan estimates at 10 billion tonnes. "If only 10 percent of that resource can be recovered it will be one of the largest mineral deposits ever discovered. It is a world class mineral deposit," says the Cook Islands National Seabed Minerals Policy, approved on June 10.

The push to explore the ocean is gaining momentum as ore grades on land decline and demand grows for metals in high-tech applications, and is more feasible now with the help of technology developed for the deepwater oil and gas industry. Still, there are technological hurdles and fears among scientists and environmentalists that mining could destroy fragile fisheries and exotic creatures at the bottom of the ocean. "Deep sea mining is coming faster than the scientific community



can monitor it," said Carlos Duarte, director of the University of Western Australia's Oceans Institute.

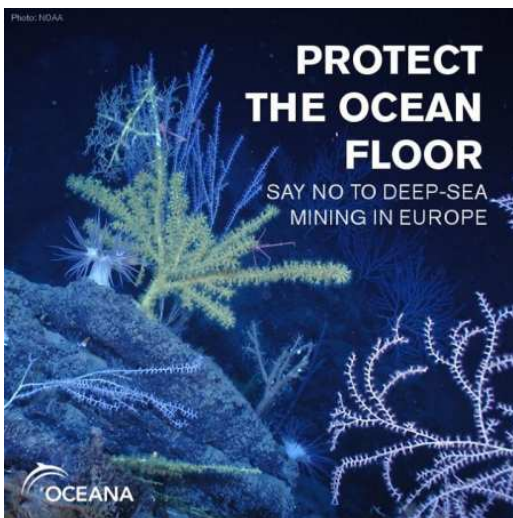
### **WAITING IN THE WINGS**

Trans Tasman Resources, which hopes to start mining in 2016, already has a mining licence but needs a marine consent from New Zealand's Environmental Protection Agency (EPA). This is the EPA's first test of regulating mining in the country's territorial waters. Its next is an application from Chatham Rock Phosphate Ltd, seeking to mine phosphate several hundred kilometres off the east coast of the South Island. Others waiting in the wings include Neptune Minerals, with deep sea tenements covering 175,000 sq km off several South Pacific countries, including New Zealand. While the world's biggest miners have no deep sea mining tenements, Anglo American PLC is keeping an eye on underwater prospects with a 5.95 percent stake in Nautilus.

The biggest backers for Nautilus are Omani oilfield services billionaire Mohammed Al Barwani and Russia's richest tycoon Alisher Usmanov's Metalloinvest Holding Ltd [MTALIM.UL], who together own 40 percent. The Canadian company aims to dig up a seafloor massive sulphide deposit, Solwara 1, about 1,600 metres underwater off Papua New Guinea, starting from 2017. Massive sulphide deposits form around deep sea vents that spurt super hot, acidic water with metals dissolved from the earth's crust. The metals drop out when the "black smokers" hit the cooler sea water and form rocky chimneys.

### **Deep sea mining-who will win the battle?**

Oceana, Author: Agata Mrowiec, June 12, 2014



Commercial deep-sea mining operations are set to become a reality by 2016 in the Pacific Ocean, and will have a negative impact on our planet that we cannot even begin to measure. According to official statistics, only 3 % of the oceans are protected (IUCN), and we have only explored about 1% of ocean floor (NOAA). It is clear that we must humbly recognize that very little knowledge exists about most of the natural processes taking place in the ocean's depths. Yet, the European Commission has placed seafloor mining high on its agenda, as one of the key priorities in their Blue Growth Strategy. What's worse, is that they have gone on to describe deep sea mining as one of the key components contributing towards the achievement of the "smart, sustainable and inclusive growth" outlined in the goals of Europe 2020.

So what is the cost to the environment? Although seabed mining does not require the construction of additional infrastructure, as is the case with land mining, it leaves a permanent footprint on the

marine environment. Industrial activities to excavate minerals using large robotic machines result in removing vast sections of the sea floor and damaging marine life. Furthermore, metals disseminated during the process of mining can easily be absorbed into fish, leading to the contamination of the food chain, and directly affecting the health of consumers. While the heated debate around deep-sea fisheries unveils a highly uneconomical and environmentally destructive activity, seabed mining looks like a twin evil. In fact deep-sea bottom trawling below 600 meters depth is known to have devastating environmental impacts, yet large-scale industrial mining projects are developing at the same depth and much deeper!

Scientists know very little about the effects this industry's activity will have on the seafloor: "This is both because it is difficult to model all of the likely impacts of such operations, and because of the limited scientific knowledge on the biological communities of the deep sea and the species that are found in them," confirms prof. Alex Rogers from the University of Oxford. The shortage of raw land minerals, the rise in prices, as well as a growing global demand for metals are the major factors behind the industry's quest for new sources of supply. But the reality is that enough of these materials are already in use, and efficient recycling policies can contribute to more cost-effective and sustainable alternatives to deep-sea mining. The Commission's Directorate General for Maritime Affairs and Fisheries recently launched a public consultation on seabed mining, serving as a platform for an open discussion on the subject. Oceana strongly invites e-activists, citizens and businesses to submit their opinions on the issue, and stand up against deep-sea mining. The question of seabed mining isn't only about economics and investments, it's also about what our society is ready to accept. Don't stay indifferent, take action and be heard!

**Say NO to deep sea mining:** <http://act.oceana.org/signup/deep-sea-mining-ec/>

### **Deep seabed mining is a new — and lightly regulated — ecological experiment**

Living on Earth, Public Radio International, Writer Adam Wernick, June 10, 2014

Undersea mining is an entirely new area of exploitation, the effects of which are not fully known. "We know less about the deep sea than we know about the surface of the moon," says environmentalist Richard Page. "So this is a big experiment." The "experiment" Page refers to is a project launched by a Canadian company called Nautilus Minerals to extract copper, gold and other valuable metals from the seabed off the coast of Papua New Guinea — nearly a mile from the ocean's surface. Page, an oceans campaigner for Greenpeace, says mining companies see a treasure trove at the bottom of the ocean. "There are three different kinds of mineral deposits in the deep ocean that industry is getting interested in," Page explains. "There are manganese nodules, which are found on the abyssal plain of the deep ocean; there are cobalt crusts — mineral-rich crusts — on a lot of the underwater mountains spread throughout the ocean; and deep sea vents, where there are deposits of metals, as well."

Some of the largest mineral deposits are in the Pacific Ocean, but there are others in the Atlantic and the Indian oceans as well. Page says Nautilus Minerals chose Papua New Guinea as its first location for exploration for several reasons. "It's a Pacific island-nation that has a large exclusive economic zone surrounded by water," Page says, "and it has an interesting deep sea geology — which has these large deposits of metals around vents. Relatively speaking, these would be technologically feasible to exploit." The government of Papua New Guinea sees this new venture as an economic opportunity for the country. But because the country is highly dependent on the ocean, seabed mining isn't supported by all of the country's citizens. There are many community groups that strongly oppose the agreement. And they're not alone. Global environmentalist organizations also worry that seabed mining could be devastating to deep ocean ecosystems.

“We all know that mining on land has all sorts of environmental impacts,” Page says. “It’s very difficult to contain mine tailings, even on land. In the ocean, which, of course, is a fluid environment with all these currents, we can expect widespread pollution.” Page says we can expect other ill effects, too — everything from smothering of deep sea creatures with sediment to light pollution, which in the deep sea will have an impact on creatures that have evolved to live in dark environments. Page says Greenpeace is calling for protection measures to be put in place now, before the “experiment” begins. “Less than three percent of the world’s oceans are either marine protected areas or ocean sanctuaries,” he notes. “And if we’re looking at waters beyond national boundaries, then it’s less than one percent.” Under the Convention on Biological Diversity and World Summit on Sustainable Development, governments and scientists agreed to the need for a global network of ocean sanctuaries, but they haven’t yet taken any action, says Page. “What we’re saying is we need to get those kind of measures in place before we start adding to the stresses being put on ocean ecosystems.”

“What we really need,” he continues, “is a new UN agreement that ties all these different elements together, so we start managing the oceans in a holistic way. ... We need an overarching framework, if you like, to manage our activities under the sea, so we don’t, for example, consider fisheries separate of seabed mining.” Right now, an organization called the International Seabed Authority is in charge of granting licenses to explore for minerals at the bottom of the ocean. Page worries it is not up to the challenge. “The International Seabed Authority was formed ... before the industry was really technologically possible, and at a time when we knew far less about the oceans than we do now,” he explains. “So I would say it isn’t really fit for the purpose. There are rules it has set which will apply to seabed mining operations in international waters, but those rules don’t take into account what is happening in the water column and other activities.”

The greatest fear for Page, and for others already concerned about the state of the planet’s oceans, is that the deal between Nautilus Minerals and Papua New Guinea is the start of a trend. Technological advances, largely developed from deep sea oil drilling, and the huge demand for the precious metals used in all of our electronic devices have created the right conditions for companies and countries looking to exploit the riches of the ocean floor. “If this venture is successful,” he says, “then we can expect to see an explosion of deep sea mining. We’ve [already] got something like 19 licenses, I believe, in international waters, and there are other countries and companies looking to do it within the economic zones of specific islands. So the Papua New Guinea venture is really the tip of the iceberg, I think.”

### **PNG church says PM betrays over seabed mining**

Radio New Zealand, 9 June 2014

A church in Papua New Guinea has accused the country's Prime Minister, Peter O'Neill, of betraying his people by allowing deep sea mining. The Evangelical Lutheran Church has called on Mr O'Neill to explain why he supported Canadian-based Nautilus in its deep sea mining project despite the objections of 1.2 million Lutherans and the teachings of the Bible. In a letter to the prime minister, the church's Pastor Kinim Siloi, said the church wanted answers. Mr O'Neill is a member of the Lutheran church.

### **PNG seabed mining restarts following dispute settlement**

Sci Dev Net, 5 June 2014

Speed read

- Canadian mining firm Nautilus will dig up mineral deposits from the sea floor

- The government has an initial 15% shareholding in the Solwara 1 project
- Opponents warn about the social and environment impacts of sea bed mining

*[PORT MORESBY] After long delays, the world's first sea bed mining project in Papua New Guinea (PNG) is back on track despite stiff opposition from green groups, church leaders and scientists.*

In a press conference last 30 May, Mel Togolo, PNG country director of the Canadian mining firm Nautilus Minerals, announced that the Solwara 1 project is "gaining momentum", with production expected in 2016, following the settlement of disputes on counterpart funding from the PNG government. He said their firm has also completed the assembly of a bulk cutter on the sea floor, the first of heavy robotic machinery to be used for underwater excavation. Nautilus is the first company to commercially explore the ocean floor for polymetallic seafloor massive sulphides. These sulphide deposits contain high grades of copper, gold, silver and zinc. The firm got its environmental and mining permits in December 2009 from the PNG government to start operations at a location in the Bismarck Sea, north of PNG.

Issues concerning the PNG government's failure to pay its equity share delayed the project for the past years. But the dispute was resolved last April after the government paid Nautilus a non-refundable deposit of US\$7 million through a loan from the Bank of South Pacific. This is part of the government's US\$120 million investment for an initial 15 per cent shareholding in the Solwara 1 project. The government is expected to increase its share to 30 per cent in the next 12 months. But in a show of growing resistance, 80 per cent of the respondents in a recent poll by a PNG daily newspaper voted against the deep sea mining venture. In January 2014, the head bishop of the 1.2 million-member Evangelical Lutheran Church of PNG, Giegere Wenge, issued an official statement, entitled "No to experimental deep sea mining in PNG". The church organisation has also challenged PNG Prime Minister Peter O'Neill, who is a member of the denomination, to "listen to the call of his people".

Opponents emphasise that more scientific research is needed to ascertain the social and environment impacts of sea bed mining on marine life as well as fisheries, one of the major revenue-earning sectors in the island nation. But Nautilus chief executive Mike Johnston argues that since the project area is located 30 kilometres off land, "there are no villages that need to be disturbed and the economic benefits are also quite pronounced". Still, scientists such as Richard Steiner, a marine conservation professor from the University of Alaska, expressed fear that by going ahead with sea bed mining, Nautilus would endanger marine organisms or even cause their extinction. In an independent review of the environmental impact of the project, Steiner noted: "Not much is understood yet about the living organisms found around the hydrothermal vents where the mining will take place, including the likely impacts that sea bed mining will have on their existence."

### **Nautilus mine a concern**

Post-Courier, June 05, 2014

The much-talked-about Nautilus mining project is a great concern for the people of New Ireland and the other island provinces. Public concerns have been raised over the Solwara 1 project, attracting the interest of International community. The concerned communities want to see the scientific findings and the environment impact of the mining that must be provided by the people taking lead in the project to show the local community that it will not do any harm to the sea. They are concerned about their sea because they depend mostly on sea for their sustenance. The community of New Ireland in Morobe, including staff and students at the University of Technology, got together in 2011 and called on the government to put a stop to the project because such mines had not oper-

ated in the world. If they want to test it here in PNG and if it does not work out it will destroy the marine lives in the sea, the islanders said.

The president of New Ireland of Morobe (NIOM) group Gerard Songi said people in the villages are still confused because there had not done any awareness on the positive and negative impact of the project. The Unitech students have done some and had come up with some ideas that they will provide to the government when they meet next time. They did some research last year. Mr Songi acknowledged the national MPs who had supported them to stop the project from going ahead. He said professional ethics and codes of conduct should be displayed when dealing with the lives of people. He also challenge Nautilus executive Mel Togolo and the company to hold a public forum and tell them the truth and not tell "lies" based on the environmental impact statement which cannot be guaranteed as conclusive by scientists. He also challenged others who are responsible for marine lives and the lives of the people to look at the issue and address it.

### **Nautilus to set up community development scheme**

Post-Courier, June 03, 2014

NAUTILUS Minerals is looking at establishing a community development scheme which is set to benefit those from the mine impact communities it will be operating in. This was revealed by Nautilus country manager Mel Togolo last Friday during a project update meeting. Mr Togolo said this to be an initiative the company had resolved to pursue. He said the scheme would be voluntary and its aim would be to contribute to community projects with focus on water and sanitation in East New Britain and New Ireland, where it will soon be opening an office. He said the company will, for every ore that it lifts, inject into a fund K2 adding this is set to grow and on a yearly basis bring in a yield of approximately K4million. He said the fund would be managed by an independent board. "There will be a company representative on the board but the majority sitting on it will be independent and eminent Papua New Guineans who will decide on how the funds will be spent," he said. Mr Togolo said for the creation of the projects, the company would be working in consultation with authorities at the provincial and local level government. He added they would be looking at engaging local expertise in delivering these community projects. The company is also looking at assisting with infrastructure projects along the West Coast of New Ireland.

### **Solwara 1 eyes 2016**

The National, 02nd of June, 2014

By GYNNIE KERO

THE seafloor production tools for the Solwara 1 project by Nautilus Minerals are 90% complete with production expected in 2016, country manager Mel Togolo said. He said the project has been gaining momentum since the company and the state signed an agreement in April. Providing an update on the project last Friday, Togolo said the second tool has been assembled and the final tool would be assembled this month. "The riser and lifting system which will be used to transfer the mined material from the seafloor to the surface within an enclosed system is over 50% complete," he said. Nautilus Minerals has started work on expanding its offices in Port Moresby and Kavieng, New Ireland. Togolo said the Canadian seafloor miner was committed to train locals and has begun recruitment positions for human resources, administration and women's affairs.

He said: "It is Nautilus's vision to train Papua New Guineans to be the first in the world to operate the seafloor production tools which is truly an exciting and rewarding opportunity for nationals. "The Solwara 1 project will provide real benefits to the people of Papua New Guinea. Nautilus Minerals is now working on a variety of initiatives which they plan to implement by fourth quarter this

year. “We’ll bring additional 15% workforce every year, when we reopened office in New Ireland we’ll have two or three people there. “I want Papua New Guineans to get maximum benefit through increase of local hire. “Important thing is Papua New Guineans own 15% of the company, with an option to take an additional 15%.” In terms of regular awareness conducted by the firm, Togolo said: “We’ve been doing serious awareness on a quarterly basis since 2007, on the West coast of New Irelands and East New Britain during that time we have talked to more than 10,000 people.”

### **Nautilus: Work begins on machines**

The National, May 30th, 2014

NAUTILUS Minerals on Wednesday said the assembly of its second of three tools, the collecting machine, had this week commenced at a facility in the United Kingdom. The collecting machine is the lightest of the three, weighing 200 tonnes when fully assembled. This tool is designed to collect material cut from the seafloor by drawing it in as seawater slurry with internal pumps and pushing it through a flexible pipe to the riser and lifting system. The Canadian seafloor miner said the production support vessel arrangements for the Solwara 1 Project would be in place at the end of the year. Nautilus will mine gold and copper under the Bismarck Sea.

### **Nautilus starts building second underwater machine**

By: Henry Lazenby, MiningWeekly, 28th May 2014



Photo: Nautilus Minerals

TORONTO (miningweekly.com) – Prospective Canadian deep-sea miner Nautilus Minerals on Wednesday announced that it had started building its second seafloor production tool (SPT), the collecting machine (CM), at third-party manufacturer Soil Machine Dynamics’ (SMD’s) facility at Newcastle upon Tyne, in the UK. Nautilus, which plans to mine copper and gold from the Solwara 1 seafloor project, offshore Papua New Guinea, said that it had split excavation and collecting mineralised material into three individual tasks, which would each be carried out by a different SPT. The Toronto-based company explained that the auxiliary cutter (AC) is designed as the pioneering tool, which prepares the rugged seabed for the more powerful bulk cutter (BC), which the company had already built. While these two tools gather the excavated material, the third – the CM – would collect the cut material by drawing it in as seawater slurry with internal pumps and push it through a flexible pipe to the subsea pump and on to the production support vessel (PSV) through the riser

and lifting system. “Having already announced in April this year, the completion of the assembly of the BC, we are delighted that the assembly of the CM has now started, with the arrival of the chassis at the SMD facility.

“This is an exciting time for the company as we continue to build the seafloor production equipment. We look forward to start the assembly of the third and final SPT, the AC, when its chassis is delivered next month,” Nautilus CEO Mike Johnston said. Last month, Nautilus reported that the Papua New Guinea government had paid \$113-million into escrow, representing the balance of the State’s 15% share of capital required to complete the Solwara 1 offshore project up to first production. At the end of last month, Nautilus announced that it had resolved the dispute with the State and signed an agreement with the State’s nominee, Eda Kopa (Solwara) Limited, a subsidiary of Petromin PNG Holdings, enabling the project to move forward toward production.



Photo: Nautilus Minerals

With Eda Kopa having paid its share of the project development capital, Nautilus’ focus now shifts to chartering a production support vessel and securing certain intellectual property rights within six months for Eda Kopa. The funds will be released to Nautilus when both conditions have been met. The company is in discussion with potential vessel partners, while also undertaking a tender process with shipyards experienced in building offshore construction vessels. Nautilus own 70% of the project, with the government of Papua New Guinea holding a 30% interest. Nautilus’ share price had more than doubled since the start of the year, spiking to its highest level in two years last month, after the company announced it had resolved its dispute with the Papua New Guinea government. However, in the stock’s recent history, at C\$0.53 apiece on Wednesday, the share price was nowhere close to the lofty C\$3.48 level seen early in 2011.

### **MIDAS (Managing Impacts of Deep-sea resource exploitation) Project and EU DG Mare Stakeholder Consultation on Seabed Mining *May 26, 2014***

Posted by eucmed in [COASTAL MANAGEMENT & RESEARCH](#). by Magdalena A K Muir

The MIDAS project – Managing Impacts of Deep-sea resource exploitation – is a multidisciplinary research programme that will investigate the environmental impacts of extracting mineral and energy resources from the deep-sea environment. This includes the exploitation of materials such as polymetallic sulphides, manganese nodules, cobalt-rich ferromanganese crusts, methane hydrates and the potential mining of rare earth elements. MIDAS is funded under the European Commission’s Framework 7 programme and started on 1 November 2013 for a period of 3 years. The

MIDAS project intends to carry out research into the nature and scales of the potential impacts of mining, including 1) the physical destruction of the seabed by mining, creation of mine tailings and the potential for catastrophic slope failures from methane hydrate exploitation; 2) the potential effects of particle-laden plumes in the water column, and 3) the possible toxic chemicals that might be released by the mining process and their effect on deep-sea ecosystems. Key biological unknowns, such as the connectivity between populations, impacts of the loss of biological diversity on ecosystem functioning, and how quickly the ecosystems will recover will be considered. A major element of MIDAS is the development of methods and technologies for preparing baseline assessments of biodiversity in areas of potential commercial extraction, and monitoring activities remotely in the deep sea during and after exploitation.

The MIDAS project intends to use this information to develop recommendations for best practice in the mining industry. A key component of MIDAS is the involvement of industry within the project and through stakeholder engagements to find feasible solutions. It will also work closely with European and international regulatory organisations to take these recommendations forward into legislation. Despite the broad scope of this project, there is no reference to civil society, or the inclusion of any parties other than industry. The MIDAS partners are predominantly academic institutions, industry, and consultants, with the 32 partners listed on the project website here. No environmental non governmental organisations (ENGOS) are partners, though some partners have links with or work with ENGOS. The MIDAS project is referred to by EU DG Mare website in its discussion of seabed mining ([http://ec.europa.eu/maritimeaffairs/policy/seabed\\_mining/index\\_en.htm](http://ec.europa.eu/maritimeaffairs/policy/seabed_mining/index_en.htm)), so the project could have an important role in shaping future EU policy. Upon inquiry to the MIDAS project, it was indicated that there may only be an opportunity for ENGOS and civil society to participate in open conferences near the end of the project. Information will also be published on the project website and newsletter. However, information provision is not meaningful engagement or participation. Therefore, there is no meaningful opportunity for civil society organizations and local communities to participate in the MIDAS project, or in the development of best practices for deep sea resource exploitation under this project. In the absence of meaningful civil society and local community participation, DG Mare should not rely solely or significantly on deliverables of the MIDAS project for determining best practices or any regulatory framework.

EU DG Mare will need to establish a separate process for civil society participation in the development of best practices and the overall regulatory framework for deep sea resource exploitation. This separate process would also be required to facilitate the development of broad social acceptance by civil society and local communities for these deep sea and seabed activities. This social acceptance has been an EU priority for offshore renewable energy and grid infrastructure development in the North Sea and been recognized as of great importance by the EU across its many activities. This observation about meaningful participation by civil society and local communities has relevance for the DG Mare Stakeholder Consultation on Seabed Mining. The European Commission's Directorate for Maritime Affairs and Fisheries has initiated a stakeholder consultation exercise on seabed mining. It is posted as an online questionnaire. DG Mare is seeking responses from public authorities, citizens, companies and organisations concerned with seabed mining. This seabed mining consultation is open until 16 June 2014, and it is very important that that civil society and local communities provide their views. EUCC will be participating in this consultation, and will post consultation remarks subsequently through this blog and documentation on the EUCC website.

### **Further information**

EU Stakeholder Consultation on Deepsea Mining:

[http://ec.europa.eu/dgs/maritimeaffairs\\_fisheries/consultations/seabed-mining/index\\_en.htm](http://ec.europa.eu/dgs/maritimeaffairs_fisheries/consultations/seabed-mining/index_en.htm)



## **Pacific Civil Society says no to seabed mining**

Radio New Zealand, May 21, 2014

A concerned group of NGOs say deep sea mining in the Pacific is being pushed forward without regard for ethics and moral principles. The Pacific Civil Society group has issued a statement, signed by the PNG-based Bismarck Ramu Group, the Pacific Conference of Churches and the Pacific Network on Globalisation, saying there is too much emphasis on financial benefits, and too little on the impact on the environment and people. A meeting in Rarotonga last week had 60 delegates discussing financial measures around the prospect of harvesting 'rare earth' minerals on the seabed around the Pacific. Previous meetings have dealt with environmental concerns and social impacts, and the Secretariat of the Pacific Community has contributed advice from its applied geoscience and technology division. But the Pacific Civil Society group says the Pacific is again being used as a testing ground, after nuclear testing last century, and there has been little consultation with land-owners.

## **Cook Islands Considers Modifying Environment Act For Seabed Mining**

*Regulations needed before undersea mining begins*

By Ben Chapman-Smith

RAROTONGA, Cook Islands (Cook Islands News, May 20, 2014) – Changes are set to be made to the Environment Act in preparation for any future seabed minerals exploration in the Cook Islands. Before significant land-based projects can take place, those involved must submit an Environment Impact Assessment (EIA) which clearly outlines the potential risks. A similar process will have to take place with deep sea exploration but regulations first need to be developed to strengthen the EIA clause of the Environment Act, said Vavia. Tangatataia, Manager of Advisory and Compliance at the National Environment Service (NES). "This deep sea mining sector is new so we need to put the rules in place. What we're doing now is trying to incorporate this into the environment permits and consents regulation." Tangatataia said these regulations will sit under the umbrella of the Environment Act. The NES is working closely with the Seabed Minerals Authority, Crown Law and the Secretariat of the Pacific Community to develop the regulations. It is also working with the Commonwealth Secretariat to address the limitations of the Environment Act.

The Seabed Minerals Authority, which last week hosted a regional workshop in Rarotonga, is likely to begin issuing the first exploration licences in the next year. One of the main challenges involved in assessing environmental impact is the depth this work will take place, in some cases up to 5000m below the ocean's surface, Tangatataia said. "For land-based mining it's easy for us to go out and monitor projects. But with these (deep sea mining operations) it involves a lot of money and it's beyond our ability." Accordingly, the NES is trying to develop capacity to identify how proper assessments can be done to make sure the mining operations won't damage the environment. "Even though it's quite deep, you'd be amazed at how much life is down there that needs to be protected." Dr Kifle Kahsai, Chief Geoscientist at the Secretariat of the Pacific Community, spoke at last week's workshop and warned Pacific Island countries to take their time and weigh up the risks before issuing their first licences for seabed minerals exploration. Tangatataia agreed with those comments. "There's no need to rush, or afterwards, we may regret the impacts of this."

## **Cook Islands Sea Bed Mining Briefing ‘Hijacked’ By Activists**

*Environmentalists ‘making a big noise’ dominate public forum*

By Ben Chapman-Smith

RAROTONGA, Cook Islands (Cook Islands News, May 19, 2014) – A seabed minerals update meeting held for the public this week was disrupted by certain individuals who "hijacked" the event, says Seabed Minerals Commissioner Paul Lynch. Organised by the Cook Islands Seabed Minerals Authority (SBMA), the public session was scheduled to run from 6pm to 7pm at the Rarotongan Beach Resort on Wednesday - but ended up finishing an hour late. A group of panellists were on hand to make presentations about deep sea minerals and then respond to questions from the audience. Lynch said a few loud individuals ended up dominating proceedings and preventing others from asking questions. "It was hijacked by people who didn't want to listen or ask questions of our panel. With locals, if someone's making a big noise they'll go back into their shell." The public meeting came in the middle of a major regional workshop on deep sea minerals - attended by dozens of overseas representatives – which was held in Rarotonga this week.

Lynch said the main purpose of this workshop – and accordingly, the public meeting - was to look specifically at the financial aspects of deep sea minerals. Those that "hijacked" the meeting had no interest in talking about these issues but focused purely on environmental concerns, he said. Jacqui Evans, Marine Park Project Manager for environmental group Te Ipukarea Society (TIS), said she found the meeting "awkward" and "repetitive". "It was long-winded. They should have given an opportunity for panellists to say something and they didn't provide a space for us to ask questions. They kept trying to steer the discussion away from the environment." She said she was more interested in putting questions to the SBMA than the panellists, but was prevented from doing so. "They just kept telling us: 'The panel are specialists and are only here for a short time, you need to ask them questions'." One positive was the presentation from Alison Swadling, an Environment Advisor with the Deep Sea Minerals Project, Evans said.

"She said we need to understand the impacts first before we decide whether to mine or not, because so often the Government has taken it for granted that we will mine without knowing what the impacts will be." Criticism of the meeting also came from visiting environmental activist Sue Arnold, head of Australians for Animals International. "Most of the evening was taken up with long and repetitive sermons that ate away question time. It must have been the only expert panel that didn't receive more than one question as Paul Lynch kept trying to change the focus to financial issues when the environment, cultural, and legal issues are paramount." Arnold said the meeting failed to give Cook Islanders an opportunity to address "the very serious concerns" associated with deep sea mining. Lynch said there will be plenty of opportunity for members of the public to learn more about deep sea minerals and ask questions. SBMA will in time be holding other meetings in community halls to talk about these issues, he said.

## **Tiefsee ohne Bergbau**

### **Alternativer Meereskongress fordert besseren Schutz der Ozeane**

In Bremen erarbeitete ein breites Bündnis eine Resolution gegen Umweltverschmutzung, Ausbeutung der Meere und für faire Schifffahrt und Fischerei.

Neues Deutschland, 19.05.2014, von Burkhard Ilschner

»Stop seabed mining. Please.« (Stoppt den Tiefseebergbau. Bitte.) - Ebenso nachdrücklich wie emotional appellierte Maureen Penjueli vom »Pacific Network on Globalisation« an die Teilnehmer der zivilgesellschaftlichen Meereskonferenz, die am Sonnabend nach zwei Tagen zu Ende gegangen ist. Der Ruf der zierlichen Frau aus Papua-Neuguinea hatte zumindest einen kleinen Erfolg: Die Schlussresolution des Kongresses beinhaltet »ein internationales Moratorium für den Abbau von

Erzen aus der Tiefsee« - ohne Wenn und Aber. »Ein anderes Meer ist möglich!« - unter diesem Motto hatte ein breites alternatives Bündnis nach Bremen eingeladen, um gemeinsam Position zu beziehen gegen den »Europäischen Tag der Meere«: So heißt ein am Montag in der Hansestadt an der Weser beginnender Messekongress der Europäischen Kommission und des Bundesverkehrsministeriums. Brüssel und Berlin haben diese seit 2008 an jährlich wechselnden Orten stattfindende Veranstaltung aktuell unter der Überschrift »Innovation driving Blue Growth« der Meerestechnologie und der nachhaltigen Nutzung der Meeresressourcen gewidmet.



Auch diese eindrucksvolle Drohgebärde wird seinen Lebensraum nicht vor der Ausbeutung schützen. Foto: AFP/Justin Marshall

Das Bündnis aus Umwelt- und Naturschutz, Entwicklungs- und Flüchtlingshilfe sowie gewerkschaftlichen und kirchlichen Gliederungen, das den Alternativkongress einberufen hatte, hält diese einseitige Ausrichtung europäischer Meerespolitik auf Wachstum und Nutzerinteressen für falsch. Auf Einladung des Projekts »fair oceans« des Bremer Vereins für Internationalismus und Kommunikation (IntKom) und des evangelischen Entwicklungsdienstes »Brot für die Welt« hatten daher Vertreter der Organisationen, die zusammen mehrere hunderttausend Menschen repräsentieren, gemeinsam mit der interessierten Öffentlichkeit Gegenkonzepte diskutiert und einen umfangreichen Forderungskatalog verabschiedet. Es ist ein beachtlicher Zusammenschluss, der sich da zu Wort meldet: Neben regionalen Initiativen und Netzwerken fanden sich der Bund für Umwelt und Naturschutz Deutschland (BUND), der Bundesverband Bürgerinitiativen Umweltschutz (BBU), die Deutsche Seemannsmission, das Forum Umwelt und Entwicklung (FUE), Greenpeace, medico international, der Naturschutzbund Deutschland (NABU), Robin Wood, die Internationale Transportarbeiter-Föderation (ITF) und die Umweltstiftung WWF zusammen. Sie alle sehen sowohl die europäische als auch die globale Meerespolitik und unser aller Umgang mit den Meeren vor einer Richtungsentscheidung. Der immer stärkere Zugriff auf die lebenden, mineralischen und energetischen Ressourcen der Meere gefährde den Erhalt der marinen Ökosysteme und befördere die ungleiche und ungleiche Entwicklung.

Es gelte, stattdessen die Entschleunigung des globalen Wettlaufs um die Schätze des Meeres in den Mittelpunkt öffentlichen Interesses zu rücken, so das Bündnis. Die Initiative warnt nachdrücklich vor der akuten Gefahr, auf See dieselben Fehler zu wiederholen, die an Land zu Umwelt-, Klima- und Entwicklungskrisen geführt haben und weiter verursachen, und skizziert daher notwendige Alternativen zu einer nur ökonomisch ausgerichteten Meerespolitik. Für den Schutz der marinen Artenvielfalt sei es unter anderem erforderlich, die Tiefsee unangetastet zu lassen und die Vermüllung der Meere zu beenden, auch müssten deutlich mehr Meeresgebiete unter effektiven und kontrollierten Schutz gestellt werden. Die Resolution kritisiert ferner schädliche Fischereitechniken und -subventionen und fordert, die industriell organisierte Überfischung zu beenden sowie die Ernährungssicherung durch Kleinfischerei zu unterstützen. Zudem plädiert das Bündnis für den Schutz

der Menschenrechte auf See durch eine andere Flüchtlingspolitik und mahnt eindringlich faire Arbeitsbedingungen in der Schifffahrt an: Das System der Billigflaggen gehöre abgeschafft, nur durch die Bindung der Flagge an Nationalität und Wohnsitz der Eigentümer sei eine Kontrolle der Verantwortlichkeiten an Bord möglich. Kai Kaschinski, Sprecher von »fair oceans« sagte zum Abschluss, die Resolution solle mit den enthaltenen Alternativen »Grenzpfeiler fürs Blaue Wachstum« setzen.

**Regional Director General says not enough data to safely allow experimental seabed mining**

*Collecting more information about the marine environment is a “critical need” if people are to make informed decisions about seabed mining, said the Director General of the South Pacific Regional Environment Program*

PNG Mine Watch, May 19, 2014



David Sheppard, Director General of SPREP

In Papua New Guinea the government has already issued a Mining Lease and Environmental Permit for experimental seabed mining, but that is premature according to the Director General of SPREP, David Sheppard. Sheppard says there is a critical need for more baseline environmental data to be collected to enable Pacific countries to ensure informed decision making and strengthen the responsible management of their deep sea mineral resources. Sheppard also says mining companies like Canadian company Nautilus Minerals which holds the permit in PNG, need to do more scientific work to justify their mining plans. “The companies themselves need to allocate money for independent scientific studies of the biodiversity and the environment in the deep sea. There is good understanding of the mineral deposits but we need to have the same level of information of the deep sea ecosystems where they occur”. Sheppard’s comments were made during a regional workshop in the Cook Islands in January.

Sheppard also said seabed mining needs to be considered within the wider context of the marine environment and its resources. “To date much of the discussion has been focussed on project level EIA but this needs to be done within a wider context of strategic plans and assessments such as marine spatial planning, cost benefit analysis and sustainability appraisals. We need to consider deep sea mining as only one of the potential uses of our ocean resources and consider it in an integrated way along other uses such as conservation, fisheries and tourism paying particular attention to accumulative impacts, setting acceptable thresholds, equity of benefits and long term sustainability.” Sheppard emphasized the need to take a precautionary approach to experimental seabed mining, something the PNG government and its environment agency have manifestly failed to do. “We need to proceed cautiously in line with the precautionary approach especially since this is an activity that has not been carried out anywhere in the world and ensure that public consultation and participation in decision making is at the core of this process.

## **Seabed mining: Need to protect environment**

Cook Islands News, May 15, 2014 Written by Emmanuel Samoglou

Attendees at this week's deep sea minerals workshop heard about the environmental issues of mining on the seabed floor. A presentation on the topic was made by Alison Swaddling, an Environment Advisor with the Deep Sea Minerals (DSM) Project - a regional training programme jointly devised and implemented by the Secretariat of the Pacific Community (SPC) and the European Union. During her presentation, Swaddling said there are a series of environmental management considerations that need to be looked at, including understanding the effects on marine ecosystems, and understanding, managing, and monitoring the potential impacts of any mining activity. According to DSM Project literature, the Cook Islands exclusive economic zone contains roughly 7.5 million metric tonnes of manganese nodules, which are located at a depth between 3000 and 5000 metres below sea level. It is believed that 32 million metric tonnes of cobalt is located on the nation's seabed floor – 520 years worth of supply based on current global demand. Swaddling said a variety of animals such as worms, sponges, molluscs (snails) live in the surrounding environment or on the nodules themselves – which, on average, fit in the palm of a hand.

Potential impacts to marine life would result from a number of mining activities, from the removal of the target material from the sea floor to the disposal of waste material (tailings) and transport of product to markets. Additionally, light and noise from mining could have the potential to either attract or repel marine life. As an example of the seabed floor's unique and delicate ecosystem, Swaddling showed a 1978 image where nodules were previously recovered. Photographed again some 26 years later, the same area showed the original disturbances on the floor – where it is said a bottom current of less than 5 cm per second exists. Environmental objectives should involve maintaining overall biodiversity and ecosystem health and functions, and if mining sites will be permanently altered, Swaddling said a network of marine reserves should be established to achieve environmental objectives. Additionally, she said mining companies contracted to source the nodules will need to monitor sites, while government officials should have a necessary monitoring regime in place to keep tabs on the contractors themselves.

## **Income From Sea Bed Mining In Cooks Could Eclipse Tourism**

*Cook Islands has "world class resource worth 'a vast sum'"*

By Ben Chapman-Smith

RAROTONGA, Cook Islands (Cook Islands News, May 15, 2014) – Mining of deep sea minerals in the Cook Islands could provide an economic return which is at least equivalent to the tourism industry, says a government advisor. Darryl Thorburn, from the Seabed Minerals Authority (SBMA), said he is wary of throwing around figures but the country's seabed minerals resource is worth "a vast sum." "What we know is the Cook Islands has a world-class resource. The likely return, if a mining operation does go ahead, is at least equivalent to the tourism industry." Those returns for the Government would come in the form of income tax and royalties. According to a 2013 survey by marine geochemist David Cronan, the Cook Islands Exclusive Economic Zone (EEZ) contains 10 billion tonnes of manganese nodules, which contain minerals like manganese, nickel, copper, titanium and cobalt.

Thorburn, the SBMA's Minerals and Natural Resources Advisor, said the gross value of the resource as it sits in the ground - based on the content of nickel, copper and cobalt - is about \$US1.7 trillion. "If you could only extract 10 per cent of that, you're still looking at about \$174 billion (of gross revenue for the Cook Islands people)." He said people should not be blinded by those large figures because only a portion of the total revenue would end up in Government coffers. "You've got to take off mining costs and lots of other things. We don't know what these mining costs are go-

ing to be yet." Exploration activities are anticipated to take place over the next three to five years, following a licensing process likely to commence later this year.

Part of the exploration work will involve mapping the seabed more thoroughly to understand its topography. This will be done in tandem with geotechnical work, and environmental and ecological studies necessary for understanding the ecology at depths of 5000 meters. Even though the Cooks has a large resource within its EEZ, it is possible that only 1 per cent could be mineable because of undersea volcanoes and "humps", he said. "It's more likely to be 40 per cent which is still a big number." Mining is unlikely to start until at least the end of this decade, depending on the development of cost-effective technology, Thorburn said. A number of concerns have been raised about seabed mining in the Cook Islands, such as the environmental impacts and whether foreign companies will profit more than the country. "It could be that the Cook Islands people say 'No, leave them in the ground'," Thorburn said. He spoke yesterday at a regional workshop focusing on the financial aspects of deep sea minerals, being held at the Rarotongan Resort.

### **New Zealand: Second seabed mining consent application lodged**

New Zealand Herald, May 15, 2014

Opponents to seabed mining are preparing for their second battle this year, with the lodging of a marine consent application for a phosphate nodule mining project on the Chatham Rise off the Canterbury coast. Chatham Rock Phosphate (CRP) yesterday lodged with the Environmental Protection Authority its formal consent application to mine a large area of seabed at the Chatham Rise. It comes as an EPA-appointed decision making committee is considering an application by Trans Tasman Resources (TTR) for a mining project off Taranaki, following a lengthy round of hearings and with staunch opposition from environmental groups, iwi and the seafood industry. CRP is proposing to mine phosphate nodules from the rise, initially within an 820 square kilometre area for which it has a mining permit, and later, potentially a wider 10,192 square kilometre area, dependent on monitoring results and environmental investigations. The company proposes to mine at least 30 square kilometre of seabed each year to meet its annual minimum production target of 1.5 million tonnes of phosphate nodules.

If its lengthy application, representing four years of work and \$25 million in investment, is accepted as complete, it will be publicly notified, beginning a following six-month process expected to lead to a decision in November. It is the second seabed mining proposal under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012. The marine consent is the only major licence that CRP now needs to begin the project. CRP managing director Chris Castle said he was confident the application would meet expected standards. "Our focus has always been two-fold: base the analysis on science and consult with all interested parties to ensure their concerns are addressed through the process," he said. "Input from both stakeholders and scientists is critical to make sure all the bases are covered." Mr Castle said results of the analysis and consultation were that the company understood what the environmental impacts were likely to be, "and we can clearly demonstrate how we can minimise and mitigate them". "We know this project can deliver to its shareholders financially, and to other stakeholders in terms of environmental requirements."

CRP has argued the phosphate mining project would free New Zealand from around \$100 million of imports annually of phosphate, a key input for New Zealand farming, and could produce a new source of exports. Environmental Defence Society chairman Gary Taylor said while the company had kept his group updated throughout the process, it had not yet formed a position on the application. "Our main concern with the proposal is the extent and range of the plume from the seabed disturbance." Mr Taylor said more information had also been needed on how the activity would affect the area's benthic environment. "We don't have enough information to see if the effects are safe or

not. I think there are more questions than answers with this project." The EDS was still to analyse the scientific information in the formal consent application before it would look at lodging a submission.

Deepwater Group, a fisheries industry lobby, has also previously voiced concerns about the Chatham Rise project, with fears it could be "potentially catastrophic" for the marine environment. Its chief executive, George Clement, was not immediately available for comment this morning. A spokeswoman for Kiwis Against Seabed Mining (KASM) said the group would oppose the application. Last year, environmental groups expressed outrage that the Government could not vote to protect deep ocean habitats from the threat of seabed mining at the world's largest conservation congress because it had already issued prospecting and exploration permits to CRP. New Zealand was one of a handful of nations at the International Union for Conservation of Nature's World Conservation Congress to oppose a motion which sought a broad range of conservation measures to protect three types of deep ocean habitat from the effects of mining.

## **Pacific Islands Urged Not To Rush Into Sea Bed Mining**

*Regional meeting in Cooks focuses on financial benefits of industry*

By Ben Chapman-Smith

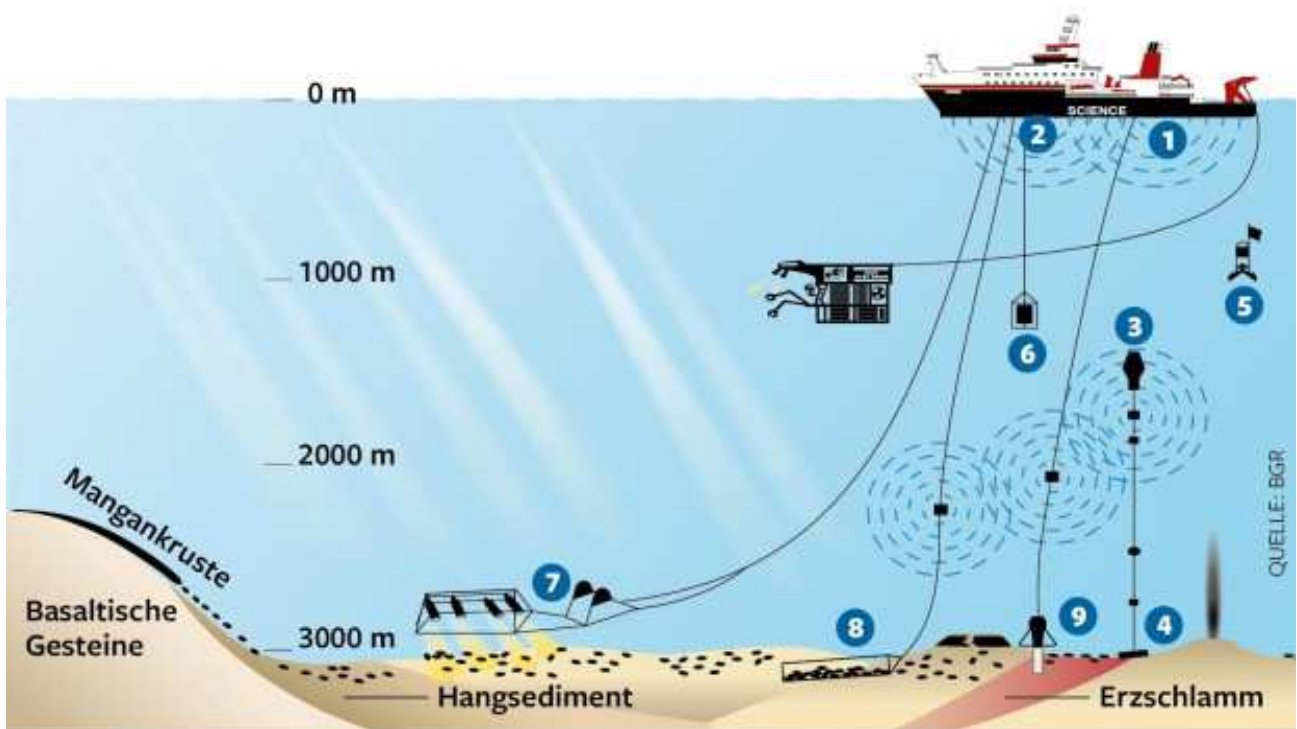
RAROTONGA, Cook Islands (Cook Islands News, May 15, 2014) – A regional training workshop focusing on the financial aspects of deep sea minerals kicked off in Rarotonga yesterday. In his opening address, Dr Kifle Kahsai, Chief Geoscientist at the Secretariat of the Pacific Community, brought a word of caution to the more than 70 overseas delegates. "Historically, mining has negative connotations due to the risks of adverse social and environmental impacts, as well as poor mining revenue management associated with some land-based mining operations." The same problems have been associated with other extractive industries like fisheries and logging, he said. "The real challenge here is to learn from the mistakes of the past and to ensure that those mistakes are not repeated when deep sea mining commences."

Now is the time for Pacific nations to be talking about how to tackle the challenges, Kahsai said. "Unless real benefits and tangible development outcomes outweigh the cumulative adverse impacts of mining, the minerals may best be left in the ground." Kahsai said another major challenge lies in developing the technology for deep sea mining – a sector still in its infancy. "Additionally, mining operators must ensure that ore extraction and processing are performed in an environmentally sustainable manner." He warned the Cook Islands Government to make sure any future revenues generated by seabed minerals are put towards helping the people. "How is the government going to improve the livelihoods of the Cook Islands people? This is a long-term development project."

This week's training course, which runs until Friday, aims to help Pacific countries better understand the likely financial benefits of mining for deep sea minerals, and mechanisms for managing revenues sustainably. The workshop is being hosted by the Cook Islands Seabed Minerals Authority, with funding from the Secretariat of the Pacific Community and European Union's joint regional DSM Project. There are 15 members of the DSM Project, which was set up in 2011 to help Pacific countries prepare for future seabed mineral activity. Members of the public are invited to attend a general seabed minerals update meeting tonight from 6-7 at the Rarotongan Resort.

## **Goldgräberstimmung. Jagd nach den besten Schätzen der Tiefsee**

*Im Atlantik, im Indischen Ozean und im Pazifik: Von Forschungsschiffen aus erkunden Geologen die Rohstoffe in der Tiefsee. Bei der Jagd nach den begehrten Lagerstätten mischt auch Deutschland mit. Von Holger Kroker, Die Welt, 14.5.2014*



DIE WELT

Foto: Infografik Die Welt Die Technik zur Erkundung von Manganknollen: (1) Lot und Echograph; (2) Lot zur Erfassung ozeanographischer Messdaten; (3) Messkette mit Auftriebskörper; (4) Verankerung; (5) Freifallgreifer; (6) Bathysonde; (7) Schleppkörper mit Kamera und Licht; (8) Großprobennahme; (9) Einzelprobennahme zur Knollen- und Bodenuntersuchung

Hell erleuchtet ankert das Forschungsschiff "Sonne" mitten im Indischen Ozean. Gerade geht die echte Sonne hinter dem Horizont unter, schlagartig fällt Dunkelheit über das Meer. Nur die starken Scheinwerfer auf dem Arbeitsdeck des Schiffes bringen Licht in die heraufziehende Nacht. Für den romantischen Sonnenuntergang aber hat hier niemand Augen. Es herrscht gespannte Konzentration. Backbord steht Kapitän Oliver Meyer, er überwacht die anstehende Prozedur, spricht über Walkie-Talkie mit dem Wachhabenden auf der Schiffsbrücke. Bootsmann Torsten Bierstedt und fünf Matrosen warten auf beiden Seiten des Decks an den Winden und Leinen. Bierstedt gibt knappe Kommandos, organisiert die Vorbereitungen. In der Mitte der Plattform stehen die vier Mitglieder der Tauchroboter-Crew vom Kieler Meeresforschungszentrum Geomar (<http://www.geomar.de/>) auf ihren Plätzen. Chefsingenieur Martin Pieper hält mit dem Headset Kontakt zum Steuercontainer des Tiefseetauchboots ROV Kiel 6000. Von dort kommen die Informationen über die Position des ferngesteuerten Fahrzeugs, des ROV. Pieper gibt sie leise an seine Kollegen weiter.



Foto: pa Metallsuche im Indischen Ozean: Das Forschungsschiff "Sonne" im Hafen von Port Louis auf Mauritius



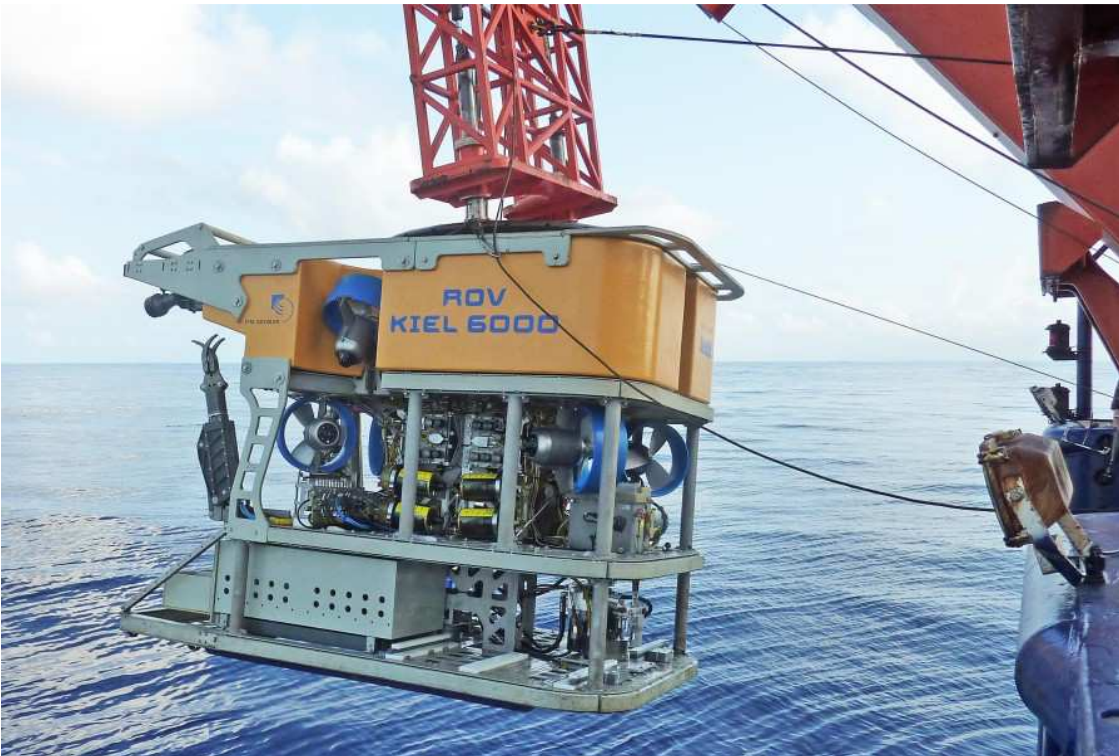


Foto: pa Der Tauchroboter ROV Kiel 6000, mit dem Forscher die Tiefsee nach Bodenschätzen absuchen



Foto: pa Manganknollen sind über riesige Flächen am Meeresgrund verteilt

Das ROV steigt gerade auf, vom Meeresboden in 3000 Meter Tiefe. Seit morgens um 9 Uhr ist es unterwegs gewesen, um am Grund nach Neuem zu suchen. In der Nacht geht seine Tagesmission nun zu Ende. Das Gefährt bringt mit, worauf auf dem Schiff alle sehnsüchtig warten: Sedimente, Gesteins- und Wasserproben und Informationen über die ferne Welt am Boden des Ozeans. Dort vermuten Forscher große Mengen Rohstoffe. Die Crew des Schiffs soll Daten darüber sammeln, ob diese Region wirtschaftlich interessant sein könnte. Die "Sonne" befindet sich rund 1400 Kilometer südöstlich von Mauritius über dem Rand des Südindischen Rückens. An diesem unterseeischen Ge-

birgszug entsteht neuer Meeresboden. Afrikanische und australische Krustenplatten werden hier auseinandergedrückt.



Foto: pa Aufnahme eines sogenannten Kastengreifer, der ein 50 x 50 Zentimeter großes und rund 40 Zentimeter tiefes Stück Meeresboden mit Manganknollen aus dem Pazifik ausgestanzt hat

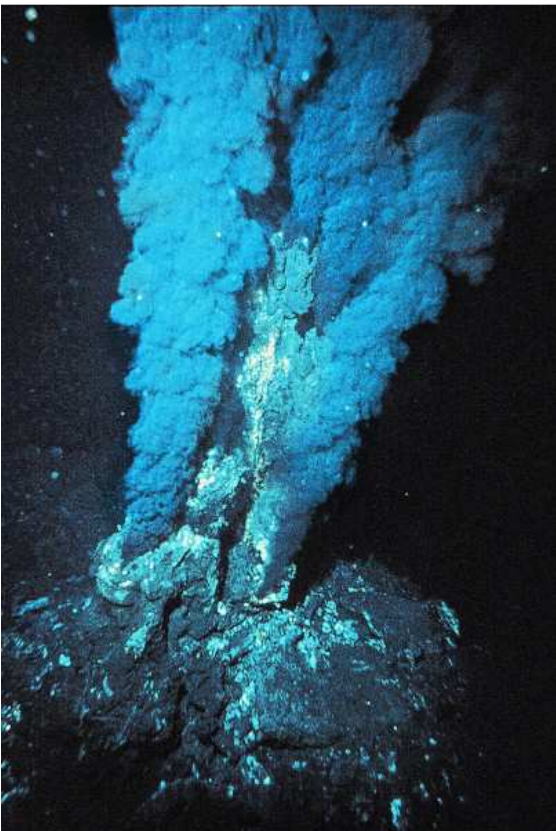


Foto: Wo schwarze Raucher sind, ist der Gehalt von Bunt- und Edelmetallen hoch

### **Schwarzen Raucher enthalten Erze**

Auch Dutzende Kilometer neben der zentralen Risszone tritt Magma aus dem Meeresboden aus, und die Energie aus dem Erdinneren speist große Felder von Schwarzen Rauchern. Diese natürlichen Schlote entstehen, wenn in der Nähe der Magmakammer das über Risse und Spalten in die

Erdkruste eingedrungene Wasser erhitzt wird und dann unter hohem Druck aus dem Meeresboden herausschießt. Das heiße Wasser laugt das Gestein aus und ist mit gelösten Mineralen hochgesättigt. Beim Kontakt mit dem kalten Meerwasser fällt diese Mineralfracht aus. So wachsen die charakteristischen Schloten. Für Geologen sind solche Hydrothermalfelder interessant, denn sie sind produktive Erzfabriken: In den Kamine der Schwarzen Raucher ist der Gehalt von Bunt- und Edelmetallen hoch. Je heißer es an den Schloten ist, umso wahrscheinlicher sind dort Erze gelöst. Erze, die für die Industrie interessant sind. Tags zuvor hatte Expeditionsleiter Uli Schwarz-Schampera mit dem sicheren Blick des Fachmanns einen unscheinbaren Brocken aus einem Haufen Gesteinsproben vom Meeresgrund gegriffen und in zwei Hälften gesägt. Tiefgrün glänzten die Schnittflächen. "Mindestens 30 Gewichtsprozent Kupfer", hatte der Lagerstättenkundler von der Bundesanstalt für Geowissenschaften und Rohstoffe (BGR, [http://www.bgr.bund.de/DE/Home/homepage\\_node.html](http://www.bgr.bund.de/DE/Home/homepage_node.html)) zufrieden gemurmelt.

### **Vier Hydrothermalfelder erkundet**

Vier Hydrothermalfelder hat die "Sonne" auf dieser Forschungsmission besucht. Bei jedem Tauchgang hat der Kieler Tauchroboter beeindruckende Bilder auf die Bildschirme an Bord übermittelt: Felder voll mit Kissen aus harter Lava, die entstanden sind, als heißes Magma beim Kontakt mit dem Meerwasser erkaltete. Schroffe Grate und Canyons, deren steile Hänge von Schuttfächern bedeckt sind. Sie zeigen, wie aktiv die Geologie am Meeresgrund ist. Einst rissen Erdbeben den Boden auf, später lösten weitere Beben Gesteinslawinen aus, die die Risse zum Teil wieder zuschütteten. An den Computermonitoren beobachteten die Forscher tagsüber, wie der ROV an aktiven Schloten vorbeitaucht. Garnelen bedecken die Raucher wie zottiges graues Fell. Ein roter Seeigel sitzt in Tausenden Meter Tiefe. Ein paradiesischer Anblick für die Biologen an Bord. Direkt daneben erheben sich erloschene Schwarze Raucher. Sie ziehen die Geologen an Bord in ihren Bann. Nicht eine einzige Muschel verirrt sich auf das dunkle Gestein. Hier ist Leben rar, hier spielen Erze die Hauptrolle. An Bord der "Sonne" aber warten die Forscher darauf, dass der ROV endlich aus der Tiefe auftaucht. Sie wollen Daten aus dem Roboter auslesen und seine Mitbringsel, die Proben aus der Tiefe, auswerten.

### **Ohne Hightech sind die Forscher blind**

Plötzlich flammt 30 Meter neben dem Schiff, mitten im blauschwarzen Ozean, ein flaschengrüner Fleck auf. Er wird größer und größer, leuchtet heller und heller: Es ist der Kieler Roboter, der mit voll aufgedrehten Scheinwerfern die letzten Meter seiner Mission zurücklegt. Als er durch die Wasseroberfläche bricht, verwandeln seine Steuerpropeller den glatten Ozean in einen grell beleuchteten Whirlpool. Für die Schiffsbesatzung und die Kieler ROV-Crew geht die harte körperliche Arbeit nun los. Während der Roboter langsam heranschwimmt, löst Azubi Sebastian Thimm die Sperrketten am Heck, Matrose Jürgen Kraft geht an das Bedienpult des riesigen Heckkrans und schwenkt ihn weit nach achtern, dem leuchtenden und sprudelnden Tauchfahrzeug entgegen. Die anderen auf dem Deck halten sich bereit. Der Roboter nähert sich dem Heck. Über ihm schwebt der Heckkran und der massive Aussetzrahmen aus Stahlgitterwerk. Jürgen Kraft senkt behutsam den Kran, das ROV wird angekoppelt.

Wie ein Spielzeug wird das 3,5-Tonnen-Gefährt aus dem Wasser gehoben und triefend an Bord der "Sonne" gehievt. Es gerät leicht ins Schaukeln, die Männer an Deck haben alle Hände voll zu tun. Schließlich steht das gut zwei Millionen Euro teure Gefährt sicher an Bord. Die ROV-Mannschaft braucht fünf Minuten für die erste Schnellkontrolle, ob der Roboter den Acht-Stunden-Einsatz in der Tiefsee gut überstanden hat, dann winkt Team-Leiter Fritz Abegg die ungeduldig wartenden Wissenschaftler heran. Endlich wollen sie ihre Proben in Händen halten und untersuchen. Die Fahrt zu vier Black-Smoker-Feldern ist kein Ausflug mit Technologiedemonstration, sondern eine Expedition zur Erkundung von Tiefseebodenschätzen, die bundesdeutsche Firmen vielleicht künftig auch einmal abbauen wollen.

### **Deutsche sammeln Daten für Lizenzgebiete**

Damit es dazu kommen kann, hat die BGR seit 2011 drei große Expeditionen in diese Region des Zentralindischen Rückens durchgeführt. Ihr Ziel: Daten sammeln für ein zweites deutsches Lizenzgebiet für Tiefseebodenschätze. Eine solche Explorationslizenz für Black-Smoker-Felder im Indischen Ozean hat die Bundesregierung im Dezember beantragt. Deutschland steht in den Ozeanen der Welt im Wettbewerb mit zahlreichen Konkurrenten. Er dreht sich um wissenschaftliche Daten und Erkenntnisse und wird mit Forschungsschiffen wie der "Sonne" ausgetragen. Er dreht sich aber auch um Wirtschaftspotenziale und wird von Diplomaten am Verhandlungstisch, etwa dem der UN-Behörde für Meeresböden (ISA), geführt. Das UN-Organ im jamaikanischen Kingston ist für die Verwaltung und Nutzung der Meeresböden auf hoher See, also außerhalb nationalstaatlicher Einflussphären, zuständig.

17 Erkundungslizenzen hat die ISA bereits erteilt: im Atlantik, im Indischen Ozean und im Pazifik. Im Stillen Ozean besitzt Deutschland bereits seit 2006 ein solches Lizenzgebiet, im ozeanischen Nirgendwo den Pazifiks auf halber Strecke zwischen Mexiko und Hawaii. In dem rund 75.000 Quadratkilometer großen Gebiet liegen potenziell wertvolle Manganknollen. Und jetzt soll ein weiteres Lizenzgebiet im südlichen Indischen Ozean hinzukommen, in der Region, in der das Forschungsschiff "Sonne" seine Erkundungsfahrten unternimmt. Wie groß das Interesse der Staaten an den Rohstoffen am Meeresgrund ist, demonstrierten indische Wissenschaftler vor einem Dreivierteljahr. Wie Deutschland bewirbt sich auch Indien um Teilgebiete in dieser Region.

### **Nationalflagge auf dem Meeresgrund**

22 von 100 möchte der Staat für sich gewinnen. Über die Vergabe soll die ISA entscheiden. Bei einem Tauchgang filmte das Kieler ROV aber bereits eine indische Nationalflagge, die von einem indischen Erkundungsteam in Tausenden Meter Tiefe symbolkräftig ausgesetzt worden war.

"Wir sind jetzt Anfang des 21. Jahrhunderts in der Situation, dass die Metallpreise seit Jahren steigen und dass man dadurch nach neuen Rohstoffvorkommen schaut", erklärt Michael Wiedicke, der bei der BGR die Meeresgeologie leitet. "Wir greifen praktisch den Faden aus den 1970er-, 80er-Jahren auf und versuchen, ihn mit unseren heutigen Methoden weiterzuführen."

Der Run auf die Rohstoffe aus der Tiefsee nimmt wieder an Fahrt auf. Es ist der Metallbedarf der Hightechindustrie, der die erneute Suche nach Lagerstätten in der Tiefsee antreibt. Von Windturbinen bis zu Smartphones – überall werden Rohstoffe verwendet, die selten und daher teuer sind. Gute Lagerstätten am Meeresboden sind entsprechend begehrt. Beim Tiefseebergbau herrscht Goldgräberstimmung. Neben den Schwarzen Rauchern sind es vor allem Manganknollen aus dem Pazifik, die das Interesse geweckt haben. Sie besitzen außer dem namengebenden Metall auch viel Kupfer, Kobalt und Nickel. Zudem enthalten sie Molybdän und Vanadium sowie Spuren von Seltenen Erden. Die wertvollen Knollen standen vor 40 Jahren schon einmal auf der Wunschliste der Industrie. Auch damals wähten sich die überirdischen Bergbaukonzerne vor einer Rohstoffkrise und entdeckten die Tiefsee. Diese Krise kam jedoch nicht, denn es wurden neue Lagerstätten an Land gefunden - und über Nacht waren all die schönen Tiefsee-Pläne Makulatur.

### **Konzerne wittern lohnendes Geschäft**

Dass der aktuelle Bergbauboom am Grund der Ozeane ebenso schnell in Vergessenheit gerät, bezweifeln Experten allerdings. "Durch die Energiewende werden wir weniger fossile Energieträger einsetzen, gleichzeitig jedoch mehr metallische und mineralische Rohstoffe verbrauchen", sagt etwa Samantha Smith, Umweltmanagerin bei Nautilus Minerals. "Wir werden uns entscheiden müssen, woher diese Metalle kommen sollen." Nautilus Minerals, hinter dem namhafte Bergbaukonzerne stehen, glaubt, dass sich für das Unternehmen am Meeresgrund ein lukratives Geschäft entwickeln kann. Zurzeit kämpft die kanadische Firma noch darum, ihr erstes Bergbauprojekt auf Schwarze Raucher in den Hoheitsgewässern von Papua-Neuguinea realisieren zu können. Ein Streit mit der Regierung des Landes hat die Pläne bislang verzögert. Zwar haben die Parteien gerade eine Eini-

gung verkündet – doch muss die noch umgesetzt werden. Die mögliche Rohstoffausbeute in dem Bergbaugebiet Solwara-1, das 1700 Meter unter der Meeresoberfläche liegt, klingt verlockend. "Der Kupfergehalt in diesem Vorkommen liegt bei sieben Prozent, und wir haben mehr als sechs Gramm Gold pro Tonne Gestein", sagt Smith. An Land werden Lagerstätten mit 2,3 Gramm Gold pro Tonne abgebaut. Allerdings dürfte Solwara-1 insgesamt nicht mehr als 15 Tonnen Gold liefern, so viel wie der südafrikanische Gold-Konzern AngloGold Ashanti in einem einzigen Jahr aus seinem größten Bergwerk, der Mponeng-Mine im westlichen Witwatersrand, gewinnt.

### **Tiefseebergbau spielt nur eine Nebenrolle**

So viel ist auch den großen Unternehmen klar: Der Tiefseebergbau wird gegenüber dem an Land immer nur eine Nebenrolle spielen. Regionen mit Schwarzen Rauchern sind in der Regel nicht größer als ein paar Fußballfelder – und nicht gerade häufig. Bei Investitionen von einigen Hundert Millionen Euro für die Abbaumaschinen würden nur eine große Zahl von Feldern den Abbau wirtschaftlich machen. Ein Vorteil ist, dass ein Bergbauschiff von Einsatzort zu Einsatzort gebracht werden kann. An Land ist die Infrastruktur an einer Lagerstätte hingegen verloren, wenn diese erschöpft ist. Anders sieht es bei den Manganknollenfeldern aus. Die Klumpen liegen über gigantische Flächen verteilt, und die Masse macht es. Nimmt man die derzeit gehandelten Wertmetall-Gehalte als Anhaltspunkt, so ruhen auf dem Meeresgrund des deutschen Lizenzgebiets im Pazifik 25 bis 30 Millionen Tonnen Kupfer, Kobalt und Nickel. Dennoch bleibt die große Frage, wie man die Metalle aus der Tiefsee an die Oberfläche bekommt. Sowohl bei den Black Smokern als auch bei den Manganknollen denkt man an ferngesteuerte Roboter, die den Meeresboden aberten und Material zu einem Schiff an der Oberfläche pumpen. Bei den Schwarzen Rauchern ist es relativ einfach: Sind sie erst erloschen, brechen die Kamine nach einiger Zeit von selbst zusammen und bilden Schutthügel. Diesen Schutt braucht die Maschine nur noch kleiner zu brechen und abzupumpen.

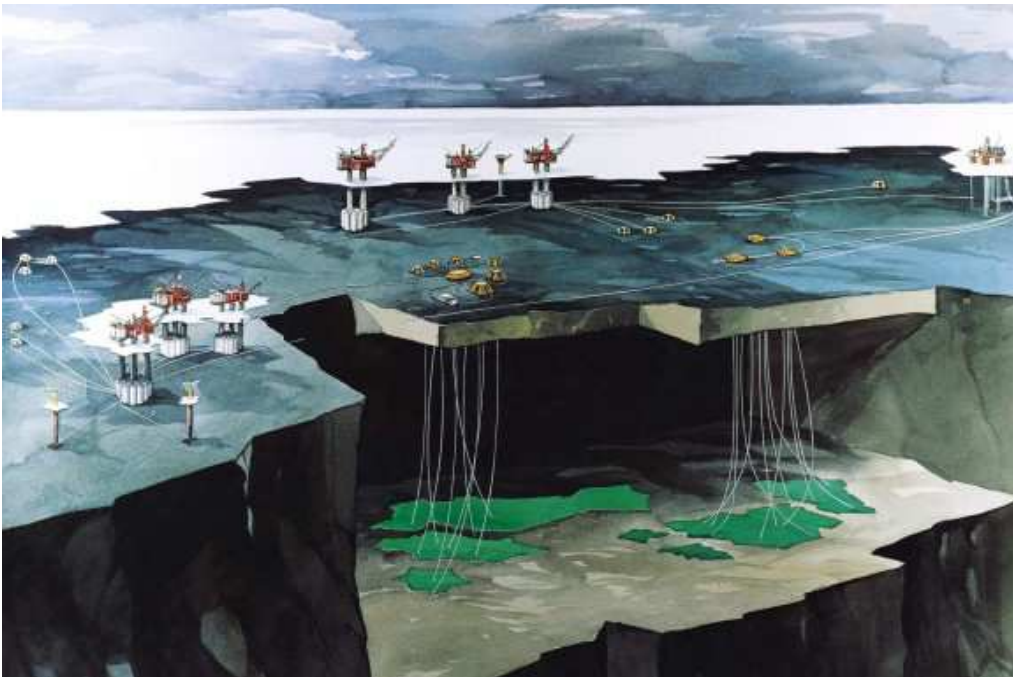


Foto: Laila S mme/Statoil; So stellen sich Ingenieure die künftige Unterwasserfabrik vor: Auf dem Meeresgrund in 3000 Meter Tiefe sollen fußballfeldgroße Maschinenparks entstehen, die bislang unerreichte Gas- und Ölvorkommen erschließen.

### **Eingriff in die letzten unberührten Naturräume**

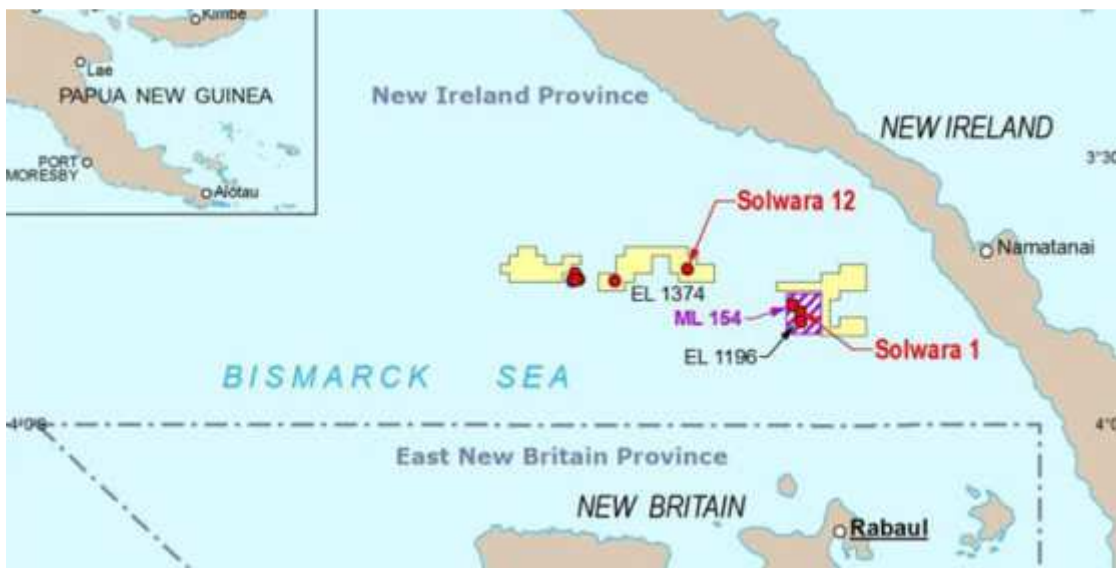
Doch es gibt auch starke Bedenken gegen den Tiefseebergbau, schließlich greift der Mensch damit in einen der letzten weitgehend unberührten Naturräume der Erde ein. Deshalb verlangt die ISA, dass die Manganknollen nicht flächendeckend geerntet werden, vielmehr müssen große Schutzzonen ausgewiesen werden, in denen die Natur nicht gestört werden darf. Auch für die Felder mit Schwarzen Rauchern sind Schutzkonzepte vorgeschrieben. Nur unbelebte Felder dürfen abgebaut

werden, um aktive Felder werden Schutzzonen eingerichtet. Ob das viel nützt? Vor mehr als 20 Jahren haben deutsche Meeresforscher einen Langzeitversuch vor der Küste Südamerikas gestartet. Sie pflügten eine Testfläche um und kontrollierten nach sechs Monaten, nach drei, vier und sieben Jahren, die Artenvielfalt und die Anzahl der Organismen.

Das Ergebnis: Schon nach drei Jahren lebten wieder so viele Tiere wie vor dem Versuch in dem Areal. Die Artenvielfalt aber hatte sich selbst nach sieben Jahren noch nicht erholt. Vor allem diejenigen Lebewesen, die einen harten Untergrund brauchen, waren betroffen, denn das einzig harte Substrat in den endlosen Schlickebenen der Tiefsee sind in der Regel die Manganknollen. Bis 2017 will die Meeresbodenbehörde Richtlinien für den umweltschonenden Umgang mit der Tiefsee erarbeitet haben. Dann sollen die ersten Explorationslizenzen in echte Abbaulizenzen umgewandelt werden. Eine britische Tochterfirma des US-Rüstungskonzerns Lockheed Martin will dann mit der Probeförderung beginnen. Doch bis der Bergbau in der Tiefe in großem Maßstab vorstättengeht, wird noch einige Zeit vergehen. Und es werden noch viele Nächte auf Forschungsschiffen wie der "Sonne" vergehen, in denen Wissenschaftler sehnsüchtig auf das Auftauchen ihrer Tauchroboter warten – um sich dann voller Freude auf ihre wissenschaftliche Ernte zu stürzen.

### **Nautilus petition gets 7,980 signatures**

PNG Mine Watch, May 14, 2014



An online campaign to collect signatures to petition against Canadian-based Nautilus Minerals for the undersea mining operation in Papua New Guinea (PNG) has today reached 7,980, just 20 shy of the target which is 8,000. The controversial underwater mining will break up the top layer of the seabed at a depth of 1,500 metres to pump the ore to the surface as slurry. The petition will be passed to the Prime Minister Peter O'Neill after 8,000 signatures are collected. However, environmental campaigners say mining the ocean floor could prove devastating, causing lasting damage to marine life as well as to the health and livelihoods of the people of PNG. Environmental campaigners have long argued that seabed mining will be hugely destructive to deep sea ecosystems. Leakages, spills and pollution from chemicals used to extract ore could all cause irreversible damage to the oceans surrounding the mine site. Despite the wide public outcry, Nautilus Minerals has finalised an agreement with the government of PNG to start deep sea mining in its coastal waters. It will be the first time in the world that ore will be extracted from the ocean floor.

## **SOPAC and the EU continue to push experimental seabed mining despite community opposition**

*SOPAC continues to push for experimental seabed mining against the wishes of Pacific peoples - while using classic doublespeak to pretend its intervention will ensure positive outcomes, something that is manifestly untrue...*

**Deep Sea Minerals Finance Workshop: Making sure the Pacific Islands are not left short-changed** Secretariat of the Pacific Community (SPC) Suva, Fiji, The Jet, via PNG Mine Watch, May 12, 2014

Deep sea minerals have the potential to be a game changer for the Pacific. Whether they will bring a change for the good or the bad will be determined by the financial management of governments and their ability to adopt and enforce sensible environmental safeguards. If revenue is managed transparently and prudently while protecting the environment, deep sea minerals could greatly improve the economies and livelihoods of the Pacific Islands countries. To address these issues, the Secretariat of the Pacific Community (SPC) is holding a regional workshop, the fifth in its technical training series. This workshop will be held in Cook Islands on 13–16 May and will centre on the ‘Financial Aspects’ of the upcoming deep sea minerals industry. The workshop will bring together more than 60 Pacific Island government minerals and finance officials and experts from around the globe for the first regional event of its kind on managing the potential wealth generated from the extraction of deep sea minerals.

Although deep sea mining is yet to occur world-wide, there is much commercial interest in mineral formations, such as nodules, crusts and seafloor massive sulphides that have been discovered on the seabed, thousands of metres below sea-level, particularly in the Pacific Ocean. The event is organised by SPC’s European Union-funded Deep Sea Minerals (DSM) Project, working with the Pacific Financial Technical Assistance Centre (PFTAC) – a subsidiary of the International Monetary Fund (IMF). A wide range of interested stakeholders will attend the workshop, from as far afield as South Sudan, Norway, and Mauritius as well as Timor Leste, with the aim of sharing their experiences and professional expertise. The workshop will discuss how to turn those minerals sitting on the deep ocean floor into new revenue for Pacific Island countries to expand their economies.

The workshop will focus on how countries that choose to proceed to mining can capture a fair ‘deal’, through good governance of revenue received, and learn from past lessons, both elsewhere and closer to home. This is where the SPC-EU DSM Project regional training events play an important role. The workshops are designed to prepare Pacific Island countries for all aspects of regulating their deep sea minerals. Previous workshops covered other subjects, including environmental, legal, social and geological aspects of DSM. The deep sea minerals industry has the potential to make a positive impact on the lives of Pacific people; however, there are issues, risks and uncertainties that need to be addressed. The DSM Project stresses the importance of engagement and participation among a wide variety of stakeholders, from local communities all the way up to regional non-governmental organisations, to enable Pacific countries to make well informed decisions for their economies, their people, and their islands.

## **European consortium develops sustainable seabed mining solutions - key role for dredging companies**

Dredging News Online - May 9, 2014

The European Commission is helping to take seabed mining to the next level by funding a four-year project entitled: "Breakthrough Solutions for Mineral Extraction and Processing in Extreme Environments – Blue Mining". The overall aims of the project are to develop new cost-effective solutions for environmentally friendly mining and processing in difficult conditions and extreme envi-

ronments, and to further unlock the large potential of raw materials in Europe. The development of sustainable seabed mining solutions is important in Europe for several reasons. Firstly, it will help to secure raw materials for Europe's high-tech industry, which depends on importing vital metals. Secondly, it will further enhance Europe's leadership in advanced deep-sea technologies on a global scale. And thirdly, it will enable new education, skills and knowledge to be offered by universities and research centres.

The extreme conditions found on the ocean floor raise specific challenges, both technically and environmentally, which are demanding and entirely different from the challenges of land-based mining. The project will be carried out by a group of 19 large European industry and research organisations with various maritime fields of expertise – the "Blue Mining" consortium. The consortium will develop solutions that will bring deep-sea mining a significant step closer. The "Blue Mining" project will address all aspects of the value chain in this field, from resource discovery to assessment, and from exploitation technologies to the legal and regulatory framework. The goal is to create breakthrough solutions for the sustainable exploration and extraction of deep-sea mineral resources. IHC Merwede is leading the project and Uniresearch is providing administrative services.

Key members of the Blue Mining consortium include:

Aker Solutions GmbH - Germany

Dredging International N.V. - Belgium

IHC Merwede B.V. - The Netherlands

IMS Ingenieurgesellschaft MBH - Germany

MTI Holland B.V. – Technical coordinator - The Netherlands

2H Offshore Engineering Ltd. - United Kingdom

Bundesanstalt fuer Geowissenschaften und Rohstoffe - Germany

Fundacao da Faculdade de Ciencias da Universidade de Lisboa - Portugal

Helmholtz Zentrum fuer Ozeanforschung Kiel - Germany

Natural Environment Research Council - United Kingdom

Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek – TNO - The Netherlands

Norges Teknisk-Naturvitenskapelige Universitet NTNU - Norway

Rheinisch-Westfaelische Technische Hochschule Aachen - Germany

SOTON University of Southampton - United Kingdom

Stichting Martiem Research Instituut Nederland - The Netherlands

Technische Universitaet Bergakademie Freiberg - Germany

Technische Universiteit Delft - The Netherlands

Guardship BVBA - Belgium

Uniresearch B.V. - The Netherlands

### **Call for more study into seabed mining**

The National, 09th of May, 2014

NORTHERN Governor Gary Juffa has challenged the Government to conduct studies on the effects of seabed mining on marine resources. He related this to the Solwara 1 project in New Ireland, which he questioned Fisheries Minister Mao Zeming in Parliament yesterday. Juffa asked Zeming if the ministry or the National Fisheries Authority would conduct an independent study on the effects of seabed mining on the marine resources. He asked what the Ministry's stand would be if scientists found the project to cause harm to the marine environment. Zeming agreed that the fishing industry would be a concern, however, the developer had already been granted a license to carryout the project by the previous government. He said he would get information from the fisheries authority and make a statement to the House later.



## **Experimental seabed mining is not ‘world class’**

Rosa Koian via PNG Mine Watch, May, 8, 2014

‘World class’ has become such a nice catch phrase that even members of parliament ride with it without really giving some thoughts to what it means. This week member for Chuave Mr Wera Mori decides to come out of his shadow and be a mouthpiece for Nautilus Minerals and welcomes ‘world class experimental seabed mining ‘ in PNG. Mr Mori however, fails to realize that for PNG to be the first to test a technology for seabed resource extraction is never best for this country. The seabed mining technology is never going to be Papua New Guinea’s. Poverty and pristine ecosystem destruction however, will be Papua New Guinea’s. Nautilus Minerals has ignored all calls to stop this destructive test project. They have bullied PNG into an, unnecessary arbitration outside of the country and forcing PNG to pay up US\$118 million. In a country stricken by poverty US\$118 million will go a very long way to help with health and education services and the long overdue police housing. To throw away this amount of money on an unprofitable exercise is a miserable mistake for PNG.

As well as the Solwara 1 experiment Papua New Guinea has added to its ‘world class’ list the dumping ground for all sorts of rejects; lamp flaps, sheep tongue, chicken feet, used clothes, used cars, used barges, outdated medicine, factory rejects of consumer items and the list goes on. How low can PNG go for a very high traditional culture that boasts thousands of years of crafting, that an experiment is allowed to take away the only shark calling culture in the world? Shark calling is by Papua New Guinea standards world class and is not an import but created by Papua New Guineans. ‘World class’ often promises good, best, the first, the richest and so on and even though Papua New Guineans are not new to the negative impacts of terrestrial resources extraction, particularly mining, many leaders bend when dollars dance. Words like these (world class) make human minds lazy and turn populations into dependent and expectant communities. The will to produce anything disappears and they wait for outsiders to bring them gifts and oftentimes they end up with gifts of unhappiness and poverty. Papua New Guinea would do well if its leaders like Wera Mori would do a little bit of homework before picking up the microphone

## **Cook Islands Hosts Deep Sea Minerals Workshop**

*Financial aspects of mining to be discussed*

By Ben Chapman-Smith

RAROTONGA, Cook Islands (Cook Islands News, May 7, 2014) – Dozens of overseas delegates are coming to Rarotonga next week for a deep sea minerals workshop focusing on the financial aspects of mining. The training course, which runs from Tuesday to Friday, aims to help Pacific countries better understand the likely financial benefits of mining for deep sea minerals, and mechanisms for managing revenues sustainably. Paul Lynch, Cook Islands Seabed Minerals Commissioner, said the fact that this Deep Sea Minerals (DSM) workshop is being run here is a major endorsement for development of the Cook Islands seabed minerals sector. "It shows we're in the international mix of seabed minerals activities now. Our DSM resource and work was unknown for many years to many people overseas." He said it's also recognition that the Cook Islands is making good progress on developing a sound regulatory framework for these future activities. "We're a small nation, but have been taking the right advice and the right steps."

The workshop is being hosted by the Cook Islands Seabed Minerals Authority, with funding from the Secretariat of the Pacific Community and European Union's joint regional DSM Project. There are 15 members of the DSM Project, which was set up in 2011 to help Pacific countries prepare for future seabed mineral activity. There have been four training workshops so far, looking at environmental and social issues. This fifth workshop will be the first to specifically focus on the financial

aspects of seabed minerals activities, in addition to the associated legal and fiscal frameworks. About 80 overseas and local delegates are expected to attend. Lynch said there has been no licensing of seabed minerals exploration in Cook Islands waters yet but everything needs to be in place before exploration licensing begins in the next year. "We're ahead of the game at the moment because we've already passed the world's first, dedicated Seabed Minerals Act in 2009, and recently tax and royalty regulations, and commenced the set up of our own national Sovereign Wealth Fund." According to a recent geological assessment, the Cook Islands' exclusive economic zone contains 10 billion tonnes of manganese nodules, which contain minerals like manganese, nickel, copper, cobalt and rare earth elements. Members of the public are invited to attend a general seabed minerals update meeting on Wednesday May 14 from 6 -7pm at the same venue, organised by the SBM Authority.

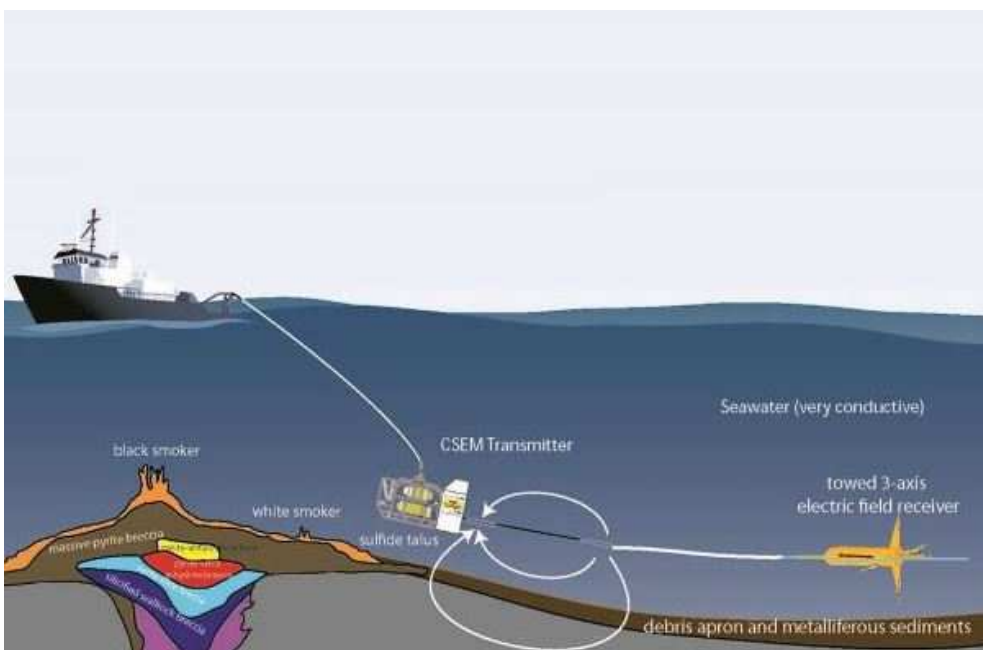
### **Local activist to pressure state on seabed deal**

The National, May 7th, 2014

A local activist group is not ruling out taking further actions against the state over its recent decision to buy a 15 % share in the Solwara 1 deep sea mining project in the Bismark Sea. Act Now programme manager Effrey Dadamo has accused the government of letting down the people of PNG and said it would be held accountable, as reported by Radio Australia. He said the communities were still concerned as no social impact studies were conducted on the impacts of the project. In a recent trade fair between the PNG and Korea government, Mineral Resources Authority managing director Philip Samar had said the drop in copper production in the country was a reason why the government permitted the Solwara 1 project to go ahead. On average the country produces 60 tonnes of gold similar amount of silver and just under 200 tonnes of copper. "The mining industry is bringing on other copper projects like the Solwara 1 to beef up the depletion of resources in OTML...depletion with some qualification. "We (state) have permitted the Solwara 1 Project; it is currently refinancing itself and hopefully in next three years will come on stream that is a new frontier that we are excited and looking forward to," Samar said.

### **European consortium develops sustainable seabed mining solutions**

Blue Mining, May 2, 2014



Delft, The Netherlands, 02/05/2014. The European Commission is helping to take seabed mining to the next level by funding a four-year project entitled: “Breakthrough Solutions for Mineral Extraction and Processing in Extreme Environments – Blue Mining”. The overall aims of this project are to develop new cost-effective solutions for environmentally friendly mining and processing in difficult conditions and extreme environments, and to further unlock the large potential of raw materials in Europe. The development of sustainable seabed mining solutions is important in Europe for several reasons. Firstly, it will help to secure raw materials for Europe’s high-tech industry, which depends on importing vital metals. Secondly, it will further enhance Europe’s leadership in advanced deep-sea technologies on a global scale. And thirdly, it will enable new education, skills and knowledge to be offered by universities and research centres.

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### **Activist groups slam seabed mine decision**

Post-Courier, May 02, 2014

By KONOPA KANA

THREE environment activist groups have condemned the state decision to fund the controversial seabed mining project in New Ireland Province. Bismarck Ramu Group, Act Now and Pacific Network on Globalisation (PANG) raised concerns of the government neglect to fully consult the west coast landowners of the unknown environmental impact that will result in construction phase of the project. This follows the signing by Bank South Pacific and Petromin Holdings Limited giving a nod for the developer Nautilus Minerals to go ahead with the preparation of the controversial Solwara 1 project. NGO organisation ACT NOW program manager Effrey Dademo said that the government has completely failed to answer any of the serious community concerns about the project. Ms Dademo claims that the environmental impacts are unknown, the mining system is completely untested, the potential financial returns are tiny and the mining will probably be unlawful.

Bismarck Ramu Group confirmed that over 20,000 landowners have signed a petition opposing the seabed mining project. Mr John Chittoa said that the government has also ignored church leaders in PNG and across the Pacific who have voiced their opposition and the scientists who have expressed their serious concerns". A vocal landowner Oigen Schulze claims that there is not enough consultation with people within the project impacted areas. He said that the government officers have been quietly conducting meetings with only selected representatives from the project area while the rest of the people are not aware of what was happening. Fiji-based Pacific Network on Globalisation (PANG) said that PNG government has also ignored a legal opinion which says the proposed mining will breach the international precautionary principle. According to PANG this means any potential mining operation is wide open to legal challenge through the courts.

## **PNG MPs Criticize Government Investment In Sea Bed Mining**

*Newly revised Nautilus project criticized as bad for country*

By Imelda Wavik

PORT MORESBY, Papua New Guinea (PNG Post-Courier, May 1, 2014) – The national Government's intention to buy a K300 million [US\$105 million] shares in a proposed mining project has been criticised by two Members of the Parliament. Oro Governor Garry Juffa and Sumkar MP Ken Fairweather have both expressed grave concerns over the Government's proposal of buying the shares from Nautilus limited's Solwara project which is still in an uncertain situation. Mr Juffa has stated that the project, which concerns sea bed mining, will have a dangerously negative effect on coastal areas in the region and eventually throughout the country. He highlighted that the government's intention to buy shares in the project may be a good one financially for the people of this country, but the project itself will do no good. Governor Juffa also voiced grave concerns that many elected members of parliament were against sea bed mining but had been very quiet on the matter because they did not wish to upset the government. But he said leaders had to speak up about their concerns for their people, the environment and the future interests of Papua New Guinea.

The governor stressed that there is no revenue needed from this project as it is a dangerous project which will cause more harm than good. "We do not need the revenue from this illegal project that may cause much damage to our coastal communities' livelihoods," he said. Mr Fairweather said he was not satisfied with the intention of the government. The member has expressed great dissatisfaction with the government betting money on an untried process. He said the government's money would be better spent on other promising projects such as the palm oil project in East Sepik. He said the money proposed to be spent on the untried Solwara-1 project would be better spent in East Sepik where it could create plenty of jobs. "You would have a better chance of getting a return by betting on the Melbourne Cup," he said. He said the Government is trying to hide this in an obscure company no one has heard of. "The whole policy of investing in resource projects is flawed and must be challenged. Whatever verbal spin the government wants to put on this is a con job. I agree totally with Governor Juffa," he said.

## **Nautilus Minerals looks across the Pacific after securing Papua New Guinea undersea mining deal**

30 Apr 2014 by Business Advantage

*Canadian mining company Nautilus Minerals will accelerate its range of seabed mining projects across the Pacific, after finally signing a US\$120 million (K336 million) agreement with the Papua New Guinea government to develop its Solwara 1 mining project in the Bismarck Sea.*

The PNG Government has paid Nautilus a non-refundable deposit of US\$7 million (K19.6 million) for an initial 15% (US\$120 million) interest in the project, and can increase its share to 30% in the next 12 months. The shareholding is held through state entity Petromin PNG Holdings Limited, with the remaining US\$113 million (K316 million) due to be paid by 31 July 2014. Mining Minister Byron Chan says the government would have bought a bigger shareholding if it already had some of the income from the PNG LNG project.

### **Pioneering financial transaction**

The Bank of South Pacific is providing the government's investment, believed to be the first time the PNG-domiciled bank has fully-funded a PNG Government venture of this magnitude. Colm Lynch, Senior Manager Corporate Banking, says BSP is looking to back further investments in infrastructure, mining and other ventures in PNG and Fiji by the government and other offshore investors.



BSP CEO Robin Fleming (right) sealing the transaction to fund the State’s equity in Solwara 1.

Looking on are (from left) Petromin CEO Arun Basu, and Petromin Non-Executive Director Jerry Wemin. ‘We see BSP as a viable local alternative to our competitors which, given our in-country infrastructure, would mean we are a natural partner to work with offshore banks and institutions,’ he told Business Advantage PNG. ‘We did a comprehensive due diligence on the environmental impact and we are comfortable with the work that Nautilus has done,’ he added. ‘It was one of the most important parts of the transaction—ensuring that the environmental approach was correct.’

**Everyone ‘happy’**

The agreement follows talks after an independent arbitrator ruled in favour of Nautilus, which accused the government of renegeing on its share of financing for the project, while the government had accused Nautilus of not fulfilling some of its obligations. The final agreed amount to be paid by the PNG State is US\$2 million more than the arbitrator ordered be paid last year. Nautilus’ CEO, Mike Johnston, has told a briefing in Toronto that everyone is happy with the agreement, which ‘represents a major vote of confidence in Nautilus Minerals and the Solwara 1 Project’. He said the company has ‘strong support’ from the PNG national and provincial governments. Johnston said the agreement covers only the Solwara 1 project, and any other exploration projects in PNG would require separate mining licences and agreements.

**Copper and gold**

The controversial project aims to extract ores of copper, gold and other valuable metals from a depth of 1,500m, in the Bismark Sea, which lies in southwestern Pacific Ocean to the north of Papua New Guinea. Nautilus says it intends to produce 80,000 to 100,000 tonnes of copper and 100,000 to 200,000 ounces of gold. Minerals will be excavated by a fleet of robotic machines steered from a ship at the surface. Johnston says he hopes to have a suitable vessel ready by the end of 2014, with production to begin within two-to-three years.

**Seafloor mining to go Pacific-wide?**



The progress of the Solwara 1 seafloor mining project, which will deploy technology previously only used in the oil and gas extraction industry, is being eagerly watched across the Pacific. While land is in short supply and normally under customary ownership, which makes land mining problematic, the Pacific's island nations are surrounded by massive Exclusive Economic Zones of ocean. If a method of extracting minerals from the seabed in those zones can be proven, and those nations can develop appropriate regulatory environments for such mining, it will establish a potentially lucrative new source of income. Nautilus Minerals CEO Mike Johnston says since the PNG deal there has been increased interest by Pacific governments in its proposals, and the company is in discussions with possible joint venture partners from the metals and mining industries. Nautilus holds a total of more than 500,000 square kilometres of exploration territory, or tenement applications, in Papua New Guinea, Tonga, Fiji, Vanuatu, the Solomon Islands, New Zealand and the Central Pacific. Nautilus Minerals 100%-owned subsidiary, Tonga Offshore Mining Limited, reported in 2012 it had found 'significant grades of manganese, nickel, copper and cobalt' in the Central Pacific.

### **PNG NGO Critical Of Government's Seabed Mining Deal**

*Delayed Nautilus project seems back on track*

WELLINGTON, New Zealand (Radio New Zealand International, April 29, 2014) – Non-governmental groups in Papua New Guinea have condemned the PNG government's decision to renew a commitment to the Nautilus company's ocean floor mine. The Canadian company is set to become the world's first undersea miner through its Solwara One project in the Bismarck Sea. A two-year delay in the project has now been resolved, with the PNG government taking a 15 percent stake in the development. The spokesperson for the NGO Act Now, Effrey Dademo, says they are stunned because the government had said a petition from coastal landowners had made them think again about being involved. "We have no idea and no information as to why there has been a change of position and we are asking the Government to come out clean and say why it has gone ahead with and what of the petition that was presented by the people to the Government, saying they should not consider it because it is a serious risk to the environment," says Dademo.

### **Nautilus, government deal paves way for project**

Post-Courier, April 28, 2014

THE State and Nautilus Minerals Incorporated have signed an agreement which now will enable the Solwara 1 project to move forward towards production. Under the agreement, the State shall take an initial 15 percent interest in the project. In a statement released last Friday the company stated that the State has the option to take up to a further 15 percent interest within 12 months of the agreement becoming unconditional. The company announced that the State has paid a non-refundable deposit for its initial 15 per cent interest of US\$7,000,000. The agreement is conditional upon the State, through a subsidiary of Petromin PNG Holdings Limited (Petromin) by 31 July 2014, the funding for the State's 15 percent share of the capital required to complete the development phase of the project up to first production, being US\$113,000,000 (excluding the deposit.) These funds will be placed in escrow until Nautilus satisfies the conditions for their release.

The funds will be released to Nautilus, and an unincorporated joint venture between the parties for the ongoing operation of the project shall be formed, if within 6 months of the funds being placed in escrow, Nautilus secures the charter of a production support vessel and secures for the State certain intellectual property rights. After its first production, Petromin's subsidiary- Eda Kopa will contribute funds in proportion to its interest. If the conditions of the agreement are satisfied and the State completes the purchase of its 15 percent interest in the project, then the arbitration concerning Nau-

tilus' claim for damages related to the termination of the State equity option agreement dated 29 March 2011, shall be dismissed. If the State does not complete the purchase, then the position the parties were in prior to signing the Agreement is reinstated. Nautilus CEO Mike Johnston said the company was pleased to have achieved an amicable resolution of its issues with the State.

"This step represents a major vote of confidence in Nautilus Minerals and the Solwara 1 project, Mr Johnston said. "Through this joint venture, the State will provide a significant capital investment and will retain a direct interest in the long term success of the project. "We look forward to working closely with the State and Petromin on Solwara 1, which will generate significant economic activity within the State and the Province of New Ireland." Mr Johnston said the company is now focusing its attention on securing a suitable vessel arrangement and is continuing its discussions with potential vessel partners while also undertaking a tender process with shipyards experienced in building offshore construction vessels. He said the company intends to have a vessel solution in place before the end of the year. Meanwhile Nautilus also announced that Mr Johnston continues to have the support of the board of directors of the company and his role as president and CEO has been made permanent.

### **Agreement reached on deep sea mining**

David Shukman, BBC, 25 April 2014



The project will extract ores of copper, gold and other valuable metals from a depth of 1,500m

Plans to open the world's first mine in the deep ocean have moved significantly closer to becoming reality. A Canadian mining company has finalised an agreement with Papua New Guinea to start digging up an area of seabed. The controversial project aims to extract ores of copper, gold and other valuable metals from a depth of 1,500m. However, environmental campaigners say mining the ocean floor will prove devastating, causing lasting damage to marine life. The company, Nautilus Minerals, has been eyeing the seabed minerals off Papua New Guinea (PNG) since the 1990s but then became locked in a lengthy dispute with the PNG government over the terms of the operation. Under the agreement just reached, PNG will take a 15% stake in the mine by contributing \$120m towards the costs of the operation.

Mike Johnston, chief executive of Nautilus Minerals, told BBC News: "It's taken a long time but everybody is very happy." "There's always been a lot of support for this project and it's very appealing that it will generate a significant amount of revenue in a region that wouldn't ordinarily expect that to happen." The mine will target an area of hydrothermal vents where superheated, highly acidic water emerges from the seabed, where it encounters far colder and more alkaline seawater, forc-

ing it to deposit high concentrations of minerals. The result is that the seabed is formed of ores that are far richer in gold and copper than ores found on land. Mr Johnston said that a temperature probe left in place for 18 months was found to have "high grade copper all over it".

For decades, the idea of mining these deposits - and mineral-rich nodules on the seabed - was dismissed as unfeasible because of the engineering challenge and high cost. But the boom in offshore oil and gas operations in recent years has seen the development of a host of advanced deep sea technologies at a time when intense demand for valuable metals has pushed up global prices. The mine, known as Solwara-1, will be excavated by a fleet of robotic machines steered from a ship at the surface. The construction of the largest machine, a Bulk Cutter weighing 310 tonnes, has just been completed by an underwater specialist manufacturer, Soil Machine Dynamics (SMD), based in Newcastle, UK.

The plan is to break up the top layer of the seabed so that the ore can be pumped up as a slurry. The agreement with PNG now clears the way for Nautilus to order a specialist vessel to manage the operation. Mining itself could start within five years. Environmental campaigners have long argued that seabed mining will be hugely destructive and that the precise effects remain unknown. Richard Page, oceans campaigner for Greenpeace, said: "The emerging threat of seabed mining is an urgent wake-up call for the need to protect the oceans.

"The deep ocean is not yet mapped or explored and so the potential loss of fauna and biospheres from mining is not yet understood. "Only 3% of the oceans and only 1% of international waters are protected, which makes them some of the most vulnerable places on earth - what we desperately need is a global network of ocean sanctuaries." According to Nautilus, the mine will have a minimal environmental footprint, covering the equivalent of about 10 football fields and focusing on an area which is likely to be rapidly re-colonised by marine life. Mr Johnston said: "It's a resilient system and studies show that life will recover in 5-10 years. An active venting site 1km to the southeast has the same bugs and snails and the current will carry the bugs and snails to the mine site. We expect it to recover quite quickly."

But this will be the first attempt to extract ore from the ocean floor, so the operation - and the company's assurances about the impacts - will be watched closely. So far, 19 licences to search for seabed minerals have been awarded by the International Seabed Authority, the UN body policing this emerging industry. The International Seabed Authority (ISA), which has welcomed the Nautilus Minerals agreement with Papua New Guinea, is currently drawing up guidelines for the environmental management of future seabed mining. Michael Lodge of the ISA told the BBC: "This is a very exciting opportunity and we are looking forward to learning from the tests of the new machine, which is a world first and should give us some valuable insights into technical feasibility and environmental impact."

### **Bank South Pacific to fund Solwara 1**

Post-Courier, April 25, 2014

By ROSALYN ALBANIÉL-EVARA

THE State has reduced its equity in Nautilus Minerals Incorporated's Solwara 1 project from the initial 30 per cent to 15 per cent. This investment of \$US120million (K364.74 million) is set to be financed by Bank South Pacific following a signing ceremony in Port Moresby with PNG Holdings Limited (Petromin) yesterday afternoon. A government official from the Treasury Department had revealed the share had been reduced following a decision by the National Executive Council. He also confirmed that three separate signings had taken place during the day, all relating to the Solwara 1 project. Two had been closed door while the last of them being the one with BSP and Petromin.



BSP's group chief executive officer Robin Fleming said the project represents a landmark transaction for the bank which had undertaken the structuring, documentation and funding on a bilateral basis for the State and Petromin. Mr Fleming said the transaction has been in the making for some time, adding the bank's intention was to show and illustrate that it can undertake financing for significant transactions, particularly with partners in the government sector.

He said this deal is a practical example of the much talked about "public private partnership", adding the bank was pleased it could participate with other partners in the country in a project that is set to be very historical and significant. He acknowledged and thanked everyone involved – including the government – who had worked tirelessly around the clock to ensure the agreements could be executed. He said this represents the closure of all transactions which could now allow for the deep sea mining project to progress to the next stage of development. The bank's senior manager corporate banking Colm Lynch said it was all about matching a solution based approach that meets the complex needs of all stakeholders. "We make sure that our proposals have a benefit to the wider community," he said. Petromin and Eda Kopa (its subsidiary) director Jerry Wemin said the signing is a milestone. He said the event is to bring to closure all the negotiations and all the hard work that had gone on behind the scenes. He thanked all those involved, including those from the Treasury Department and from government and his management.

### **Nautilus Mineral Announces Complete Assembly Of Bulk Cutter**

*Seafloor mining in PNG is now one step closer*

PORT MORESBY, Papua New Guinea (The National, April 25, 2014) – Nautilus Minerals Inc recently announced that the assembling of its Bulk Cutter (BC), which is the first of the Seafloor Production Tools (SPTs), has been completed. Chief executive Mike Johnston said: "This is a major milestone for the company, having the first of the three SPTs assembled. This achievement brings the company all the closer to making seafloor mining a reality." Subsea vehicle designer and manufacturer, Soil Machine Dynamics Ltd (SMD) of Newcastle, United Kingdom, is the company responsible for building the SPTs for Nautilus. SMD are experts in the "marinisation" of mechanical, hydraulic, electric and electronic equipment for use in a subsea environment (water and pressure immersion). SMD uses this skill set as the basis of much of its existing product line in remotely operated vehicles and subsea trenchers.

"Nautilus is proud to be able to utilise their vast experience in the design, manufacture and testing of our SPTs," Johnston said. The Bulk Cutter is the heaviest of the three SPTs, weighing 310 tonnes when fully assembled. It is designed to be the high productivity machine responsible for the bulk of production. Companies and institutions involved in the simulations and test work of the BC include CSIRO, Cellula Robotics, Deltares, Istanbul Technical University, ContiTech Oil & Marine Corp and Paterson & Cooke Consulting. Johnston said: "We are proud to have such world class companies and institutions involved in the design and testing of these tools. "The next step is to carry out commissioning and acceptance testing of the BC in parallel with assembling the other two production tools, the auxiliary cutter and the collecting machine.

### **Nautilus Minerals and State of PNG Resolve Issues and Sign Agreement**

TORONTO, ONTARIO--(Marketwired - April 24, 2014

(the "Company" or "Nautilus") announces that the Company and the Independent State of Papua New Guinea (the "State") have today signed an agreement (the "Agreement"), enabling the Solwara 1 Project (the "Project") to move forward toward production with the full support of the State. Under the Agreement, the State shall take an initial 15% interest in the Project. The State has the op-

tion to take up to a further 15% interest within 12 months of the Agreement becoming unconditional. The State has paid Nautilus a non-refundable deposit for its initial 15% interest of US\$ 7,000,000. The Agreement is conditional upon the State, (through a subsidiary of Petromin PNG Holdings Limited ("Petromin")), securing by 31 July 2014, the funding for the State's 15% share of the capital required to complete the development phase of the Project up to first production, being US\$ 113,000,000 (excluding the deposit). These funds will be placed in escrow until Nautilus satisfies the conditions for their release.

The funds will be released to Nautilus, and an unincorporated joint venture between the parties for the ongoing operation of the Project shall be formed, if within 6 months of the funds being placed in escrow Nautilus secures the charter of a Production Support Vessel and secures for the State certain intellectual property rights. After first production, Petromin's subsidiary will contribute funds in proportion to its interest. If the conditions of the Agreement are satisfied and the State completes the purchase of its 15% interest in the Project, then the Arbitration concerning Nautilus' claim for damages related to the termination of the State Equity Option Agreement dated 29 March 2011, shall be dismissed. If the State does not complete the purchase, then the position the parties were in prior to signing the Agreement is reinstated. Nautilus' CEO, Mike Johnston, said the Company was pleased to have achieved an amicable resolution of its issues with the State.

"This step represents a major vote of confidence in Nautilus Minerals and the Solwara 1 Project. Through this joint venture, the State will provide a significant capital investment and will retain a direct interest in the long term success of the Project. We look forward to working closely with the State and Petromin on Solwara 1, which will generate significant economic activity within the State and the Province of New Ireland," he said. "The Company is now focusing its attention on securing a suitable vessel arrangement and is continuing its discussions with potential vessel partners while also undertaking a tender process with shipyards experienced in building offshore construction vessels. The Company intends to have a vessel solution in place before the end of the year," he added. Mr Johnston continues to have the support of the Board of Directors of Nautilus with his interim role as President and Chief Executive Officer having now been made permanent.

### **RPT-The robot is ready - so when will deep sea mining start?**

Reuters, Apr 18, 2014

- \* Most potential subsea minerals in international waters
- \* U.N. body expects mining code in 2-3 years
- \* Canadian company ready to mine off Papua New Guinea

By Stephen Eisenhammer and Silvia Antonioli

NEWCASTLE, England/LONDON, April 18 (Reuters) - The world's first deep sea mining robot sits idle on a British factory floor, waiting to claw up high grade copper and gold from the seabed off Papua New Guinea (PNG) - when a wrangle over terms is solved. Beyond PNG, in international waters, regulation and royalty terms for mining the planet's subsea wealth have also yet to be finalised. The world waits for the judgement of a United Nations agency based in Jamaica. "If we can take care of the environment we have a brand new day ahead of us. The marine area beyond national jurisdiction is 50 percent of the Ocean," said Nii Odunton, secretary general of the U.N.'s International Seabed Authority (ISA). "I believe the grades look good, the abundance looks good, I believe that money will be made," Odunton said from the ISA offices in Kingston. High-tech advances, depleted easy-to-reach minerals onshore and historically high prices have boosted the idea of mining offshore, where metals can be fifteen times the quality of land deposits.



Employees of Soil Machine Dynamics (SMD) work on a subsea mining machine being built for Nautilus Minerals at Wallsend, northern England April 14, 2014. *Credit: Reuters/Nigel Roddis*

In Newcastle, the "beasty", as engineer Keith Franklin calls his machine, lies in wait, resembling a submersible tank with four metre wide cutting blades. Built by Soil Machine Dynamics (SMD), it will put Canadian listed Nautilus Minerals on course to become the first company to commercially mine in deep water. Nautilus' primary resource, Solwara 1, about 1,500 metres underwater, is a Sea-floor Massive Sulphide (SMS) deposit, which forms along hydrothermal vents where mineral-rich fluids spurt from cracks in the ocean crust. Equipped with cameras and 3D sonar sensors the robot is driven by two pilots from a control room on the vessel above, attached via a giant power cable. "The cameras aren't enough by themselves because the machine will be working by vents where black soot spurts from the ocean crust and it will sometimes be near impossible to see anything," said Stef Kapusniak, business development manager for mining at SMD. "The 3D sonar will allow it to make images and send it back to the control room." The machine then cuts up the sea floor and sucks the rocks through a pipe to deposit it in mounds behind - "like icing a cake," Kapusniak said. Another machine, yet to be built, will then help suck the ore to the surface.

Nautilus aims to produce 80,000-100,000 tonnes of copper and 100,000-200,000 ounces of gold - equivalent to a modest onshore mine. It was supposed to be producing by now, but disagreements with the PNG government over financial terms have set it back. Chief Executive Mike Johnston told Reuters he was confident a resolution would be sorted out and the company would be mining within two to three years. Most of the world's best deposits lie even deeper than Nautilus' Solwara 1, at around 6,000 metres in an area known as the Clarion Clipperton Zone. Large numbers of manganese nodules - potato sized rocks rich in copper, cobalt and nickel - lie across this 4.5 million square kilometre abyssal plain between Hawaii and Mexico.

### **LICENSES ALREADY AWARDED**

The U.N.'s ISA is drawing up a code to deal with some environmental concerns and the commercial terms for deep-sea mining. It predicts it will be finished in around two or three years, with mining still 5-10 years away. "It's only after the code is in place and people are happy with it that the huge investments needed to start deep-sea mining will occur," ISA's Odunton, a Ghanaian, said. ISA is, however, already doling out exploration licenses - 19 have been approved. Odunton said interest in them had "catapulted" in the past five years. In order to get a licence through ISA an applicant must be sponsored or partnered with a country. For nations like Japan which lack their own resource wealth, deep-sea mining is a potential way to secure mineral supply for the future. China, the world's largest metals consumers, is also one of the most active in exploring the area. Britain has an exploration licence in partnership with UK Seabed Resources, a subsidiary of defence firm Lock-

heed Martin. "These are the days you have to take a position, especially as a government," said Martijn Schouten, managing director at IHC's mining division - an equipment maker which targets seabed mining as its next growth driver.

IHC is the leading partner in an European Union funded project called Blue Mining, begun in February, and will look at the business case and technology for deep-sea mining over the next four years. This new frontier is an exciting prospect for developing island nations like Tonga and Nauru, which both have exploration licences. For Tonga, where Nautilus says it has been collecting encouraging exploration results, it could be a game changer. "The revenue stream and taxes from a medium sized mine would have an enormous benefit to the country," Nautilus' Johnston said. The main companies looking to mine the seabed, like Nautilus and UK Seabed Resources, are not, however, traditional mining firms, although Anglo American does have a 5 percent stake in the former. IHC said most of its contracts were with technology-based companies that were not in the mining industry, although it would not specify further due to confidentiality clauses.

IHC said it has had discussions with oil majors who are beginning to show an interest in deep sea mining. But, with little of the deep ocean mapped or explored, environmentalists worry about the potential loss of fauna and biospheres whose existence is not yet understood. "Only 3 percent of the oceans are protected and less than 1 percent of the high seas, making them some of the least protected places on earth. The emerging threat of seabed mining is an urgent wake-up call," Greenpeace said in a report last year. "I think we really have to be careful about what happens to the environment," said ISA's Odunton. "We don't know enough to take some of the risks we've taken on land."

### **Rohstoff-Gewinnung: Deutsche Industrie will Metallerze in der Tiefsee abbauen**

*Bis zu 30 deutsche Firmen wollen nach SPIEGEL-Informationen einen Bergbauverein für die Tiefsee gründen. Dort sollen Metallerze abgebaut werden - es geht um Investitionen in dreistelliger Millionenhöhe.*

SpiegelOnline, 6.4.2014



DPA, Manganknollen: Metallschatz in der Tiefsee

Die deutsche Industrie bereitet sich auf den Abbau von Metallerzen in der Tiefsee vor. Nach SPIEGEL-Informationen wollen 20 bis 30 deutsche Unternehmen am Mittwoch einen Tiefseebergbauverein gründen. Das Ziel ist die Förderung "mariner mineralischer Rohstoffe", berichtet Michael Jarowsky. Er ist Koordinator des vom Bundesministerium für Wirtschaft und Energie (BMWi) initiierten Nationalen Masterplans Maritime Technologien. An der Initiative wirken Technologiefirmen wie etwa Aker Solutions und Bauer Maschinenbau mit. Weitere Firmen mit maritimer Ex-

pertise wie ThyssenKrupp Marine Systems und die Gutachter von DNV GL und Lloyd's Register hätten auch Interesse, sagt Jarowinsky. Die Deutschen wollen außerdem bei einem EU-Projekt mitmischen. Voraussichtlich Ende April wird in Brüssel über verschiedene Pilotprojekte einer europäischen Rohstoffinitiative entschieden.

Eines der Vorhaben soll in portugiesischen Gewässern rund um die Azoren eingerichtet werden. 45 Unternehmen und Forschungsinstitute - ein Drittel davon aus Deutschland - hoffen, dort marine Metalle zu finden und abzubauen. Jarowinsky rechnet mit Investitionen "in dreistelliger Millionenhöhe", wenn das Projekt zustande kommt. "Das wäre das erste Mal, dass wir in Europa ein Pilotprojekt im Tiefseebergbau auf die Schiene setzen würden", sagt er. Marine Massivsulfide, Manganknollen und Kobaltkrusten enthalten eine Vielzahl von Metallen wie Kupfer, Eisen, Zink, Blei, Gold, Silber oder Kobalt; in geringen Mengen finden sich darin auch Molybdän, Wismut, Antimon, Tellur oder Indium. Diese Stoffe werden gebraucht für den Bau von Computern, Handys, Fernsehern oder Windkraftanlagen.

### **Solwara 1 production tools 90% complete**

The National, April 4th, 2014

NAUTILUS Minerals has announced that its production tools for the Solwara 1 project has been 90% complete as of Dec 31 last year. Chief executive Mike Johnston said: "While 2013 was a challenging year for Nautilus, we are excited by the progress that was made, in particular with the seafloor production tools, which have been 90% complete. "Although the company recently terminated the state equity option agreement, Nautilus is continuing discussions with the state to reach an amicable resolution." The company has remained committed to maximising shareholder value by achieving its objective of developing the world's first commercial high grade seafloor copper-gold project and launching the deep water seafloor resource production industry, Johnston said.

### **UK looks for huge profits from Pacific resource theft**

Anglo via PNG Mine Watch, March 28, 2014



Protesters against seabed mining plans

Through a new subsidiary, called UK Seabed Resources, LMUK has become the first commercial organisation to obtain an exploration licence from the International Seabed Authority (ISA). Lockheed Martin UK (LMUK), in partnership with the Department for Business Innovation and Skills, is predicted to have a high economic potential worth at least £1bn a year to the UK economy through the collection of valuable polymetallic nodules from the Pacific Ocean floor. These polymetallic

nodules are situated about 4 kilometres beneath the ocean's surface and can provide millions of tonnes of copper, nickel, cobalt and manganese, as well as rare earth minerals, which could be used in the construction, aerospace, alternative energy, as well as other industries. The seabed exploration area is approximately 1,500 kilometres west of Mexico and 4,000 kilometres south of Hawaii. Current estimates predict that harvesting polymetallic nodules can contribute approximately £40 billion to the UK national economy, over a 30-year period. UK Seabed Resources is collaborating with UK government departments and research institutions on environmental and industrial aspects of the project.

It must be noted, however, that the firm is concentrated on harvesting of polymetallic nodules and not manganese crusts, which are found on hydrothermal vents. UK Prime Minister David Cameron said: "The award of this exploration licence to UK Seabed Resources is excellent news for British companies and British scientists, and the Government is extremely pleased to have supported it. "The UK is leading the way in this exciting new industry which has the potential to create specialist and supply chain jobs across the country and is expected to be worth up to £40bn to the UK economy over the next 30 years. With our technology, skills, scientific and environmental expertise at the forefront, this demonstrates that the UK is open for business as we compete in the global race." Environmentally responsible collection of polymetallic nodules presents a complex engineering challenge, but our team has the knowledge and experience necessary to help position the UK at the forefront of this emerging industry," said Stephen Ball, Chief Executive, Lockheed Martin UK and UK Seabed Resources. "We are offering British companies, research institutions and academia exciting opportunities to become involved in this cutting edge business," said Stephen Ball.

### **Nautilus reconfirms shaken PNG partnership**

Justin Niessner, Mining News, 27 March 2014

JUST weeks after pledging to seek damages following a fizzled investment deal for its Solwara tenement with the Papua New Guinea government, Nautilus Minerals says the partnership remains committed to the project's success.

Nautilus investor relations executive Michael Joyner walked Mines and Money Hong Kong delegates through the proposed undersea mine 40km off the coast of New Ireland, saying cooperation with the PNG government was ongoing. "We have great relationships with the government of PNG at all levels," Joyner said. "We are currently negotiating with the government in terms of an amount they are going to put into the company. "This has been dragging on for some time and it has slowed things down a bit, which I guess isn't too uncommon in the industry as a whole today. "But we're working very hard with them over the last little while and we're committed to getting this done." The comments follow the Toronto-listed explorer's decision last month to terminate its agreement with the government after the state failed to pay \$US118 million (\$A129.9 million) for its share of Solwara funding.

This precipitated a selloff of Nautilus shares and fresh concerns about the viability of the world's first ocean-bed copper-gold operation. Joyner said yesterday, however, that recent issues with the government had allowed for a great deal of work to continue behind the scenes. "A lot of people don't realise just how far we've really come," he said. "I'd say we're about 90% through the build of the equipment over all, and about 50% through the pump and the riser system. Progress was also flagged to include a redesigned 70-tonne capacity production support vessel for which Joyner said the company was fielding several proposals. A call for tenders is expected to be put out shortly, with a further update from the company in the third quarter.

Nautilus plans to extract high-grade seafloor massive sulphide systems on a commercial scale, using what is effectively a mobile mine based on oil and gas industry technology. The project is hoped to

open the door for future undersea prospects already being developed by the company outside PNG, including the polymetallic nodule exploration work being carried out in the Clarion Clipperton zone of the Pacific Ocean. “In terms of the pipeline of projects moving forward, we’ve got about 500,000 sq.km, that’s about the size of Texas or Chile, which makes us one of the largest landowners in the world,” Joyner said. “At this point we’re probably given very little value for those projects or for the ground that we have – but as we’re able to see that we can get the material off the seafloor successfully, I think we’ll see this having the potential to go up exponentially.”

## **Schatz im Meer**

Von Maximilian Weingartner, F.A.Z 22.03.2014

*Auf der Jagd nach Ressourcen rückt die Tiefsee zunehmend ins Visier von Staaten und Unternehmen. Fachleute fürchten beim Abbau irreparable Schäden, zudem könnten Lärm und Vibrationen die Tiere stören.*

Anfang der neunziger Jahre machte ein CDU-Politiker den kuriosen und wohl nicht ganz ernst gemeinten Vorschlag, die Baleareninsel Mallorca als 17. Bundesland zu kaufen. Zwei Jahrzehnte später kam es sogar fast noch besser: Deutschland ist stolzer Besitzer eines in der Nähe von Hawaii gelegenen Gebiets im Pazifischen Ozean, das so groß wie Bayern ist – allerdings in 4.000 Meter Tiefe am Meeresgrund liegt. Der Boden ist hier flach wie das Alpenvorland, eine dunkle, schlammige Ebene. Ein paar Schiffsstunden nordwestlich liegt Belgien, in direkter Nachbarschaft zu Südkorea. Noch etwas weiter folgen Frankreich und Russland – eine Kartographie wie aus der Kolonialzeit.

Auf der Jagd nach Ressourcen machen die größtenteils unerforschten Bodenschätze der Tiefsee das Meer zum größten Konfliktschauplatz der Zukunft – es geht um die letzten unverteilten Räume des Planeten Erde. 17 Staaten haben inzwischen Anspruchsgebiete, sogenannte Claims, am Grunde des Pazifiks abgesteckt. Auf einer Fläche von der Größe Europas ist der Meeresboden mit Manganknollen übersät, dunklen metallreichen Mineralienklumpen. Clarion-Clipperton-Zone (kurz CCZ) heißt das Meeresgebiet zwischen Mexiko und Hawaii, in dem die Manganknollen mancherorts so dicht liegen wie die Pflastersteine einer alten Dorfstraße. Geologen schätzen die Vorräte allein in der CCZ auf 21 Milliarden Tonnen.

### **„Rohstoffe im Meer haben großes Potential“**

Manganknollen enthalten Nickel, Kupfer oder Kobalt. Allesamt gefragte Rohstoffe für Smartphones, Elektroautos oder Windkraftanlagen. „Rohstoffe im Meer haben großes Potential“, sagt Martin Visbeck, Professor für physikalische Ozeanographie in Kiel, am Satellitentelefon, weil er sich gerade auf einer Forschungsreise auf den Kapverdischen Inseln befindet. International gibt es zwar bisher noch keinen kommerziellen Tiefseebergbau von Metallen. Allerdings stehen schon einige Staaten wie Deutschland und private Unternehmen in den Startlöchern.

„Rohstoffe sind von großer Bedeutung für industrielle Produktionsprozesse, neue Technologien und Hightech-Produkte und damit für Wachstum und Beschäftigung in von Rohstoffimporten stark abhängigen Ländern wie Deutschland“, heißt es in einem Strategiepapier des Bundeswirtschaftsministeriums, das dieser Zeitung vorliegt. Das Problem an dem rasant gestiegenen Interesse: Schnell nachwachsende Ressourcen wie Fisch, Muscheln und Algen lassen sich prinzipiell nachhaltig nutzen, wenn man den Lebensraum sichert und die Ernte so reguliert, dass genug im Meer bleibt und damit der Nachwuchs gesichert ist. Mineralische Ressourcen aber entstehen in Millionen von Jahren. Die Manganknollen wachsen in einer Million Jahre wenige Millimeter. Es existiert nur eine endliche Menge dieser Ressourcen. Diese liegen oft Hunderte von Metern unter dem Meeresboden und sind nur mit komplexer Technologie zu fördern.

### **Schnecken und Seegurken würden sterben**

Jedoch sind bisher nicht einmal 10 Prozent des Meeresgrundes ordentlich kartiert. Viele Regionen der Tiefsee sind also im wörtlichen Sinn „terra incognita“. Wie soll man von einem System, das man zu wenig kennt, die Folgen industrieller Belastung prognostizieren? Ein Abbau sei immer mit Risiken und Umweltbelastungen verbunden, sagt der Forscher Martin Visbeck. So sind sich die Wissenschaftler des Berichts „World Ocean Review III – Rohstoffe aus dem Meer“ einig, „dass der Abbau von Manganknollen einen erheblichen Eingriff in den Lebensraum Meer darstellt“. Der Lärm und die Vibrationen, die bei Abbau, Herauspumpen und Reinigen der Knollen entstehen, könnten Delfine und Wale stören.

Und im durchpflügten Bereich würden alle Tiere sterben, die nicht schnell genug fliehen könnten, etwa Schnecken und Seegurken. „Wenn abseits unserer Wahrnehmung riesige Geschäfte locken, dann gerät nicht nur die Umwelt in Gefahr, sondern auch elementare Menschenrechte und soziale Gerechtigkeit“, sagt Nikolaus Gelpke, Präsident des International Ocean Institute, dass sich für eine friedliche und nachhaltige Nutzung des Ozeans einsetzt. Insbesondere Konzerne hätten bisher weder im Schutz der Natur noch in einer fairen Teilhabe der Bevölkerung an den Erlösen eine Notwendigkeit gesehen.

### **Viele Rohstoffländer seien instabil und der Abbau zu teuer**

Auf der anderen Seite vermeide Meeresbergbau Landnutzungskonflikte, sagt Martin Visbeck. Und Staaten, die über keine eigenen Rohstoffreserven verfügen, könnten mehr Unabhängigkeit erlangen. So wie Deutschland. Die Bundesregierung hat dazu im Jahr 2010 die Strategie zur Sicherung einer nachhaltigen Rohstoffversorgung mit nichtenergetischen mineralischen Rohstoffen ins Leben gerufen. Vor zwei Jahren gründete die Bundesregierung die Deutsche Rohstoffagentur als Ableger der Bundesanstalt für Geowissenschaften und Rohstoffe.

Die Agentur soll ein Informations- und Beratungsangebot zu Fragen der geologischen und rohstoffwirtschaftlichen Verfügbarkeit von Metallen und Mineralien bieten. Ein weiteres Beispiel des zunehmenden Engagements ist das 2013 geschaffene Explorationsförderprogramm. Mit dem Ausbau der bilateralen Beziehungen zu Kasachstan, der Mongolei, Peru und Chile wurde der Boden für eine engere Zusammenarbeit im Rohstoffbereich und für die Entfaltung privater Initiativen bereitet. „Die Initiativen der Bundesregierung sind dringend nötig“, sagt Matthias Wachter, Leiter der Abteilung Sicherheit und Rohstoffe beim Bundesverband der Deutschen Industrie (BDI). Inzwischen seien viele Rohstoffländer instabil und der Abbau zu teuer. „Der Tiefseebergbau bietet auf jeden Fall Chancen für die zukünftige Rohstoffsicherung“, sagt Wachter. Mittelfristig rechnet er mit einer Knappheit von bestimmten Rohstoffen und langfristig sei sowieso klar, dass Deutschland seine Abhängigkeit verringern müsse.

### **Die globale Nachfrage wächst**

Unter den großen Industrienationen zählt Deutschland zu jenen Staaten, die besonders auf Rohstoffimporte, vor allem im Energiebereich, aber auch bei den Eisen- und Metallerzen, angewiesen sind. Die Europäische Union hat 14 Rohstoffe als kritisch eingestuft, weil sie eine hohe ökonomische Bedeutung für die Hightech-Industrie haben und zugleich ein hohes Lieferrisiko in sich bergen. Darunter befinden sich zum Beispiel Beryllium, Metalle der Platin-Gruppe, seltene Erden und Wolfram. In den meisten Fällen besteht eine sehr hohe Abhängigkeit von Exportländern wie China, Russland, Kongo und Brasilien. China beansprucht aber auch selbst einen immer größeren Teil der natürlichen Ressourcen für sich und besorgt diese insbesondere in Afrika ohne Rücksicht auf Verluste. Hinzu kommt, dass in einer ganzen Reihe von Staaten zunehmend Handelsbeschränkungen eingeführt wurden. Indonesien hat erst kürzlich ein Ausfuhrverbot für 65 Rohstoffen beschlossen.

Gleichzeitig wächst die globale Nachfrage. „Deshalb bleibt es vordringliche Aufgabe, den internationalen, europäischen und nationalen Rahmen weiter zu gestalten und die Rückgewinnung von und



den sparsamen Umgang mit Rohstoffen voranzutreiben“, heißt es in einem Strategiepapier des Wirtschaftsministeriums. Und weiter: „Förderinstrumente und Beratungsleistungen der öffentlichen Hand und deren Weiterentwicklung müssen sich am konkreten Bedarf der Industrie orientieren.“ Von besonderer Bedeutung sei hier die Bereitschaft der Industrie, sich aktiv in Rohstoffprojekten zu engagieren. In den vergangenen Jahren hatten Konzerne mehrfach den Produktionsstart angekündigt – und ihn immer wieder aufgeschoben, weil Geldgeber absprangen oder Vertragspartner uneins waren. „Die Rohstoffsicherung ist in erster Linie Sache der Unternehmen“, sagt Matthias Wachter vom BDI.

### **Wem gehört das Meer?**

Durch langfristige Lieferverträge, Diversifikation bei Bezugsquellen und gegebenenfalls Beteiligungen an Rohstoffprojekten könnten die Firmen ihre Abhängigkeit verringern. „Die Bundesregierung soll die internationale Kooperation zwischen Rohstoffproduzenten und Rohstoffnachfragern forcieren und auf einen Abbau der Handelshemmnisse hinwirken.“ Die entscheidende Frage aber lautet: Wem gehört das Meer, das rund 71 Prozent der Erdoberfläche bedeckt? In schönen Worten beschreiben die Vereinten Nationen es als „gemeinsames Erbe der Menschheit“. Doch genau das ist ein Teil des Problems.

Das Meer gehört niemandem allein, abgesehen von den zwölf Seemeilen Küstengebiet und der 200 Seemeilen breiten „ausschließlichen Wirtschaftszone“. In der Tat gibt es um die Gebiete auf hoher See immer wieder Ärger. „Man hat die tieferen Gewässer noch nicht genau ausgelotet, weil sich aufgrund der Grenzstreitigkeiten keine Firma traut, mit der Exploration anzufangen“, sagt Hans-Georg Babies von der Bundesanstalt für Geowissenschaften und Rohstoffe.

Jüngstes Beispiel ist die Arktis. Nordöstlich von Island öffnet sich eine Abkürzung für den Seehandel. Die arktische Nordostpassage wird zusehends eisfrei. Sie ist zwar noch immer gefährlich, verkürzt aber die Seestrecke zwischen Ostasien und Europa im Vergleich zu der Route über den Suezkanal um satte 8000 Kilometer. Mit dem Packeis ist auch ein Territorialkonflikt aufgebrochen. Die Anrainerstaaten, von den Vereinigten Staaten bis Russland, ringen um Zugriff auf diese Region, zumal hier unter anderem 13 Prozent des unentdeckten Öls und 30 Prozent des unentdeckten Gases lagern sollen – und immer besser zugänglich werden.

### **Eine Frage der Zeit**

Schon vor sieben Jahren rammte Russland medienwirksam seine Flagge aus Titan in den Meeresboden der Arktis. Norwegen schimpfte über den „PR-Gag“. Doch die Arktis ist nur der Anfang. Auch zwischen Japan und China gibt es heftige Auseinandersetzungen über das Besitzrecht einer kleinen Inselgruppe, unter der wertvolle Rohstoffe lagern sollen. Seit dem Jahr 1994 gibt es zwar ein internationales Seerechtsübereinkommen. Auch Österreich hat es unterschrieben, die einzige globale Seemacht, die Vereinigten Staaten, aber nicht. Mit dem Abkommen wurde eine internationale Meeresbodenbehörde geschaffen, die durch die Vergabe von Lizenzen Zündstoff aus dem Konflikt um die Tiefsee-Erforschung nehmen soll. Noch sind die Rohstoffe nicht gewinnbringend abzubauen. Aber das ist eine Frage der Zeit.

Um einen gefährlichen Wettlauf um die wertvollsten Gebiete zu verhindern und wildem Abbau inklusive möglicher Umweltschäden einen Riegel vorzuschieben, arbeitet die Internationale Meeresbodenbehörde in Jamaika mit 32 Mitarbeitern an Regeln, die Bedingungen einer Tiefseeförderung festlegt. Für die nächsten zwei Jahre hat Deutschland den Vorsitz der Behörde inne. Der BDI erhofft sich davon relativ hohe Umweltstandards und einen fairen Wettbewerb um die Rohstoffe. Bisher wurden nur Forschungslizenzen an China, Deutschland, Frankreich, Indien, Japan, Russland sowie an die „Interoceanmental Joint Organisation“, ein Zusammenschluss von Bulgarien, Tschechien, der Slowakei, Polen, Russland und Kuba, vergeben. Anträge wurden kürzlich auch von zwei Unternehmen sowie einigen Entwicklungsländern, die mit westlichen Firmen kooperieren, gestellt.

Abbaulizenzen gab es bisher noch keine, erst im Jahr 2016 sollen die ersten Staaten und Unternehmen die Erlaubnis zum Unterwasserbergbau bekommen. Die Behörde verlangt nach 15 Jahren 50 Prozent der Gebiete zurück, um sie zugunsten der ärmeren Länder zu verwalten. Denn das Meer gehört allen.

## **UK Seabed Resources joins deep-ocean mineral-mining rush**

BBC 14 March 2014

A new and controversial frontier in mining is opening up as a British firm joins a growing rush to exploit minerals in the depths of the oceans. UK Seabed Resources is a subsidiary of the British arm of Lockheed Martin. It has plans for a major prospecting operation in the Pacific. The company says surveys have revealed huge numbers of so-called nodules - small lumps of rock rich in valuable metals - lying on the ocean floor south of Hawaii and west of Mexico. The exact value of these resources is impossible to calculate reliably, but a leading UN official described the scale of mineral deposits in the world's oceans as "staggering" with "several hundred years' worth of cobalt and nickel". An expedition to assess the potential environmental impact of extracting the nodules will be launched this summer amid concerns that massive "vacuuming" operations to harvest the nodules might cause lasting damage to ecosystems. With the support of the British government, UK Seabed Resources has secured a licence from the United Nations to explore an area of seabed twice the size of Wales and 4,000m deep.

Under the [UN's Convention on the Law of the Sea](#), mining rights on the ocean floor are controlled by a little-known body, the [International Seabed Authority](#), which since 2001 has issued 13 licences - with another six in prospect. These licences, valid for 15 years, have been bought for \$500,000 each by government organisations, state-owned corporations and private companies from countries including China, India, Russia, Japan and South Korea. The high prices fetched for copper, gold and rare-earth minerals are leading to a surge in interest in mining the ocean floor. The idea first surfaced in the 1970s but was dropped because the costs were too high and the technology could not cope. The nodules are known to contain up to 28% metal - 10 times the proportion found on land.

A similarly high metal content is found in another target for seabed mining: hydrothermal vents, chimneys formed by extremely hot water, rich in minerals. We reported on the discovery of the world's deepest vents last month. Stephen Ball, chief executive officer of Lockheed Martin UK, owner of UK Seabed Resources, says the engineering experience of offshore oil and gas operations and the trend to rising mineral prices have now combined to make seabed mining feasible. "It's another source of minerals - there's a shortage and there's difficulty getting access, so there's strategic value for the UK government in getting an opportunity to get these minerals," he told the BBC. China's domination of the global production of rare-earth minerals in particular has fuelled the search for other sources of materials essential for everything from electronics to wind turbines.

But many marine scientists and conservationists have warned that the implications of this deep-sea gold rush are not yet understood - and that mining nodules or hydrothermal vents could prove catastrophic for seabed ecology. Mr Ball said exploration over the next three years would establish whether a system to vacuum up the nodules could be designed to cause minimal impact. The nodules typically lie in a shallow layer of silt. He said he believed it would be "perfectly feasible to create a benign method to extract these minerals from extreme depths without disturbing the seabed." "But until we've demonstrated that, there will be a debate around that." One risk is that the mining operations could generate huge plumes of sediment that could drift through the sea - choking any marine life that feeds by ingesting water and filtering out its food sources.

Michael Lodge, general counsel for the International Seabed Authority, told me that the authority's aim was to encourage a new mining industry to exploit seabed minerals but within strict environmental controls. "The nodules are generally lying in sediment that is between 2-6in (5-15cm) thick that's been there undisturbed for millions of years. We simply don't know the recovery times or the distribution of species - there are lots of uncertainties." He described mining hydrothermal vents as "more invasive" because it would involve breaking up the uppermost metre of the sea floor and piping the rock fragments to the surface.

### **Cold War heritage**

A Canadian company, Nautilus Minerals, is hoping to be the pioneer of vent mining with plans for operations off the coast of Papua New Guinea. However, work is currently delayed because of a legal dispute. The concern is for the impact mining could have on ecosystems. Nautilus would use massive robotic machines, which are being built in Wallsend, near Newcastle-upon-Tyne, by a firm with long experience of marine engineering, Soil Machine Dynamics. Nautilus says that it is devising strategies for minimising the environmental impact, by trying to contain any disturbed sediment and leaving parts of the seabed untouched so the mined area can be recolonised by marine life. A leading biologist, Professor Cindy Van Dover of Duke University in North Carolina, has carried out research for Nautilus and says life might recover after a single mining event but that no-one can be sure.

"How do we do this so a hundred years from now somebody doesn't look back at us - at me - and say 'Oh my God, I can't believe they were so stupid and let this happen in a particular way'." "So how do we do it right? How do we do it sustainably? Michael Lodge has also said questions will remain about profitability while the final terms of mining licences are settled. The authority was set up to encourage and manage this new sector but any future business, such as the Lockheed Martin subsidiary UK Seabed Resources, will have to pay royalties to the authority to be distributed to developing countries. The exact details have still to be negotiated. Research into seabed minerals has a long and slightly conspiratorial history, starting in the Cold War with the United States and the Soviet Union surveying the oceans ahead of possible future conflict. Surveys of seabed nodules in 1970s were also used as a cover by the US for the secret retrieval of a lost Soviet submarine. Now, the legacy of all that research and exploration is the growing likelihood of large-scale mining operations, fuelled by rising mineral prices, in many parts of the ocean in the coming decades.

### **No Seabed Mining Permits Issued For CNMI, Speaker Confirms**

*Interior Department reassures Guerrero that no licenses exist*

By Haidee V. Eugenio

SAIPAN, CNMI (Saipan Tribune, March 12, 2014) –House Speaker Joseph Deleon Guerrero (Ind-Saipan) said yesterday that the U.S. Department of the Interior assured him that no commercial companies have been issued licenses to mine the CNMI seafloor, although the federal agency said mineral deposits such as gold and iron-manganese nodules do, or are likely to occur, within the CNMI's exclusive economic zones. Deleon Guerrero was able to pose questions to Interior officials on the reported existence of seafloor minerals during his recent trip to Washington, D.C. to meet with federal officials on a host of issues. "The Interior said no licenses were issued to any commercial companies," the speaker told Saipan Tribune yesterday. "They cited the Outer Continental Shelf Act or OSCA, under which the Interior is the agency authorized to grant licenses for seabed mining in coastal states, but not to U.S. territories such as the CNMI."

Deleon Guerrero said Interior cited a U.S. Geological Survey report on marine mineral resources of the Pacific islands. The USGS report said mineral deposits that do, or are likely to occur within CNMI exclusive economic zones include "cobalt-rich iron-manganese crusts, iron-manganese nod-

ules, phosphorite deposits, epithermal gold deposits, hydrothermal manganese and iron oxide deposits, hydrothermal manganese and iron oxide deposits, hydrothermal polymetallic sulfides, insular and lagoonal phosphorite deposits, shallow-water sand and gravel deposits, and shallow- and deep-water precious coral." Deleon Guerrero earlier got hold of online reports citing international seafloor mining companies' interests in mining multimillion worth of high-grade hydrothermal deposits rich in copper, zinc, and lead with a high gold and silver content, as well as large oil and natural gas reserves within CNMI area. The online publications stated that two seafloor mining companies—Canada-based Nautilus Minerals and Australia-based Neptune Minerals—have applied for mining exploration licenses in the CNMI.

But Deleon Guerrero said no licenses were granted to these firms, based on information from the Interior. Now that the CNMI has control over many of its submerged lands, the speaker believes the CNMI has the authority to issue mining licenses for minerals within 3-mile submerged lands. Another issue that Interior officials discussed with the speaker is that the Interior secretary is supposed to convey to the CNMI all rights, titles, and interests of the United States in deposits of oil, gas, and other minerals in the submerged lands within a certain period. The speaker, citing Interior officials, said that the 60-day period ends later this week, starting from Jan. 15 when President Barack Obama signed a proclamation temporarily withholding the transfer to the CNMI of submerged lands around five islands that are either part of a national marine monument or under lease to the U.S. military. In January, Delegate Gregorio Kilili C. Sablan (Ind-MP) asked Interior Secretary Sally Jewell to take action on the transfer of oil, gas, and other mineral rights to the CNMI now that the transfer of submerged lands in the CNMI from the federal government to the Commonwealth has begun.

### **Nautilus still keen on seabed mining project**

Post-Courier, March 03, 2014

INTERIM president and chief executive officer of Nautilus Minerals, Mike Johnston, has said the Canadian company still intends to develop the Solwara-1 deep sea bed mining project, despite terminating its agreement with the PNG Government. This is according to a report by *Business Advantage*. Nautilus had recently announced the termination after the Government failed to complete its purchase of 30% of the Solwara 1 Project, as ordered by an independent arbitrator last October. The Government signed an agreement in March 2011 to exercise its option to take a 30% shareholding in the world's first sea bed mining project in the Bismarck Sea, off the north coast of Papua New Guinea. However, it failed to complete the purchase and, in June 2012, took Nautilus to compulsory arbitration. The binding ruling ordered the PNG Government to pay US\$118 million (K285m) by 23 October 2013, which it failed to do.

Mr Johnson said terminating the agreement meant that the PNG Government had forfeited its right to participate in the project, and to any equipment, intellectual property and licences. *Business Advantage* had reported Mr Johnston saying there was too much uncertainty created by the state's continued non-performance and Nautilus could not continue to carry the share of development costs on behalf of the state. "The mining lease and environment permit remain valid in PNG and Nautilus remains committed to PNG and the local communities in which it operates. "Nautilus' preference is still to achieve an amicable resolution of the issues with the state. "We are now also free to look at other funding and development options ... an essential part of our plan going forward is look at securing additional funding," Mr Johnston said. Given it instigated the arbitration last year, many in the mining industry are puzzled by the PNG Government's inaction. It had yet to respond to the Nautilus announcement.

## Marine mining: Underwater gold rush sparks fears of ocean catastrophe

*Mining metal and minerals in 'ecosystems we hardly understand' poses grave threat to marine life, warn environmentalists*

Suzanne Goldenberg, The Observer, 2 March 2014



Underwater terrain. The prospect of a race to the bottom of the ocean has alarmed scientists. Photograph: 13/Ocean/Corbis

This is the last frontier: the ocean floor, 4,000 metres beneath the waters of the central Pacific, where mining companies are now exploring for the rich deposits of ores needed to keep industry humming and smartphones switched on. The prospect of a race to the bottom of the ocean – a 21st-century high seas version of the Klondike gold rush – has alarmed scientists. The oceans, which make up 45% of the world's surface, are already degraded by overfishing, industrial waste, plastic debris and climate change, which is altering their chemistry. Now comes a new extractive industry – and scientists say governments are not prepared. "It's like a land grab," said Sylvia Earle, an oceanographer and explorer-in-residence for *National Geographic*. "It's a handful of individuals who are giving away or letting disproportionate special interests have access to large parts of the planet that just happen to be under water." The vast expanses of the central Pacific seabed being opened up for mining are still largely an unknown, she said. "What are we sacrificing by looking at the deep sea with dollar signs on the few tangible materials that we know are there? We haven't begun to truly explore the ocean before we have started aiming to exploit it."

But the warnings may arrive too late. The price of metals is rising. The ore content of the nodules of copper, manganese, cobalt and rare earths strewn across the ocean floor promise to be 10 times greater than the richest seams on land, making the cost of their retrieval from the extreme depths more attractive to companies. Mining the ocean floor of the central Pacific on a commercial scale is five years away, but the beginnings of an underwater gold rush are under way. The number of companies seeking to mine beneath international waters has tripled in the last three or four years. "We have already got a gold rush, in a way," said Michael Lodge, deputy secretary general of the International Seabed Authority, which regulates the use of the sea floor in international waters. "The amount of activity has expanded exponentially." The Jamaica-based agency has granted 26 permits to date to explore an area the size of Mexico beneath the central Pacific that had been set aside for seabed mining – all but eight within the last three or four years.

Britain is leading the way in a project led by Lockheed Martin, but Russia, China, Japan, and South Korea all have projects in play. This year alone, companies from Brazil, Germany and the Cook Islands have obtained permits to explore tracts of up to 75,000 sq km on the ocean floor for copper, cobalt, nickel and manganese, and the rare earth metals that help power smartphones, tablets and other devices. Other areas of the Pacific – outside international waters – are also opening up for mining. Papua New Guinea has granted permission to a Canadian firm, Nautilus Minerals, to explore a site 30km off its coast for copper, zinc and gold deposit worth potentially hundreds of millions of dollars. Lodge expects the pace to continue, with rising demand for metals for emerging economies, and for technologies such as hybrid cars and smart phones. Extracting the metals will not require drilling. The ore deposits are in nodules strewn across the rolling plains of sediment that carpet the ocean floor. Oceanographers say they resemble knobbly black potatoes, ranging in size from a couple of centimetres to 30cm. Mining companies say it may be possible to scoop them up with giant tongs and then siphon them up to vessels waiting on the surface.

The problem is much remains unknown – not just about what exists on the ocean floor but how ocean systems operate to keep the planet habitable. The ocean floor was once thought to be a marine desert, but oceanographers say the sediment is rich in marine life, with thousands of species of invertebrates at a single site. "It's tampering with ecosystems we hardly understand that are really at the frontier of our knowledge base," said Greg Stone, vice-president for Conservation International. "We are starting mining extracting operations in a place where we don't fully understand how it works yet. So that is our concern – disturbing the deep sea habitat." Most of the models rely on being able to produce 1 million tonnes of ore a year. Stone said the seabed authority was putting systems in place to protect the ocean floor, but other scientists said there still remained enormous risks to the sediment and the creatures that live there.

"It is going to damage vast areas of the sea floor," said Craig Smith, an oceanographer at the University of Hawaii who served as an adviser to the International Seabed Authority. "I just don't see any way [in] mining one of these claims that whole areas won't be heavily damaged." Earle expressed fears about how mining companies will deal with waste in the high seas. "Mining is possible," she said. "But the 20,000ft question is what do you do with the tailings? All of the proposals involved dumping the tailings at sea with profound impacts on the water column and the sea floor below. The Seabed Authority initially proposed to set aside 1.6m sq km of the ocean floor as protected areas, or about 20% of its territory. But those reserves are under review. As economic pressures rise, there are fears that commercial operations would begin to erode those protected areas. "I think it is certain that within a year or two there will be more claims covering these areas and there won't be enough room left to develop these scientifically defensible protected areas," Smith said.

Some have argued that with all the unknowns there should be no mining at all – and that the high seas should remain out of bounds for mineral extraction and for shipping. José María Figueres, a former president of Costa Rica and co-chair with the former British foreign secretary, David Miliband, of the Global Ocean Commission, an independent entity charged with developing ideas for ocean reform, suggested leaving all of the high seas as a no-go area for commercial exploitation (apart from shipping). "Do we know enough about the seabed to go ahead and mine it?" said Figueres. "Do we understand enough about the interconnection between the seabed, the column of water, the 50% of the oxygen that the ocean produces for the world, the 25% of the carbon that it fixes in order to go in and disrupt the seabed in way that we would if we went in and started mining? I don't think so, not until we have scientific backing to determine whether this is something good or bad for the planet."

World leaders are now mobilising to address concerns, not just about seabed mining, but about how to safeguard ocean systems which are increasingly recognised as critical to global food security and a healthy planet. US secretary of state John Kerry, in a video address delivered to a high-level ocean

summit hosted by the *Economist* and *National Geographic* last week, invited leaders to a two-day summit in Washington that will seek ways of protecting fishing stocks from overexploitation and protecting the ocean from industrial pollution, plastic debris and the ravages of climate change. The stakes have never been higher, scientists said. The oceans are becoming increasingly important to global food security. Each year more than a million commercial fishing vessels extract more than 80m metric tonnes of fish and seafood from the ocean. Up to three billion people rely on the sea for a large share of their protein, especially in the developing world. Those demands are only projected to grow. "If you look at where food security has to go between now and 2030 we have to start looking at the ocean. We have to start looking at the proteins coming from the sea," said Valerie Hickey, an environmental scientist at the World Bank.

That makes it all the more crucial to crack down on illegal and unregulated fishing, which is sabotaging efforts to build sustainable seafood industries. Two-thirds of the fish taken on the high seas are from stocks that are already dangerously depleted – far more so than in those parts of the ocean that lie within 200 miles of the shore and are under direct national control. Estimates of the unreported and illegal catch on the high seas range between \$10bn and \$24bn a year, overwhelming government efforts to track or apprehend the illegal fishing boats. The illegal fishing also hurts responsible fishing crews. Figueres and Miliband suggested fitting all the vessels operating on the high seas with transponders to track their movements. That would single out rogue fishing vessels, making it easier for authorities to apprehend the vessels and their catch. It's not a perfect solution. A diplomat who has negotiated international agreements to control illegal fishing said captains – already cagey about revealing their favourite fishing routes – would simply flip off the transponders.

United Nations officials were also sceptical of the idea of a high-seas police force. "It sounds a little bit like science fiction for me at this particular moment," said Irina Bokova, the director general of Unesco, which manages 46 marine sites. "What kind of police? Who is going to monitor? How is it founded? It's a very complicated issue." But the debate was a sign of growing momentum in an international effort to protect the oceans – before it's too late. When it comes to the ocean floor, that process is at the very early stages. But given the multiple disasters humans have made with the ocean so far, the stakes are high for getting it right. "There is no doubt there are huge mineral resources to be extracted at some point in the future," Lodge said. "It's also true we don't know enough about the impact on biodiversity and the impact on marine life once the mining takes place." As the ultimate custodian, said Michael Lodge, the International Seabed Authority had two responsibilities; making sure companies access that vast mineral wealth in an environmentally responsible way, and then sharing it out equitably. "We have a huge challenge to devise a fiscal regime so that humankind as a whole gets a fair share. That's an enormous challenge, he said. "If we end up giving it away to industry, then we have failed in our missions." And the costs of such a failure are already becoming painfully evident in the greater ocean.

## **Scientists call for tougher treaty to protect the deep ocean**

Oleg Klimov, Panos, Sci Dev Net, 28 February 2014

Speed read:


- A new treaty could be used to police the expected rise in deep-sea mining
- It could also ensure that gains from marine genetic resources are fairly shared
- Capacity building is needed to help developing nations exploit their resources

A new international agreement is needed to police the exploitation of the deep ocean because of the rising threats of deep-sea mining and bottom trawling for fish, say scientists. Speakers at a symposium this month (16 February) urged the UN to negotiate a new treaty for the deep ocean to supplement the UN Convention on the Law of the Sea. The symposium took place at the annual meet-

ing of the AAAS (American Association for the Advancement of Science) in Chicago, United States. “This is an opportunity for scientists to voice their concerns about mounting human impacts on the once-remote deep ocean to those who have the power in their hands to make the changes,” says Kristina Gjerde, high seas policy advisor for the International Union for Conservation of Nature. The deep sea makes up about two-thirds of the world’s oceans. It begins at a depth of around 200 metres, both within and beyond zones of national jurisdiction.

But deep-sea environments are threatened by “imminent” mining and bottom trawling for fish, said the scientists at the meeting. “We’re calling for a new treaty to sew the gaps in international law that don’t currently include biodiversity, conservation, marine genetic resources, capacity development and technology transfer for areas beyond national jurisdiction,” says Gjerde. The UN-sanctioned International Seabed Authority (ISA) was established in 1994 to regulate mineral extraction from the deep seabed outside national zones of jurisdiction. The ISA, based in Jamaica, has so far approved 19 mineral prospecting licences in the deep ocean around the world for companies and government bodies, including China and India, as well as those sponsored by the Pacific island nations of Kiribati, Nauru and Tonga [See map]. The Cook Islands have also applied to explore deep-sea mining opportunities.



The map shows prospecting licences approved so far by the International Seabed Authority. The colour-coded arrows show the approximate location of licences held by larger countries. Several smaller nations, circled in orange, have permission to prospect in the Pacific ocean. Credit: SciDev.Net; 

But the ISA does not regulate marine genetic resources, which could be valuable to the medical and pharmaceutical sectors, or biodiversity conservation, says Lisa Levin, director of the Center for Marine Biodiversity & Conservation at the Scripps Institution of Oceanography, United States. “The problem is that the ISA’s mandate is to facilitate the extraction of minerals. They don’t have a mandate to identify which parts of the sea floor are most critical to ecosystem health in the ocean,” says Linwood Pendleton, senior scholar in the Ocean and Coastal Policy Program at Duke University, United States. The new treaty would ensure that financial gains made from marine genetic resources are shared between all nations, and that new mechanisms are developed to transfer marine technology and develop capacity in this field, says Gjerde.

Significant deep sea resources are often found within the deep seas of the developing world, often within the nations’ exclusive economic zones [that stretch up to 200 nautical miles from their shore] of those countries, says Levin. “Yet those countries often don’t have the necessary expertise or



technology to explore the deep seabed. So they often rely on countries that do have the technology and expertise,” she says. “It’s very important that we do a lot of capacity building, information sharing and transfer of expertise so that those countries are able to manage their own deep ocean resources.” The scientists at the meeting also warned that extracting minerals and precious metals from the deep sea could cause catastrophic long-term damage to marine ecology unless managed carefully.

New technology, dwindling land-based resources and high commodity prices mean that deep-sea mining is not only feasible, but imminent, says Pendleton. “Precaution is essential,” says Gjerde. “This means rules should be in place before mining begins, including measures such as environmental impact assessments, comprehensive systems of marine protected areas and the mechanisms for monitoring and controlling impacts.” She adds: “It is important to set and maintain common standards so that a few unscrupulous operators can’t take advantage of countries with weak legal systems, causing irreparable harm in return for very short-term gain.” New mining ventures are underway off various Pacific islands and off the African coast, as well as on the international seabed area that lies outside nations’ jurisdiction, says Gjerde.

Canadian company Nautilus Minerals had planned to mine hydrothermal vents in Papua New Guinea, but this has been delayed, says Levin. And the Namibian government is considering leasing the deep sea bottom in its national waters for phosphate mining, although last September it placed an 18-month moratorium on all mining decisions, while it gathers new information, she adds. “Because no mining has happened yet [anywhere in the deep sea], there’s time to put some major environmental management in place,” she tells SciDev.Net. The key is to identify places where mineral wealth is high and ecological impacts are low and target mining there, says Pendleton. Deep-sea trawling for fish has already had terrible long-lasting impacts on the deep sea, says Gjerde. The deep sea fish populations are quickly depleted because the fish aggregate, which makes them easy to catch, and they are slow growing, living over one hundred years, says Levin. One-fifth of the world’s continental margins, an area the size of the United States and Canada combined, have already been trawled, she adds.

### **Namibia seeks advice as seabed mining harms fisheries industry**

Undercurrentnews, February 28, 2014

A conflict of interest between the sustainability of the marine ecosystem and international mining companies seeking to mine the seabed has resulted in Namibian authorities approaching Norwegian researchers for advice. In the 1980s, pre-independence, Namibian fish stocks were at a low point. Today fisheries are sustainable, but mining the seabed could threaten the vital fisheries resource. “This is largely a conflict that can be compared with the debate for and against oil and gas exploration in Lofoten and Vesteraalen in Norway”, said project manager and biologist Roar Solbakken of Sintef Fisheries and Aquaculture Research. Sintef was contacted by the fisheries ministry of Namibia in 2012, as it sought a research partner with no commercial ties to the region. Sintef has submitted proposals for an environmental study that will cover the consequences for the entire Namibian coast, were it to be opened for phosphate recovery from the sea.

Sintef Fisheries and Aquaculture is leading the project while the Institute of Marine Research partners. IMR has a long marine operating experience in projects in Namibia and the Southern Africa region. In the 1980s the fish stocks in the West African country were on the verge of collapse due to overfishing, but because its waters are nutritious, cold, and unpolluted, the authorities have managed to restore fish stocks with the help of good management. But it’s not just fish that make the sea an important natural resource for the country. The sea bed contains large deposits of both diamonds and phosphates. The latter is coveted for production of fertilizers. Deputy fisheries minister Hon.

Ankama will address the NASF conference on the topic of Namibian marine phosphate mining research on March 6.

## **Deep Sea Mining; Digging a Hole We Can't Get Out Of**

By Dr. Gerry Goeden, The Epoch Times, February 26, 2014



This weird deep sea angler fish lives at abyssal depths that exert pressures of 11,000 pounds per square inch.

In May, 2013 the United Nations published its first plan for deep sea mining saying companies could apply for mining licenses as soon as 2016. To date the UN's International Seabed Authority has issued 17 exploration permits with 7 more pending. "We are at the threshold of a new era of deep sea mining" said Michael Lodge, legal counsel for the ISA. An assessment of the Pacific Ocean has estimated more than 27 billion tonnes of rocks could be lying on its floor, including 290 million tonnes of copper and 340 million tonnes of nickel. The extraction of the rock 'nodules' – small mineral-rich rocks from the seabed, has been around as a concept for decades but deep sea mining for them has only recently become viable with advancements in technology.

Deep sea mining sites are usually around active hydrothermal vents at about 1,400 – 3,700 m below the ocean's surface. The vents pour scalding mineral rich water from deep within the Earth and create sulphide deposits. These deposits contain valuable metals such as silver, gold, copper, manganese, cobalt, and zinc. The deposits are mined using either hydraulic pumps or bucket systems that take ore to the surface to be separated from millions of tons of sediments and marine life. Nodules occur in an environment called the abyssal plane. It is part of the ocean floor between about 3,000 and 6,000 metres depth existing in perpetual darkness. Incredibly, this almost unknown and strange place covers more than 50% of the Earth's surface and would be the way an outside observer would describe our planet.

Recent oceanographic expeditions conducted by an international group of scientists from the Census of Diversity of Abyssal Marine Life (CeDAMar) have found an extremely high level of biodiversity and the abyss may be a major reservoir of animal life in the oceans. The abyss also exerts significant influence upon ocean carbon cycling, dissolution of calcium carbonate and atmospheric CO<sub>2</sub> concentrations over timescales of 100–1000 years. Its permanent inhabitants are able to with-

stand the immense pressures of the ocean depths, up to 76 megapascals (11,000 psi). These regions are also characterized by continuous cold and lack of nutrients. The abyssal zone has temperatures around 2 °C to 3 °C (35 °F to 37 °F). In August, 2012, the Papua New Guinea Government gave the go-ahead to Nautilus Minerals to start the world's first deep sea mining. Japan and China have also expressed interest. Canadian firm Diamond Fields International and its joint venture partner Manafa International Trade Company of Saudi Arabia the go ahead for the Atlantis II Deeps. They plan to mine what DFI calls "one of the largest hydrothermal poly-metallic deposits in the world". Sudan's mining minister Kamal Abdel Latif said it had already started and "We are expecting starting production maybe 2014," added, according to Lebanon Today. The Atlantis II Deeps is believed to contain around 1.83 million tonnes of zinc, 402,000 tonnes of copper, and 3,432 tonnes of silver. Companies including Trans-Tasman Resources (TTR) have plans to mine the seabed off the coast of NZ's North Island. TTR has cited surveys estimating that possibly 481 million tonnes of iron ore exist up to nine metres beneath the seabed. This will effectively turn the seabed into a giant open-cut mine.



Spider crabs are as much as 4 metres across and a metre high.

But all that glitters is not gold! From 2009 to 2012, Aker Wirth, in cooperation with the BGR (German Federal Institute for Geosciences and Natural Resources), developed a concept for the deep sea mining of manganese nodules combined with a profitability analysis. The study was undertaken for the German Federal Ministry of Economics and Technology. The newly-developed concept has been designed for the mining of manganese nodules from water depths of up to 6000 m. Their system consists of two manganese nodule collectors, a transport system for conveying the material, and a specially-designed production vessel. Steffen Knodt, Vice President of Technology & Innovation at Aker Wirth, explained: "To ensure efficient mining, a continuous transportation of raw material from the collectors via risers that are several kilometres in length is required. At such water depths, this places considerable demands on the robustness of the single components."

The huge mineral collectors will cut through the ocean floor, lift the ore to the surface, and pump millions of tons of fine muddy sediments back into the water. The first environmental concern focuses on the destruction of abyssal marine life that is incredibly slow growing in the near freezing (2°C) waters. The huge mineral collectors will destroy most of the life they pass over leaving a barren track across the abyssal plane. Data acquired from the abyssal North Pacific and North Atlantic led Adrian Glover and Craig Smith (2003) to suggest that deep-sea ecosystems will be affected by deep sea mining operations on decadal time scales. In 1978, a dredge aboard the Hughes Glomar Explorer, operated by the American mining consortium Ocean Minerals Company, made a mining track at a depth of 5000 meters in the nodule fields of the CCFZ. In 2004, the French Research Institute for Exploitation of the Sea found that the mining track was still visible on the seabed. Sam-

ples taken of the superficial sediment revealed that its physical and chemical properties had not shown any recovery since the disturbance made 26 years earlier.

The second environmental issue deals with the discarded waste sediments. Sediment plumes could have the greatest impact. Plumes are caused when the tailings from mining are dumped back into the ocean, creating a cloud of fine mud floating in the water. Near bottom plumes occur when the tailings are pumped back to the mining site. The floating particles increase the cloudiness of the water, clogging filter-feeding of organisms. Surface plumes cause a more serious problem. Depending on the size of the particles and water currents the plumes will spread over enormous areas. According to Ahnert and Borowski in *Environment and Deep-Sea Mining: A Perspective*, the plumes will impact on the tiny plankton by reducing light penetration and in turn alter the mid-ocean food web. Because we know almost nothing of this strange environment that covers more than half of the planet, environmental advocacy groups such as Greenpeace argue that much of the abyss should not be mined and we must proceed with caution. Deep sea mining is a contentious issue causing inevitable environmental damage.

Conservation experts have long warned that mining the seabed will be highly destructive and will have disastrous long-term impacts for marine life. The ISA study itself recognizes that mining will cause "inevitable environmental damage". A key factor in the ISA's report is the need for environmental safeguards. The document calls for monitoring of the seabed during deep sea mining operation however critics are sceptical if activity in the ocean depths can be monitored much less policed. Acker Wirth Company claim that "the increasing scarcity of resources coupled with the continuous rise in resource prices drive the search for new raw material deposits". These include "precious and high-tech metals, such as manganese, cobalt, nickel, copper and gold, along with rare earths (which are important for the high-tech industry)". They would have us believe that they have no choice and are mining for the general good. One of the 20th Century's greatest leaders remarked, "Earth provides enough to satisfy every man's needs, but not every man's greed." He was Mahatma Gandhi. I wonder how he would have seen the destruction of the World's last great wilderness in exchange for the wealth of a few.

### **Die Chancen und Risiken des Tiefseebergbaus**

*Die Herausforderungen sind immens, aber angesichts der hohen Rohstoffpreise interessieren sich immer mehr Staaten und Firmen für den Tiefseebergbau. Der "World Ocean Review" trägt Fakten zusammen. Von Birgitta von Gyldenfeldt, Die Welt, 20.2.2014*

Gold und Silber, Kupfer und Zink. Diese und weitere seltene Metalle, die zum Teil Ausgangsbasis für High-Tech-Teile sind, sind heiß begehrt. Bisher werden sie in Minen an Land abgebaut, doch der weltweite Hunger nach Rohstoffen und die daraus resultierenden hohen Preise rückt auch Lagerstätten in der Tiefsee ins Visier von Staaten und Firmen. So "sollen künftig Erze in Form von Manganknollen, Kobaltkrusten und Massivsulfiden in bis zu 4000 Meter Tiefe abgebaut werden", um den wachsenden Bedarf an Rohstoffen zu decken, heißt es im "[World Ocean Review III – Rohstoffe aus dem Meer](#)", der am Donnerstag in Hamburg vorgestellt wurde. Heute sei die Arbeit in der Tiefe allerdings noch unwirtschaftlich. In dem 168 Seiten starken Bericht haben Wissenschaftler des Kieler Exzellenzclusters "Ozeane der Zukunft" und international renommierte Experten Fakten über die bekannten Öl- und Gasvorkommen zusammengetragen und informieren über mineralische Ressourcen.

### **Staaten und Firmen stehen in den Startlöchern**

"Rohstoffe im Meer haben großes Potenzial", sagte der Sprecher des Kieler Exzellenzclusters "Ozean der Zukunft", Prof. Martin Visbeck anlässlich der Vorstellung des Berichts. "Aber man kann wohl sagen, trotz der steigenden Metallpreise ist derzeit noch niemand bereit, sehr viel Geld für den

Tiefseebergbau in die Hand zu nehmen." Dennoch, "die wirtschaftliche Nutzung mariner mineralischer Rohstoffe rückt angesichts des Anstiegs der Rohstoffpreise und globaler Verknappungsszenarien bei bestimmten Rohstoffen immer mehr in den Fokus und könnte mittelfristig eine größere Bedeutung erlangen". So steht es beispielsweise im "Nationalen Masterplan Maritime Technologien" Deutschlands. Und auch Unternehmen zeigen Interesse an den mineralischen Schätzen der Ozeane. "Natürlich gucken sich Firmen da nach neuen Lagerstätten um", sagte Visbeck. Weltweit gibt es bisher noch keinen kommerziellen Tiefseebergbau von Metallen. Allerdings stehen schon einige Staaten wie Deutschland und private Firmen in den Startlöchern und machen Erkundungsbohrungen oder haben Lizenzen dafür beantragt. Es sei sinnvoll, diese Pilotvorhaben wissenschaftlich zu begleiten, Umweltaspekte zu berücksichtigen und herauszufinden, ob das grundsätzlich überhaupt darstellbar ist. "Da sind Industrie und Forschung gemeinsam unterwegs", sagte Visbeck.

### **Pro und Kontra des Abbaus**

Ein Abbau sei immer mit Risiken und Umweltbelastungen verbunden, darüber müsse diskutiert werden, sagte der Kieler Ozeanograph. So sind sich Wissenschaftler laut Bericht beispielsweise darin einig, "dass der Abbau von Manganknollen einen erheblichen Eingriff in den Lebensraum Meer darstellt". So könnte durch den Lärm und die Vibrationen, die bei Abbau, Herauspumpen und Reinigen der Knollen entstehen, Delfine und Wale gestört werden. Und im durchpflügten Bereich würden alle Tiere sterben, die nicht schnell genug fliehen könnten, Würmer, Schnecken und Seegurken beispielsweise. Zudem werden die metallischen Rohstoffe beispielsweise als nachwachsend bezeichnet – zu Unrecht. "Man muss ganz klar sagen, da ist nix nachhaltig", sagte Visbeck, "die Vorkommen sind endlich." Zudem sei ein Abbau sehr kostspielig. Auf der anderen Seite vermeide Meeresbergbau Landnutzungskonflikte, heißt es im "World Ocean Review. Und Staaten, die über keine eigenen Rohstoffreserven verfügen, erlangten ein Stück weit Unabhängigkeit von den Exportnationen. Eine Empfehlung oder einen Ratschlag für oder gegen den Tiefseebergbau jeglicher Art, gibt der Bericht nicht. "Wir wollten Hintergründe und Fakten bündeln und auf den Tisch legen", sagte Visbeck. Auf dieser Grundlage könnten alle Beteiligten in Politik, Wirtschaft, Wissenschaft und Gesellschaft nun sachlich diskutieren, ob und in welcher Form der Tiefseebergbau gewünscht sei.

### **Scientists warn over coming era of deep sea mining**

The Independent (UK), February 17, 2014



Strip mining and vacuum mining are coming to the seafloor

The last great unexplored wilderness on Earth is about to experience industrial-scale mining that could change the face of the pristine seabed of the deep ocean for generations to come, scientists have warned. Access to the mineral deposits and rare-earth metals that are known to exist on the seabed has never been easier with the help of robotic submarines and there are already 19 leases for prospecting in international waters and another five leases that are pending, they said. Strip mining involving giant underwater cutters, where vast areas of the seabed are removed and brought to the surface as a slurry, and vacuum mining where the seabed is literally sucked up by machines, are the kind of mining operations that could be commonplace in a few years time, they told the American Association for the Advancement of Science.

“The deep ocean is a vast repository of natural resources and we’re going to be going in there if not now, then within the next 50 years,” said Lindwood Pendleton of the Duke Nicholas Institute for Environmental Policy Solutions in Beaufort, North Carolina. “We’re really in the dark when it comes to the ecology of the deep sea. We know a lot about a few places, but nobody is dealing with the deep sea as a whole, and the lack of knowledge is a problem for decision-making and policy,” Dr Pendleton said. Without careful controls the physical habitat of the seabed hundreds of feet below the surface could be irrevocably destroyed along with the unique wildlife it supports, said Cindy Lee Van Dover of Duke University in North Carolina. “The deep sea is out of sight, out of mind, and because there isn’t a specific human society that will be directly impacted by the negative consequences of extraction, there’s a whole level of concern that isn’t being expressed when it comes to deep sea industrialisation,” Dr Van Dover said.

“There’s just so much that we don’t know about the deep sea, and we need that basic research before we form policy, but we urgently need policy before this window of opportunity closes,” she said. “One hundred years from now, we want people to say they got this right based on the science they had, and they weren’t asleep at the wheel,” she told the meeting. One mining company prospecting off the coast of Namibia intends to remove between 1 and 5 metres of seabed silt and ship it to the land for extracting phosphate deposits before the waste slurry is siphoned off and dumped back into the sea. Bronwen Currie of Namibia’s National Marine Information and Research Centre in Swakopmund, said that concerns about the environmental impact of the phosphate mining has led to the government imposing a moratorium until further assessments can be made about its long-term effects. “The biggest concern is the accumulation of effects. We need research on the impact on fish stocks. There is no real knowledge of the real impacts of this kind of mining,” Dr Currie said.

### **Nautilus Minerals Terminates Agreement With PNG Government**

*Sea-bed mining company will seek damages for breach of contract*

WELLINGTON, New Zealand (Radio New Zealand International, Feb. 17, 2014) – Nautilus Minerals Limited, which is operating the world's first seabed mining site in Papua New Guinea, has announced it is terminating its agreement with the PNG government. A statement released by the Canadian-registered company last week says contrary to the arbitrator's award of October last year the PNG government had failed to complete the purchase of its 30-percent interest in the Solwara 1 Project. The company says it will now terminate the agreement and claim damages. Nautilus says it still wants to reach an amicable resolution with the government. The company was granted the first lease to mine the ocean floor for polymetallic sulphide deposits, from which it expects to obtain copper, gold and silver.

### **Nautilus takes harder line with PNG gov't over Solwara 1 dispute**

*The dispute between Nautilus Minerals and Papua New Guinea over the Solwara 1 project continues, with Nautilus terminating PNG's ownership rights and seeking damages.*

Kip Keen, mineweb.com, 14 Feb 2014

HALIFAX, NS (MINEWEB) - Turning more combative in a long-running dispute, Nautilus Minerals said Wednesday it terminated the Papua New Guinea government's right to a 30-percent interest in the Solwara 1 underwater mining project - over failure to meet payment despite a binding judgement it was to do so - and that it would seek undisclosed damages. Responding to emailed questions, Nautilus spokesperson John Elias reiterated Nautilus' desire to find compromise: "It is our intention to complete the project and the company is still in discussions with the State." The move to go after damages against the PNG government comes after a binding arbitration judgement went against the island nation last year. The dispute, at its most basic level, is over government ownership of Solwara 1, an underwater mining project that a few years back looked well on its way to construction. Indeed the PNG government exercised its legal right to buy a 30-percent interest in the project in 2011.

Soon after it exercised the option, however, the government contended Nautilus was in breach of contract and - with the state having refused to pay - the spat headed to international arbitration. The case finally went to judgement in early October 2013 and an arbitrator ruled the PNG government had until the 23rd that same month to meet its contractual obligations; that is to pay a bill that Nautilus pegged to the tune of \$118 million. Now 113 days later, and counting, after the arbitration-set deadline, payment has yet to come and Nautilus is resorting to more legal recourse to recoup damages. "Nautilus will work with its lawyers in preparing for a damages hearing," Elias said in an email, later clarifying the hearing is to be overseen by the same international arbitrator. Elias, referring to the PNG's option agreement, also added: "The purpose of the damages claim is to put Nautilus into the position it would have been in financially had the State performed its obligations under the SEOA."

A possible outcome Nautilus might hope for is to pressure the PNG government to reconsider its position on the project were it to seem a greater financial risk to continue to fight a legal battle with Nautilus. It is not clear, however, what was the PNG government's position on the dispute, or the 2013 arbitration decision. An emailed request for a statement was sent to the PNG government's Washington-based embassy mid-Wednesday PST (early morning in Papua New Guinea). Looking at Nautilus' decision against PNG optimistically, Elias also highlighted potential benefits of not having the government as partner. He noted that with full ownership of Solwara 1 Nautilus had more options to strike joint ventures or other partnerships over the intellectual property rights it owns in having developed unique underwater mining systems to mine seafloor VMS deposits and in seeking funds to build equipment it needs to develop Solwara 1.

## **Mining the Abyss**

Peter Neill Director, World Ocean Observatory, Huffington Post via PNG Mine Watch 11.2.2014

World Ocean Observatory gathers its subject matter from sources all over the world. This week's story, "Mining the Abyss," comes from an excellent journalistic piece by Jo Chandler (<http://www.theglobalmail.org/feature/mining-the-abyss/760/>)(published in December 2013 by The Global Mail an Internet news services based in Sidney, Australia.

The article is framed by the occupation of Eliuda Toxok, a resident of the west coast of New Ireland, a province of Papua New Guinea. Toxok is a so-called shark-caller, an artisanal fisherman and devotee of traditional lore who attracts sharks to his small outrigger canoe by rattling small half-coconuts on a chain to mimic the sound of thrashing fish that in turn lures the fish to a vine noose by which he captures his prey -- some 100 caught in a career of over 40 years. Toxok lives on less than \$2 a day, and he is representative of his friends and neighbors who live in poverty far from the

eyes of the developing world. Unless that world looks to just 30 kilometers offshore where Solwara 1, a vast area of the ocean floor, has been licensed by the New Guinea government for the world's first open-cut deep water mining operation in pursuit of gold, silver, and copper in amounts significant enough to justify an investment of some \$383 million toward a \$600 million return over a life-span of only five years after which the "vein" is exhausted and the equipment moves on to another opportunity.



The engineering is staggering: three enormous robotic machines, two to scour the bottom and a third to vacuum this dislodged ore up to surface vessels where it will be transferred to China for processing. The copper recovery is estimated at 10 times that of a land-based mine, and the gold is predicted at an astonishing 6.4 grams per ton. The company that has received the first exploration license is Nautilus Mineral, registered in Canada and based in Brisbane, Australia. This enriched site is of course aligned to a volcanic ridge, near North Su, an active underwater volcano, an area where temperature, pH conditions, and the lightless environment also supports unique and profuse concentrations of heretofore unknown forms of marine life supported by the very same natural circumstances that manufactured the extreme mineral concentrations to be mined.

In this one example, you have all the conflicts of the modern world combined: our insatiable demand for natural resources from anywhere without limit, the market-driven assertion of economic value over social return, the new technical capacity to go and get without limit, the international collusion of corporate connection, corruption or political compromise by the smaller nations in which this raw wealth is found, and the social disruption resultant from the physical and financial impact on local communities that inevitably are excluded from royalties and returns exported to faceless investors far away. There is a United Nations agency, the International Seabed Authority, based in Jamaica, that is charged with oversight of deep ocean mining, but it has done very little in its history, in part as there has not been much activity to date, and in part as it is jurisdictionally delimited from projects within a nation's exclusive economic zone. That will change, as the economics and engineering technology have changed, and other multi-national corporations, like UK Seabed Resources, a subsidiary of Lockheed Martin in the US, are getting into the race for returns estimated in the billions.

Is this an irresistible force with an inevitable end? Two counter-forces exist and have serious oppositional power: first, the loss of the biodiversity and knowledge inherent in these unique underwater environments and the profit from the potential of future scientific transformation into medicine, food, biotechnology, and other yet-to-be-investigated contributions to human well-being; and, second, the loss to the local communities that have already experienced the disappointment of promised economic and social returns from such enterprise on land and the profit that should be derived individually, locally, and nationally from this transfer of indigenous resources and value. "Resource



nationalism" pertains here -- the right of a nation to exchange its resources for return to its population and general social welfare that is sustainable over time.

Globalization has stood that idea on its head. The Middle East has flourished on its surfeit of oil, a rich although single-sourced economy, now at risk as the resources are exhausted, similar supplies are found elsewhere, or alternatives dilute demand. Saudi Arabia and the others have had a nice ride on oil. Why should the people of Papua New Guinea, indeed why should Eliuda Toxok not share fully in this wealth, managed as a sustainable asset in what must also be a sustainable place? We have heard this discussion before; but we are hearing it again, now, the same old debate, with perhaps the same devastating outcome, albeit in a new environment, under the sea.

## **CNMI Could Be Sitting On A Gold Mine: House Speaker**

*Mining companies have already applied for exploratory licenses*

By Haidee V. Eugenio

SAIPAN, CNMI (Saipan Tribune, Feb. 4, 2014) – If international seafloor mining companies' interests in previous years are a gauge, then the CNMI may be sitting on or surrounded by multimillion worth of high-grade hydrothermal deposits rich in copper, zinc and lead with a high gold and silver content as well as large oil and natural gas reserves—without its local government even knowing about it—based on information that House Speaker Joseph Deleon Guerrero (Ind-Saipan) recently gathered. Meanwhile, the Inos administration said it would like to obtain more information about the reported minerals. The speaker, on his way to Washington, D.C. later this month to meet with federal officials, said he would be posing questions—and hopes to obtain answers—about reported valuable minerals within or near the CNMI. He cited, for example, online publications stating that two seafloor mining companies—Canada-based Nautilus Minerals and Australia-based Neptune Minerals—have applied for mining exploration licenses in the CNMI.

In their respective websites, the companies said they plan to mine the world's seafloor copper-gold sites, also called seafloor massive sulphide, or SMS, deposits. SMS are high-grade hydrothermal deposits rich in copper, zinc, and lead with a high gold and silver content found on the ocean floor. Quoting online resources, the speaker cited that in January 2006, Neptune Minerals applied for exploration licenses covering approximately 147,000 square kilometers along the Marianas Arc and the associated back-arc basin offshore from the CNMI. That was three years before then-President Bush signed in January 2009 a proclamation establishing the CNMI's three northernmost islands a part of a Marianas Trench Marine National Monument. "The articles didn't say whether they [Nautilus and Neptune] were granted a license [when they applied for it]," Deleon Guerrero told Saipan Tribune yesterday. His first question is: "What is out there?" "We want to know and confirm what is out there. If the federal government has information about what's out there, I think we should be informed," Deleon Guerrero said. The second question, he said, would be whether the federal government has granted anyone a license to mine these minerals.

"The third question is, in the context of the submerged lands conveyance to the CNMI, if these deposits are within the 3 miles territorial waters, are we entitled to any royalties or revenues? If the licenses were issued prior to the conveyance, and now that it has been conveyed, are those rights also transferred?" Our reading of the Submerged Lands Act is that we are not," the speaker said. But he said he would like the U.S. government to confirm such. Another question is whether the U.S. Department of the Interior would still issue licenses to seafloor mining companies now that the CNMI controls its 3-mile submerged lands, except those in the Marianas Trench Marine Monument and around military leases on Tinian and Farallon de Medinilla. "We don't have any type of authority regulating underwater or seabed mining. There's a lot of questions that need to be asked and clarified," the House speaker added.

Another online publication tackling the Marianas Trench Marine Monument stated that in the seabed around the Marianas Trench and Rose Atoll National Monuments, geologists have identified "hard minerals like phosphate, abyssal manganese, ferromanganese, cobalt, sulfide, olivine, feldspar, clinopyroxene, opaline, silica and pyrite as well as hydrothermal deposits of gold and silver—and the world's richest deposits of baryite (barite)." The publication says under those seabed is "the world's largest oil and natural gas reserves." "Preliminary estimates suggest the oil and natural gas reserves will dwarf the combined reserves found under the North Slope of Alaska and in the Arabian Peninsula—combined," the publication adds. The House speaker also cited another online article stating that the establishment of the Marianas Trench as a National Marine Monument prohibiting mining "could have effectively neutralized some of these mining activities in the Marianas."

Still, the speaker said this is a question that needs to be asked and hopefully answered. Delegate Gregorio Kilili C. Sablan (Ind-MP), meanwhile, earlier asked Interior Secretary Sally Jewell to take action on the transfer of oil, gas, and other mineral rights to the CNMI, now that the U.S. transfer of control over submerged lands to the CNMI has started. At the time, Sablan said he's not aware of any such leases or grants that the federal government may have issued in areas that the CNMI now owns. Press secretary Angel Demapan, when sought for comment yesterday, said he's not aware if the information the speaker has gathered has been directly communicated to the administration. "However, it is definitely something that the administration would like to obtain more information about. At this point, the government's view is that the submerged lands conveyed to the Commonwealth are the property of the Commonwealth. As such, any and all matters that affect these areas should be addressed to and by the Commonwealth," Demapan told Saipan Tribune.

Deleon Guerrero, at Sablan's invitation, would be meeting with officials from the U.S. Department of the Interior and the Department of Defense. Also among his key concerns are the U.S. military's plans for Pagan and Tinian and the entire CNMI. When asked whether he's perplexed that the U.S. government has not brought the issue of minerals to the CNMI's attention, the speaker said "maybe because we never asked" or "maybe because all rights and authority over the waters surrounding the Marianas were under federal control." Meanwhile, on Friday afternoon, the CNMI House of Representatives adopted a joint resolution urging Congress to recognize the rights of people of Northern Marianas descent to control its exclusive economic zone—the submerged lands and water extending 200 miles around the islands. By a vote of 19-1, the House adopted Rep. Felicidad Ogumoro's (R-Saipan) House Joint Resolution 18-1 introduced a year ago. The resolution is on its way to the CNMI Senate.

## **Die riskante Rodung am Grund des Ozeans**

*Das Meer ist auch ein noch nahezu ungenutztes Reservoir an Energie – und Rohstoffen. Mit Pumpen und Schläuchen sollen tonnenweise Gold, Erze und Mangan abgebaut werden. Das hat Folgen für die Umwelt. Von Thomas Jüngling, Die Welt, 26.01.2014*

Rundherum ist es stockdunkel, nur wenige Strahler beleuchten die gespenstische Szenerie. Eine 300 Tonnen schwere Baumaschine schiebt sich langsam über den Boden. Das monströse Gerät ist bestückt mit einem rotierenden Zylinder. An deren Unterseite sitzen acht Zentimeter lange Metallzähne, die sich in den Boden fräsen und das Gestein lockern. Der Maschine folgt ein weiteres Untertum, dessen 200 metallische Wolfram-Zähne das Gestein in fünf Zentimeter kleine Stücke zermalmen. Trotzdem ist nur ein dumpfes Grollen und Rumpeln zu hören, schließlich spielt die Szene etwa 3000 Meter unterhalb der Meeresoberfläche. Noch ist sie nur als Animation auf dem Computerbildschirm zu sehen, doch Unternehmen wie das kanadische Nautilus Minerals wollen in wenigen Jahren solche autonom fahrenden Maschinen auf dem Meeresboden arbeiten lassen. Das Meer bietet dem Menschen nicht nur reichlich Nahrung und Trinkwasser. Es ist auch ein noch nahezu unge-

nutztes Reservoir an Energie – und eben Rohstoffen. Davon liegen Unmengen direkt auf dem Meeresgrund oder einige Meter darunter. Abgesehen haben es die Abbauunternehmen vor allem auf sogenannte Massivsulfide und auf Manganknollen. Massivsulfide entstehen, wenn Eruptionen Material aus dem Meeresboden herausschleudern, zum Beispiel in den Schwarzen Rauchern, aus denen regelmäßig Sedimente ins Meerwasser strömen. Oder wenn kaltes Meerwasser in Spalten eindringt, dort auf bis zu 360 Grad Celsius erhitzt wird und wieder austritt. Dabei nimmt es Schwefel und Metalle aus dem Gestein mit. Die Metallsulfide fallen nach Abkühlung durch das Meerwasser wieder auf den Boden.

### **Gold in rauen Mengen**

Darin enthalten sind in hoher Konzentration zum Beispiel Kupfer und Gold. Beim Abbau an Land kommen auf eine Tonne Gestein etwa 0,6 Prozent Kupfer, bei dem vom Meeresboden sind es sieben Prozent. Bei Gold ist die Ausbeute ebenfalls sehr effizient. Aus Goldminen an Land kommen auf eine Tonne Abbauprodukte im Durchschnitt 2,3 Gramm Gold, beim submarinen Bergbau sind es mehr als sechs Gramm. Enthalten sind zudem Silber und Indium, mit dem zum Beispiel Flachbildschirme beschichtet werden. "Wir haben das für eine Massivsulfid-Lagerstätte in den Hoheitsgewässern von Papua-Neuguinea einmal durchgerechnet: Bei einer Abbaumenge, die ungefähr das halbe Olympiastadion in Berlin füllt, ließen sich Metalle wie Kupfer, Zink, Gold oder Silber in einem Wert von zwei Milliarden Euro gewinnen", sagt Peter Herzig, Direktor des Geomar-Helmholtz-Zentrums für Ozeanforschung in Kiel. Auch Seltene Erden kommen in den Flächen auf dem Meeresboden vor, zum Beispiel Scandium und Neodym, die für Hochleistungsbatterien, als Leuchtmittel in Displays oder als Dauermagneten in Windkraftanlagen eingesetzt werden.

### **Realistische Ziele**

Weltweit sind mehr als 500 Felder mit Schwarzen Rauchern bekannt. Ein Drittel davon bietet Vorkommen mit Massivsulfiden, die für den Abbau interessant sind. Dazu kommen noch die schwer aufspürbaren erloschenen Raucher. Die Technik für den Abbau ist zu 80 Prozent schon entwickelt, heißt es bei Nautilus Minerals. Die Crawler und Cutter mit Wolfram-Zähnen sind bereits im Bau. Die Maschinen bewegen sich mit nur einem Meter pro Minute über den Boden, schlucken das Gestein und zerkleinern es. Ein riesiger Kollektor sammelt die Brocken ein, und eine 150 Tonnen schwere Pumpe bringt sie durch eine gummierte Röhre – verstärkt durch Stahl und Kevlar – zum Produktionsschiff. Nur in Küstennähe gibt es den Abbau in ähnlicher Form schon, um Diamanten vor Namibias Küste aus der Tiefe zu holen. Doch Herzig ist sich sicher, dass auch der Rohstoffabbau vorankommen wird und Nautilus Minerals es schaffen könnte: "Das ist keine Briefkastenfirma, die werden es bestimmt hibekommen. In den kommenden fünf Jahren wird da sicherlich etwas passieren."

### **Risikant für die Umwelt**

Neben den Massivsulfiden sind vor allem Manganknollen interessant, in denen zahlreiche Metalle stecken. Wie Kartoffelroder sollen Maschinen die Felder in bis zu 6000 Meter Tiefe beackern und die Knollen abernten, die dann über Pumpen und Schläuche an die Oberfläche gebracht werden. Die Technik ist jedoch umstritten. "Die Knollen liegen in 5000 bis 6000 Meter Wassertiefe auf dem schwach verfestigten Sediment. Fährt dann der Kollektor darüber, wirbelt er dieses extrem feinkörnige Material auf. Das beeinträchtigt definitiv die Lebenswelt auf und unterhalb des Meeresbodens im Abbaugbiet. Darüber hinaus werden die Sedimentwolken durch Bodenströmungen verdriftet, dadurch sind auch angrenzende Flächen davon betroffen", sagt Herzig. Bis sich eine Abbaufäche davon wieder erholt hat, kann viel Zeit vergehen. Es braucht eine Million Jahre, bis sich eine ein Zentimeter dicke Schicht an Sedimenten auf dem Meeresboden wieder absetzt. Umweltfreundlicher könnte da schon der Abbau der Massivsulfide sein – obwohl die Schwarzen Raucher ganz besonders dicht von Lebewesen besiedelt sind. Die Massivsulfide sind jedoch an vulkanisches Gestein gebunden und nicht an Sedimente: "Dadurch würden beim Abbau nur wenige Erz- und Gesteinsteilchen hochgewirbelt. Die sind deutlich schwerer als Sedimentpartikel, werden also nicht weit

verdriftet und setzen sich sofort wieder am Boden ab", sagt Herzig. Für die Knollenernte aber "brauchen wir dringend schonendere Abbaumethoden, die sind aber noch nicht entwickelt. Deutschland kann hier eine Vorreiterrolle übernehmen, um den Abbau von Manganknollen in der Tiefsee umweltverträglich zu gestalten. Technische Innovationen sind hier jetzt gefragt", sagt Herzig.

### **Manganknollen im Fokus**

Deutschland ist tatsächlich dabei: Seit 2006 hält es eine Lizenz zur Erkundung der Manganknollen-vorkommen im Zentralpazifik. Schwindelerregende Zahlen zu den Rohstoffvorkommen im Meer sind im Umlauf: Sieben Milliarden Manganknollen sollen abgebaut werden können. Darin dürften dann 340 Millionen Tonnen Nickel und knapp 300 Millionen Tonnen Kupfer stecken. Neben dem Abbau von stark nachgefragten Metallen soll das Meer auch als Energiequelle dienen. Zum Beispiel über Kraftwerke wie Sea Gen, bei denen Propeller die Strömungen aufnehmen, oder durch Wasserschlangen, die Wellenbewegungen in Energie umsetzen. Der norwegische Energiekonzern Statoil will schon in wenigen Jahren eine Plattform auf den Meeresboden setzen, um nach Öl zu bohren. Vor allem Methan ist reichlich im Meeresboden vorhanden, zwölf Billionen Tonnen sollen in Hohlräumen lagern. Es steckt in erstarrtem Wasser. Wird dem Kohlendioxid zugeführt, tauschen die Gase die Plätze. Das Kohlendioxid rückt in die Struktur, das Methan entweicht – und lässt sich auffangen. In etwa 3000 Meter Tiefe müssten sich die Anlagen zur Methangewinnung befinden und möglichst auf ebenen Flächen stehen. An Hängen, zum Beispiel denen der Kontinentalplatten, könnte es dagegen zu Erdbeben kommen, wenn das Methan dort unkontrolliert entweicht. Das kennen viele Leser des Romans "Der Schwarm". Dort führt ein solcher Erdbeben direkt in die Katastrophe. Und tatsächlich beschreibt Frank Schätzing kein reines Science-Fiction-Szenario, sondern eine ganz reale Gefahr.

### **People now back seabed mining**

The National, December 30th, 2013

THE lack of tangible development, especially along the west coast of New Ireland, has turned the tide in support for the Solwara 1 Seabed Mining Project. In a statement, local communities situated along more than 100-km of shoreline have declared their full support for Nautilus Minerals to proceed with the world's pioneering deep-sea mining operation. It is in direct about face to their initial rejection of the project. The change in stance was highlighted during a recent community awareness programme by the Department of Mineral Policy and Geo Hazard Management in the area to highlight and educate impacted communities on amendments and progress of policy formulation to the Mining Act. Among those who attended were representatives of developer Nautilus Minerals, the provincial administration, local-level government representatives, NGOs and impacted communities. The meeting at Messi village saw representatives of the four communities of Messi, Kono, Konogogo and Ratugu in unanimous support of the project because of the lack of government services from the provincial headquarters in Kavieng.

### **Seabed Mining - Special Report**

Researchandmarkets.com, December 2013

There was a flurry of interest in mining deepwater areas of the planet in the 1970s. Now, interest is returning as onshore resources run down and demand continues to grow. For the sector to move forward, though, a number of aspects – including technological, environmental, political and financial – will have to line up and there are some major hurdles in the first, early steps. This Seabed Mining Special Report includes interviews with a number of key players in the sector, providing a balanced perspective on the state of this fascinating business. There are strong precedents for the pursuit of metals and rare earths from the seabed, with diamonds and construction materials already

being extracted from shallow waters. But miners are now moving into even deeper waters, of more than 4,000 metres. International waters are thought to hold some of the most attractive deposits but are controlled by the International Seabed Authority, which is still unclear about some of the finer details of regulating commercial production. As such, progress is being driven by deals signed with states. Environmental opposition is one of the major challenges facing.

[http://www.researchandmarkets.com/research/vvkrp6/seabed\\_mining](http://www.researchandmarkets.com/research/vvkrp6/seabed_mining)

## **Campaign against seabed mining**

Post-Courier, December 19, 2013

By *FRANKLIN KOLMA*

The campaign to stop the experimental seabed mining in Solwara 1 by Nautilus Minerals Limited was established on Sunday, December 1 and was held at the Ela Beach Hotel with the establishment of a civil group, 'Papua New Guinea Group against Seabed Experimental Mining. The group is made up of a coalition of resource owners: the Centre for Environmental Law and Community Rights, Partners with Melanesia, Mas Kagin Tapani, Four Maisin, Madang Indigenous Peoples Forum, Madang Deputy Governor Rama Marisan, Oro Governor Gary Juffa, the PNG Council of Churches, private Lawyers Moses Murray and Thomas Elisah and some university lecturers and students from both the University of PNG and University of Technology in Lae. The group will be formally registered to pursue the matter further even in court to ultimately stop the activity of seabed mining. "Seafloor mining has not taken place anywhere else in the world. The costs of any possible environmental damage caused as a result of seafloor mining can be catastrophic and immeasurable," said Mr Murray.

He said in such a case, the State and Nautilus Minerals Ltd may not be in any position to contain the damage which can harm the marine environment, and the lives of the people who live off it. He warned that those who may be affected by such damage include not just the people of New Ireland and East New Britain but everyone who consumes anything in the Bismarck Solomon seas. "Mining on the land is much easier to track and monitor the destruction caused. Unlike the ocean, current flows in completely different directions," said Mr Murray. The Deputy Governor for Madang, Rama Marisan said on behalf of the Madang Provincial Government and the people of Madang Province, extended full support on behalf of the Governor and the Madang Provincial Government to say "NO" to Deep Sea Mining in PNG. He said a lot of mining activity can be seen on land and their aftermath can be visually seen. He gave examples of Panguna, Lihir, Ok Tedi, and Ramu Nickel which are causing great concern to people as they impact on PNG's fresh water, forests and sea and biodiversity.

He raised concerns that anything within the three mile zone belongs to the customary owners, but anything outside the three mile zone is the State's. The Government issued a license to Nautilus Minerals Ltd to mine for high grade copper, gold, zinc and other minerals found in high concentration on the seafloor and massive sulphide deposits over 59km<sup>2</sup> sections of the Bismarck Sea. The Solwara 1 project site is located at 1,600m below sea level and is about 30km from New Ireland and 50km from East New Britain provinces. The government has granted a 20-year mine lease for the project to Nautilus Minerals Ltd as well as taken a 30 per cent stake in the venture. The lobby group is in close consultation with scientists and a lawyer abroad for support and guidance in its endeavour to achieve its goal.

## **Deep-sea mining pushed**

The National, December 19th, 2013

THE demand for metals is adding more pressure on land-based resources, resulting in growing social and environmental issues, Nautilus' PNG based environmental adviser William Saleu said. He told a meeting in Nadi, Fiji recently that seafloor mining with its small environmental footprint and limited social impacts offered many advantages over land-based mining. Saleu said: "Nautilus Minerals has taken an 'above and beyond approach' to environmental management. To promote transparency, Nautilus Minerals agreed that collaborating scientists working on the environmental impact assessment for the Solwara 1 project, be free to publish the results of their studies. Taking the lead in exploring the deep sea and eventually extracting minerals from the ocean floors, Nautilus Minerals was confident that the Solwara 1 project would bring many social and economic benefits to the people of PNG.

"Nautilus Minerals like the communities of Papua New Guinea care about the environment. The company has taken a vigorous and intensive approach to all of its exploration and environmental research for the Solwara 1 Project." The weeklong meeting provided a forum for representatives of governments from the Pacific Island countries, non-governmental organisations (NGOs), international experts and industry to discuss potential issues from an environmental perspective. The key areas included environment impact assessment (EIA) processes, establishing environmental management plans (EMP), monitoring and enforcement of the EMPs.

Stakeholders including representatives from 15 Pacific Island countries applauded the meeting as a step in the right direction for this new industry. PNG was represented by the Department of Mineral Policy and Geo-hazard and Mineral Resource Authority and was able to provide leadership to other Pacific Island countries on the back of its firsthand experience with seafloor mining and permitting gained over the last 15 years. This was the fourth meeting of the deep sea minerals project, which was an initiative of the Secretariat of the Pacific Community (SPC) and funded by the European Union. The project had seen the SPC devise and implement a regional training programme to develop and enhance the knowledge of all regional stakeholders on issues relating to deep sea minerals.

## **Deep Sea Mining is not the answer: Pacific Civil Society**

Solomon Star, 18 December 2013

PACIFIC Civil society groups across the Pacific criticise SOPAC and its development of a regional regulatory framework on deep sea mining (DSM). They argue that it facilitates and pre-empts DSM before Pacific Island communities have had the opportunity to debate whether this is a form of development they want. Last week the Secretariat of the Pacific Community (SPC) funded by the EU held its 4th Deep Sea Minerals Regional Training Workshop in Fiji. The workshop was jointly organised by Secretariat of the Pacific Regional Environment Programme (SPREP) and focused on "the Environmental Perspectives of Deep Sea Mineral Activities". Laisa Vereti, Pacific Islands Association of on-Government organisations (PIANGO) said: "The EU funded SOPAC DSM project needs to have a clear process and mechanism in place. "Our pacific governments lack the capacity and expertise to go into this new venture. "Countries need to put proper legislation and regulation in place to safe guard their resources and the well-being of their people before even thinking of engaging in this new industry."

The workshop brought together civil society, Pacific Island Government Representatives and DSM mining companies. The scientific experts confirmed that little is still known about deep sea environments and there is much speculation about the extent and nature of the impacts of deep sea min-

ing. The discussion at the SOPAC meeting was sometimes tense as industry and government were confronted by some difficult truths about the deficiencies in Environmental Impact Assessments and the serious gaps in capacity to manage environmental issues. Thomas Imal, Lawyer with the Centre for Environmental Law & Community Rights (CELCOR) said, “The PNG Government has put the cart before the horse by issuing Nautilus Minerals Solwara 1 mining licence without adequate and independent scientific studies, or comprehensive national policy, laws and regulations for DSM.”

“To date the PNG Government has ignored the concerns of communities and other stakeholders. “This has been the cause of a strong backlash from PNG society culminating in the threat of a legal challenge. “Whilst DSM maybe a viable option for other Pacific Island states it is not the same for Papua New Guinea. “We need to apply the Precautionary Principle[2], the uncertainties far out weight the benefits and it is not beneficial for the country at this time.” In stark contrast to the PNG Government, the Vanuatu Government is embarking on a national deep sea mining consultation process. Under the oversight of the Hon. Ralph Regenvanu, Minister for Land and Natural Resources, the Vanuatu national consultations aim to model best practice Public Participation in Deep Sea Mining Decision-Making.

Charlie Timpolua Harrison, Interim CEO, Vanuatu Association of Non-Governmental Organisations (VANGO) said, “It is paramount that our people fully understand what DSM is before we develop any policy, review any mining legislation or, for that matter, develop any new legislation. “All policy and legislation amendments have to involve civil society participation at the core of these national undertakings.” “This Vanuatu process will draw on the principles and approaches embedded in Free Prior and Informed Consent[3] and the Precautionary Principle. “It will be open and transparent and will ensure that if any licences are awarded it is with the consent of Vanuatu’s civil society and on the basis of independently verified science-based risk assessments.” Dr. Helen Rosenbaum, coordinator, Deep Sea Mining campaign said, “SOPAC is actively promoting DSM as the Pacific Panacea – the answer to poverty alleviation throughout the Pacific. “However the truth is somewhat different. Many Pacific countries already have significant mining projects but still lack basic infrastructure, and good health and education systems. DSM will not be a quick fix for this.”

### **Nautilus could be first deep-sea miner**

The National, December 16th, 2013

A MINERAL exploration company could become the first in the world to conduct deep-sea mining as early as next year if all goes according to plan. Nautilus Minerals Fiji country manager RatuIsoa Gavididi said should deep-sea mining begin at Solwara 1 in Papua New Guinea, it would set the platform for other deep sea mining activities around the globe. “This is frontier mining,” he said. “No one is doing sea-bed mining and if Nautilus starts mining next year at Solwara 1 in PNG, which has been delayed, we will be the first company in the world that is going to conduct deep sea mining.” Ratu Isoa said Nautilus had a mining contract with the PNG Government for mineral resources alone. “We are not doing oil, which is a common misconception. “We are going for minerals like copper, manganese, gold and rare earths that are needed for modern technological devices.” – Fiji Times

## 18 Deep-Sea Mining Prospecting Licenses Approved By Fiji

*Exploration could lead to ways to mine safely: official*

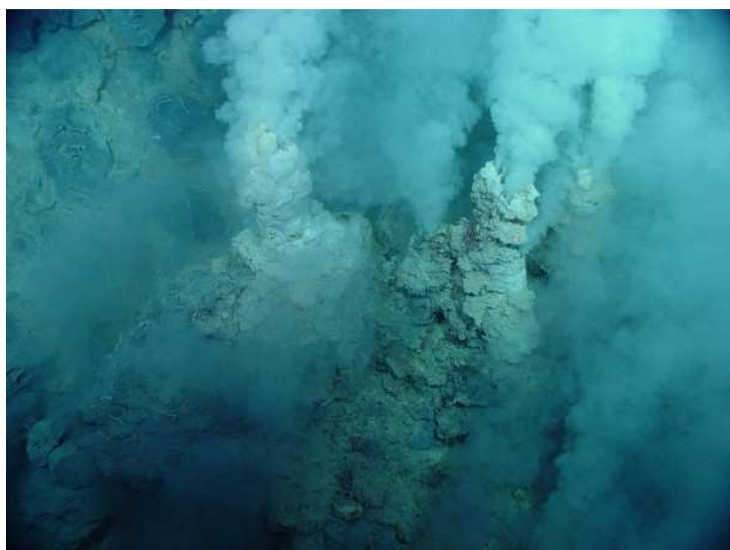
By Shayal Devi

SUVA, Fiji (Fiji Times, Dec. 12, 2013) – Eighteen special prospecting licences for deep-sea minerals in Fiji's exclusive economic zone were given to Nautilus Minerals of Canada, Bluewater Minerals Australia and Korea Institute of Science and Technology. This, according to the director of Mineral and Resources Department Malakai Finau. Mr Finau stated that Fiji was still in the exploration phase. "With the current exploration licenses issued, hopefully it will lead to identification of economic mineral deposits," he said. "Also, it can lead to identifying much more important ways in which it can be mined safely and without adversely impacting the environment and other natural resources of the deep-sea environment." Mr Finau said from a mineral development perspective, deep-sea mining meant developing mineral resources sustainably for the benefit of the nation. "Deep-sea mining can also provide possible sources of employment, economic activity and financial benefits generated from such activity.

"The other major benefit as compared to land-based open cast mining is its low footprint given that it occurs far away from land and at great depths." He also said deep-sea mining could have an impact on the environment. "Deep-sea mining is similar to land-based mining in many ways but we are trying hard to learn from the adverse environment impacts of some land-based mining bad practices. "We also look at other ways of identifying such adverse impacts socially, economically and how it can be better managed so we could all benefit from it." So far, Fiji looks good for deep-sea mining and Mr Finau said "we have the experience of hindsight with many years of land-based mining in Fiji and the many lessons there is to learn from". "The lessons are not only within Fiji but from the region where mining has been part of economic development in our neighbouring countries namely New Caledonia, Papua New Guinea, New Zealand and Australia."

## New Interest in Seafloor Mining Revives Calls for Conservation

By Michael W. Lodge, National Geographic, Posted by Guest Blogger in Ocean Views on December 11, 2013



There is large commercial interest in mining deep-sea hydrothermal vents for minerals. Photo courtesy of Pacific Ring of Fire 2004 Expedition. NOAA Office of Ocean Exploration; Dr. Bob Embley, NOAA PMEL, Chief Scientist

*New interest in the exploitation of seabed minerals has led to the revival of old concerns for the preservation of our oceans, argues Michael W. Lodge, Deputy to the Secretary-General and Legal*



*Counsel of the International Seabed Authority, and speaker at the upcoming World Ocean Summit hosted by The Economist in partnership with National Geographic Society.*

The sea floor is as crucial to human flourishing as the earth's surface, and as in need of careful stewardship. Just like the terrestrial environment, it is made up of mountain ranges, plateaus, volcanic peaks, canyons and vast plains. It contains most of the same minerals we find on land, often in enriched forms, as well as mineral formations that are unique to the deep ocean such as ferromanganese crusts and manganese nodules. The possibility of mining the deep seabed has been known for several decades. As long ago as the 1960s, the idea that manganese nodules on the deep seabed offered the prospect of massive profits for industrialized nations with the technology to access them, coupled with the fear that there would be a race to colonize the seabed, led the United Nations General Assembly to declare the mineral resources of the seabed as the common heritage of mankind, to be used "for the benefit of mankind as a whole".

After the initial euphoria of the 1970s, a collapse in world metal prices, combined with relatively easy access to minerals in the developing world, dampened interest in seabed mining. Nevertheless, the United Nations forged ahead to develop the international machinery to administer the mineral resources of the deep seabed, in the form of an international organization known as the International Seabed Authority (ISA). The ISA, established under the 1982 UN Convention on the Law of the Sea (UNCLOS), and with a membership of 166 states, is empowered to issue contracts for seabed mining, to receive royalties from mining and to distribute those royalties for the benefit of developing countries that lack the technology and capital to carry out mining for themselves. Now, after decades in which it lay dormant, there is an explosion of interest in the commercial exploitation of seabed minerals, from the private sector and governments alike. [see *Will Deep-sea Mining Yield an Underwater Gold Rush?*]

The main drivers of this new interest are technological advances in marine mining and processing; a dramatic increase in demand for metals, largely fueled by emerging economies, which has caused metal prices to rise; a decline in the grade of land-based nickel, copper and cobalt sulphide deposits being mined and developed; and increased demand for rare earth minerals that coincides with reduced supply (these are used in "green" applications such as renewable energy and hybrid motor vehicles). Currently, there are a range of active marine mining operations at relatively shallow water depths (up to 140m), including diamond mining in Namibia and tin mining in Indonesia. There are also increasing numbers of exploration activities taking place in national jurisdictions (up to 200 nautical miles from shore). As an example, Canadian company Nautilus Minerals (whose chief executive is a member of the World Ocean Summit 2014 advisory board) currently holds more than 100 active prospecting licenses in Tonga, Fiji, the Solomon Islands and Vanuatu, as well as a sea-floor mining concession in Papua New Guinea. In the area regulated by the ISA—the deep seabed beyond national jurisdictions—UNCLOS states that exploration and mining may only be carried out under a contract with the ISA and subject to its rules, regulations and procedures.

Contracts may be issued to public and private mining enterprises, provided they are sponsored by a state party to UNCLOS and meet certain standards of technical and financial capacity. While a number of state-backed operations from Russia, China, Japan and others have held such contracts for several years, the last three years has seen a rapid increase in activity for the ISA, especially from the private sector. Today, 19 entities hold exploration contracts granted by the ISA, covering a total area roughly the size of Mexico, and there are a further five applications in the pipeline. This rapid increase in activity raises a number of environmental, legal and economic challenges for the ISA and its member states. The most immediate of these is environmental. The deep ocean, below 200m, is the largest habitat for life on Earth and the most difficult to access. Far from being a marine desert, as was once commonly thought, the deep seabed supports a surprising diversity of marine life. One study estimated that there might be more than a thousand species at a single site.



Many scientists and conservationists are concerned about the impacts on these sensitive – and little-known – ecosystems. Photo courtesy of Pacific Ring of Fire 2004 Expedition. NOAA Office of Ocean Exploration; Dr. Bob Embley, NOAA PMEL, Chief Scientist

While we can predict some of the environmental impacts of seabed mining, much remains unknown and untested. We remain largely ignorant of how deep-ocean ecosystems change in response to human activities and natural variations, and of the consequences of these changes. It is reasonable to assume that recovery periods are likely to be decades long, and that at least in localized areas, these ecosystems may never recover. Important environmental management work aimed at better understanding the impact of deep-seabed mining has already been undertaken and is ongoing. Yet there remains a need for us to better understand the effects of multiple anthropogenic stressors on deep-sea ecosystems. Out of that understanding, we will also need to devise an integrated management strategy that balances future mineral extraction with the preservation of a sustainable, productive and healthy marine environment.

Source: <http://newswatch.nationalgeographic.com/2013/12/11/new-interest-in-seafloor-mining-revives-calls-for-conservation/>

### *News Release*

#### **Pacific Stakeholders Meet To Discuss Deep Sea Mining**

Nadi, Fiji, Secretariat of the Pacific Regional Environmental Programme, December 11, 2013

The Secretariat of the Pacific Community (SPC) and the Secretariat of the Pacific Regional Environment Programme (SPREP) are working closely together to consult stakeholders in order to identify and address concerns about the potential impacts of deep sea mining activities in the region. As part of this ongoing work SOPAC, SPC's Applied Geoscience and Technology Division, is co-hosting a regional training workshop with SPREP on the environmental impacts of deep sea minerals activities from 9-13th December 2013 at the Tanoa International Hotel in Nadi, Fiji. While no deep sea mining activities have yet taken place, this workshop is designed to collectively identify

and assess national and regional environmental management needs and to develop a robust process for strengthened strategic planning and Environmental Impact Assessments (EIA's) before any deep sea mining activities occur. Two government officials, one each from the environment and mineral development agencies of each of the 15 Pacific ACP States, and representatives from Civil Society have also been invited.

This workshop is part of the ongoing work of the SPC-EU Pacific Deep Sea Minerals Project to build national capacity and greater public awareness of the key issues related to the development and management of deep sea mineral resources in the Pacific. SPREP's Director General, Mr David Sheppard, says there is a critical need for more baseline environmental data to be collected to enable Pacific countries to ensure informed decision making and strengthen the responsible management of their deep sea mineral resources. "SPREP as the environmental agency is committed to partnering with SPC and SOPAC to try to bring more environmental information to the table. But the companies themselves need to allocate money for independent scientific studies of the biodiversity and the environment in the deep sea. There is good understanding of the mineral deposits but we need to have the same level of information of the deep sea ecosystems where they occur.

"To date much of the discussion has been focussed on project level EIA but this needs to be done within a wider context of strategic plans and assessments such as marine spatial planning, cost benefit analysis and sustainability appraisals. We need to consider deep sea mining as only one of the potential uses of our ocean resources and consider it in an integrated way along other uses such as conservation, fisheries and tourism paying particular attention to accumulative impacts, setting acceptable thresholds, equity of benefits and long term sustainability," he says. Mr Sheppard believes the upcoming Nadi workshop is a critical step forward to improve knowledge and cooperation across the region. "The aim is to get key stakeholders, and that includes civil society, environmental experts in the governments of Pacific countries, and also those people that are knowledgeable in this area. So we'd like to have a cross-section to have quality participation and to really come out with some useful recommendations as we go forward. "But we need to proceed cautiously in line with the precautionary approach especially since this is an activity that has not been carried out anywhere in the world and ensure that public consultation and participation in decision making is at the core of this process," he says.

SOPAC Director, Professor Mike Petterson, says the workshop will also help to address poor public awareness about deep sea minerals and the possible impacts of mining. "While it is true that we still face a lot of 'unknowns' there are also many 'knowns' and the Nadi workshop will help us to learn from some of world's leading experts on the deep sea environment. As a region we need to use this best current knowledge to put in place regulatory measures before any seabed mining starts. By proactively agreeing common standards and tools across the Pacific, we can empower member countries to protect their marine environments and apply the precautionary approach, whilst exploring the economic opportunity presented by their seabed minerals. "This workshop will provide some very practical outcomes, such as a template for conducting environmental impact assessment before any seabed mining commences. But, I have to stress that, while SOPAC will continue to play an important role in helping countries to agree common standards, the ultimate responsibility for protecting the marine environment inevitably lies with Pacific Island countries themselves, not regional agencies like SPC," he says. Dr Malcolm Clark, Principal Scientist at New Zealand's National Institute of Water and Atmospheric Research (NIWA) says many of the most damaging impacts of seabed mining, will occur at the seafloor, and in most cases this will be too deep to directly affect Pacific Island fisheries.

"It is important to ensure that mining doesn't occur in known spawning areas or regions where small fish are abundant. Knowledge of the nature and extent of sediment plumes generated by the seafloor mining operation must be assessed before mining starts. The discharge of processed waters also

needs to be carefully understood, and should occur deeper than the depth of fisheries and other important animals," he says. Currently the SPC-EU Deep Sea Minerals Project provides the only means for Pacific Island countries to work together to manage and minimize any potential environmental impacts from future deep sea mining activities. Mr Akuila Tawake, the Manager of the SPC-EU Deep Sea Minerals Project, says this regional approach will help Pacific Island countries to avoid irresponsible mining practices. "We are encouraging Pacific Island countries to move away from what we call a 'race to the bottom' scenario, where countries have to work on their own and compete against each other. I think that's a bad scenario for the whole region. We want them to work together, against a background of limited resources, and limited knowledge that they have, so we can pool those resources together and strengthen our policy and our legislation and our capacity to be able to fully and meaningfully engage in this new industry," he says.

## **Future not looking bright for Nautilus in PNG**

EMTV, 11.12.2013

Prime Minister Peter O'Neill said the government is now in direct discussions with Nautilus Minerals to sort out unresolved issues. He made the comments last week, when asked by EMTV's Resource PNG program, what arrangements the government was making with Nautilus, following arbitration proceedings in Australia. Mr. O'Neill said there were issues with the arbitration itself as two parties are needed to agree to go into arbitration in the first place. "The State has never agreed for that. One employee of the State made that decision by himself. There's no NEC decision, there's no approval from the government that we have a dispute so we will go into arbitration." he said. He said the decision made by the tribunal in Australia is now being reviewed. Mr. O'Neill said that the decision was biased, and feels that the State can discuss directly with Nautilus to overcome the issues.

A few months ago, Nautilus gave a presentation of its operations at a media briefing following a series of negative publicity. They pointed out that no chemicals will be used in the extraction process. The deposits will be piped up and undergo a dewatering process. And after filtering, processed clean water will be piped back to the sea floor. But Mr. O'Neill maintains that the issues of environmental impact, capacity to deliver, and equipment to be used need to be examined. He went on to say, "Our aim is to reduce our participation in that particular project. That project is unproven. It has never been done anywhere in the world." He said there are legal issues surrounding the K118million awarded, which the lawyers are now looking at. He said the State feels it is not liable for such damage, and the government is not prepared to pay for it yet, until a constructive dialogue with Nautilus.

## **Mining the Abyss**

By Jo Chandler, The Global Mail, December 6, 2013

Pacific islanders have always been sustained by the ocean. Might it now make them rich – and at what cost?



VLAD SOKHIN; Eliuda Toxok, a shark caller of Mesi village, prepares to go to the sea on his canoe.

The old man's cap proclaims "*Jesus Loves Me*", but his embrace of the faith imported to this South Pacific island by missionaries just a century ago – his parents were likely the first generation to hear The Word – doesn't preclude him from dabbling in a little local magic. Today, there are incantations to be sung and sacred stones to be gathered from the enchanted forest enclosing his village; according to lore, this is a place of potent power. He checks off a list of ritual devotions that will ready his body, soul and canoe for a perilous expedition. At dawn he will push his outrigger into the Bismarck Sea, drop some stones in the water at his *ples masalai* (spirit place) and paddle to the horizon. There he will try to summon a monster from the deep. Eliuda Toxok is a shark caller. He lives on a fabled stretch of the remote west coast of New Ireland, Papua New Guinea, home to the local mythic hero Moroa, now melded with the Christian creator into an almighty, one-size-fits-all deity. Toxok is the inheritor of an enduring, albeit fading, mystical tradition that is entwined with the natural world, and heir to a rare culture of the Bismarck Archipelago, one that has long intrigued visitors to these waters.



VLAD SOKHIN; Eliuda Toxok is the heir of the enduring, albeit fading, mystical tradition of shark calling.

When the Dutch explorer Abel Tasman sailed by in 1642, he recorded the strange custom of the shark callers in his log: "They bound to a canoe many small half-coconut husks, assembled in a chain, and rattled with this implement on top of the water to gather the fish." This evening Toxok picks up the *larung* – the tambourine-like apparatus Tasman described – and gives it a shake. Its magic (and genius) is to mimic the sound of a school of fish thrashing on the surface of the water. He hangs it on a stake planted in the sand alongside his other tools of trade. There's the *ka'saman*, a propeller-shaped float with a noose of twisted vine looped through it in which the shark will be snared. And there's the conch shell Toxok will blow if he is successful. This signal will be recognised and broadcast in a triumphal signature drum beat from his clan's *haus boi*, men's clubhouse, on the shoreline. Having summoned his family onto the beach to receive him, he will offer his catch to be butchered and shared according to strict protocol.



Vlad Sokhin; Two men demonstrate the *ka'saman*, a propeller-shaped float with a noose of twisted vine looped through it. Shark callers use this to ensnare sharks.

It's only a month since Toxok brought home his last shark, his hundred-and-somethingth in more than 40 years of shark calling (he started at around age 30). Now that the annual shark season – such as it was this year – has turned, he is not so hopeful of a catch this day. On land and sea life is changing in New Ireland; even during the season there are reportedly fewer sharks than there were a decade ago, and there are certainly far fewer shark callers. Lately, heavy rains, freak tides and floods have curtailed fishing and spoiled garden crops along the coast. Climate change is much discussed – not in the abstract, but as a presence. What was once the dry season is now just more wet, says Stanly Laxarun, a senior man from Kanemeradan village just up the road. “So crops are taking longer to mature.” Toxok supplies wife Miriam's cooking pot by hunting in the forest. Lean and wiry, all sinew and hollows (he personally prefers chewing *buai* to eating food, *kaikai*), he scrambles with his slingshot, the handle worn shiny with use, up the green-draped escarpment behind the village and enters the tangled interior. During his earliest years, his family lived here, biding out the Japanese occupation.



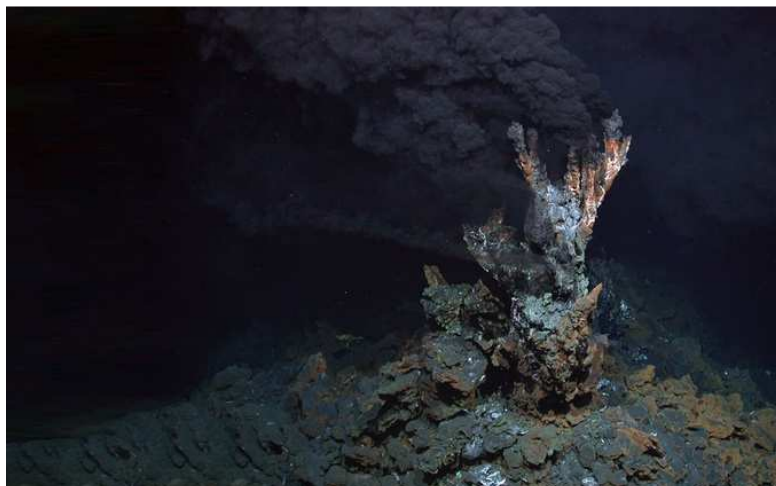
VLAD SOKHIN; The larung mimics the sound of a school of fish thrashing on the surface of the water, thereby "calling" nearby sharks.

His eyes are rheumy, fried by a lifetime of navigating the brilliant sea, but his aim is still true enough to regularly bring home a flying fox. It's protein, that most elusive staple, and it costs not a Kina. Such resourcefulness matters in a country where 57 per cent of the population live on less than \$US2 a day – a bit over Kina 5, the price of a tin of fish at a town store, and twice what it would cost at a village stall. Many people along the coast are surviving on taro and coconut, and relief rations of rice – a fig-leaf of essential service from a lethargic, uninterested state – which are delivered by truck along the fractured track that is the community's only thoroughfare. Green vegetables are scarce. Prized household pigs, skinny and nervous, give up their wallows under the huts to scavenge through stinking-hot afternoons. Mesi village doesn't much look like a place that's sitting on a gold mine. But just 30 kilometres off its beach, out beyond where Toxok paddles his canoe, is the site pegged for the world's first commercial deep-seabed mine, where treasure lies buried 1.6 kilometres under the sea.

*“In the depths of the ocean, there are mines of zinc, iron, silver and gold that would be quite easy to exploit.”* Captain Nemo, *Twenty Thousand Leagues Under The Sea*, by Jules Verne (1870)

Solwara 1 – ‘saltwater’ in PNG's *lingua franca*, *Tok Pidgin* – contains gold, silver, copper and lead at dizzyingly high concentrations, cooked up in a volcanic crucible way down where the submerged earth's seams bump and grind. For now, all remains dark and mostly still at what will likely be the world's first open-cut deep water mine, which sits on the crest of a volcanic ridge geologists dubbed Suzette, not far from a submerged volcano called North Su. The volcano spurts plumes of gas and sediment into the water that might push up as high as 1100 metres below the sea surface and then, depending on the current, settle over Solwara 1. The noise booms and echoes throughout the deep. There are no constants here, brutal conditions fluctuate and change. If we were to visit the site in a

submersible craft, as scientists have in recent years – the first being a French team in 2001 – we would soon leave behind the reach of daylight. The sweep of our lights would reveal a ghostly panorama of towering mineral-encrusted “chimneys”, only a few of which are still active, and bizarre populations of pale crabs, snails the size of tennis balls and bright red worms with an armour of scales. It’s not a particularly distinguished collection as such underwater communities go, but experts say it contains some novel and intriguing characters.





Yoshihiro FUJIWARA/JAMSTEC; A hydrothermal vent snail found off the east coast of Japan.

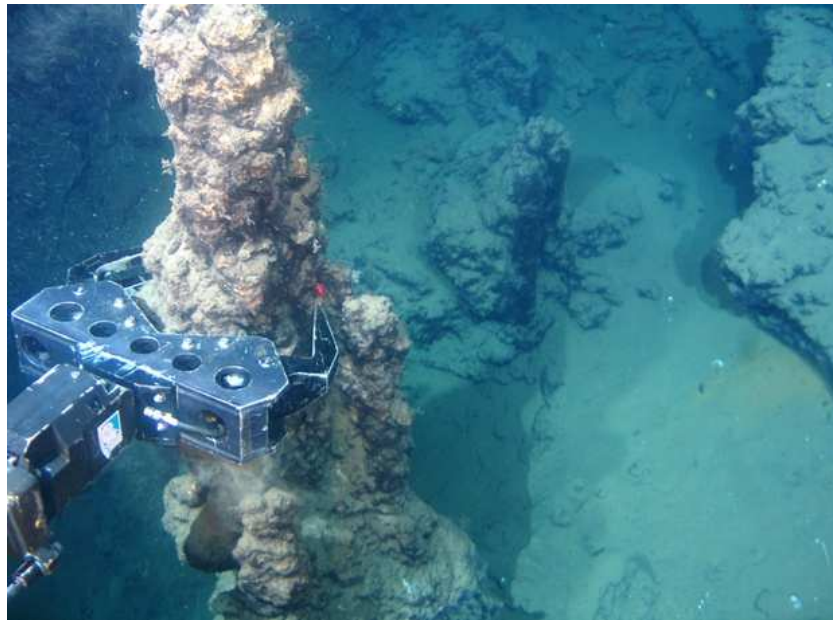
The pH is 8.2, tipping into the base end of the scale, except in the vicinity of the active chimneys, where the outpouring might be highly acid, around pH 3. Water temperature on the sea floor averages an inhospitable 3 degrees Celsius, and so life tends to orbit around any warm, nurturing vents and currents. Existence in this dark, dynamic, sometimes toxic world is precarious. Whole populations with no capacity to run or crawl or swim to safety are snuffed out when the geyser sustaining them spontaneously splutters or stops as the earth's crust spreads and shifts. Scientists call these "natural catastrophic events". The fact that they happen regularly is enlisted by proponents of deep sea mining to support their cause – nature herself mercilessly devastates these sites, and yet somehow life reconstitutes and endures. "In time, I believe that oceans could provide the world's demand for metals in its entirety." – Steve Rogers, former chief of Nautilus Minerals

How? Science is still largely at a loss to understand such environments. The deep sea is the largest ecosystem on earth, but it remains among the least explored. In the abyss we glimpse wonder and suspect menace. It captures our imagination, in the narratives of Jules Verne, and in the observations of recent record-breaking sea-floor expeditions by adventurer and movie director James Cameron, who used nearby waters as a testing ground for his conquest of the Mariana Trench. It's less than 40 years since sensors and cameras were trawled across a deep-water ridge near the Galapagos Islands, revealing for the first time super-heated volcanic plumes erupting from hydrothermal vents akin to the hot springs we might find on land. Then in 1977 and 1979 scientists climbed into a submersible called Alvin and navigated their way down for a closer look. Their lights found a huge "smoker", an "incredible pipe organ of chemicals coming into the ocean", hitting the cold water and forming lumps of copper, lead, silver, zinc and gold, recalled pioneering American marine explorer Dr Robert Ballard, when he relived the moment for a TED Talk audience in 2008.

A dormant 'smoker'. These pillars are a veritable mineral motherlode, forming lumps of copper, lead, silver, zinc and gold. They are also home to whole populations of deep-sea life. But it wasn't the mineral motherlode that took Ballard's breath away. "We discovered a profusion of life in a world that should not exist. Giant tube worms, 10 feet tall," he marvelled. "We went and found these incredible clam beds sitting on the barren rock [but] ... when we cut them open, they didn't have the anatomy of a clam. No mouth, no gut, no digestive system. Their bodies had been totally taken over by another organism, a bacterium, that had figured out how to replicate photosynthesis in the dark, through a process we now call chemosynthesis." By accident, they had found what would be hailed as one of the greatest scientific discoveries of the 20th century. While Ballard is probably most famous for finding the wreck of the *Titanic*, in scientific terms his role in the ensemble that found new life forms hiding in the deep ocean is way more impressive. "None of it [was] in our text



books”, Ballard explained. “We did not know about this life system. We were not predicting it. We stumbled on it.”



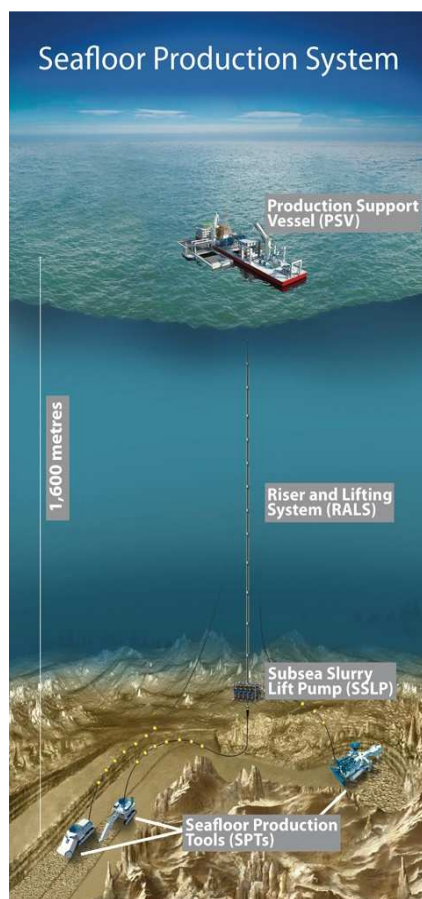
Courtesy Nautilus

Some scientists have since suggested that these hitherto hidden systems may be where life first evolved on earth. But it was the geology that would, inevitably, excite treasure-hunters, especially as ore deposits on land became more depleted. The only surprise for many pundits is that it would take another 30 years for the nexus of mineral-market appetites, technology and opportunity to trigger what is today shaping up as an underwater minerals rush. “Our livelihood and culture is based around these oceans... Our lives are interconnected with the cycles of the sea, it is our calendar and we are dependent on it for our survival” – people of the Bismarck Sea communities. The metal contents of the deposits discovered around black smokers stunned scientists, recalls Dr Chris Yeats, today program leader for CSIRO Earth Science and Resource Engineering. He explored the Manus Basin, where the Solwara site and others earmarked for development are located, during the late-1990s. The initial lure for the CSIRO was in the clues that underwater volcanic ranges might yield to locating further deposits on land, says Yeats. Instead its scientists found riches that rivalled anything remaining on the exposed earth.

Precocious Canadian-registered, Brisbane-based prospector Nautilus Minerals soon seized the initiative and obtained the first of its exploration licenses over the area. It has since staked out tenements that cover 500,000 square kilometres of the waters of PNG, Tonga, Solomon Islands, Fiji, Vanuatu and New Zealand. Its plan for Solwara 1 – the first of many proposed mining sites – is to drop three monster robot vehicles to the sea floor, two of which will manoeuvre giant cutters by remote control to scour and scrape the vent field, levelling some of the chimneys. The third machine will suck the ore up long pipes into the belly of a vessel floating on the surface. This method is designed to prevent a toxic sediment plume rising into the water column and causing turbidity (cloudiness). The ore will then be finely filtered and transferred to a barge and ferried directly to Nautilus’ customer in China for processing. Earlier plans for a stopover at a facility on nearby East New Britain have been shelved, at least for phase one, says the company’s country manager, Mel Togolo. Wastewater from the filtering process will be sent back down pipes to be expelled over the sea floor.

All being well, the mess is largely confined to the area of the seafloor, and the siphoning pipes bypass interference with the higher realm of fish and birds. It’s been estimated that the hardware for this mine will cost around \$US383 million. It will be used to shift 2.26 million tonnes of ore from

the deep sea floor over the mine's short lifespan – likely less than five years – and will sift from it copper at levels 10 times the average of what is being dug out of land-based mines and gold at a mouthwatering 6.4 grams per tonne. In raw terms, at today's market prices and at the most conservative end of the resource estimate, the gold and copper alone would fetch in the area of \$US600 million. Once the site is exhausted, the whole apparatus will up anchor and sail on to the next location. Another 18 mineralised seabed systems have already been identified in the Bismarck Sea, although Yeats observes that most don't have anything like the promise of Solwara 1, and they require different technology to realise.



Courtesy Nautilus

Last year, Steve Rogers, former chief of Nautilus Minerals, pronounced, “In time, I believe that oceans could provide the world's demand for metals in its entirety.” Other players have materialised on the seabed scene. The UN's International Seabed Authority, reflecting on a flurry of recent applications under its auspices, characterises this moment as “the threshold of a new era”. Some insight into the momentum fuelling the prospecting rush can be glimpsed in British Prime Minister David Cameron's strong endorsement, in March, of a venture by Pacific prospector UK Seabed Resources, a subsidiary of US defence giant Lockheed Martin. Deep sea mining could be £40 billion to the UK economy in the next 30 years, he said. “We are involved in a global race where we have to compete with the fast-growing economies of the south and east of the world.”

*“PNG's economic development has a history of boom and bust, feast and famine, hope and despair. Its people and its communities question where all the money has gone and why their expectations have not been fulfilled. In the end, the questions are left unanswered and people continue to live with the precious little that is left.” Lode Shedding: A Case Study of the Economic Benefits of the Porgera Gold Mine, PNG National Research Institute discussion paper by Peter Johnson, 2012*

What all this deep sea activity will mean for the marine environment, and for the human communities that rely on it, is a matter of intense conjecture – in the rarified halls of top-tier scientific institutions and the palm-and-thatch meeting houses of coastal villages across the Pacific. The tone may vary, from dispassionate to viscerally invested, but the conclusions are much the same: no-one knows. As 11 leading researchers noted in a major 2011 analysis from the international Census of Marine Life – “Man and the Last Great Wilderness: Human Impact on the Deep Sea” – the “real nature of the impact” of mining the riches lying on the seafloor “is still not well understood”. They caution that seabed mining is taking shape at the same time as ocean ecosystems face “large and accelerating” challenges, including from other physical disturbances (trawling, waste disposal, oil and gas extraction) and physiological stress from interacting climate factors such as temperature, acidification and hypoxia (expanding ‘dead zones’ of low oxygen). Potential mining impacts identified in the report include the disruption of the vent sites (individual chimneys and their fauna would be destroyed), the production of sediment plumes affecting filter feeders higher in the water column, changes in hydrothermal circulation and the polluting effect of wastewater. The report’s authors – drawing on field research around the Solwara 1 site conducted in 2008 as part of the Nautilus environmental impact process – highlighted the “significant risk” of losing rare species.

*“The fact is deep-sea mining has never been done. The best-laid plans go awry. We don’t know what the effects will be.” – Professor Charles Fisher, marine biologist*

Nautilus, working with a team of American research scientists, has outlined several strategies to mitigate impacts on seafloor biodiversity. They include preserving untouched nearby areas with highly similar communities; setting up temporary ‘refuge’ sites within the project boundary which won’t be dug up until damaged areas have recovered; and using one of the robot vehicles to shift large clumps of rock with its resident biology out of harm’s way. But Professor Richard Steiner, formerly of the University of Alaska, and science advisor to the Bismarck-Solomon Seas Indigenous People’s Council, said in his 2009 review of the Nautilus Environmental Impact Statement (EIS) that while the company had conducted extensive studies of the bottom-dwelling (benthic) communities, it had barely considered life in the deep-water column. Even assuming the plume from the digging could be fully contained and spills avoided, there would still be light and noise from the project, both at the seafloor and around the surface traffic.

Noise from the site could travel 600 km underwater. This would be sufficient to mask what’s heard by migrating fish and whales and dolphins in at least a 15-kilometre range. The Nautilus EIS argued that industrial noise would itself be drowned out by the eruptions of the underwater North Su volcano – not a good enough investigation of this serious concern, Steiner argued. Many scientists are nonetheless confident enough of the technology, the safeguards, and the resilience and remoteness of the deep sea to cautiously endorse a first foray into seabed exploitation through the Nautilus project, under caveats of close, long-term scrutiny – if for no other reason than to learn more. But the majority speaking up at village meetings and gatherings attended by *The Global Mail* over several days in October on the west coast of New Ireland – the closest human communities to the project – find this suck-it-and-see strategy deeply objectionable. They say they don’t want to be “guinea pigs”. They have zero confidence in the capacity of local regulators or government to safeguard their interests. “Let it be tried first someplace else,” they say – somewhere easily accessible, with good communications, where the world can observe what occurs; somewhere capable of efficient response and recovery if something goes awry. Most say they are dead against the project. Others are pragmatic, wondering what might be gleaned from it to improve woeful local services and infrastructure.

A handful of locals are positioning to secure some substantial piece of the action for their communities – jobs, cargo, benefits, power, maybe a processing facility on their shores so that the lion’s share of loot doesn’t go direct to China. There have been rumblings that uprisings will take place if

the locals are not heard—the spectre has been raised of the copper-fuelled crisis that began 25 years ago on nearby Bougainville Island. “This thing will not come to pass if they don’t take us on board,” declares one of the big men in Mesi, Peter Lakna. Lakna is angry, as many are, that coastal peoples’ traditional seafaring and fishing hasn’t guaranteed them a royalties share or a seat at the table for talks over the shape of the project, as they would likely have gained if the resource were on land. “The sea is our garden,” he insists. But the legal advice to the PNG Minerals Resources Authority doesn’t support that claim, specifically stating that “coastal people cannot be recognised for (Memorandum of Agreement) discussions and cannot be recipients of benefits derived from the project”. It asserts that the site is owned by the PNG Government.



VLAD SOKHIN, Children in New Ireland Province are learning the value of the land. The chalkboard reads "It is a resource which our life depends on."

Several women at the meetings declared that they would march on the next Nautilus project talks in Kavieng and present the forum with gorgor, a kind of ginger root plant which is used in customary dispute handling. Gorgor is a taboo marker, signaling a grievance and demanding resolution, one which managers at New Ireland’s Lihir mine have been confronted with frequently in recent years. Last week a photograph appeared on the high-traffic PNG political Facebook forum ‘Sharp Talk’ showing a man from Mesi waving gorgor from his outrigger over the sea. “In New Ireland the gorgor protocol is our traditional law,” wrote University of PNG political scientist and activist Patrick Kaiku. “[Nautilus] ships or vessels must not venture into this area prohibited by the gorgor. If Nautilus breaches this area and enters illegally, we have all the right under kastom to destroy the vessels or ship.” Attitudes in the villages range from resigned cynicism to concern to fury. The depths of ordinary New Irelanders’ disquiet at the project is an enunciation of something much bigger: the rumble of pervasive disenchantment and despair palpable in communities across PNG, where 80 per cent of 7 million citizens live in rural and remote communities, many with limited or no access to basic services.

*People feel ripped off by the resources boom, by the promise that giving miners and loggers access to their land would bring some material improvement to their lives.*

The Prime Minister, Peter O’Neill, acknowledged their grievances in an extraordinarily blunt recent speech to a grassroots audience in Central Province, declaring that, “we’ve wasted the last 12 years”, blown the windfall of an economy growing at 6 to 8 per cent, and surpluses of K7 billion to K8 billion, “on priorities that did not really help the community”. Taxes and other statutory payments from mining companies contribute significantly to PNG’s coffers, with those from the four biggest miners combined worth an average K1568.4m a year (in the three years from 2009-11), according to a recent analysis by Margaret Callan for the Development Policy Centre at the Crawford

School, Australian National University. That accounts for over 17 per cent of total government revenue. But these benefits “are undermined by poor government capacity to convert revenue into basic infrastructure and services, and weak accountability and often poor performance by development authorities and landowner organisations”, Callan concluded.

Much of the resources windfall has been gobbled up by rampant corruption. “How frustrating it is to watch the richness of one’s homeland vanish into the hands of the few,” wrote the government’s chief anti-corruption agent, Sam Koim, in a paper for an Australian law journal earlier this year. He has estimated that at least 40 per cent of the country’s annual budget has been lost to sticky fingers, mismanagement and waste. People feel ripped off by the resources boom, by the promise that giving miners and loggers access to their land would bring some material improvement to their lives. For many communities, living standards have gone backwards, as captured in a parable published last year by a young economist from a highlands village near the Porgera gold mine, the country’s second largest, which has distributed K6.4 billion over 15 years to various governments, groups, institutions and landowners. But in that same timeframe “the single health center, the primary school which I attended as a boy, an airstrip that brings supplies to the village, and agricultural extension services have all closed down, and shrubs are now growing on a new road which was built in the late 1990s to connect my village to the nearest town,” Andrew Anton Mako reported. Landscapes, forests, waterways, traditions and communities have been ravaged. Meanwhile the latest UN human-development index confirms PNG’s entrenched, woeful ranking near the bottom of the global ladder; it is assessed at number 156 of 187 countries.

This is the context underwriting much of the the volatile politics and grassroots violence that blights the nation. At the macro level it’s likely contributing to the growing inclination towards economic nationalism, which culminated in the breathtaking move by the PNG Parliament in September to gain ownership of the country’s largest mining company Ok Tedi Mining Limited. Since the departure of BHP-Billiton from Ok Tedi a Singapore-based trust (PNG Sustainable Development Program) has controlled the environmentally-disastrous mine’s majority stake, holding the shares for the people of PNG, particularly those whose rivers were devastated by its operation. It also controls a \$US1.4 billion trust fund. O’Neill’s government acquired the 63.4 per cent owned by PNGSDP, so far without compensation, after accusing the trust board of being controlled by foreign interests and not serving PNG’s needs. And down at the grassroots, in the villages on the west coast of New Ireland, it’s why seabed mining stirs trepidation and resentment rather than excitement. A new frontier, maybe, but for many it smacks of the same old story.

“The people have seen what is continuously happening up in the highlands where there is oil and gas, and in Western Province where the Ok Tedi mine is,” says Aisack Pisure at a meeting up the road from Mesi, at Kanemeradan village, “They have seen the damage that can occur downstream. With seabed mining, what is the government trying to do [by supporting this]? They don’t seem to be concerned at all about people’s wellbeing and future.” Elsa Lenakot – the only woman to speak up publicly at the Kanemeradan gathering (though many sidle up to privately share their concerns with *The Global Mail*) – delivers a short, shaky, passionate tirade. She describes herself as “just an illiterate mother”, but what if this project brings harm to the next generation, she asks. Who will sort out the mess if anything goes wrong? “It is hard for people to believe what the company says,” says Pastor John Liak. “They would prefer that the project takes place somewhere else first – prove to them that there won’t be any environmental damage ... [that] it won’t affect their livelihood.”

Nautilus’s Mel Togolo says New Ireland and East New Britain will receive substantial benefits and royalties, though the terms are still being negotiated with the two provincial administrations and the national government. Although the amounts haven’t been determined it is Nautilus’ understanding, he says, that the stake that would in other circumstances go to landowners will be dispersed to local level governments, mostly along the coasts closest to the project – although the National Govern-

ment would have the last word. The company will also contribute K2 per tonne of ore extracted (which on expected volumes would yield roughly K4.5 million total) to an independent development fund, which would be distributed according to local priorities to support schools, aid posts and the like. The Provincial Government says that while the coastal people may not be legally considered landowners, they nonetheless should receive a greater, disproportionate share of the benefits flowing to the province from the development.



VLAD SOKHIN; Local PNG communities remain divided on the issue of deep-sea mining. Their daily routines, customs and diet turn on the sea, and the impacts of deep-sea mining are still a mystery.

Togolo insists that the company has consulted closely, that it has met with around 20,000 people in the course of awareness programs. The science is complex, he says, “we just have to keep talking to the people, explaining”. Most concerns, he adds, are founded on misinformation or misunderstanding: “People come with a mindset of land-based operation. In this operation, first we won’t be chopping trees down, we won’t be carving roads, we won’t be digging the topsoil off, we won’t be blasting ... there are no villages down there to be relocated. “Because it is high grade [the deposit], there is less waste,” Togolo says. “We won’t be using chemicals ... [the ore] won’t have any direct contact with the water column, it is an enclosed system, so it has minimum impact with the fisheries in there.” There was much talk at the Kanemeradan meeting of a big school of dead tuna, 200 fish, washing up on the nearby beach during exploratory work on the seabed in 2010 – “even the dogs wouldn’t eat them”. But no-one collected samples for analysis in the capital, Kavieng, which is several hours’ ride away on the bus, or took photographs. Any number of things going on in the changing sea might have caused such an event. It’s an easy story for experts to dismiss or to disbelieve. But that doesn’t make it go away.

*“Seabed mining is a risk not worth taking”*

*Sir Julius Chan, Governor, New Ireland Province, 9 September 2012*

Seventy signatories representing communities across the Bismarck Sea region wrote to Nautilus back in 2008 declaring their right, under customary law and as outlined in the UN Declaration on Indigenous People, to Free Prior Informed Consent over any project impacting on their land or sea resources, and to withholding their consent. “Our livelihood and culture is based around these oceans, and it is an inseparable part of our culture, identity and way of life. Our lives are interconnected with the cycles of the sea, it is our calendar and we are dependent on it for our survival,” they wrote. Their concerns included irreversible environmental damage, a lack of meaningful consultation, and inadequate laws to manage and regulate the project. “We are aware that the socio-economic and environmental costs of mining in PNG are often greater than the benefits,” they wrote. PNG’s increasingly influential activist Twitterati took up the cause. For a time they had a

formidable ally – former Prime Minister and veteran power-player Sir Julius Chan, who told Australia’s SBS television last August that he didn’t want his home province “to be the first in the world” to try the technology. International groups, including Greenpeace and the (anti-) Deep Sea Mining Campaign, lobbied for a worldwide moratorium.



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Nonetheless, in late 2009, Nautilus Minerals gained an environmental permit from the PNG Government for Solwara 1, and a mining license in January 2011. The Somare Government, then on its last legs, was so keen for the mine to go ahead it controversially chose to take up its option for a 30 per cent equity stake. Last year a petition with 24,000 signatures from around PNG, which called for a halt to the project, was presented to local MP and PNG Mining Minister Byron Chan – son of Sir Julius. There’s been no formal response. Political attitudes to the project are today in a state of flux. After a year-long legal dispute Prime Minister Peter O’Neill’s government has failed to come good with the money for its stake, despite an arbitration ruling in Sydney last month ordering it to pay \$US118 million to Nautilus. When the deadline passed, O’Neill released a brief, vague statement, saying that his government was seeking “legal advice” on the supposedly binding ruling. Nautilus, momentarily buoyed at having its case upheld, is saying only that talks continue and its preference is that matters be amicably resolved.

Meanwhile, Sir Julius’s provincial New Ireland government now appears to be on board with Solwara 1, having gained some assurances from Nautilus. An agreement between the company, the national government, and the two closest provinces – New Ireland and East New Britain – is still “a long way from a done deal”, according to Chan’s key advisor, Dr Bruce Harris. But, he says, “We have developed a much better relationship with [Nautilus] over the past year.” How much the deal would be worth in royalties, tax credits and support grants is not yet clear, says Harris. But Sir Julius has long had a reputation as a cunning operator. Chan is also engaged in a bigger battle, championing an agenda for radical reform of the PNG Mining Act (1992), saying Papua New Guineans have been “duped” into “systematically giving away [their] birthright” to mining companies losing claim to minerals under the ground which had been theirs for 40,000 years of history. “We have squandered this wealth, and in doing so condemned our people to poverty, to being left behind while others prosper,” he told a conference in August.

He’s preaching the rising creed of resources nationalism, the growth of which worldwide is identified by the mining industry as its biggest threat. Chan argues the state should, automatically and free of charge, get at least 30 per cent equity in ventures like Nautilus. He’s lobbying for the raising of royalties, talking in ambit terms from about 2 per cent to 10 per cent, (noting that many nations have, or are pondering, higher rates again) and to return ownership of minerals “to the people who

live on the land or to the provinces in whose territory seabed extraction is done”. His son, Minister Byron Chan, sent mining companies and investors into conniptions in late 2011 when he proposed just such a move. Nautilus has, Harris says, neutralised some of Sir Julius’ environmental concerns by agreeing to engage an independent scientific expert who will assess the project at least monthly; by providing a “drop-dead switch” on operations in event of problems; and by securing insurance to allow immediate relief to local people if they sustain any damage from an accident. The company has also agreed to build and upgrade roads and bridges on the west coast. “I’m not 100 per cent convinced that this is something that is going to go off without a hitch – I suspect that’s not the case,” says Harris. But Port Moresby had signed the deal, like it or not. “What we are trying to do is ensure that anything happening in New Ireland waters is done in ways that are acceptable to us and provide us with a minimum of coverage and safeguards,” says Harris.

*“The reality is that we all have our gizmos and gadgets... we all drive around in our tin cars. We all in our way are supporting mining, and this is the new frontier.” – Jeff Kinch, PNG National Fisheries*

Meanwhile the integrity of the Environmental Impact Statement that underwrites the mine’s license continues to be questioned by scientists, non-government organisations and activists, including in three substantial expert reports commissioned by lobbyists. “It is likely that the project would result in severe, prolonged, and perhaps region-wide impacts to a globally rare and poorly understood biological community, and it is clear that the EIS does not adequately assess many of these impacts,” argued Professor Steiner in his report. Dr John Luick, an Australian consultant oceanographer, wrote a report for the Deep Sea Mining Campaign last year, which maintains that the physical modelling components of the EIS were “to put it kindly, second rate ... Moreover, every omission in the analysis plays down the risk.” He concluded that it, “fails to provide the basic information needed to assess the risk of pollution of the environment or the risk to local communities”.

Perth-based CSIRO geologist Dr Chris Yeats is widely quoted by anti-mining campaigners for saying, “we know more about the surface of Mars and Venus than we know about the deep ocean floor, broadly speaking it is a great unknown”. That’s true, he says, in general terms, but the area around Solwara 1 is well characterised – mostly as a result of Nautilus’s research. It’s his belief that enough is known to be able to conduct seabed mining safely. He also argues that environmental concerns should be weighed against the social and environmental impact of continuing to exploit land for the minerals that markets continue to demand. Land-based mining displaces communities, “potentially using land that could be used for other purposes (agriculture, housing etc),” says Yeats. “Then there’s the associated infrastructure – road or rail to transport the ore to a port ... to get it to a smelter. “That’s all fixed – you build it for one mine, and then if you go and mine somewhere else, you build it all again. Then you’ve got all the rehabilitation, reclamation and sterilisation-of-land issues.” Meanwhile mines get bigger and deeper, because all the easily extracted surface stuff is long gone.

Seabed mining leaves no blot on the human landscape. And when one mine is exhausted, you haul the equipment to the next deposit, “so from that point of view it is relatively low impact environmentally, and cost effective”, says Yeats. Yeats perceives the biggest enduring environmental risk of deep-sea mining as being if the 1,600-metre-long pipelines break or leak, or if ore is accidentally spilled at the surface. There are toxic materials, including arsenic, in the sludge. But unlike an oil spill, he says, the material is heavy and would soon drop back to the bottom. Mess stirred up from the seafloor by the cutters would be contained by the pipe sucking it up and by its own weight. If some of it did find its way up the water column, Yeats says, it would encounter a natural ceiling at about the 900-metre level, where an abrupt change in the character of the water forms a barrier that fences off the lower waters from the upper layers. Dr Charles Fisher, professor of biology at Pennsylvania State University and an expert in deep-sea ecosystems, who has advised several Pacific



countries, says that the land-versus-sea argument has limited power because the people who make it “are not proposing to stop mining on land when they start mining in the sea – it’s not an either/or proposition. We won’t recover the bad effects of land mining if we start mining the deep sea.

“I’m pretty familiar with Nautilus’ plans. I think in general these guys are trying hard ... but in the end they are there to make money, and there is a lot we don’t know yet. We need some really careful monitoring, and for a really long time. That isn’t very palatable to mining companies because it is going to be expensive, and it is going to require a commitment long after they’ve left. “The fact is deep-sea mining has never been done. The best-laid plans go awry. We don’t know what the effects will be.” Fisher, who has studied deep-sea vent communities for 30 years, says, “if you increase the frequency of disturbance you are going to favour some groups over other groups, and you can upset ecological balances. “When they mine they will wipe out the population at that site,” says Fisher. In Solwara 1’s case there are other sites nearby with similar communities that could provide larvae to repopulate the damaged area. But “mining companies aren’t going to just mine one site – once they have the infrastructure they will mine site after site. “We need to plan more than just recuperation of a single site ... we need to make sure that we’ve got sites in every region that are preserved for the full diversity and the life histories of all the different animals, that can really provide viable source populations for extended periods of time. So we need to think about protected areas.”

As for the anxieties of coastal communities about the safety of their fishing, Fisher has some qualified reassurance. There is little evidence of extensive or direct connections between the fish in the upper pelagic realm and the very deep ocean. “But there is a tonne we don’t know. We are not [down] there very often. There are certainly indirect connections ... larval species that originate at the vents and go into the water column. The ocean is one connected ecosystem. I’m not anti-mining. But I’m very much pro moving slowly and methodically, being aware of our uncertainty and acting on it. “Mining is important to small island countries in the region, and I think it would be ludicrous for scientists from rich countries to try to dictate not to mine because of the unknowns. But I do urge the people of those countries to be aware there are unknowns, and to move forward slowly, to monitor as we go.” Questions about PNG’s capacity for oversight of such ventures presents a stumbling block even for seabed mining supporters.



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“I think the issue of monitoring is a real concern,” says Jeff Kinch, head of the PNG National Fisheries College in Kavieng. “PNG does have a poor history” in that area, he says, most notably with the environmental fallout from the Ok Tedi mine. That aside, he’s supportive of the mining concept. “The reality is that we all have our gizmos and gadgets,” he says, waving at the collection of phones, cameras and microphones on his desk. “We all drive around in our tin cars. We all in our

way are supporting mining, and this is the new frontier.” Kinch, whose college provides training and education on fishing and seafood handling, believes mining won’t interfere with commercial or community catches. But there are many other pressures on Pacific fisheries, he says, and seabed mining would provide alternative revenue for states that presently have fish and not much else by way of resources, places like Tonga and the Cook Islands.

*Nautilus Minerals has staked out tenements that cover 500,000 square kilometres of the waters of PNG, Tonga, Solomon Islands, Fiji, Vanuatu and New Zealand.*

The Cook Islands anticipates that seabed mining in its waters could grow its GDP one-hundredfold, and transform it into one of the world’s richest nations within a decade. It’s negotiating with several nations and companies, and expects that it will get a substantial stake in any venture for free, in return for access to the resources. Tongan Deputy Prime Minister Samiu Vaipulu is an enthusiastic champion of the industry, with little time for some of its critics. “We need to develop our economy so our people can benefit. Will the [anti-mining] NGOs help our people? I say no, they do nothing.” Nautilus has already identified 19 mineralised seabed systems within its exploration tenements in Tonga’s waters. The Secretariat of the Pacific Community (SPC) has also identified seabed potential in Fiji, Micronesia, Kiribati, Tuvulu, Timor Leste, Marshall Islands, the Solomon Islands, Vanuatu and Niue.

At least 1.5 million square kilometres of the South Pacific floor are already under exploration leasehold, according to a year-old estimate of known sites by the Deep Sea Mining Campaign. Meanwhile there is mounting resistance to the push in some quarters. In June Australia’s Northern Territory government banned seabed mining in the Gulf of Carpentaria and around Groote Eylandt, while in New Zealand proposals have sparked an energetic push for a moratorium. On November 11 a coalition of lawyers, students, academics and activists from New Ireland Province announced plans to sue the PNG Government – likely in Port Moresby, but possibly in Canada – challenging the legality of the Solwara 1 license on the grounds that the risk-assessment and consultation processes were flawed and inadequate.

*“...the changes in material culture have caused only very small changes in, for instance, the traditional and economically important shark-fishing at Mesi. Contact with European civilization has shown no better methods in catching sharks than the old ones.” Tambu-Stones of New Ireland, Bismarck Archipelago, by Sofus Christiansen (1962 Noona Dan Expedition)*

Today many of the clan haus bois lined up in the scrub on the shoreline at Mesi are neglected. The elaborate gates, tall splayed posts of wind-polished or painted timber through which young men would carry a pig on their wedding day, remain in place, but the surrounding graveyards are overgrown and the low stone walls are crumbling. Relics they once housed – magical stones and shark fins – have been sold, stolen or hidden away.

Eanock Tovalaun, massa of one of the local clans, clicks his tongue at the condition of his clan’s compound. By morning he will have dispatched a detail of women with hand brooms and men with bush-knives and instructions to clean it up. “Younger generations are misusing the haus bois,” complains Tovalaun. They sneak down with home-brewed jungle juice “just to get drunk, causing a lot of problems”. It’s quiet now because the elders still have enough clout for the occasional crack-down, and they’ve just exercised it. There are few shark callers left in Mesi, or in Tembin or Kontu, the other nearby villages where the tradition endures as observed by the late documentary filmmaker Dennis O’Rourke in the classic Sharkcallers of Kontu. Eliuda Toxok is passing the knowledge to his son Amos, but other young men are not much interested. Education and modern expectations have changed their thinking.



VLAD SOKHIN; A boy near the grave of a shark caller, who died a decade ago.

Shark-calling traditionally had status and mystique, it was a kind of raw South Pacific incarnation of the matador – the brave loner setting out to beguile and conquer a wild creature, winning en route the respect of men and the adoration of women. Ladies would likely be fighting over him on the beach even as he paddled back with his catch, says Tovalaun. But the practice also demands discipline and sacrifice. For several days before he goes to sea the shark caller must leave his wife and sleep in his clan’s haus boi. The shark caller must abstain from sex. Some of the younger men admit the “no pus pus” rule, combined with the other hazards of the job and fading kastam (custom) has something to do with the diminishing allure of the vocation. The shark caller must also abstain from certain foods, and can only eat food made and served by certain people. “We can only take food from our old mama, or we cook the food ourselves ... until we complete the mission we are prepared for,” explains Tovalaun, translating the old man’s Mandak-tongue commentary, and elaborating with some of his own.

*Shark-calling traditionally had status and mystique, it was a kind of raw South Pacific incarnation of the matador – the brave loner setting out to beguile and conquer a wild creature, winning en route the respect of men and the adoration of women.*

The shark, he says, is very sensitive. “It can hear you from far away,” hence it responds to the clatter of the larung when it is shaken in the water. “It can smell you from far away.” One of the core concerns in Mesi and other villages is that the noise from the Solwara 1 project will disturb sharks, dolphins and other fish the communities depend on. Eliuda Toxok is convinced that it already has. He echoes the claims of several local men who regularly skin-dive for fish, who tell stories of encountering strange noise and “dust” under the water during the exploratory phase of the project. “When the seabed drillers came around, they started reducing our lifestyle, our way of catching sharks, because it disturbs the sea,” says Toxok. “We are not agreeing with the project.” The Nautilus EIS states that due to the project’s distant location, it couldn’t interfere with subsistence fishing and there would be no impact from mining on “near-shore coral reefs, including traditional reef fishing and shark calling”. But Toxok’s assertion finds some sympathy in Professor Steiner’s report, which says the EIS doesn’t adequately consider factors like underwater noise including traffic from vessels. “This noise may represent a significant impact to reef sharks, and shark-calling conducted by coastal peoples of the region.”

It may be, given the cultural, social and economic changes already washing across New Ireland – including initiatives that strive to improve health, education, communications and opportunity – that the era of the shark caller, of traditional life attuned to and reliant on merciless natural systems, is already largely gone. Shark calling is fading fast as a subsistence activity, and soon it may only en-

ture as a curiosity, a performance piece revived for festivals and tourists. Toxok and Tovalaun recognise this and seem resigned to it. Their campaign is not to save the shark callers, but to preserve for their descendants the sharks and other fish that sustained their ancestors. Tovalaun himself isn't a shark caller – his father, a missionary, forbade his participation (not least because of the associated “women trouble”), and sent him away to be educated. He's cannily applied the lessons he learned; he sells some trees to the Malaysian loggers whose ships loom perpetually just off the coast, plants a little oil palm.

He lives mostly up near Kavieng, but loves to come home to Mesi. If he lost everything tomorrow, he could come back here and sleep in his *haus boi* and live for nothing. “When we have a little bit of *kaukau*, taro and banana, it doesn't cost me anything. If I don't have money, I can still eat.” Tovalaun is 58 years old and, like many of his generation, he moves with apparent ease between the modern and traditional, contrived and natural realms, enjoying the best of both. The pre-whites world of his grandparents is vivid in his storytelling, delivered as he sits cross-legged on the sand under a giant *Calophyllum* tree – the trunk 10-strides wide – upon which, he says in passing, his ancestors once hoisted the heads of their enemies. Sometimes they would cook them. Cultures evolve and change, Tovalaun observes, and that's as it should be.



VLAD SOKHIN; A local fisherman transfers Eliuda and his canoe far from the coast.

In his lifetime he's seen law and order, roads, bridges and aid posts appear and then rot away. “Today, we should be advancing. We've got copra and cocoa to sell, but our infrastructure is eroding, and we can't get it out.” The champions of seabed mining argue that exploiting the treasure buried at the bottom of the Bismarck Sea is the solution, not the problem. They say it will provide a lucrative revenue stream, one that doesn't scar the landscape or displace communities, and which, on the advice of many experts, is unlikely to impact human dimensions. But the sense of communities on the coast right now is that it's a double-or-nothing bet. Some people “want money for nothing”, Tovalaun says. But such money never lasts. His father taught him that the only providers that might be relied upon are God, sweat and nature. Today his concern is for the last, and most potent, of these. Source: <http://www.theglobalmail.org/feature/mining-the-abyss/760/>

### **Nautilus Minerals PNG Holds Consultations In New Ireland**

*Solwara 1 will have 'minimum' environmental impact: manager*

PORT MORESBY, Papua New Guinea (The National, Dec. 5, 2013) – Nautilus Minerals PNG says it takes the management of the environment seriously and is consulting the people on what it is doing. Company officials visited seven villages along the western coast of Namatanai, in New Ireland,

as part of its community consultation programme. Country manager Mel Togolo said: “It is important that villagers understand the commitments we have made to ensure the Solwara 1 project has a minimum impact on the marine environment. “We want the people, especially the communities nearest to Solwara 1 to be excited about the project. “Nautilus Minerals takes environmental management and monitoring very seriously. “To ensure the Solwara 1 project has minimum impact on the marine environment, Nautilus has made certain commitments. “There will be no blasting, there will be no tailings, a fully enclosed pipe and pump system to be used to ensure no mixing of mined materials with water columns, and only biodegradable fluids be used on all subsea equipment.”

They were joined by officials from the Department of Environment and Conservation, and Mineral Resource Authority using a multi-stakeholder approach to conduct awareness and meetings. Nautilus Minerals is the forerunner in seafloor resource production and developer of the Solwara 1 project. Its community consultation programme began in 2007 focusing on areas closest to the Solwara 1 site in New Ireland and East New Britain. Villagers were shown maps and diagrams and the exact location of the Solwara 1 site. It is 30km from land and at depths of 1600 metres. The company claimed it was well below fish stocks and away from coral reefs and shallow water. Togolo reiterated that Nautilus Minerals’ goals were aligned with those of the Government. Nautilus Minerals is committed to helping develop an economic base for PNG, the company said. It said it was committed to employing Papua New Guineans where ever possible and bringing world leading experts to PNG and nurture the next generation of scientists and leaders in PNG.

### **Traditional law used to exclude Nautilus from proposed mine site**

Dennis A. Kosam, PNG Mine Watch 5.12.2013

Last week, a man from Messi village, in the Central West Coast Namatanai of New Ireland province put up a “gorgor” at the proposed Solwara 1 experimental seabed mining project site. In New Ireland society, the “gorgor protocol” is our traditional law. Ships or vessels by Nautilus MUST NOT venture into this area prohibited by the ”gorgor”. If Nautilus breaches this area and enters illegally, we have ALL the right under kastom to destroy the vessels or ship. Elders and villagers from adjoining villages have caution the National Government to critically address the issue from the bottom up. Traditional law over the environment must be respected by foreigners.

### **New group formed to fight experimental seabed mining**

PNG Mine Watch 3.12.2013

Another new group to stop experimental seabed mining has been formed in PNG, bringing together Provincial governments, politicians, public servants and senior lawyers with non government and community organisations. The PNG Group Against Seabed Experimental Mining is led by its newly elected Chairperson, prominent lawyer Moses Murray. The formation of the group, which was also witnessed by another senior lawyer, Thomas Elizah, and representatives from the Madang and Oro Provincial governments, reflects the growing opposition to the experimental seabed mining plans of Nautilus minerals not only from communities and students but also in the professional ranks and among business people and public servants and politicians. Other members of the group include the Centre for Environmental Law and Community Rights (CELCOR), Partners with Melanesian, Madang Provincial Government, Yariyari Lawyers, Hon Gary Juffa MP, Oro Provincial Government, and representatives from Manus, Milne Bay and Madang. The group has been formed to stop any experimental seabed mining in PNG including the proposed Solwara 1 mine.

## **International miners line up to plot the destruction of our oceans**

PNG Mine Watch 29.11.2013

As we move into an era of mining the deep-ocean floor, the world's most remote and least understood environment, mining companies are working on overcoming the perceived challenges and island nations are watching with interest. As the demand for base metals and minerals surges ever beyond what our land is able to provide, new technological and technical developments are helping to drive forward this new industry. The Deep Sea Mining Summit 2014 will bring together a large array of solution providers, upcoming deep sea miners, members from the scientific community, and those within allied industries wanting to learn more about the opportunities within this emerging marketplace. Following the huge success of the previous Deep Sea Mining Summit, this year's objective is to build on and identify new and innovative technology developments, technical know-how's, and to focus on the real challenges which face a new breed of deep sea miners and industry providers. Case studies and real results will address the issues. The Deep Sea Mining Summit is seeking presentations that are focused on the following topics:

- New developments in deep sea mining, a resources future
- Achieving sustainable seabed mining projects
- Regional studies of Seafloor Massive Sulphide deposits and Manganese Nodules
- Prospecting and Exploration, Methods and Results
- Deep sea mining equipment, lessons learned and future developments
- Future of technologies for seabed mining and robotic innovations

A rise in the demand for metals and minerals has led to an inflation of prices never seen before in history, particularly of many base metals that are found in seabed deposits. Both private and government-sponsored marine mineral exploration projects are on-going in efforts to respond to this ever increasing demand. To date, the International Seabed Authority has awarded 17 applications for seabed exploration licenses. As new technological solutions are being utilised for deep sea mining explorations we anticipate new commercial operations to develop further in the near term. The Deep Sea Mining Summit will be an opportunity for professionals engaged in relevant disciplines to report on their accomplishments and to exchange views. Presentations that focus on the challenges facing the deep sea mining sector, in particular, an update on recent technological and technical developments are most welcomed, along with other relevant topics of timely interest.

### **Nautilus exploration due soon: Togolo**

THE NATIONAL/PACNEWS, 29/11/2013

Nautilus Minerals, the Canadian deep-sea mining company, will start sea floor mining exploration in the waters of Papua New Guinea and Solomon Islands soon. Company country manager Mel Togolo disclosed this recently to the Madang provincial government. Exploration activities are expected to be completed in December. Nautilus has licences around Bismarck Sea and the Woodlark areas and parts of the Solomon Islands. The operation will explore for deposits and will do "target testing" using remote operated vehicle (ROV) to test for metal content. The company's exploration vessel mv Fugro Solstic was due to call at Madang port yesterday. Company manager for environment Dr Samantha Smith said the vessel was 70m long and had the capacity to carry 51 people at one time including 33 crew members. The vessel was fitted with latest technology required for such a big operation, she said.

## **Nautilus holding talks with government**

The National, November 21st, 2013

By SHIRLEY MAULUDU

NAUTILUS Minerals is holding discussions with concerned Government officials in a bid to push the Solwara 1 project, country manager Mel Togolo said. Earlier, Mining Minister Byron Chan said that due to current legal matters that needed to be addressed, the project would be delayed. However, yesterday, Togolo said the ongoing negotiations between the miner and concerned Government officials seemed to be working well. "I don't think it has so much to do with the delay. We are having very positive discussions with the Government officials involved to move the project forward and those discussions are continuing. "We want to work with the Government to ensure that the project moves forward," Togolo said. He said Nautilus could also face cost effects should there be any delays in the project implementation. "When there are delays in projects, not only in mining but also in other projects, there is always cost implications. "That is the risk that any delay would impose in a project. That's a general statement to all projects," he added.

Meanwhile, Togolo told The National the Government had shown positive response to meet its 30% equity in time so that the project would not be delayed any further. "The Government has elected to exercise its option to take up 30% and I think that is a commitment that the Government has made. "I think the Government is very serious about its commitment and when the time is right, it would be able to fulfil that (commitment)," Togolo said. Nautilus Minerals was the first company to explore the ocean floor for polymetallic seafloor massive sulphide deposits. The company was granted first mining lease for such deposits at the prospect known as Solwara 1 in Bismarck Sea where it will extract copper, gold and silver. The Canadian company was granted environmental permit for this site with license granted under the previous government.

## **Solwara I faces delay**

The National, November 14th, 2013

By SHIRLEY MAULUDU

THERE will be a delay in implementing the Solwara 1 project, Mining Minister Byron Chan said. He said the seabed mining operation would be delayed because of the current legal matters that needed to be addressed. "PNG government gave Nautilus Minerals 38 months to deliver and to actually get all necessary equipment, ships and logistics. "That has been delayed because of the current legal issues that have gone on for almost eight months now," Chan said. He said the court made a ruling against the state in favour of Nautilus Minerals in relation to an obligation that the government had to pay 30% equity in the seabed mining project. However, he said the government, through the Treasury and other state departments, were working on to finance the equity. "But Nautilus was already issued a mining lease, and the company had the right to mine the area. "We had given them conditions and they had to fulfil those conditions, though there would be a delay," Chan said.

When reacting to the move by certain non governmentat organisations and concerned PNG citizens to take PNG government to court over the seabed mining by Nautilus, the mining minister said it was their right to take any issue to court. "The NGOs have their own rights to take matters to court, we don't deny that", Chan said. "The problem is that, the lease had already been given and this company (Nautilus Minerals) had already spent hundreds of millions of kina towards putting the project online -- all this had to be taken into consideration", he said. "But it is their right to take the matter to court and let the court decide.". Nautilus was granted first mining lease at the prospect known as Solwara 1, in PNG's Bismarck Sea where it is aiming to mine copper, gold and silver. The company was granted its environmental permit for this site under the Somare government.

## **Civil society groups take PNG government to court over Nautilus seabed mining project**

Australia Network News, 11.11.2013

A coalition of NGOs is mounting a legal challenge to the world's first license to operate a deep sea mine in Papua New Guinea. The license was granted under the former Somare government to the Canadian company Nautilus for its Solwara 1 mine. One of the NGOs which is taking the government to court over the seabed mining project is Stop Experimental Seabed Mining in the Pacific. Its spokesman Wenceslas Magun has told Radio Australia's Pacific Beat that the current government has been "arrogant and ignorant", despite its appeal to stop the project. "Just this fear that it's going to threaten our marine environment, our marine ecological system and affecting the livelihood of the people that benefit off our marine resources," he said. Mr Magun says the move to block the project is a precautionary measure. "The majority of Papua New Guineans that live off the marine resources do not know what the threats of seabed mining is going to cost to the marine environment," he said.

Mr Magun says the group's advisors - which include scientists and lawyers - have "clearly indicated that there is going to be damage to the ecological system". "Nobody knows what the impact of the damage is going to be to the marine ecosystem because no one has ever done seabed mining in the world," he said. "It's only based on assumptions... we cannot learn from lessons learnt in the past and mitigate any effect that does happen should the seabed mining take place." Mr Magun says the group has been told "there is sufficient grounds to take the matter to court." "Based on these information from our experts, we are going to strategise how we are going to address the issue," he said, adding that a working committee has been formed to take the matter forward," he said. "We know that other countries like in Australia, the... people have banned attempts to mine their sea floor. "And the government of Australia, the state of Queensland had adhered to their appeal. "The (PNG) government has not heard our appeal, that is why we are taking this matter to court."

## **Vanuatu world leader on best practice Deep Sea Mining decision-making**

Deep Sea Mining Campaign via PNG Mine Watch 7.11.2013

Around the Pacific the feverish interest in deep sea mining has given rise to an equally intense opposition to this unprecedented extractive industry. Dr. Helen Rosenbaum, coordinator, Deep Sea Mining campaign said "With over 1.5 million square kilometres of Pacific Ocean floor under exploration leasehold around the Pacific, communities fear their governments will rush into granting licences before there has been open debate and before scientific studies have been able to assess the risks to livelihoods, health and ecosystems." The world's first license to operate a deep sea mine has been granted in PNG by the former Somare Government to Canadian company Nautilus Inc for its Solwara 1 mine. "The fact that this license was granted without the Free Prior and Informed Consent of the communities that will be affected has created a storm of public protest. This was undoubtedly a significant factor in Nautilus' decision to suspend operations a year ago," stated Ms Rosenbaum.

Community leaders are now pressuring PNG PM O'Neill to not allow Nautilus to resume its operations or pay the company the money a recent arbitration hearing ruled it should. Oigen Schultz, Director of Zero Inc, a community organisation in New Ireland Province said, "Local communities have NOT sanctioned the Solwara 1 project. No one knows what the impacts of this form of mining will be." "We are calling for our PNG National Government to place a moratorium on sea bed mining until New Ireland Province communities have provided their consent to the mine's go-ahead." In stark contrast to the PNG Government, the Vanuatu Government is embarking on a national deep sea mining consultation process. Under the oversight of the Hon. Ralph Regenvanu, Minister for



Land and Natural Resources, the Vanuatu national consultations aim to model best practice Public Participation in Deep Sea Mining Decision-Making.”

The process will draw on the principles and approaches embedded in Free Prior and Informed Consent and the Precautionary Principle. It will be open and transparent and will ensure that if any licences are awarded it is with the consent of Vanuatu’s civil society and on the basis of independently verified science-based risk assessments. Wence Magun, National Coordinator for the Madang based Mas Kagin Tapani said “We call on PM O’Neil and the PNG Government to WAKE UP and to now commit to a National PNG consultation similar to Vanuatu’s.” “Vanuatu is showing PNG how a Government who truly respects the concerns of its citizens should go about decision making for this experimental form of mining.”

### **Seabed mining still an issue**

Post-Courier, November 7, 2013

*By ROSALYN ALBANIEL-EVARA*

WHILE the Government may be for seabed mining, there is still an air of skepticism hovering over this form of mining. This was evident in yesterday’s discussions by leaders of provinces who are attending the inaugural PNG maritime governors roundtable meeting in Madang. Oro Governor Garry Juffa was very vocal on the issue and made known in no uncertain terms that neither he nor his people would support this activity. Mr Juffa had revealed that his government had already engaged a lawyer to look into this matter because the unknown was far too great for the country to venture into compared to the returns. He said for a start there were no laws in place to govern the activities and its impact and that many learned persons, including scientists abroad, had stated that it would be hazardous and had already advised against it. He said many countries were not prepared to venture into this activity and questioned why PNG would even consider it. The former Customs boss said if anything, a stop must be put to this project given the return on it would only equate to about four per cent.

“There is no economic return on this and the people of Oro will not entertain it. If the people are consulted by government, they will find the people to be against this project,” Mr Juffa said. New Ireland Governor Sir Julius Chan was unable to attend the meeting but his government’s chief adviser Dr Bruce Harris had also raised some concerns over this issue. Dr Harris said for them marine governance was critical as the province housed one of the largest and richest areas for fisheries. He said for them the issue was very critical because not only did the country host 50 per cent of the world’s tuna stock but more importantly that being a maritime province its populace livelihood depended heavily on the sea and its marine life. He said it was in this regard that the governor, who was unable to make it to the meeting, was not only concerned of the possible threats this activity may have and was supportive of the initiative undertaken by authorities to host this meeting.

Dr Harris said if the project was allowed by the government to go forward, proper checks and safeguards must be in place, so that it could be stopped if any threat was detected. He also expressed grave concerns over the tendency by the government to rail-road projects without giving provinces the opportunity to respond, adding that seabed mining was one such case in point. He said exploration and mining licenses had been given despite objections and this must stop and provinces must be given more say. He said while all provinces may have some things in common there were also some differences which must be respected.

## **Seabed lawsuit likely**

Post-Courier, November 7, 2013

*By ROSALYN ALBANIEL-EVARA*

A CIVIL lawsuit may be imminent in a bid to stop seabed mining. This was revealed by the chairman of the Madang People's Forum John Simoi yesterday prior to his departure to Port Moresby. While details regarding this proposed action were scarce, it is understood this will be done with outside assistance from civil society organisations including from neighbouring island nations who were reportedly equally concerned about this activity and its possible effects. It is understood a reputable law firm from a first world country has been engaged for this legal challenge. Mr Simoi said it was unfortunate that he had to leave at a time when an important meeting, the inaugural PNG maritime roundtable talks, was being convened as he would have personally welcomed the opportunity to hear what maritime governors had to say about sea-bed mining and on the deep sea tailings placement system allowed by government and which was being trialled in Madang by the developer of the multi-million kina Ramu Nickel project. He said it would have been interesting to hear how the governors intended to address this issue, especially its effects.

He said it was not a good sign that this project was being allowed to go ahead when there were no laws in place governing the operation and impacts of sea bed mining and the deep sea tailings system. Mr Simoi questioned how government leaders could talk about conservation of the seas and the marine life when they were allowing these activities and lacked necessary laws to minimise the impacts. "The toxic wastes will no doubt destroy the seas and adversely affect our environment and I would like to urge the governors attending this meeting and government to think seriously and constructively about these issues," Mr Simoi said. "They need not look far as they have the experiences of OK Tedi, Tolokuma and even Misima to draw on. We have no proper laws and policies in place yet government is approving and giving licenses to mining companies to come in and operate." Mr Simoi said he was worried that despite advice against sea bed mining the government would allow this project to go ahead. "Many people including my people on Bagabag Island depend heavily on the seas for our livelihood and we are concerned of the effects these activities will have on it," he said.

## **Serious allegations of corruption come at a bad time for Nautilus**

via Facebook, PNG Mine Watch 4.11.2013

Revelations from a former Nautilus PR Officer (Kavieng, New Ireland province office), Mr. Robin Kamkam exposing the inner workings of Nautilus and its scandalous dealings in PNG: "Nautilus has been paying airfares and hotel accommodations including meals for MRA and DEC officers while on community awareness in New Ireland province and East New Britain province to mislead the people on the project. This is a fact. Nautilus has been telling communities in NIP and ENB that the project is a small print (3 to 5 years) but the government granted it a 25 years mining license. The math does not equate"..... "What Nautilus is doing in PNG is pushing the country (PNG) against the wall and demanding it to pay up its 30 percent share – evidence that the company (Nautilus) does not have funds for the completion of its untested deep sea mining technology. The Environmental Impact Study is a cut and paste document as a lot of money went (I believe) under the table to secure information as well as support from external scientific institutions for positive support for the EIS so that government can grant its approval. This is evidenced by the fact that VP Community and Social Responsibility Dr. Samantha Smith was an academic with no prior experience in deep sea science. The company does not possess technical and practical experience in sea bed mining and they are banking their on computer models. They do not have the financial resources to complete the project. Nautilus is an arrogant company. The CEO Mike Johnston is a land mining geologist (ex Porgera)....."

## **Cook Islands prepares for seabed mining but concerns abundant**

Radio New Zealand, 1 November 2013

The Cook Islands government says the country is preparing well to benefit from the rich store of minerals on its seabed. And it says things are well in hand to ensure the country does not become a guinea pig in the frontier industry surrounding seabed mineral extraction. But there is concern it is being too pushy on the issue. Sally Round has been in Rarotonga and filed this report. Beyond the surf pounding the reefs which encircle the Cooks 15 far-flung islands lie huge and valuable mineral deposits. The small round lumps known as nodules lie on the sea-floor about 5 to 6 kilometres down. They contain base metals such as manganese, nickel, cobalt and titanium and they're being eyed by multinationals keen to supply a growing global market for high-tech devices.

"MARK BROWN: Valuations on the amount of minerals on the sea floor range into the billions of dollars."

The Minister for Seabed Minerals, Mark Brown, says the government is in discussion with a number of international companies over exploration rights.

MARK BROWN: It's significant deposits that are down there, but we still have to get further information as to how much of this would be available to and is viable for exploitation. Even though the technology for commercial mining, or 'harvesting' as the industry prefers it to be called, is not expected to be on stream until after 2020, the Cook Islands already has legislation and an authority in place. I've come to the Seabed Minerals Authority to find out more about the nodules and their location. The Authority is tasked with ensuring the seabed minerals sector is developed in a steady and informed manner, maximising benefits to the people and taking into account economic and social impacts. The Minister Mark Brown says the Cooks is also setting up a Sovereign Wealth Fund and looking at a beneficial tax regime.

MARK BROWN: We've seen in the last few years in terrestrial mining in countries like Australia the attempts to put in a super tax to realise super profits, if you like, when the price of minerals spikes up. So all of these things we're looking at and taking into consideration to ensure that the country receives a fair share of any of the revenue that's derived from our minerals that are exploited from our waters.

But the leader of the opposition Democratic Party, Wilkie Rasmussen, says the government is driving through a message of the economic benefits seabed mining would bring and it's a way of diverting attention from more pressing issues like depopulation. He doesn't think much of the government's efforts at consultation.

WILKIE RASMUSSEN: If consultation is to be done, it needs to be taken to the people of the outer islands. You have a handful of people that go to several meetings that they hold here in Rarotonga and they take that to justify that that process has been done. I see it more as the government ticking off the boxes. It's not full consultation. I don't think it's representative at all of the Cook Islands people.

Wilkie Rasmussen's sentiments are echoed by some of the country's traditional leaders. Although the House of Ariki has given its blessing to the idea of exploring the potential for seabed mining, it wants to see the environment protected as the sea is the food basket for its people. The President of the House of Ariki, Tou Ariki, says people in the outer islands are waiting to hear from the Seabed Minerals Commissioner.

WILKIE RASMUSSEN: Outer island people, they don't know what really is happening. I know the commission has been overseas. It should be concentrating on going to our own people first and telling our own people what is happening now.

An environmental watchdog in the country, the Te Ipukarea Society, is working closely with the Seabed Minerals Authority to ensure the Cooks Islands takes a precautionary approach. One of its board members, Teina McKenzie, says more awareness needs to be raised in the Cooks around environmental concerns.

TEINA MCKENZIE: So far, the only consultation that has gone out has been about the money that can be earned from this industry. That has to be balanced with the realistic impacts on our environ-

ment. We have to be very careful about that as a large ocean state. An official from the island of Mangaia, Poroa Arokapiti, says the people there are fifty/fifty about the idea of mining, which they have learnt about during consultations on the marine reserve.

**POROA AROKAPITI:** 50% really agree and the other 50 don't know. They don't understand what seabed mining is. And I believe those who agree, they still don't know what seabed mining is. The rumour is there's more money - millions and millions of dollars are going to come to the Cook Islands, which is a good thing. But I believe if there's money coming, it should be shared among the islands. The Cook Islands whale sanctuary spans three million square kilometres of the country's waters and the Cooks is a centre for whale research. Sheryl John of the Cook Islands Whale and Wildlife Centre fears the lack of information about seabed mining and its possible effects on sea creatures.

**SHERYL JOHN:** It's the fear of the unknown, to a point, because I don't think anyone really know what result this is going to have. The bottom of the sea has always been untouched. It's a really important part of the whole of the marine life that happens in the deep ocean. If we go in there and rape and village everything from the bottom of the ocean, which is until now untouched, I'm really concerned about what that is going to mean. Opposition MP Sel Napa also worries about the unknown.

**SEL NAPA:** I would rather see someone else mine, and then let's wait and see what their result is, what effect it will have on their environment and the people and their food cupboard. Because us Pacific island people, we love our fish, and we like to see the fish still around in our ocean. The Cook Islands announced the setting up of its Marine Reserve the largest in the world last year. But the Minister for Seabed Minerals, Mark Brown, says it won't preclude the harvesting of seabed nodules. He says the government wants to ensure good environmental protection measures are in place to safeguard the Cook Islands pristine waters and its present number one earner, tourism, as well as other marine resources.

**MARK BROWN:** We don't see ourselves as a guinea pig, we see ourselves more as pioneers and leaders in this particular field. It's important that when we do get into any sort of negotiations we do have the best information possible so that we can make informed decisions. But it's important that we lead any future development in seabed mineral mining and that we're not being led. It's a learning process. A lot of what we know about the bottom of the sea at 5,000 metres... As somebody once told me, I think we know more about the dark side of the moon than we know about what's down 5,000 metres below us.

Mark Brown says exploration licenses are expected to be issued within six years.

## **Canada: Current Issues In Seabed Mining**

Article by Wylie Spicer, mondaq.com October 30, 2013

When the International Regime for Seabed Mining was introduced at the United Nations in 1994, as an amendment to the Law of the Sea Treaty (the Treaty) the then Secretary General of the International Seabed Authority (ISA) Ambassador Satya Nandan described the proposed regime as providing for: "a stable environment for investors in deep - seabed minerals under a market - oriented regime; it guarantees access to the resources of the seabed to all qualified investors; it provides for the establishment of system of taxation which is fair to the seabed miner and from which the international community as a whole may benefit;" As of 2013 it is fair to ask what progress has been made towards these goals. The Regime described to the United Nations by Ambassador Nandan concerned the development of a Seabed Mining Regime in respect of the ocean floor beyond the territorial limits of coastal states (the Area). A mining regime within the limits of the jurisdiction of a country does not involve the ISA; consequently the development of the necessary relationships to pursue mining are between the miner and the government of the coastal state. However, many of the issues are relevant to both mining areas.

Activity in coastal waters has been concentrated in the Southern Pacific. A number of Pacific Island countries have granted either exploration or exploitation leases and the Secretariat of the Pacific Community has identified seabed mineral potential in Papua New Guinea, Fiji, Federated States of Micronesia, Kiribati, Tuvalu, the Solomon Islands, Vanuatu, the Cook Islands, Samoa and Niue. In the Area, the ISA has granted seventeen contracts either directly to countries or to companies sponsored by a country (this is a requirement of the ISA). ISA contracts are for exploration; contracts granted in respect of mining in territorial waters may include rights to exploit the resource (this is the case with the lease granted by Papua New Guinea to Nautilus Minerals). The result of all of this is that both governments and private industry have interests in the development of seabed mining in territorial waters and beyond.

All this interest in seabed mining arises from a number of sources, two of which are the world need for more metal (including rare earth metals) and the possibilities of financial benefits for the countries that possess the metals. Using copper as an example, the US Geological Survey has estimated that world consumption of copper over the next 25 years will exceed all of the copper metal ever mined to date. The average reserve grade of land based copper projects as of 2009 stood at .61 %. Nautilus has estimated that the grade available in its Papua New Guinea seabed project is 7.2 %. As a potential beneficiary the Cook Islands estimate that mining the minerals in their waters has the potential to increase their GDP a hundred fold. The UN estimates that the current per - capita income of the Cook Islands is \$12,200.

Seabed mining is not unlike other new industries attempting to establish themselves. In order to prosper there must be a legal framework in place and industry must have a social license from the relevant stakeholders. With a new industry in uncharted waters the attainment of a social license involves the development of a consensus that the activity is safe and that it does not adversely affect the environment in which it is conducted. This is frequently a substantial hill to climb for industries in new areas. The seabed is one such area. Mining for shale gas faced much the same developmental issues and one expects that methane hydrate mining will encounter similar hurdles. The complete legal framework for seabed mining is not yet in place, what currently exists is a developing framework. There is no exploitation code for seabed mining in areas regulated by the ISA. Many ISA exploration licenses expire in 2016 and the current licensees will require guidance on an exploitation framework.

The ISA has recently published a study describing what might be included in a regulatory framework for exploitation but currently it is just that, a study. In the South Pacific very few of the island nations have mining codes, although some are in progress, such as the Cook Islands. Part and parcel of the establishment of the regulatory framework is the development of a taxation/royalty regime to provide certainty for a developer assessing its risks. For activities in territorial waters this may be negotiated between the developer and the coastal state. The Finance Minister for the Cook Islands, Mark Brown, has recently stated that the Cook Islands would expect to receive stakes in mining companies for free as the price for granting rights to exploit the resources of the Cook Islands. In the case of ISA regulated leases one expects that a generic regime, including a royalty structure, will be developed to cover production in all ISA regulated areas. This will probably be a regime bereft of any individual negotiation between ISA and its individual licensees. It will be interesting to see whether the companies who have leases in ISA areas as a result of state sponsorship have the staying power to await an ISA articulated mining regime.

The attainment of a social license mine is very much a work in progress. There has been considerable opposition to seabed mining in territorial waters. To date there does not seem to be a political consensus as to whether seabed mining is acceptable. The lack of consensus is a continuing concern in assessing risk. In the case of a coastal state the political consensus which will eventually result in the granting of the social license will be directed to issues specific to the coastal state.

The ISA process involves the politics of the state members and their representatives members of the ISA. In formulating a social licence for seabed mining the ISA is guided by the Treaty, a main purpose of which is the protection and preservation of the marine environment. When the ISA determines the environmental regime to be applied to seabed mining its considerations will be based on the interests of state members and the dictates of the Treaty.

The leases granted by the ISA are in areas of the ocean floor beyond national jurisdiction. When the ISA puts in place a royalty regime it will be against the backdrop that the seabed (and its resources) over which it has regulatory authority are part of the common heritage of mankind and that all rights in these resources are vested in mankind as a whole. It is the responsibility of ISA to act on behalf of mankind. Bearing this in mind, the ISA has, on a number of occasions, discussed whether the granting of leases should be done such that monopolization of the resource is avoided. Since in some cases leases are granted to member states and in others to companies sponsored by a state the ISA has mooted whether the objective should be to prevent monopolization by a single applicant for a lease (regardless of whether that is a state or state sponsored enterprise) or alternatively whether the objective is to prevent monopolization by a single State member of the ISA. It is a complicated and undecided issue.

This year at the ISA annual meeting, the report of the Legal and Technical Commission (the ISA entity tasked with detailed consideration of applications for leases) commented: "the Commission also held a general discussion on the issues of monopolization of activities in the Area. It noted that in recent years new business models of business arrangements had begun emerging that required the attention of the Commission. It was considered that in light of current developments...the Commission's work on this matter should be prioritized and the Council may also wish to give further consideration to the potential for monopolistic behaviour in relation to polymetallic nodules." The requirement of the Treaty that the ISA act on behalf of the common good of mankind may have to be considered along side potential state, or state sponsored enterprise, monopolization of the resource. In summary there are many issues which investors will need to address as the industry and its legal frameworks develop. *First published in Mining Journal on October 18, 2013*

### **PNG seeks legal advice over seabed mining dispute**

Cole Latimer, Mining Australia, 29 October, 2013

Papua New Guinea's Government is seeking legal advice after the deadline passes for it to pay back seabed miner Nautilus Minerals. It came after the miner won its arbitration case against the PNG Government following a prolonged impasse with PNG over their partnership in the Solwara 1 underwater mining project earlier this year. Earlier this year Michael Johnston, Nautilus president and CEO, said that the miner has been willing to provide Papua New Guinea ownership of intellectual property rights. But the problem, as Johnston told it, was that many of the deeds covering proprietary technology and subsea mining methods, which Nautilus and several partners developed over the years, did not contain clauses allowing for a third party, such as the Papua New Guinean government, to come on board as an additional partner and owner of the intellectual property rights.

Johnston described sensitive negotiations over the past few months in which Nautilus had to go to its partners, "household names" in the dredging business he gave as examples, to convince them to redraw the deeds to allow the Papua New Guinea government to gain direct 30 per cent ownership of the intellectual property rights. Now Johnston said Nautilus has redrawn the deeds with its partners and delivered the new terms to the Papua New Guinea government. Following this the two entered arbitration to come to a conclusion, with Murray Gleeson, AC QC issuing an award in Nautilus' favour. The PNG Government was obliged to pay the miner by 23 October, however the dead-

line has passed and now it is seeking legal advice over the tribunal's decision and payment time frame, according to the ABC.

PNG prime minister Peter O'Neill said "since the decision was handed down, we have been reviewing it and have sought legal advice. The state is looking at its options, and we have commenced discussions with Nautilus for an amicable solution to this". "There are other issues connected with this project that were raised, in the local community and in Parliament, which the government was dealing with before this arbitration decision landed on us. "So there are a whole ranges of issues we are dealing with, so we need to be careful about placing time limits on these issues," he said. "We respect the decision of the tribunal, and we are dealing with it in the best possible way." Nautilus has since issued statements saying that it is aiming to resolve the issue 'amicably'.

### **PNG Misses Deadline For Arbitration Ordered Payment, Nautilus Says**

*O'Neill says legal advice being sought over arbitration award*

PORT MORESBY, Papua New Guinea (PNG Post-Courier, Oct. 28, 2013) – Nautilus Minerals says that time has lapsed for the Papua New Guinea Government to pay for its disputed 30 per cent interest in the Solwara 1 underwater mining project. A few weeks ago an arbitrator ruled against the PNG government and set October 23, 2013, as a deadline for it to pay Nautilus around \$118 million for a 30 percent stake in Solwara 1. The government had exercised its 30 percent option back in late March, 2011, but never paid up, contending the junior hadn't met all its obligations on the project. The dispute headed to binding arbitration in June last year and an arbitration decision finally came out in early October, this year. Nautilus said the arbiter ruled in its favour and ordered Papua New Guinea to pay the junior for the 30 percent interest by October 23.

But that deadline has now passed without payment, Nautilus said yesterday in a news release that was thin with details. But Prime Minister Peter O'Neill said yesterday that the government was seeking legal advice on the arbitration tribunal's decision on Nautilus and the time limits placed on it regarding payment of its equity. "Since the decision was handed down, we have been reviewing it and have sought legal advice. "The State is looking at its options, and we have commenced discussions with Nautilus for an amicable solution to this," the Prime Minister said yesterday in response to a statement issued by Nautilus. "There are other issues connected with this project that were raised, in the local community and in Parliament, which the government was dealing with before this arbitration decision landed on us. So there are a whole ranges of issues we are dealing with, so we need to be careful about placing time limits on these issues," Mr O'Neill said.

"We respect the decision of the tribunal, and we are dealing with it in the best possible way," he said. Nautilus, on the other hand, stated it "is in discussions with senior officials of the State" and added that it preferred "to resolve these matters amicably". In the run up to the October 23 deadline Nautilus President and CEO Michael Johnston had voiced hope the government would make payment on time. In an early October conference Mr Johnston said he had met with Papua New Guinea officials to talk about the arbiter's decision and that officials did not show resistance to it. "Those discussions were very good," Mr Johnston said. "We're currently working with the government to try and achieve completion by October 23."

### **Papua New Guinea misses binding deadline on \$118 million payment – Nautilus**

*The saga of the Solwara 1 option payment from the Papua New Guinea government continues for Nautilus Minerals.*

HALIFAX, NS (MINEWEB) - Kip Keen, Mineweb, 24 Oct 2013

Nautilus Minerals says the Papua New Guinea didn't pay for a much disputed 30-percent interest in the Solwara 1 underwater mining project on time. A few weeks ago an arbitrator ruled against the Papua New Guinea government and set October 23, 2013, as a deadline to pay Nautilus around \$118 million for a 30 percent stake in Solwara 1. The government had exercised its 30 percent option back in late March, 2011, but never paid up, contending the junior hadn't met all its obligations on the project. The dispute headed to binding arbitration in June last year and an arbitration decision finally came out in early October, this year. Nautilus said the arbiter ruled in its favour and ordered Papua New Guinea to pay the junior for the 30 percent interest by October 23. But that deadline has now passed without payment, Nautilus said this morning in a news release that was thin on details.

Nautilus stated it "is in discussions with senior officials of the State" and added that it preferred "to resolve these matters amicably." In the run up to the October 23 deadline Nautilus President and CEO Michael Johnston had voiced hope the government would make payment on time. In an early October conference call Johnston said he had met with Papua New Guinea officials to talk about the arbiter's decision and that officials did not show resistance to it. "Those discussions were very good," Johnston said. "We're currently working with the government to try and achieve completion by October 23." In a Q&A with Radio Australia Johnston was asked what would happen if Papua New Guinea missed payment, but didn't expand on the consequences. "You know, like I said, the decision is legally binding on the state."

### **Seafloor mining robots and equipment nearing completion to mine for gold, silver and copper** nextbigfuture.com, 22.10.2013

The Canadian company Nautilus Minerals is the leader in marine mineral exploration. Nautilus Minerals has developed robotic technology for deep-sea mining in collaboration with the French company Technip. The company is planning to open the first deep-water mine in 2015. The Solwara 1 mine will be located 1600 metres below sea level. The company has found large deposits of copper and gold there. Solwara 1 is located in the Pacific Ocean, north of Australia, in Papua New Guinea.

Nautilus Minerals plans to continue searching for additional commercially viable deposits of copper, gold, zinc, and silver outside of Fiji, Tonga, the Solomon Islands, Vanuatu, and in the western part of the Pacific Ocean. Solwara 1 was supposed to start operations in 2013, but this was postponed. Nautilus Minerals will use submersible robots to work on the ocean floor and break apart loose ore. A pipeline will then transport the ore to a specialty vessel on the surface, which then will transport the ore to shore for refining. Nautilus Minerals has a sales agreement with a Chinese company for the minerals that are recovered. China has a huge demand for copper. "This is an extremely rich deposit of gold and copper," says Terje Bjerkgård from Norway's Geological Survey (NGU). He studies mineral resources and has participated in two research expeditions that included the area around Papua New Guinea.

"Underwater mining will first be commercialized in the Pacific," he says. "The largest known deposit on the ocean floor is in Middle Valley in the northeast Pacific Ocean, off Canada. Other interesting deposits are north of New Zealand. Underwater mining will become more viable as land-based deposits become harder and more expensive to exploit. The challenges are tied to the distinct fauna around the hot springs." Many countries are active in securing rights to underwater mineral resources, even though the start of large-scale mining efforts remains years away. "Many countries, such as China, Russia, Japan, France and India, are positioning themselves strategically to secure resource areas in international waters," says Søreide. "The politics of international oceans is full of intricate details, with a lot of the laws tied to the international laws of the sea."



## Seafloor Production Tools (SPTs)

75 % complete



### Auxiliary Cutter

Length:	15.8m
Width:	6.0m
Height:	7.6m
Boom swing:	11.6m
Boom cutting:	+4 -1.0m

In fabrication



### Bulk Cutter

Length:	14.2m
Width:	4.2m
Height:	6.8m
Cutter Width:	4.2m
Cutting Height:	+4 -0.5m

In assembly



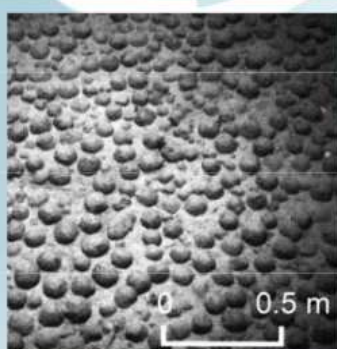
### Collecting Machine

Length:	16.5m
Width:	6.0m
Height:	7.6m
Collection Range – height:	-2m +5m
Collection Range – Width:	+ 4m

In fabrication



## Nodule License



- N143 101 resource  
410 million tonnes @ 1.2% Ni, 1.1% Cu, 0.24% Co, and 26.9% Mn\*
- Nodules lie on the seafloor at depths starting at 4,500 metres
- Sponsored by Tongan Government
- Planning underway to upgrade a significant portion of inferred resource to indicated to move to scoping/prefeasibility studies

\* Resource prepared by Matthew Nimmo, Principal Geologist, Golder Associates Pty Ltd, a member of the Australian Institute of Geoscientists and a qualified Person under N143-101

The Norwegian University of Science and Technology (NTNU), Statoil, and the mining company Nordic Mining are collaborating on a research project that will map marine mineral resources along the Mid-Atlantic Ridge. “Our primary goal is to map potential resources,” says Fredrik Søreide, an adjunct professor at NTNU’s Department of Marine Technology who is heading up the project. “We can then prioritize research and development as we move ahead.” Researchers from the university’s Department of Geology and Mineral Resources Engineering and Applied Underwater Robotics Laboratory will also participate in this project.

## New Zealand: Seabed mining bid stirs protest

By Jamie Morton, New Zealand Herald, Oct 22, 2013



Miners are eyeing iron-rich sand off South Taranaki. Photo / Getty Images

The first marine consent application for seabed mining on the North Island's west coast is about to be lodged, rallying environmental groups over what one described as the most important clash on the issue. Trans-Tasman Resources says it will this week lodge a bid to mine 65sq km of exclusive economic zone seabed in the South Taranaki Bight for iron-rich sand particles. But a band of groups including Forest and Bird and Greenpeace called for a moratorium on all seabed mining in New Zealand. The groups claim there is a lack of knowledge about the marine environments involved and the cumulative effects of mining, an inadequate regulatory process and doubts over the social and economic effects of the operations, as well as the method used. But the company says its operation would have minimal environmental effects on the surrounding area, and scientific reports were prepared before its application to the Environmental Protection Authority.

Kiwis Against Seabed Mining, which is preparing for a fight, sees the bid as crucial as it believes many more application for mining along the west coast will be lodged if the consent is granted. "It starts the ball rolling ... it's like the big toe of a giant prying the door open," chairman Phil McCabe said. His group believed there was still not enough information about the effects on marine life, particularly mammals, and considered the submission period - usually 20 working days then 40 more until hearings began - far too brief. The proposal has run into opposition along the coast, although TTR resources environment and approvals manager Andy Sommerville said there had been considerable consultation with the community. Mr Sommerville said the company had looked at other possible effects from the mining, such as on waves, surf breaks, fishing and marine life, but expected it to have little impact. "We've done a tremendous amount on determining what is out there."

### Mining plan

- \* Trans-Tasman Resources is seeking a consent to mine 65sq km of exclusive economic zone seabed in the South Taranaki Bight for iron-rich sand particles.
- \* The mining would be done by remote-controlled 12m-long, 350-tonne "crawler" machines, which would travel along the seafloor pumping sand to a processing ship above.
- \* Once iron ore particles were separated magnetically, the sand would be deposited on areas already worked over.
- \* Any life on the seafloor, such as tubeworms, would be killed as the mining progressed 300sq m block by block, but the company believed the areas would soon be repopulated.
- \* The project, which seeks to generate an extra \$147 million in exports for NZ, would ultimately involve the excavation of up to 50 million tonnes a year.

## Deep sea riches could spark Pacific mining boom

By Ann Arnold, ABC Radio National, 20 October 2013

*A project to dig minerals from the seabed off Papua New Guinea could signal a new era of mining in the world's most remote and least understood environment, the deep sea. Mining companies are excited, ecologists are worried, and struggling island nations are watching with interest, as Ann Arnold writes.*

One and a half kilometres below the sea, on the flank of an active volcano, hundreds of tonnes of machinery will carve up mineral-laden rock, and pump it to a ship on the surface. The entire operation will be remotely controlled from the ship. This is not a sci-fi fantasy. Nautilus Minerals Inc, a Canadian-registered company based in Brisbane, is forging ahead with this plan with renewed vigour, after winning a recent commercial dispute. The Nautilus project, called Solwara 1, is based in the Bismark Sea, off the coast of Papua New Guinea. 'Solwara' is pidgin for saltwater. On the seabed, it's pitch black, acidic, and very cold. And just a bit spooky. 'It's sloping, fairly rugged and then on top of that you got super-imposed these what they call chimneys, or almost like a forest of what is in effect, high grade copper deposits which have grown from the sea floor,' Nautilus CEO Mike Johnston says. These thermal vents may or may not be active, belching black smoke. 'Where the chimneys are still active, you'll have snails all over the vent, down to the point where the ambient water temperature gets too cold for the snails. In the upper portions of the chimney they'll be covered in snails.'

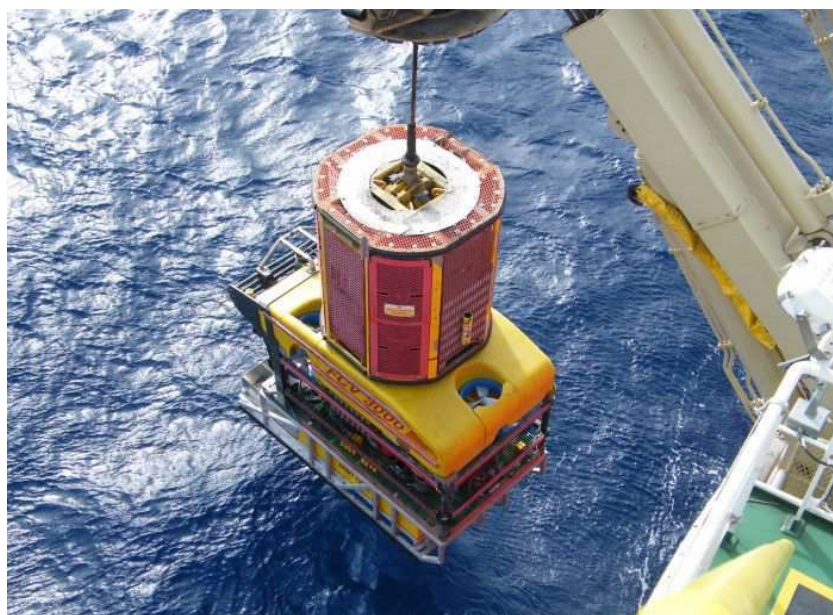


Image: Launching the Remotely Operate Vehicle (ROV) off the back deck of the vessel. (Courtesy: Nautilus Minerals)

Nautilus is spearheading a global rush to mine the deep seabed. Conventional mining on land is increasingly expensive and ore quality is declining over time. Deep sea mining, promoted by its advocates as less disruptive and less harmful to the environment, is touted as the challenging, but necessary, next phase of exploitation. But there are inherent risks and dangers, and, unless very closely monitored and regulated, deep sea mining will be a plunge into the unknown—literally. Only a fraction of the world's deep seas have been studied. Scientists are now scrambling to keep pace with this burgeoning industry. The seabed treasure excites the miners. 'It's a fabulous looking metal,' says Mike Johnston. The Solwara 1 sulphide mounds that he's targeting are largely chalcopyrite, a very high grade copper mineral, with high gold content. 'It looks actually like gold when you see big chunks of it. It averages about six grams gold per tonne. To put that into context, the average mine in Western Australia, an open pit gold mine, would be probably mining an average of about one and a half grams,' says Johnston. 'Then you've got the copper content, and the copper's a shade

under eight per cent copper. The average grade of copper mined last year on land was less than 0.6 per cent copper.’

Add to that mix zinc and silver, and it’s obvious why Nautilus is keen to start work. After obtaining the world’s first seabed mining licence, from the PNG government in 2011, the project has been on hold for over a year, with a dispute over a payment from the government. The government is a partner in the venture, and has 30 per cent equity. An arbitration decision earlier this month by the Honourable Murray Gleeson, former chief justice of the High Court of Australia, requires the government to pay Nautilus \$118 million dollars by next Tuesday, October 23. Watching closely as the project unfolds are the many income-deprived island nations of the Pacific, whose territorial waters contain abundant mineral riches. There is the potential for a bonanza for them, and also for the commercial interests lining up to exploit their assets. Companies from Russia, the UK, India, Japan, South Korea and elsewhere have seabed exploration licences in the Pacific, covering hundreds of thousands of square kilometres. The Pacific is buzzing with talk of it, with some countries more impatient than others.



Image: Nautilus’ PNG program is spearheading global interest to mine deep seabeds (Courtesy: Nautilus Minerals)

Legislation is being drawn up by each of the small nations, and environmental safeguards established, with support from the SPC, the partly EU-funded Secretariat of the Pacific Community. The resource-strapped countries are being urged to protect themselves, and cover all contingencies. Back in the 1990s, Julian Malnic, who as a geologist founded Nautilus and obtained the Solwara 1 exploration lease, went to Tonga. ‘When I got there the Mining Act was only one and a half pages long! And I had to really simulate the whole process of claiming there,’ says Malnic. ‘They were very nice people and gave me the keys to the department over the weekend. It was a pretty sleepy place back then, Tonga. ‘I drafted a form, wrote Ancient Kingdom of Tonga across the top, and for an application fee put \$300 Tongan dollars. It sounded about right. ‘Then I made the forms, printed them out, filled in the forms by hand, so they looked the part, and took out eight and a half degrees of latitude of mineral potential, right through the Tongan exclusive economic zone.’ Julian Malnic has left Nautilus, but still retains shares in the company. Today, Nautilus has more than 200,000 square kilometres of deep sea exploration tenements in Tonga granted, or under application. Several other companies are active there too.

As well as sulphite mounds in volcanic areas, on the even deeper abyssal plains which span the Pacific there are polymetallic nodules, which look like potatoes sitting in the silt of the seafloor. They are about four to five kilometres down, and the American defence behemoth Lockheed Martin is behind one scheme to extract them. Jimmie Rodgers, the secretary general of the SPC, says seabed

mining is both a curse and a gift. ‘For many of these countries, that will be the only thing they have going forward apart from fish,’ says Rodgers. ‘I think, because of that importance, there will be continuous political and economic pressure, both from the countries and investors, to make sure they go at it.’ The Solwara 1 project was approved with an Environmental Impact Statement (EIS) which critics such as Rick Steiner, a retired professor of marine conservation at the University of Alaska, say was inadequate.

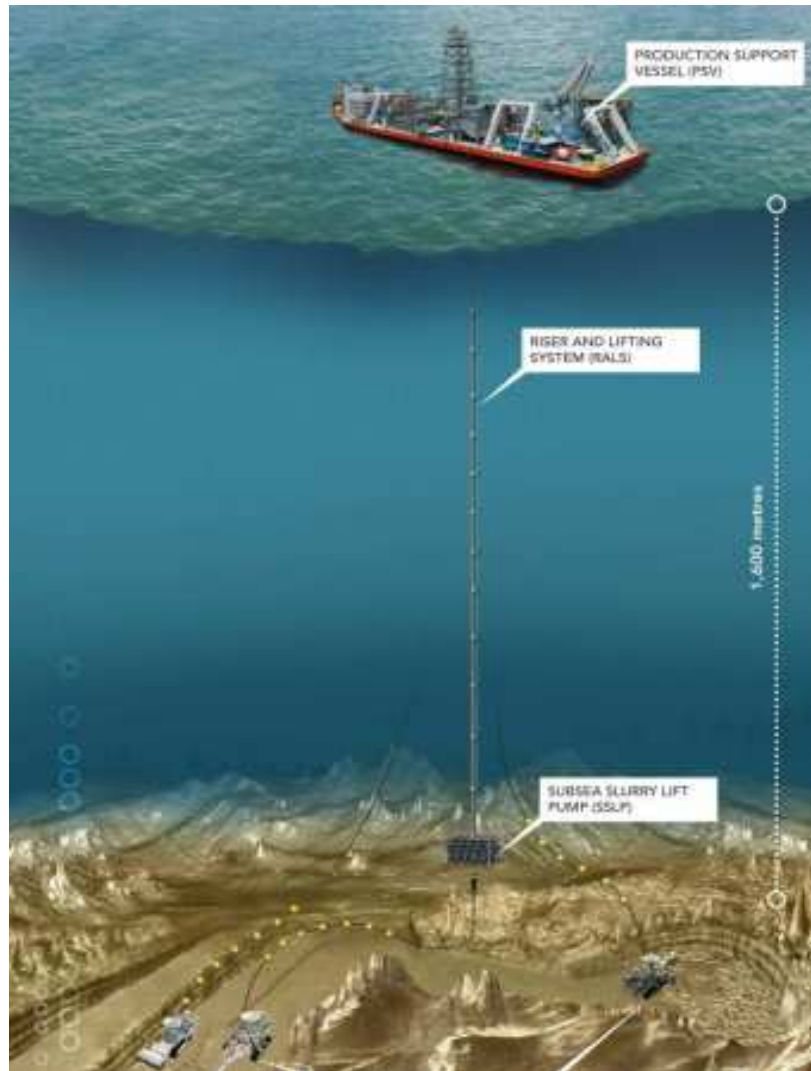


Image: An illustration shows the process of mining the seabed (Courtesy: Nautilus Minerals)

‘This was the document that Nautilus submitted to the government, seeking permission to do the project. One, it was incomplete – the annexes and appendices were not available,’ says Professor Steiner. ‘Even the body of the document showed glaring omissions. The science was only partially completed. There were a lot of unanswered questions, a lot of issues the EIS did not address.’ Nautilus says substantial scientific work has been done since then, much of it funded by the company, and there are remediation plans. But one of the lessons from Solwara 1, according to Jimmie Rodgers, is the need for independent assessment of an EIS. There has been anxiety within coastal communities in PNG about what impacts the mining might have on the water quality, and the fact that it’s being done in a volcanic area. The other lesson for the rest of the Pacific, says Rodgers, is the need to do community consultation well. ‘When you look at the kind of information you put to the community, it’s got to be both the benefits, and the cons,’ he says.

‘When you look at areas of environmental degradation, there’s not enough known about the impact on the seabed, at this point in time. And we’ve got to be truthful, nobody really knows, not even the scientists really know. ‘If you look at terrestrial mining we can see open cut mining and not too

much is left there. It doesn't take too much imagination to think what happens, if the same kind of thing happens on the seabed.' Jimmie Rodgers is realistic about what lies ahead for the Pacific, however. 'Can we actually stop it? I think the answer is no. Can we modify it in such a way that would minimise it? I think yes,' he says. 'The work that the SPC is currently doing is to make sure that people are aware that when they make a choice, they know that yes, we will have some resources. 'But at the same time, they know that they are putting the future of their countries into some kind of risk that they are not able to quantify.'

### **Nautilus Could Mine 2nd Site In PNG Within 4 Years**

*Company also pushing ahead with plans for rest of Pacific*

MELBOURNE, Australia (Radio Australia, Oct. 18, 2013, 2013) – Canadian company Nautilus Minerals could begin seafloor mining at a second site in the Pacific in as little as four years.



Nautilus Minerals has been exploring the territorial waters of Papua New Guinea (PNG) for mineral deposits since 1997, when the first offshore mineral exploration licenses were granted. (Credit: ABC)

The company hopes to be the first in the world to mine copper and gold from the deep ocean at its site in the Bismark Sea in Papua New Guinea. Nautilus's CEO, Mike Johnson, has been keeping a low profile in the media since last year when its dispute with the PNG government was referred to international arbitration. Now that the dispute has been resolved, the company is pushing ahead with its plans in PNG and elsewhere in the Pacific. Nautilus is now willing to answer questions from its critics. Nautilus Minerals says it is to ready ramp up its deep-sea copper and gold exploration project after an international arbitrators ruling on its dispute with the government of Papua New Guinea.

Earlier this month former Chief Justice of the High Court of Australia Murray Gleeson ordered PNG to pay for its 30 per cent stake in the joint venture and to pay its share of costs to date. Papua New Guinea had argued that Nautilus had not kept its obligations, allowing it to terminate its role in the venture. Mike Johnson told Radio Australia's Pacific Beat the project is still on track to become the world's first commercial deep-sea copper and gold mine. "Now that the arbitration dispute has been dealt with...we are looking forward to accelerating the rest of the contracts and build [our] schedule," Mr Johnson said. The State has been told to comply with the arbitrator's decision which means the PNG government is expected to pay US\$118 million by October 23rd. Mr Johnson said they are confident that the state would meet its obligation. Metal prices have been falling and the dispute caused delays and extra costs.

But Mr Johnson believes the value of copper is still rating well enough. "The project is largely a copper mine. Copper pricing is still very, very good; \$3.20 last friday," Mr Johnson said. "There is a little bit of jitteriness around gold as there always is when you have significant political events happening, and I guess the current sate of the U.S. would be classified as a significant political event." Mr Johnson admits that the dispute had some damaging effects on the company. "Definitely, it has had an impact on our company...and on the project because delays ultimately result in increased cost," Mr Johnson. "We have managed to track to a revised schedule on [our three main contracts] but any delays, generally, in the mining industry result in increased cost." Mr Johnson believes the dispute has not risked the commercial viability of the project. "We always planned for a significant ramp-up period when we were commissioning the machines and bringing them on line, but now we will have the ability to do a fair bit of that work closer to home where they were built back in Newcastle." Mr Johnson said.

"It will be a lot easier to fix any minor problems...so there has been a few benefits there with the time delay." Mr Johnson believes there is a lot more support for the project than people are aware of. "It is a very, very good project that suits what PNG needs [to] go forward," he said. "Papua New Guinea needs to start developing small to medium sized enterprises. This project sits nicely in the desire to develop those sorts of industries." "It is not your normal type of mining project." Mr Johnson believes if PNG takes up the areas of business associated with the project, it can capture 60-70 percent of the value chain for an investment of 30 per cent of the actual capital. "It is my belief that this would still be the first project [commercial deep-sea mining] in the world," Mr Johnson said. "We are well advanced on design work for the vessel and discussions with yards and financiers but until a contract is decided on and awarded we won't be able to say exactly what that timeframe will look like."

### *Letter to the editor*

#### **Nautilus Minerals deal benefits only investors**

The National, October 16th, 2013

I WOULD like to comment on an article on the front page of The National regarding the state being asked to pay K295 million to Nautilus Minerals Inc (Oct 7). By paying the money, PNG will have to allow the Canadian company to start the Solwara-1 deep sea mining project. The implications of deep sea mining to the environment is unknown because it will be the first time it is done, in PNG. There is no guarantee that the venture will succeed. There are some very powerful stakeholders in this business, and we have been made to dance to their tune all because of the contract the PNG government signed in March, 2011. Nautilus Minerals Inc has shareholders from huge mining companies that operate worldwide, from Oman to Cyprus to the United States. The company, no doubt, was able to convince PNG politicians into signing that agreement, and that led to the government failing to honour the contract. In the 32 months since the signing of the agreement, the PNG government was expected to pay K 9 million a month. How in the world did any politician in his right mind sign the agreement? The K295 million is much-needed money for hospitals, schools, roads and bridges. There are rural areas in PNG which lack basic medicine, and people are still dying of preventable diseases. It is a shame that a big corporation such as Nautilus can take what little money we have so that it can please its fat investors. This giant of a company is shoving the decision right down our throats whether we like it or not. Archer, Popondetta

## **Nautilus project at least two or three years away, even if government pays up**

Business Advantage via PNG Mine Watch 16.10.2013

Even if the PNG Government puts up its share of the funds for the Solwara I project, as Nautilus Minerals' CEO expects, it will be at least two to three years before the company can begin its deep sea mining operation in the Bismarck Sea. Earlier this month, Nautilus won a legally-binding ruling that the PNG government pay for its 30% stake in the joint venture Solwara I project and to pay its share of costs to date. As we reported last week, the independent arbitrator ordered the PNG government to pay US\$118m (K 303 million) by 23 October 2013. Nautilus's CEO, Mike Johnston, reassured an investors conference last week that he is confident the government will pay by the due date. Johnson said he had met with the new head of Treasury Dairi Vele in Port Moresby last week, and other officials, 'and didn't meet with any real resistance. The project is continuing to move forward and we have a lot of support'.

'The arbitration has basically given clarity to some of the issues which really were issues between the company and the government obviously, but also internally within the government and that clarity makes it very clear what the path forward is for both parties, in my view, we're both keen to get on with it now,' he said. Nautilus is now going ahead with plans to build a special-purpose vessel that will separate ore from seawater. Johnson says he expects the order to be placed in the first quarter of 2014, but would not be able to give a timeline on exploration until then. The company has quotes ranging from US\$180 million (K 462m) to US\$260 million (K 668m) for the ship, according to Chief Financial Officer, Shontel Norgate. The vessel will take two to three years to build, depending on which shipyard gets the order, she said. She said Nautilus could fund the cost of the vessel with partners or pay for it alone, which would involve paying 20–30% of the cost through equity and the rest with debt financing.

## **Solwara 1 project recommences MoA talks**

Post-Courier, October 16, 2013

STAKEHOLDERS of the Solwara 1 deep sea mining project have re-commenced discussions on the project's memorandum of agreement (MoA). This comes more than a year after the project was engaged in an arbitration process between the State and Nautilus with respect to their financing obligations as joint venture partners. These issues have since been resolved. The stakeholders comprising the state, New Ireland Provincial Government, Nautilus Minerals Inc, and the East New Britain Provincial Government, met last week in Kavieng where the MoA was discussed. The Mineral Resources Authority's acting Executive Manager for the Development Coordination Division and senior member of the state team, Sean Ngansia said the parties are committed to executing this MoA before the end of the year. He said last week's meeting was successfully concluded as issues progressed well despite some disagreements.

Among many other issues discussed were royalty distribution between the New Ireland Provincial Government and the East New Britain Provincial Government, business development plan and employment and training. It was agreed that the NIPG would table to its provincial executive council, the national government proposed royalty break up of 40 per cent ENBPG and 60 per cent NIPG between the two provinces. The NIPG position on this would be tabled in the next MoA meeting. The stakeholders agreed that Nautilus will provide a business development plan to the state, particularly to the Department of Commerce and Industry. It was agreed that Nautilus would submit an employment and training plan to the Department of Labour & Industrial. The recent MoU signed between the NIPG and Nautilus although not part of the MoA, was also discussed. It was also agreed that the NIPG would discuss the details of the MoU with its local level governments. All



stakeholders expressed satisfaction with the outcomes of the meetings despite issues that needed to be sorted out.

### **Nautilus confident PNG government will meet deadline to pay its share of seabed mine** ABC Radio Australia, 14.10.2013

Nautilus Minerals says it is ready ramp up its deep-sea copper and gold exploration project after an international arbitrators ruling on its dispute with the government of Papua New Guinea. Earlier this month, former Chief Justice of the High Court of Australia, Murray Gleeson ordered PNG to pay for its 30 per cent stake in the joint venture and to pay its share of costs to date. Papua New Guinea had argued that Nautilus had not kept its obligations, allowing it to terminate its role in the venture.

*Presenter: Jemima Garrett*

*Speaker: Nautilus's CEO, Mike Johnson*

JOHNSON: The State has been told to comply with the arbitrator's decision within a reasonable time frame so we issued a notice saying we would like completion by 23rd October and we are working to that date. And once that is achieved, ..As you are aware we have always managed to keep the 3 key contracts underway during this process. It was difficult but we managed to do it, particularly the sea-floor production tools so production of those tools has been ongoing through this and now that the arbitration dispute has been dealt with by the arbitrator, we are looking forward to accelerating the rest of the contracts and build schedule.

GARRETT: You expect the Papua New Guinea government to pay US\$118 million by 23rd October. How sure are you that it will pay up by the deadline?

JOHNSON: Well, the arbitrator's decision is legally binding and it is final so the state must abide by his ruling and meet its obligations under the state equity options agreement that it signed back in May 2011, I think it was.

GARRETT: Have you spoken with PNG government Ministers or senior officials since the arbitration to find out whether they are actually on the case and will be able to pay by the deadline?

JOHNSON: Yeah, I have spoken to officials in Treasury and they are working to meet their obligations so yep!

GARRETT: So you are confident you will get the money?

JOHNSON: Well, we are confident that the state will meet its obligation.

GARRETT: By the deadline?

JOHNSON: Yeah, we have a deadline of the 23rd. The state, in my discussions with them last week the State was working to meet its obligations by the due date so..

GARRETT: What happens if PNG doesn't pay up by the deadline?

JOHNSON: Well, it is a legally binding obligation on the state.

GARRETT: I guess you can't put them in prison. What are the consequences of not paying up?

JOHNSON: (laugh) Oh! You know, like I said the decision is legally binding on the state.

GARRETT: Metal prices have been falling while this dispute has been happening and the dispute has caused delays and extra cost. What impact will those factors have on the project?

JOHNSON: Oh there is no doubt as we have discussed previously that the dispute has resulted and will result in delays in terms of the project. As for metal prices falling, well the project is largely a copper mine. Copper pricing is still very, very good; \$3.20 last Friday so you know. I can remember working in the mining industry back in the early 2000's when copper was 60 cents a pound so I wouldn't say prices have fallen. There is a little bit of jitteriness around gold as there always is when you have significant political events happening. And I guess the current state of the U.S. would be classified as a significant political event.

GARRETT: How damaging has the dispute been to the project?

JOHNSON: Well, we have managed to keep the project on track and continue with the build but yes, definitely, it has had an impact on our company, that is for sure, and on the project because delays ultimately result in increased cost. We were tracking very well with the project early on and we

are still, with the three main contracts we have managed to keep going, we have managed to track to a revised schedule on those but any delays, generally, in the mining industry result in increased cost.

GARRETT: Has this dispute risked the commercial viability of the project?

JOHNSON: No! What it has done, I guess is, the delays have resulted in the critical path moving through the vessel rather than the machines. So what it will do is give us the ability to test the mining tools in particular, iron out any operational issues that may occur with those in the early stages. I mean we always planned for a significant ramp-up period when we were commissioning the machines and bringing them on line, but now we will have the ability, hopefully, to do a fair bit of that work closer to home where they were built back in Newcastle. It will be a lot easier to fix any minor problems, when the factory is just down the road than, literally, on the other side of the world. So there has been a few benefits there with the time delay.

GARRETT: What are you doing to heal the rift with the PNG government?

JOHNSON: To me listening is the key part of any relationship and I think I have always, we as a company, are always keen to hear what people think and where there is good ideas, take those ideas on board. So as a result of that I like to think we have very strong support at all levels of government, whether it is politicians or bureaucrats. There is a lot more support for the project than people are aware of and it is a very, very good project, that suits what PNG needs going forward, you know. Papua New Guinea needs to start developing small to medium sized enterprises. This project sits nicely in the desire to develop those sorts of industry. You know, it is not your normal type of mining project. There is opportunity for Papua New Guinea to participate throughout the project, throughout the value chain. You know, if Papua New Guinea takes up the areas of business associated with this project, Papua New Guinea can capture 60-70 per cent of the value chain for an investment of 30 per cent of the actual capital.

GARRETT: Will Papua New Guinea still be the first country in the world to start commercial deep-sea mining?

JOHNSON: Well, it is my belief that this would still be the first project. I know people are looking at other projects but it is my belief that this one would be the first.

GARRETT: So what is the timetable for getting commercial mining happening in PNG now the arbitration is complete?

JOHNSON: the timeframe still relies on the building of a vessel and critical path for delivery of the project still goes through the vessel. Vessel construction can take anywhere from 24 to 36 months depending on the yard and the type of vessel that's required. We are well advanced on design work for the vessel and discussions with yards and financiers but until a contract is decided on and awarded we won't be able to say exactly what that timeframe will look like.

### **Concerns rise over environmental impacts of deep sea mining**

Nuku'alofa, Tonga, Matangi Tonga Online, October 11, 2013

Members of various regional organisations have voiced their concerns over the prospect of deep sea mining in Pacific waters. The concerns were raised in a United Nations administered forum known as the Pacific Solution Exchange and highlighted in a press release by the United Nations Development Programme (UNDP) last week. The forum hosts e-discussions on topics with contributions from researchers, scientists, civil servants and experts from around the Pacific. According to the UNDP, Pacific waters are "...now facing large-scale industrial exploitation as mining of the deep seabed for minerals becomes a reality". Pacific Political Advisor for Greenpeace Australia Pacific, Ms Seni Nabou stated "As terrestrial minerals become depleted and prices rise, the search for new sources for supply is turning to the sea floor and many non-government organisations remain concerned at the haste in which exploration and mining is taking place,"

“While harvesting these resources could provide a much-needed economic boost to many Pacific Island countries, Greenpeace Australia Pacific and a coalition of Pacific Regional Non-Government Organisations are concerned about the rush to deep seabed mining and have called for a halt to it in the Pacific region”. “This emerging industry, facilitated greatly by advances in technology, poses a major threat to our oceans, which are already suffering from a number of pressures including over-fishing, pollution, and the effects of climate change”. The concerns were shared by Deep Sea Minerals Project Legal Advisor from the Secretariat of the Pacific Community, Hannah Lily who stated that in some cases, “Scientists predict the direct impacts of seabed mining of seabed mining are likely to be localised to the mining site, due to the high pressure and low current in the deep ocean, which will restrict sediment dispersal”. The Pacific Solutions Exchange is a forum that has over 1500 members including practitioners, students, government, concerned elders, and community members in remote islands.

### **Government wrong to allow Nautilus, leader says**

The National, October 10th, 2013

A COMMUNITY leader in East New Britain said the arbitration ruling for the government to pay Nautilus Minerals nearly K300 million indicates it was wrong initially to allow the company into the country. Jack Ephraim, an outspoken leader from the Duke of Yorks islands, in Kokopo district, said many concerned leaders and environmental organisations were calling on the government to reconsider its decision in allowing Nautilus to conduct exploration on the country’s seabed in the proposed Solwara 1 project in the Bismarck Sea. Ephraim said the government had to pay the fine for breaching the contract with the company, which had indicated a lack of consultation with the people before making such a decision that would impact the lives of people between ENB and New Ireland. He has cautioned the government to pay up its due before the deadline on Oct 23. Ephraim said it was best if the government put a stop to anymore dealings with the company and said the project without a proper environmental impact study was likely to have environmental destruction. It is understood Nautilus was looking forward to bringing the Solwara 1 project into production and will work with the state in order to progress.

### **PNG Government To Pay \$118 Million To Nautilus Minerals**

*State must buy 30% interest, pay 30% of project expenditures*

PORT MORESBY, Papua New Guinea (The National, Oct. 7, 2013) – Papua New Guinea’s national government has been ordered to fulfill its commitment to the Solwara-1 deep sea mining project – meaning it has to meet a demand to pay an estimated US\$118 million (K307.7 million) to the developer, Nautilus Minerals, by Oct. 23. Canada-based sea floor miner Nautilus Minerals, said in a statement last Thursday that Sydney-based arbitrator Murray Gleeson had issued an award in the company’s favour in respect of the issues that were the subject of a notice of arbitration initiated by the State of PNG. Under the applicable arbitration rules, the arbitrator’s decision is final and binding. The arbitration began on Aug. 26 and lasted 10 days. Prime Minister Peter O’Neill has been in Bali, Indonesia, attending the Asia Pacific Economic Cooperation (APEC) meeting. He is expected to issue a statement after his return tomorrow.

Gleeson made a declaration that the State of PNG was in breach of the state equity option agreement signed by the parties in March 2011 in failing to complete the purchase of a 30% interest in the Solwara-1 Project on Nov 7, 2011. He issued an order that the State was required to comply with its obligations under the agreement to complete the purchase of the 30% interest in the Solwara 1 Project and pay 30% of all project expenditure incurred to date within a reasonable time after the award. Nautilus, last Thursday, issued the State with a notice requiring completion to occur on Oct

23. The company estimated that the total amount payable by the State at completion to be approximately US\$118 million (including interest). "Nautilus looks forward to bringing the Solwara 1 Project into production and will work with the State in order to move the project forward in light of the arbitrator's award," its interim chief executive Michael Johnston said in a statement.

The value of Nautilus stock shot up 50.1% to US\$0.55 on the news. The arbitration decision comes after a prolonged impasse with PNG over its partnership in mining project earlier this year. The problem, as Johnston told it, was that many of the deeds covering proprietary technology and sub-sea mining methods, which Nautilus and several partners developed over the years, did not contain clauses allowing for a third party, such as the PNG government, to come on board as an additional partner and owner of the intellectual property rights. Johnston said negotiations with the company's partners in the dredging business were conducted to convince them to redraw the deeds to allow the Papua New Guinea government to gain direct 30% ownership of the intellectual property rights

### **Arbitrator Rules In Favor Of Nautilus In Dispute With PNG**

*PNG government compelled to pay share of undersea mining project*

WELLINGTON, New Zealand (Radio New Zealand International, Oct. 6, 2013) – The mining company Nautilus Minerals says an international arbitrator has ruled in its favour and compelled the Papua New Guinea government to keep its end of a joint venture agreement. Nautilus is planning to mine copper and gold in Papua New Guinea territorial waters under the Solwara 1 deep-sea mining project. The company had filed a notice of arbitration against the PNG government on June the first last year, regarding a disagreement about the parties' obligations under the joint venture and alleging the government had not paid its share of project development costs. A former Chief Justice of the High Court of Australia, Murray Gleeson, declared that PNG was in breach of the state equity option agreement, which the parties signed in March 2011. Mr Gleeson says the PNG government has failed to buy a 30 percent interest in the project on November the 7th, 2011 and has compelled it to comply with the agreement and pay its share of all project expenditure incurred to date.

### **Nautilus' PNG marine mining project to proceed after arbitration decision**

PACNREWS, 04/10/2013

Nautilus Minerals, which proposes to mine copper and gold at the Solwara 1 deep-sea mining project in Papua New Guinea (PNG) territorial waters, on Thursday said an international arbitrator had ruled in its favour, and compelled the PNG government to keep to its end of a joint-venture agreement. Former Chief Justice of the High Court of Australia, Murray Gleeson, declared that PNG was in breach of the state equity option agreement, which the parties signed in March 2011, in failing to buy a 30% interest in the project on November 7, 2011. Gleeson compelled the State to comply with its obligations under the agreement to buy the 30% interest in the project and pay its share of all project expenditure incurred to date within a reasonable time. Nautilus said it expected a payment of about \$118-million, and that it had issued the State with a notice requiring the transaction to be complete by October 23. The company said it looked forward to bringing the Solwara 1 project into production and that it would work with PNG to move the project forward in light of the arbitrator's award.

Nautilus had initiated a dispute resolution process by filing a notice of arbitration against the PNG government on June 1, 2012, owing to a disagreement about the parties' obligations in the completion of the contract and alleging that the State had not paid its share of project development costs. But the PNG government countered by asserting that Nautilus had not met certain obligations on which completion of the transaction was dependent, arguing that the company had breached the

agreement and that the State was entitled to terminate the agreement. Nautilus refuted these claims, maintaining that it was the State that had breached the agreement. The arbitration was conducted in Sydney, Australia, under the United Nations Commission on International Trade Law's arbitration rules.

The Solwara 1 project seeks to exploit seafloor massive sulphides that form an ore body close to vents at depths of 1 600 m. The high-grade mineralisation has been brought up by site's hydrothermal plumes and then deposited on the nearby seabed. Mining would entail the use of underwater vehicles to cut and crush ore that is then fed as slurry into a pump and lifted to a surface vessel. Here the ore would be disaggregated from the deep-sea water, with output then transferred onto a neighbouring vessel for transport to PNG and further processing. Effective November 25, 2011, and at a cut-off grade of 2.6% copper, the project had 1.03-million tonnes grading 7.2% copper and 5 g/t gold for 74 160 t copper and 165 600 oz gold indicated. Inferred material contained 124 740 t copper and 316 900 oz gold..

**Nautilus gets the green light to mine under water, will receive \$118 million in compensation**  
Cecilia Jamasmie, Mining.com, October 3, 2013

After almost two years of locking horns with the Papua New Guinea government over a project's ownership, Canada-based Nautilus Minerals is finally free to move forward with its pioneering plan to mine the seafloor. The company, the first yet not the only one exploring the ocean floor for polymetallic massive sulphide deposits, said in a statement that the arbitrator has ruled that Papua New Guinea breached the contract signed in March 2011 under which the country optioned to acquire 30% of the Solwara 1 project, located in its territorial waters in the Bismarck Sea. As part of the deal, PNG agreed to pay its share of development costs for the mine, a clause it decided to disregard later, sending Nautilus shares downhill and jeopardizing the future of the first commercial underwater mine in the world.

Today's decision, however, clears up the way for Nautilus to go ahead with the project, as it requires the State to comply with its agreement obligations and so complete the purchase of the 30% interest in the Solwara 1. PNG will also have to pay Nautilus 30% of all project expenditure incurred to date, within a reasonable time after the award, the company said. The Toronto-based firm added it has set Oct. 23 as the deadline for the Oceanic state to do what it has been ordered, which implies Nautilus should receive about US\$118 million (including interest) before the end of the month. The Solwara 1 project, located in the minerals-rich Manus basin, was originally slated to begin production in the fourth quarter this year. Nautilus shares were up almost 32% at 10:45 am ET in the Toronto Stock Exchange after the announcement.

**Knight: Nautilus Minerals banned**  
The National, September 26th, 2013

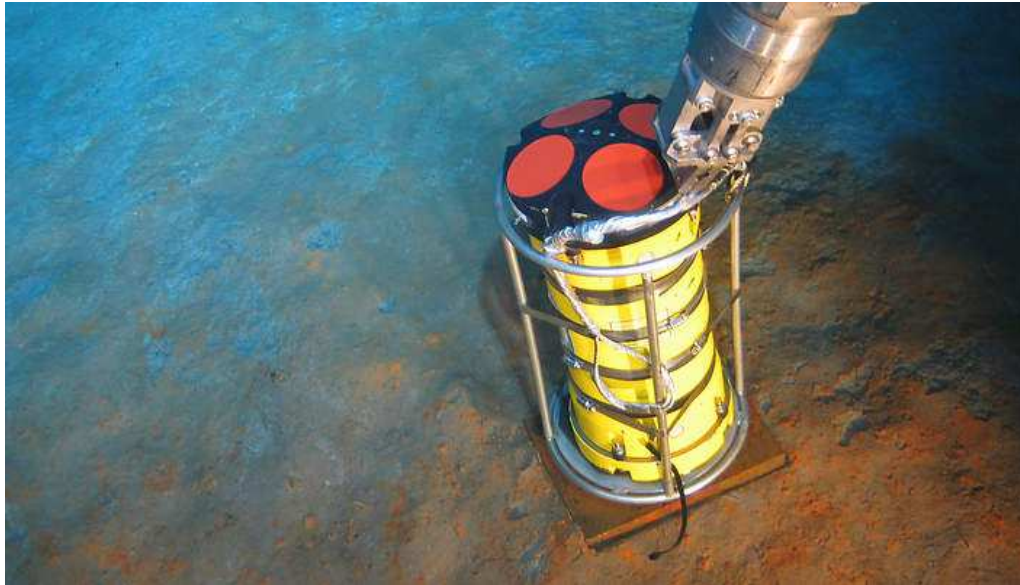
By MALUM NALU

MANUS MP Ronnie Knight says Canadian miner, Nautilus Minerals, is banned from the province. He made this comment on Tuesday on FM100 Talkback Show after country manager Mel Togolo tried to sell the idea at the Pacific Regional Tuna Forum in Honiara, Solomon Islands, last week, that seabed mining would not affect tuna. Knight, a deep-sea diver, said Nautilus should go and mine its own seas in Canada before even thinking about venturing into PNG. He said because PNG did not have tough environmental laws such as Canada and other countries, Nautilus thought it could do anything. "Not matter what you say, no matter what you do, no matter if you tell us how good it's going to be – as long as I'm head of Manus Nautilus will never enter our waters," Knight

said. “Go and do it in Canada first, where we can first see the benefits, before you come to us.” Knight said legislation would be moved in Parliament to stop Nautilus from entering PNG waters. “I believe the Minister for Environment and Conservation is already addressing this issue,” he said. “I believe in the next few sittings (of Parliament), we will have legislation to stop this sort of thing happening. “It (deep-sea mining) will never happen in Manus.”

### **Deep Sea Mining: Coming soon to an ocean near you**

Source: The Conversation, By Carlos Duarte, SBS Blog September 25, 2013



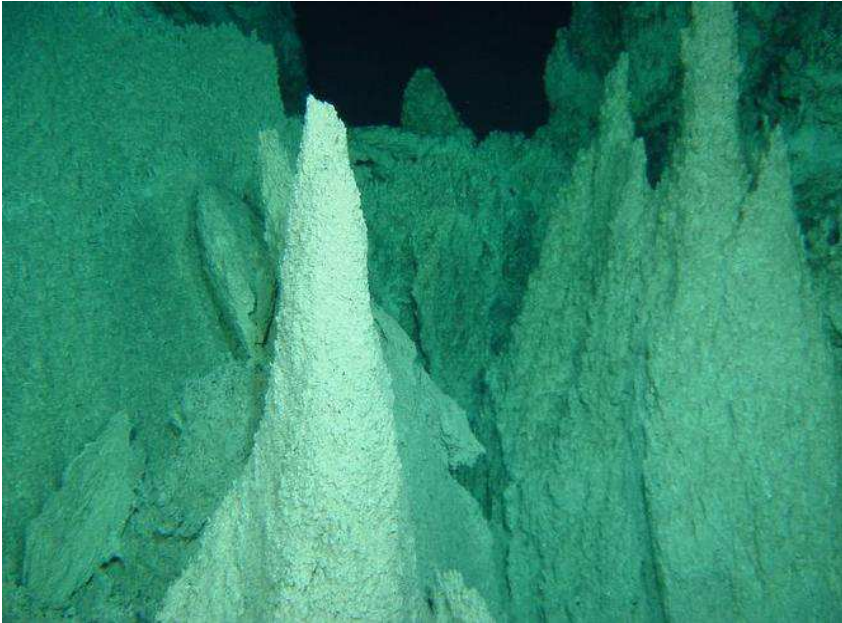
Canadian giant, Nautilus Minerals, is leading the world in deep-water mining exploration, and has plans to harvest the riches of 11 hectares of copper and gold-rich sea bed. (Source: AAP/Nautilus Minerals)

The depletion of resources on land together with the increase in resource demand and the parallel development in technologies for deep sea exploration have brought the issue of deep-sea mining to the forefront of political, industrial and scientific debate, writes Carlos Duarte.

Shallow submarine mining is already a reality in coastal areas, such as the De Beers Marine diamond mining operation in Namibia, in depths up to 150 metres. The current challenge is to move these operations to the deep sea, which contains vast resources of minerals, including manganese, iron, nickel, copper, cobalt, rare earths and gold, often associated with areas of volcanic activity. Whereas nations are sovereign to regulate seabed mining within their economic exclusive zones, the access to resources in the seabed and ocean floor beyond these national jurisdiction waters, referred in United Nation Convention on the Law of the Sea (UNCLOS) as “the Area”. is organized and controlled by the autonomous international organization called “International Seabed Authority” initially established under UNCLOS. To date, the International Seabed Authority has entered into seventeen 15-year contracts for exploration for polymetallic nodules and polymetallic sulphides in the deep seabed with thirteen contractors. Eleven of these contracts are for exploration for polymetallic nodules in the Clarion Clipperton Fracture Zone in the Pacific, with two contracts for exploration for polymetallic sulphides in the South West Indian Ridge and the Mid Atlantic Ridge.

These contracts allow the contractors to explore specified parts of the deep oceans outside national jurisdiction, giving each contractor the exclusive right to explore an initial area of up to 150,000 km<sup>2</sup>. Russia, China, Korea, Germany and France are the nations involved in most of these contracts, which include contracts for small nations, such as Nauru, Kiribati and Tonga, whom would likely open them up to tender by international companies. Indeed, at a summit on Deep-Sea Mining in London two months ago Mark Brown, Minister of Minerals and Natural Resources of the Cook

Islands, announced that the Cook Islands is embracing deep-sea mining as a pathway to multiply the country's gross domestic product by up to 100 fold, as they assessed that the Cook Islands' 2 million Km<sup>2</sup> exclusive economic zone contains 10 billion tons of manganese nodules, which contain manganese, nickel, copper, cobalt and rare earth minerals used in electronics. Negotiations are under way between the Cook Islands and companies in the UK, China, Korea, Japan and Norway, towards granting the first tenders within a year.



Carbonate chimneys at inactive hydrothermal vent sites of Lost City, Mid Atlantic Ridge. (c) Ifremer, Exomar cruise 2005.



nodules Ifremer Nodinaut

These facts suggest that we may soon face an underwater gold rush, but in most citizens' minds deep-sea mining is still something for sci-fi movies. Much to the contrary, the technology for deep-sea mining is not something of the future but it is largely existing. A deep-sea mining operation consists of a mining support platform or vessel; a launch and recovery system; a crawler with a mining head, centrifugal pump and vertical transport system; and electrical, control, instrumentation and visualization systems. Companies such as Lockheed Martin, Soil Machine Dynamics, IHC Mining and Bauer or Nautilus Minerals are developing vehicles for deep-sea mining, pledging they are in the position to readily develop techniques to operate down to 5,000 metre depth. Indeed, the

submarine vehicles required are already in existence and their operations are described in compelling animations. Besides direct removal of parts of the sea floor during mineral collection, increased toxicity and turbidity is expected in the water column due to sediment resuspension during the extraction (ie near bottom) and tailings rejection after minerals are sorted on the floating platform (ie near the surface) resulting in clouds of particles forming plumes. . Waste will represent most, 90%, of the volume of materials pumped to surface and, thus, seabed operations will deposit massive amounts of waste at the sea floor. This waste can, in turn, release massive amounts of metals and other elements to the surrounding water, impacting on the ecosystems that thrive near these deep sea mining sites. While near bottom resuspended sediment may cause a major threat to local communities, surface plumes generated by tailing may have a wider impact by affecting larger areas.

Here is, however, where the main problem lies. Deep sea communities are very poorly characterized and mapped, and even where a reasonable taxonomic knowledge could be claimed and communities mapped over accurate scales, their sensitivity to these impacts is unknown. Despite these uncertainties, there is little doubt that losses of fragile deep-sea communities during the operations will be unavoidable, and the focus of industry and scientists is placed in the ecological restoration of the deep sea from impacts of mining. The International Marine Minerals Society has developed a voluntary Code for Environmental Management of Marine Mining that recommends that plans for deep sea mining include at the outset procedures that “aid in the recruitment, re-establishment and migration of biota...”. The first impact assessment for a deep-sea mining project has now been produced. This was commissioned by Nautilus Minerals Inc., incorporated in Canada but also present in Australia (Queensland). Nautilus was granted the first mining lease for polymetallic seafloor massive sulphide deposits at the prospect known as Solwara 1, in the territorial waters of Papua New Guinea, where it is aiming to extract copper, gold and silver. The company, which is likely to be the first one to implement deep-sea mining is also looking at operating in the exclusive economic zones and territorial waters of Fiji, Tonga, the Solomon Islands, Vanuatu and New Zealand.

A workshop, promoted by Nautilus Minerals Inc., was held in Sète (France) in November 2012, including one of us (S.A.-H.) to consider the feasibility of ecological restoration of the deep sea following mining operations. The outcomes of the workshop are reported in a paper, including coauthors from Nautilus Minerals Inc, published in the journal *Marine Policy* (Van Dover et al. 2013). This exercise indicated that most of the direct costs (80%) for a deep-sea mining restoration programs would be associated with ship use, including use of remotely operated and autonomous underwater vehicles. The experts attending this workshop concluded that deep-sea restoration will be expensive, but that cost alone should not be a reason for inaction and that restoration should be included in project budgets. They concluded that where restoration costs are prohibitive, offsetting options can be explored but that neither restoration nor rehabilitation objectives or commitments should be taken as a ‘license to trash’.

A record of disasters in the offshore oil and gas industry, as well as deep sea fisheries, shows that there is a high price to pay in allowing industry to move offshore faster than scientific research does, yet only a handful of nations – which do not include Australia – are sufficiently equipped for deep sea scientific exploration as to keep pace with industry. The basic knowledge (taxonomic inventories, habitat mapping, characterization of faunal assemblages and dynamics of deep species interactions, ...) of deep sea ecosystems and the evaluation of their vulnerability, recovery time scales and processes is a matter of urgency, but this goals cannot be met without significant investments in capabilities for deep-sea research. Providing the immediacy of deep-sea mining, the investment in scientific infrastructure and research to provide the scientific underpinnings for the safe and sustainable mining operations in the deep-sea is an imperative.

*This piece has been co-authored with Sophie Arnaud-Haond, IFREMER, France.*



## **Seabed mining won't affect tuna**

Post-Courier, September 24, 2013

By *KONOPA KANA*

NAUTILUS Minerals country manager Mel Togolo believes there is a bright prospect in cooperation with the tuna fishery sector. Mr Togolo said this at the fourth Pacific regional tuna industry forum held last week in Honiara, the capital of Solomon Islands. Mr Togolo told the PNG media during an interview that the operations of the controversial seabed mining by Nautilus would be a safe one with consultation with stakeholders to design a safe production method that would have minimum impact on marine life. He based his comments on the information Nautilus provided, saying the company has developed and designed an enclosed pipe production system where all the ore mined will be piped up through to the vessel. Mr Togolo said before developing the mining equipment, information sharing was paramount in getting the right design. He said that there was wide consultation to make sure the machinery built were of world class standard so that operations would not affect tuna and other marine life.

Mr Togolo said that there were extensive discussions to come up with an enclosed system where ore mined will not come into contact with the marine life, piping everything straight to vessels. "Most of the tuna and majority of the marine life live in the sea within the first 400 meters of the ocean where photosynthesis, light and oxygen is available," Mr Togolo said. "But deep sea mining operations will be conducted at a depth of 1,600 meters below the surface, where there is minimal marine life and things that humans don't consume live there". He said in terms of developing this production system, there will be zero use of chemicals and blasting, which would have minimum impact on tuna and other marine life. "We continue to build our machinery overseas in England and the US and setting up the stage to bring them up to the vessels will be a major task," Mr Togolo said. "We will co-operate in terms of research and on-board safety with local maritime agencies like the National Maritime Safety Authority, to provide information on up-to-date shipping charges and telecommunication."

## **PNG National Fisheries Authority concerned with seabed mining**

EMTV/PACNEWS, 20/09/2013

The National Fisheries Authority in Papua New Guinea has again expressed its concerns over seabed mining in the country. And its concerns is based on the unavailability of proper legislation in the country, said Managing Director of NFA Sylvester Pokajam. Rather more awareness should be carried out to educate the people on the impacts of the project, Pokajam told EMTV News. The controversial seabed mining Solwara one project to be carried out by Nautilus Minerals has been approved by the government. But it has generated a lot of debate from concerned Papua New Guineans and organizations. Many of the concerns are based on the fact, that Papua New Guinea will be the first country in the world to experiment with this project, without any proper laws governing its operation.

The potential impacts on marine life are said to be minimal, but that has not stopped the National Fisheries authority to query the project. Pokajam hinted possible risks to the growing fisheries sector with the onset of the project, and wants proper feasibility and environmental assessment carried out to ascertain the benefits of the project. Commercial Manager to Parties to the Nauru Agreement Maurice Brownjohn said it will become a growing problem to regional fisheries if no proper awareness is carried out. He said, environmental aspects may be small but perception will be the biggest problem because of misunderstanding. The issue of sustainable fisheries will one of the key issues discussed in the Pacific Tuna forum, and seabed mining will be highlighted.

## **Nautilus and PNG await arbitration decision**

The Northern Miner, 17.9.2013

VANCOUVER – In 2011 it looked like Nautilus Minerals' pioneering plan to mine high-grade seafloor sulphide deposits might actually work. The company had permits, a joint venture with the Papua New Guinea government, contracts with partners to build and operate the novel underwater mining machinery, and lots of money from excited investors. Then the PNG government failed to pay its share of project costs and Nautilus' momentum ground to a halt. In exchange for a 30% stake in Nautilus' most advanced project, Solwara 1, the PNG government had agreed in early 2011 to pay 30% of project costs up to that point and to fund 30% of the costs going forward. According to Nautilus, those payments just didn't happen. The government says fault sits with Nautilus, which it says failed to meet several contractual obligations (details of that allegation have not been made public). Whatever the case, by late 2012 Nautilus could no longer bear the full costs of advancing Solwara 1 alone. The company halted construction of its seafloor production system, effectively putting Solwara 1 on standby. By the time it suspended construction, Nautilus says the PNG government was in arrears to the tune of \$75 million.

Direct negotiations failed and the Solwara 1 partners entered arbitration. That process, which started in mid-2012, is finally wrapping up. On August 26 the arbitration hearing took place. Now Nautilus has only to wait for the outcome. Investors also seem interested in the outcome: Nautilus' share price has doubled since early July to hover near 40¢. The rally found its footing the previous month, when Nautilus had little trouble selling 200 million shares at 20¢ apiece, for gross proceeds of \$40 million. The company says existing shareholders filled most of the private placement, and indeed Nautilus earned a wide and varied investor base between 2008 and 2011 as its novel proposal to mine massive sulphides on the seafloor took shape. Major shareholders include Mawarid Mining, a subsidiary of Oman's state oil, gas, and mining company, with 28%; Russian iron ore and steel major Metalloinvest with 20.75%; and Anglo American with 5.95%.

Solwara 1 is 30 km from the coastline of PNG, which means it is in Papua New Guinea's territorial waters. Underneath 1,600 metres of Bismarck Sea Nautilus has delineated 1.03 million indicated tonnes grading 7.2% copper, 5 grams gold per tonne, 23 grams silver per tonne, and 0.4% zinc. Inferred resources add 1.54 million tonnes averaging 8.1% copper, 6.4 grams gold, 34 grams silver, and 0.9% zinc. Nautilus' plan to move those mineral-rich tonnes to the surface starts with two large, robotic, continuous cutting excavators that leave cut material sitting on the seafloor. A collecting machine follows, drawing the mixture of sand, gravel, and silt in a slurry and pumping it through a flexible pipe to the riser and lifting system (RALS). The RALS comprises a large pump that pushes the slurry up a rigid pipe to a ship, which is known as the production support vessel (PSV). Onboard the PSV the slurry is dewatered and transferred to a barge, while the used seawater is pumped back to the seafloor to avoid mixing cold deep waters into the warm surface waters.

When Nautilus suspended construction, work on the RALS was more than half complete. In the last year some further progress has been made, as Nautilus continued to fund work on three parts of the system. "The company considered it essential to continue with the build of its three key contracts related to the Seafloor Production System to ensure the company is in the best possible position to advance the Solwara 1 project following the resolution of the dispute with the State of PNG, or alternatively to allow for the re-deployment of the equipment to other jurisdictions," Nautilus wrote in its latest quarterly financials. The three key contracts concern the seafloor excavators and collecting machine and the detailed engineering of the RALS. Nautilus has also continued work on plans for the PSV. The \$40-million financing was completed to fund this ongoing work and keep the company afloat until the arbitration decision, which is expected by the end of September. If the arbitration returns a decision that renders Solwara 1 unviable for Nautilus, the company's investments in the project to date will not all have been in vain as the equipment is mobile and Nautilus has other sea-

floor massive sulphide projects. The company holds 500,000 sq. km of exploration tenements in the territorial waters and exclusive economic zones of Papua New Guinea, Tonga, Solomon Islands, Fiji, Vanuatu, and New Zealand, as well as 75,000 sq. km of tenements in the Clarion Clipperton Zone, in the international waters of the Eastern Pacific between Hawaii and Mexico. Nautilus closed recently at 42¢. The company has a 52-week trading range of 20¢ to \$1.15 and has 437 million shares outstanding.

### **The new Fiji constitution and seabed mining**

Moana Niu, PNG Mine Watch 8. September 2013

This is an addendum to an earlier article: “*SOPAC assists Fiji/Lockheed Martin in new deep seabed mining legislation.*” (March 12, 2013) As President Epeli Nailatikau of Fiji prepares to give assent to a new Constitution, we have learned that protestors were arrested for their silent protests. Both Amnesty International and Human Rights Watch have posted their concerns over the new Constitution’s failures to protect Human Rights. This new “Bill of Rights” is a paternalistic assault on basic rights like Freedom of Expression, Freedom of Assembly, and Freedom of Association, with “rights” being asserted only upon the condition that laws may limit that freedom, and that lawmakers may authorize the limitation of those freedoms. These limitations include registering trade unions; collective bargaining; providing mechanisms for the resolution of employment disputes and grievances; regulating essential industries (which would include extractive industries like seabed mining).

These new conditions are equivalent to saying that citizens have these rights, however, the government has the authority to take them away. This willy-nilly authority seeks to redefine the concept of constitutional rights in such a way that the Fijian legal system could become a comedy of jurisprudence. Additionally, these amendments that qualify “freedoms” by imposing an authority of limitations seems to be derived from an Orwellian contradiction that expands the power of the government to limit these freedoms in the interests of “national security, public safety, public order, public morality, public health, the orderly conduct of elections” and “the overall interests of the Fijian economy.” In regard to extractive industries (expanding upon the seabed mining article) here are three relevant amendments that would likely give Lockheed Martin the authority they seek to use Fiji’s license and begin exploration in the Clarion-Clipperton region.

### **Parliamentary authority over international agreements**

48.—(1) An international agreement binds the State only after it has been approved by Parliament, unless it is an agreement referred to in subsection (2).

(2) An international agreement of a technical and administrative nature, entered into by Cabinet, may bind the State without approval by Parliament, but must be tabled in Parliament.

### **Regulations and similar laws**

47.—(1) No person may make any regulation, or issue any other instrument having the force of law, except as expressly authorized by this Constitution or a written law.

(2) A person making any regulations or issuing any instrument having the force of law must, so far as practicable, provide reasonable opportunity for public participation in the development and review of the law before it is made.

### **Environmental rights**

37.—(1) Every person has the right to a clean and healthy environment, which includes the right to have the natural world protected for the benefit of present and future generations through legislative and other measures.

(2) A law may limit, or may authorize the limitation of, the rights set out in this section.

Giving assent to this new constitution amounts to the Bainimarama regime proclaiming himself Supreme Ruler, and I imagine that history will not look kindly upon him selling out his country by asserting an illegitimate constitution. Hawaii, too, suffered from a sinister constitutional debacle in 1887, when King Kalakaua was forced into signing what is now called the “Bayonet Constitution” which gave the sugar industry huge concessions to land, water rights and tariff reductions. Five years later when Queen Lili’uokalani tried to introduce a new restorative constitution limiting these concessions, the rich sugar-dominated oligarchy successfully launched a coup against the Kingdom.

### **China enters race with foreign rivals to mine the seabed for valuable minerals**

South China Morning Post, 04 September, 2013, by Stephen Chen

*China can now explore the seabed for up to three valuable minerals but it faces a major challenge to close the mining technology gap with the West. With China recently achieving its long-held desire to exploit untapped underwater resources, a new method of sustaining its rapid economic development appeared to be secure.*

The award of exploration contracts last month for valuable minerals by the 165-member International Seabed Authority, which regulates deep-sea mining activities, approved exploration plans for cobalt-rich ferromanganese crusts by both China and Japan. China can now legally poke around on a Western Pacific seamount, while Japan can venture beneath international waters off the isolated Japanese coral atoll of Minamitorishima. Both areas measure about 3,000 square kilometres - nearly three times the size of Hong Kong. China is the only nation authorised to explore seabeds for as many as three major types of minerals, as it faces the depletion of natural resources at home and rising mineral prices abroad. But the drive to mine the ocean floors has come up against unforeseen hurdles. China first secured the rights to explore for polymetallic nodules - lumps found on the ocean floor where layers of metals have formed around a rock core - in the northeast Pacific in 2001, and for polymetallic sulphide deposits in the southwest Indian Ocean two years ago. China Ocean Mineral Resources Research and Development Association (Comra) clinched the latest contract, along with the earlier contracts in 2001 and 2011.





The goal is to mine cobalt crusts, which are rich in iron, and hydroxide deposits containing significant concentrations of cobalt, titanium, nickel, platinum, molybdenum, tellurium, cerium and other metals and rare earth elements. China won the contract partly because it had been surveying in the region over the past 15 years, according to Chinese marine authorities. It has built up a large fleet of survey vessels with deep-reaching robotic and manned submersibles, giving state leaders unprecedented confidence in China's ability to harvest the earth's undersea riches. Shortly after winning the cobalt contract, President Xi Jinping vowed to turn the marine industries into a pillar of China's economy. "China's maritime cause has generally entered the best period of development after years of efforts," he was quoted by Xinhua as saying.

"In no way will the country abandon its legitimate rights and interests, nor will it give up its core national interests." But compared to developed countries, China is a latecomer to the game. Germany, the United States and Japan were conducting intensive surveys on cobalt crusts and made many promising findings as early as the 1980s. A deposit near Hawaii alone was estimated to contain 300 million tons of cobalt, enough for thousands of years of consumption in the United States. Also, China is reliant on overseas suppliers for technology and equipment for geophysical exploration. Amid concerns China could use and adapt such technology for its own engineering and military use, most countries restricted the export of advanced products to it. And now, some Chinese researchers doubt whether China can explore and exploit seabed minerals without the very best technology and equipment. Xiao Zhijian, sales manager at China's biggest cobalt supplier, the Jinchuan Group, said cobalt reserves in China were small, and the country would desperately need them in the future.



The research submersible Jiaolong preparing to dive. Photo: Xinhua

The metal is widely used in the aerospace industry, he said, where aircraft engines need cobalt to maintain strength amid high temperatures. But the biggest consumption of cobalt is anticipated to be in industrial batteries. When electric vehicles were still at the infant stage, the demand for cobalt was weak. Land reserves in Congo-Kinshasa alone could meet up to 70 per cent of the international demand, Xiao said. "But we expect explosive growth in cobalt after 2017 as electric cars mature. Perhaps that is why the government was so eager to secure the seabed contract," he said. Cui Yingchun, a researcher with China's First Institute of Oceanography, State Oceanic Administration, told *Science and Technology Daily* that cobalt crusts still puzzled scientists with their mysterious formation. For nearly a century scientists had been debating whether they were formed physically, chemically or even biologically.

But one thing is certain - mining them will be difficult. The technical challenge of mining the crusts will be much greater than that of mining polymetallic nodules, Cui told the newspaper. While the nodules are distributed loosely on soft sediments, the crusts are often tightly glued to very hard bedrock. "While scraping the crusts, you must avoid the bedrock, otherwise the quality of the ore is severely affected," Cui said. But the crusts contain many valuable metals and are widely distributed among relatively shallow seabeds. There is also less controversy about their exploitation in international communities, compared to other minerals, he said. However, Cui explained that during mining "disturbance to the original seabed can be huge, and there is a significant risk of upsetting the entire ecosystem". He added: "In addition, due to the current limitations of technology, the development of underwater equipment also faces no small challenge."

And that may prove to be China's bigger headache. Wang Xiuming, ultra-sonar expert with the Chinese Academy of Sciences' Institute of Acoustics, said China was still far behind developed countries in the mining technology race. "About 80 to 90 per cent of the geophysical surveying instruments on the international market are not allowed to be sold to China," he said. "They do not sell precise instruments to us. They are afraid we will copy their designs. They are also afraid we will use the knowledge in the military - highly sensitive geophysical sensors can be used to detect and identify submarines. These instruments are very expensive, usually costing tens of millions of yuan, but money is not the main problem. The problem is nobody will sell it to us." China is now developing its own equipment, but the gap with overseas products is huge, according to Wang. "When it comes to land surveying, the gap may be narrowing, but on ocean mapping we are still far behind. The government didn't realise the importance of seabed minerals," he said. "When we joined the race, the foreign countries had been ahead of us for decades. This gap can't be eliminated in the short term."

Professor Chen Daizhao, a geophysicist with the CAS Institute of Geology and Geophysics, said China was not only backward when it came to equipment, but also software. Most analytical software used in China was written by other countries. Even scientists who had used it for decades did not have a clue how the programme's core modules worked. "The government is now aware of the problem and wants to achieve independence in both software and hardware," Chen said. "But it is extremely difficult to change the situation, as almost every basic tool we use is a foreign product." The exception is Jiaolong, a deep sea research submersible that can dive to a depth of over 7,000 metres. Arguably the deepest manned submersible that can move freely on the ocean bed, Jiaolong is this month busily exploring China's contracted seabed in the northeast Pacific. Jiaolong last month dived down to explore for polymetallic nodules, reaching a depth of more than 5,200 metres. The trip led to the discovery that more than 50 per cent of the seabed was covered by the nodules, confirming previous estimates.

But Chinese scientists were also astonished to find marine life thriving throughout the deep sea region. Many fish species along with sea cucumbers, starfish, shrimp, jellyfish, corals, sponges, ctenophores and a total of 20 kinds of giant benthic creatures - species living in sedimentary seabed envi-

ronments - were all observed, Xinhua reported. The scientists estimate there is at least one cucumber in every 10 square metres, and in some areas the density of creatures was so high they almost filled the explorer's entire monitoring screen. One important job of the mission was to relocate some creatures from abyssal plains to an undersea mountain chain. If future return visits showed these creatures could live happily in their new home, it would provide evidence the creatures could migrate and live in shallower waters, helping show that mining may not seriously harm biodiversity. However, the Jiaolong experiment failed. A mission to trap sea life was dogged by mechanical or design problems, according to Xinhua, and put on hold. China now has to grapple with the frustration of having a rich new source of natural wealth within its grasp, but with technological limitations and potential environmental damage barring its way.

## **Deep sea mining to transform Cook Islands' economy**

Post-Courier, August 9, 2013

Deep sea mining has the potential to transform the economy of the Cook Islands, an official of the South Pacific country says. A report in the British newspaper *The Guardian* Monday cites a geological survey by Imperial College marine geochemist David Cronan estimating the 772,204-square-mile exclusive economic zone of the Cook Islands contains 10 billion tons of manganese nodules rich in manganese, nickel, copper, cobalt and rare earth minerals typically used in electronics. With a population of 14,000 and an annual per-capita income estimated by the United Nations at just \$12,200, mining the minerals "has the potential to basically transform our economy hugely, significantly with just the value of the resources sitting on the sea floor," Mark Brown, the Cook Islands' finance minister, told *The Guardian*. "We still have a jump to make the move from developing nation status to a developed nation status," Brown said of the archipelago of 15 small islands between New Zealand and Hawaii. "The seabed mining industry provides that potential for us." While mining is not likely to begin for five years, Brown said talks are under way with major mining companies and other nations regarding licensing deals, with the first tenders due to be granted before June 2014. The Cook Islands would expect "stakes in (mining) companies for free" in return for their "rights to exploit our resources," he said. "We are here to meet the new players," Brown said last week at the Deep Sea Mining Summit in London. SOURCE: UPI/ PACNEWS

## **Deep-sea mining firms up standards as Nautilus 'turns corner'**

By Simon Rees, Mining Weekly, 8th August 2013

TORONTO (miningweekly.com) – Nautilus Minerals has faced some tough times over the past 12 months, its difficulties mainly related to a commercial dispute between the company and the government of Papua New Guinea (PNG) that arose in June 2012. The disagreement's knock-on effects weighed on the development of Nautilus' flagship Solwara 1 deep sea mining project in PNG territorial waters, although the company believes it is now back on track as it seeks an amicable resolution or a favourable ruling through an arbitration hearing set to convene on August 26. "I think we've turned the corner," Nautilus Minerals interim president and CEO Michael Johnston told *Mining Weekly Online*. "We've been in discussions with the government, aiming to address the commercial issues that form the dispute's basis ... there's a desire on both sides to get this wrapped up." "I've consistently told people that the dispute was always about commercial issues, the biggest one concerning background intellectual property. I believe we now have that resolved," he added.

The Solwara 1 project seeks to exploit seafloor massive sulphides (SMS) that form an ore body close to vents at depths of 1 600 m. The high-grade mineralisation has been brought up by site's hydrothermal plumes and then deposited on the nearby seabed. Mining will entail the use of underwater vehicles to cut and crush ore that is then fed as slurry into a pump and lifted to a surface ves-

sel. Here the ore will be disaggregated from the deep-sea water, with output then transferred onto a neighbouring vessel for transport to PNG and further processing. Solwara 1's resource offers an inkling into the wider potential of SMS deposits. Effective November 25, 2011, and at a cut-off grade of 2.6% copper, the project had 1.03-million tonnes grading 7.2% copper and 5 g/t gold for 74 160 t copper and 165 600 oz gold indicated. Inferred material contained 124 740 t copper and 316 900 oz gold.

### DEEPER THINKING

As Nautilus progresses Solwara 1 and several other projects, concern in some quarters has been raised about deep-sea mining and its potential effect on the environment. Some of the most vocal opposition has come from nongovernment organisations (NGOs), although Johnston argued that much of the information published is often misinformed or simply wrong. "There's a lot of stuff put in the press by NGOs and anti-mining bodies with a lot of erroneous facts. Some of it is very poorly done," he said. Environmental considerations were of the utmost importance for the company, he stressed. "Solwara 1 is probably one of the most studied pieces of planet's deep ocean. It's had something like 36 scientific papers written on it," he added. Deep-sea ecosystems are important because they are unique; they have evolved at great depths and use the sulphur carried within the hydrothermal water as an energy source.

"We also know there are species able to survive at 100°C that live near the vents. They are important for those seeking to understand the limits of life at high temperature," senior scientist geology and geophysics at the Woods Hole Oceanographic Institute Maurice Tivey told *Mining Weekly Online*. Tivey then emphasised the importance of disposing any water disaggregated from the ore back to its original source. Further, water in the immediate proximity of vent sites must be treated with utmost caution due to its acidic qualities. Johnston concurred, adding that Nautilus not only models countless variables but also seeks advice from the world's most qualified people. "We'll also have researchers present at every stage of operation," he said. Disaggregated water will be returned using the project's pumping system. "[And] we won't be engaging with water that comes directly out of the vent," he said. "It's important to note that deep sea water is uniform at 2.6°C with a pH value of 8.2. This is the case to within half a metre of a vent site."

### GETTING IT RIGHT

Nautilus is following best practice. However, there are fears that other companies might not be as diligent. "It's always a concern and that's where NGO consultation, public policy and government policy is required," Johnston said. There is also a worry that developing nations will be unable to afford effective monitoring of deep-sea mining operations. One solution might be to pool resources between nations. "The grouping of sovereign nations to monitor deep-sea mining may be the way forward. For example, there's a group called Sopac that represents about 15 southern Pacific countries that is pulling together," Norton Rose Fulbright QC Wylie Spicer told *Mining Weekly Online*. Spicer has over 35 years' experience in the shipping and offshore oil and gas industry. He also specialises in deep-sea mining law. "Sopac has already released proposals regarding the regulation of contractors and the group's constituent nations," he added. One key player in constructing a framework for environmental best practice will be the International Seabed Authority (ISA), a supranational body established by the Law of the Sea Convention.

The ISA has the authority to award exploration and exploitation leases for deep-sea mining in international waters. "They are adamant about best environmental practices with respect to all kinds of activities and they are backed by various international agreements and binding conventions," Spicer said. "At the start of 2013, the ISA released a study providing recommendations for exploitation. One of the study's central platforms related to environmental regulation." But Tivey is uncertain how the ISA will successfully monitor compliance and reclamation work. "On land, one can simply visit a site to make sure reclamation is being done. Checking the deep sea sites is another matter en-



tirely,” he said. “[And] while they can put rules in place, there’ still debate about who will do the monitoring,” he added. “Most likely the companies will be required to so, although it would be best practice to have an independent body or an independent contractor that has no conflict of interest and is able to assess the situation. Hopefully something like that will be put in place instead.” Deep-sea mining may also lead to an international royalties or a revenue-raising system. “At some stage there will be a functioning deep-sea mining industry with some of the profit, whether you call it a royalty or a tax, going to the ISA. The authority will then be responsible for the distribution of this sum to other countries in the world,” Spicer said.

“This fits in with the notion that all mankind should share in the wealth accrued by exploiting minerals from the ocean floor in international waters. But how they set up an equitable mechanism for payment to all countries will be an immense challenge,” he added. When considering the benefits to mankind, proponents of deep-sea mining argue it also affords a partial solution to offsetting the interruption and impact caused by surface operations. Questions about how, where and to what extent traditional mining should take place will undoubtedly intensify as the global population continues to climb. “It’s getting harder to develop mines on land and there are fewer places left on the planet where you can establish a mine without affecting people,” Johnston said. Nonetheless, it is critical that marine ecosystems are afforded equal respect to those on land. In this regard, binding frameworks for deep-sea mining, environmental best practice and monitoring should be formally codified sooner rather than later. By striking the right balance now, future mineral rewards from the deep will be both great and good.

### **New Zealand: Risks of sea floor mining plan too great**

By Eric Barratt, New Zealand Herald, Aug 6, 2013

*Proposal to extract phosphate from Chatham Islands seabed could destroy vital fishery, writes Eric Barratt.*



Scientists believe that the Chatham Rise is New Zealand's only known juvenile hoki nursery. Photo / APN

What's good for the environment is good for business. Those of us in the fishing industry know that better than anyone. Without enough fish, we wouldn't have an industry. Our success depends on our ability to grow our business while protecting the source of that growth. Last year hoki fishing made \$195 million in export earnings. I'm proud of the value that adds to the New Zealand economy, and the number of local jobs it reflects. Development is good for New Zealand. I'm not anti-mining. But I am deeply concerned about a proposal before the courts to mine the protected seabed of the deep waters off the Chatham Islands. Chatham Rock Phosphate are lodging a proposal with the Environment Protection Authority this week to mine for phosphate (for use in fertilisers) by vacuuming up large tracts of the Chatham Rise seabed, extracting the phosphate and returning the debris to the sea.

Scientists believe the Chatham Rise is the location of the only known juvenile nursery for hoki in New Zealand. It seems that all young hoki migrate from the spawning grounds (off the West Coast of the South Island and the Cook Strait) to the Chatham Rise. Once the fish are bigger, they migrate off again to other areas. Interfering with this nursery could devastate the entire hoki fishery and cost the country millions of dollars. We simply don't know enough to allow this to happen. Not only that, seabed mining at this depth has never been done before. Risking an entire fishing industry to experiment with untested techniques and for limited economic gains makes no sense. Imagine finding out in 10 years' time that we'd decimated the hoki stocks? Chatham Rock Phosphate agree that everything in the direct line of the drills will be killed. What no one knows is the long-term effect of dumping the dirty cloud of debris back into the sea after the phosphate has been extracted.

The risk to other fish stocks and marine life is even greater because Chatham Rise is in an underwater "national park" - a Benthic Protection Area (BPA). In 2007 the fishing industry persuaded the Government to "fence off" 1.1 million sq km of our seabeds to prevent any bottom trawling or dredging in these "parks". We protect these areas for a reason. They represent a full range of marine seabed habitats and ecosystems, and protecting this helps us secure a sustainable seafood industry. If you do the maths, the potential damage to the seabed in this "national park" is staggering. The drills will vacuum up the equivalent of a small mountain like Mt Victoria in Wellington every day that the mining vessel is on-site - for 15 years. By the end of that, the Chatham Rise mine site will be 20 times bigger than New Zealand's largest open cast coal mine (the Stockton mine on the West Coast of the South Island) and 250 times bigger than the proposed new Escarpment open cast coal mine on the Denniston Plateau. The area affected would be nearly three times as big as the Auckland Harbour.

Today there are 17 BPAs and 19 protected seamounts within New Zealand's Exclusive Economic Zone. That means 30 per cent of the zone is now protected from dredging and trawling. It makes a mockery of our attempts to protect these seabeds if we are about to allow a mining company to rip them up using untested techniques, with no guarantee that any economic benefits will stay in New Zealand, and no certainty that the fish stocks won't be damaged. And unlike any proposed mining in our national parks on land, this will happen 400m under the sea where we can't scrutinise it. I hope the Environment Protection Authority will see sense and say unless we have better baseline monitoring and research that tells us this is safe, it's not worth risking a New Zealand industry that produces seafood for more than one billion meals each year around the world.

### **Seabed mining could earn Cook Islands 'tens of billions of dollars'**

Tiny nation expects stakes in companies for free in return for rights to exploit its resources, says finance minister. Rupert Neate, *The Guardian*, 5 August 2013

The Cook Islands hopes to transform itself into one of the world's richest countries within a decade by sending robots to the sea floor to collect minerals that it believes are worth tens of billions of dollars. Mark Brown, the Cook Islands' finance minister, said mining the minerals on the bottom of the South Pacific could increase gross domestic product a hundredfold. "It has the potential to basically transform our economy hugely significantly with just the value of the resources sitting on the sea floor," he told the *Guardian*. Brown said there is such a supply of minerals at the bottom of the ocean surrounding the Cook Islands – an archipelago of 15 small islands between New Zealand and Hawaii – that it could transform the nation into one of the richest in the world in terms of per-capita income. The UN estimates that the per-capita income of the Cook Islands, which has a population of 14,000, is currently \$12,200 (£7,945). This compares with about \$50,000 in the US and \$40,000 in the UK. "We still have a jump to make the move from developing nation status to a developed nation status," Brown said. "The seabed mining industry provides that potential for us." But environmentalists warn mining could irreparably damage the country's beaches and marine ecosystem.



Aitutaki Atoll, part of the Cook Islands, one of the world's poorest countries with a per capita income of £7,945. Photograph: Alamy

The Cook Islands – named after Captain Cook, who visited the islands in 1773 and 1777 – were found to have a vast amount of underwater riches in the 1970s, but only recent advances in technology have made mining economically viable. A new geological survey by Imperial College marine geochemist David Cronan estimates that the Cook Islands' 2 million square kilometre exclusive economic zone contains 10bn tonnes of manganese nodules. The nodules, which vary from the size of a potato to that of a dining table, contain manganese, nickel, copper, cobalt and rare earth minerals used in electronics. The minerals will be mined using robots first developed for underwater warfare and espionage. The technology has already been adapted for underwater oil and gas projects, but has yet to be used for large deep-sea mining projects. Brown said it would be about five years before mining starts. He said he is in talks with some of the world's biggest mining companies and other nations about licensing deals. "We are here to meet the new players," Brown said at the world's first deep-sea mining conference in London last week. "We have had a lot interest from some companies and countries, [but] we certainly won't be jumping into bed with the first person to come along." Talks are under way with the UK, China, Korea, Japan and Norway, and the first tenders are due to be granted before June 2014, he said.

Papua New Guinea has already granted a deep-sea mining licence to Canadian mining firm Nautilus Minerals to extract gold and copper from the seabed, but large-scale mining has yet to start. The Cook Islands government acknowledges that the prospect of largely untested deep-sea mining in some of the world's most pristine tropical waters raises serious environmental concerns. "The Cook Islands already has a very good industry in terms of tourism," said Paul Lynch, the islands' seabed minerals commissioner. "The good, clean, green beaches are not something we want to harm just for the sake of mineral wealth. "We have the only legislation in the world dedicated to deep water minerals," he added. He says the country has introduced legislation to protect the environment and turn half of the country's waters into a marine park.

Greenpeace warns that deep-sea mining "poses a major environmental threat to our oceans, which are already suffering from a number of pressures including overfishing, pollution, and the effects of climate change". Natalie Lowrey, co-ordinator of its deep-sea mining campaign, said: "Serious concerns have also been raised about the potential for heavy metals entering marine food chains with serious consequences for the health of coastal communities." Brown said the Cook Islands – which is self-governing in free association with New Zealand, and whose head of state is the Queen – would expect "stakes in [mining] companies for free" in return for their "rights to exploit our resources". He said the islands would maintain a significant stake in each stage of the mining process from exploration and extraction to refinement and sale. One of the first mining companies to be in-

volved is likely to be UK Seabed Resources, a British subsidiary of US defence and engineering giant Lockheed Martin. Lockheed first collected nodules from the Cook Islands' seabeds in the 1970s. UK Seabed Resources has already been awarded a licence to explore 58,000 square kilometres of Pacific seabed outside of territorial waters. The licence, awarded in March, was granted by the International Seabed Authority, a UN-created body that controls oceans outside of national exclusive economic zones.

David Cameron, who supported UK Seabed Resources' bid, said the seabed mining industry could be the worth £40bn to the UK economy over the next 30 years. "We are involved in a global race where we have to compete with the fast-growing economies of the south and east of the world," the prime minister said. "We want to make sure we get every opportunity out of this." Brown said the potential income for the Cook Islands could be so vast that a sovereign wealth fund would be set up to manage the cash for future generations and provide a safety net if the islands are swamped by rising sea levels as a result of climate change. He is about to embark on a world tour to learn about their sovereign wealth funds. "It's important to learn lessons of the past from other counties that have come into wealth," he said. "To learn lessons from those that have squandered theirs. This is not a renewable resource, you exploit it once, you have the revenue from it once," he said.

### **Squids in**

If mining doesn't work for the Cook Islands, there's always squid. The country is considering creating a new industry centred on fishing for giant squid, following the successful creation of a squid fishing industry on the Japanese island of Okinawa. "We thought to ourselves, if we can find it here maybe we could do the same, something for our own local market," said William Sokimi, the fisheries development officer of the Secretariat of the Pacific Community, which represents 22 Pacific island countries. A recent small-scale fishing trial caught four diamondback squids and a neon flying squid, the biggest one weighing in at 17kg. "So far, it is looking very promising ... we have now established that giant squid can be caught in the Cook Islands," Sokimi told Radio Australia. He admitted, however, that work needs to be done to convince the locals to eat squid. "We've given out some recipe booklets with about 53 recipes," he said.

### **Regional Organization Releases Deep Sea Mining Video**

*Various viewpoints presented to inform Pacific people*

SUVA, Fiji (Fiji Times, July 29, 2013) – In an attempt to shed a little more light on the subject of deep sea mining, the SPC-EU Pacific Deep Sea Minerals Project launched a new 25-minute film earlier this month. This was revealed in a statement issued by SOPAC which explained that the short film, titled 'Under Pressure', was aimed at increasing public awareness around the topic. The video sites opinions from different organisations anti-deep sea mining NGOs, politicians, government agencies, deep sea mining companies and SPC. It is available to the general public on the [SOPAC website](http://www.sopac.org/dsm/index.php/under-pressure-documentary) (<http://www.sopac.org/dsm/index.php/under-pressure-documentary>).

### **Seabed mining healthy says Mining vice minister Mori**

Post-Courier, July 24, 2013

VICE Minister for Mining and Chuave MP, Wera Mori, a professional geologist, described seabed mining as healthy for PNG. He said there would not be any footprint of environmental damages left behind unlike other land based –mining, gas and oil explorations. Mori challenged Non Governmental Organisations (NGO) and their consultants to actually visit the ocean floors and conduct tests to support their negative propositions of the sea bed mining of the Solwara 1 Project. The experienced geologist-cum politician called on the people to understand the basic facts and not to ac-

cept the negative comments perpetrated by the NGO and their consultants as well as other organizations that would only confuse them further in relation to seabed mining activities. Mori's comments come at a time when discussions are now taking place between the senior management of Nautilus Minerals (PNG) Ltd and the National Government in relation to the development of the Solwara 1 Project.

The current talks are being centered on the premise that the national government will be taking equity of a certain percentage in the project which is set to resume its explorations after it had been abandoned following strong opposition from certain sectors of the PNG communities including NGOs and the people from areas where the Solwara 1 project is located. "Unfortunately, mining has always received a lot of negative publicity. "People have related mining to pollution and other negative activities. "In this case of seabed mining and for that matter, the Solwara 1 Project being developed by the Nautilus Minerals, I want to assure the people of PNG that it is healthy for this country because unlike the land-based mining operations, which have their own share of problems, seabed mining will be completely different because its operations are and will be located in a totally different environment. Mori said the Solwara 1 Project is totally different to land-based mining operations. "These are two different mining operations where the latter involves the dumping of its wastages either to the sea or in the river systems that at some degree cause some form of environmental damages to the communities," Mori said.

### **Nautilus forms local working group**

Post-Courier, July 19, 2013

A JOINT working group has been established to oversee the development of Solwara 1 deep sea mining project in Bismarck Sea of New Ireland province. The working group, New Ireland Nautilus Mineral Working Group (NINMWG) consists of three representatives each from the New Ireland Government (NIG) and Nautilus Minerals Limited. The working group was established under a Memorandum of Understanding (MoU) signed on Wednesday in Port Moresby by representatives of NIG and Nautilus Minerals. Governor of New Ireland, Sir Julius Chan described the MoU as "historic, first of its kind and penetrating into new time" involving the NIG from the initial stages of the Solwara 1 project. "We want to set the cornerstone for future arrangements in similar extractive industries. "Before anything happens, NIG, the elected representatives of the mine affected areas will be directly involved from the start. The spirit of co-operation is vital. I'm very pleased that from here on, the spirit of misunderstanding is removed. "Here we are upholding the spirit of consultation as required by the constitution and Organic Law of Provincial and Local Level Government. "Life after development is important. "This is an aspect the stakeholders must consider in the whole process," Sir Julius stressed. Ministers for State Enterprises and Mining, Ben Micah and Byron Chan respectively, gave their full support and pledged to fully co-operate and work with all stakeholders for the maximum benefit of the people of West Coast, New Ireland and Papua New Guinea.

The country manager for Nautilus Minerals, Mel Togolo stressed that "what we do must be of greater benefit to the people". CEO of Nautilus Minerals Niugini Limited, Mike Johnston thanked Sir Julius for being the driving force in ensuring that the people and NIG gain maximum benefit from the project. "It is important to understand the challenges and issues involved at early stages of the project so that all stakeholders benefit," Mr Johnston said. Previously, the NIG opposed any new mining and exploration activities in New Ireland province following continuous failure by the National Government to honour its financial obligations and project commitments under the Lihir Memorandum of Agreements (MOA) of 1995. That MOA specified for among others the National Government to allocate each year major infrastructure grants, Special Support Grants and major infrastructure projects. The infrastructure projects include an international airport, an international

seaport, a modern well equipped hospital at Namatanai and major redevelopment and sealing of the Bulminski Highway. To date, none of the major projects have been undertaken and Sir Julius has warned on a number of occasions that "the agreement you sign is not worth the paper you're signing, if the State is not going to honour its obligations".

### **Solomons Premier Does Not Oppose Undersea Mining**

*Temotu's Beu: no evidence mining will impact environment*

WELLINGTON, New Zealand (Radio New Zealand International, July 18, 2013) – The premier of Solomon Islands' Temotu province says until he receives proof that seabed mining is environmentally unsafe, he will not stand in the way of it taking place in the region. The comment follows reports that local people are unhappy the national government has granted a license to an Australian company, Bluewater Metals, to do exploratory drilling for gold in the seas off Temotu province. But Father Charles Brown Beu says there is no evidence to show that undersea mining will have any impact on either fish or the marine environment. "If the people are made aware of these things in no uncertain terms most definitely people will welcome this. It's only because they still do not understand and it's not easy to understand these things, it is the first time ever in Solomon Islands." Father Charles Brown Beu says if there is any sign that the mining is unsafe the onus is on the national government to put a stop to it.

### **Mining executives urge Solomons' Temotu to open up sea bed**

Radio New Zealand, 18.7.2013

Mining executives are urging people in Solomon Islands' Temotu province to open up their seabed area for minerals exploration. The Australia-based Bluewater Metals was granted an exploration licence last year to search for gold in 12 sites near Temotu Province and has said if it is successful, it will upgrade Lata's airport and hospital. The company's founders, Timothy McConachy and Harvey Cook, say their company is more than ready to extract seabed minerals for the benefit of island nations using safe, environmentally friendly technology. But our correspondent in Temotu province, George West, says the local people are very unhappy that the national government is allowing undersea mining to go ahead. "The communities want more consultations and even in the long run maybe they are going to demand some - something for what they think their share of the natural resources is in their seas or bordering their seas." George West says he understands students are using social networking to organise some sort of protest action.

### **Joint group to oversee Solwara 1**

The National, July 18th, 2013

A JOINT working group has been established to oversee the development of the Solwara 1 deep sea mining project in the Bismarck Sea. The group called the New Ireland Nautilus Mineral Working Group (NINMWG) consists of three representatives from the New Ireland provincial government (NIPG) and Nautilus Minerals Ltd. The group was established under a memorandum of understanding signed yesterday in Port Moresby by representatives of the provincial government and Nautilus Minerals. New Ireland Governor Sir Julius Chan described the MoU as "historic, first of its kind and penetrating into new time" involving the NIPG from the initial stages of the Solwara 1 project. "We want to set the cornerstone for future arrangements in similar extractive industries. "Before anything happens, NIPG, the elected representatives of the mine affected areas will directly involve from the start. "Spirit of cooperation is very vital. I'm very pleased that from here on, the spirit of misunderstanding is removed. "Here we are upholding the spirit of consultation as required by the

Constitution and Organic Law of Provincial and Local Level Government. "Life after development (mine life) is important. This is an aspect the stakeholders must consider in the whole process," Sir Julius stressed.

Ministers Ben Micah (State Enterprises) and Byron Chan (Mining) pledged their support and cooperation with all stakeholders for the maximum benefit of the people of West Coast, New Ireland and PNG. Country Manager for Nautilus Minerals Mel Togolo stressed that "what we do must be of greater benefit to the people". CEO of Nautilus Minerals Niugini Ltd, Mike Johnston thanked Sir Julius for being the driving force in ensuring that the people and provincial government gained maximum benefit from the project. "It is important to understand the challenges and issues involved at the early stages of the project so that all stakeholders benefit," Johnston said. Previously, the provincial government opposed any new mining and exploration activities in New Ireland following continuous failure by the National Government to honour its financial obligations and project commitments under the Lihir Memorandum of Agreements (MoA) of 1995. That MoA specified for, among others, the National Government to allocate each year major infrastructure grants, special support grants and major infrastructure projects. The infrastructure projects include an international airport, an international seaport, a modern well-equipped hospital at Namatanai and major redevelopment and sealing of the Bulminski Highway. To date, none of these projects have been undertaken and Sir Julius has warned on a number of occasions that "the agreement you sign is not worth the paper you're signing, if the State is not going to honour its obligations".

### **Greenpeace calls for halt in the granting of deep seabed mining licences**

ABC Radio Australia, 17 July 2013

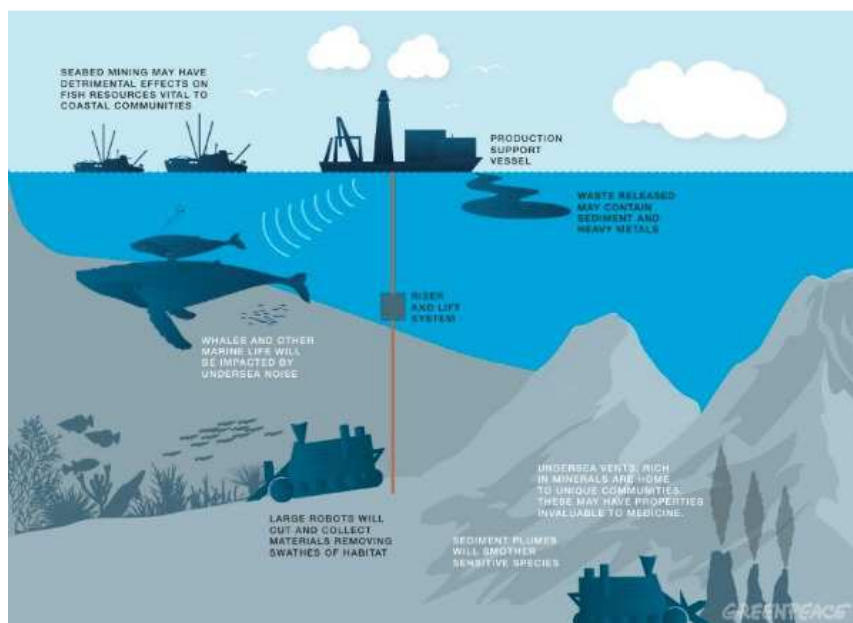
Environmental organisation Greenpeace International has called for a suspension in the granting of deep seabed mining licences. A new report from the organisation has found that deep seabed mining could have a serious impact on the ocean environment and on the livelihood of coastal communities. "We have some traditional medicines found in that sea area and as soon as explorations started, the communities began to see that this traditional medicine in the sea was eroding," Seni Nabou, the political advisor for Greenpeace in Fiji, told Radio Australia's Pacific Beat. Ms Nabou says a license has already been granted for deep seabed mining in Papua New Guinean waters. She says a lot more work needs to be done to protect the world's oceans before companies should be allowed to start operating. "We don't believe that seabed mining applications should be granted," Ms Nabou said.

"Environmental impact assessments are not priority prior to any of this exploration taking place, nor are they being made public. "No exploration or exploitation should take place unless or until the full range of marine habitats, biodiversity and ecosystem functions are adequately protected." Ms Nabou says many of the habitats on the deep sea floor are yet to be studied by scientists. "The habitats are dark, previously thought to be lifeless by scientists, but we know now that this is not true," she said. "There are still too many unknowns out there, which is why we are joining the Pacific Conference of Churches...in calling for a moratorium on these applications until we know more." Ms Nabou says she wants a network of marine reserves to be set up in 40 per cent of the world's oceans, where no extractive activities can take place. "We particularly want to see rules to ensure that environmental and cumulative impacts of seabed mining as well as potential impacts, alternative uses and livelihoods have been thoroughly assessed," she said.

## Greenpeace takes on deep sea mining

MINING.com News, July 7, 2013

Greenpeace International is warning the extinction of unique deep sea species and other significant irreversible environmental damage to oceans would be a likely result of an emerging trend to exploit seabed minerals. A new report from the environmental activist group has found that the potential impact of deep sea mining is not properly understood. "Mining could devastate biodiversity hotspots and endanger deep sea organisms as sediment waste and pollution from toxic heavy metals are discharged. This comes as only 3% of the world's oceans and less than 1% of the high seas are protected, making them among the most environmentally vulnerable places on Earth," Greenpeace said. "Copper, manganese, cobalt and rare earth metals are found in or on the seabed and a growing number of governments and companies are developing deep seabed mining ventures for mineral exploration. Canada, Japan, South Korea, China and the UK are just some of the countries that have been granted contracts by the International Seabed Authority, which is holding its 19th session in Jamaica from July 15-26 where more applications will be considered. "The International Seabed Authority Council has approved 17 exploration contracts to date for the seabed that lies beyond national jurisdiction in the deep seas of the Pacific, Atlantic and Indian oceans, compared with only 8 contracts in 2010.



"Commercial mining operations may start as early as 2016. There is also significant exploration interest within national waters, particularly in the Pacific Ocean, and one license to mine the deep seabed has already been granted in Papua New Guinean waters. "'We're on the verge of a dangerous new kind of gold rush in our oceans," protect the ecosystems that we all rely on for our survival,' said Alicia Crow, Greenpeace International oceans campaigner." Download the Greenpeace report: [www.greenpeace.org/canada/Global/canada/report/2013/07/DeepSeabedMiningReport.PDF](http://www.greenpeace.org/canada/Global/canada/report/2013/07/DeepSeabedMiningReport.PDF)

## Nautilus digger in UK

The National, July 5th, 2013

A GIANT undersea mining vehicle that will be used to extract gold and copper from a volcanic site in Papua New Guinea has arrived on Tyneside, England. The 70-tonne Bulk Cutter chassis was delivered to engineering firm Soil Machine Dynamics (SMD) based in Wallsend. The subsea vehicle manufacturers were awarded the £60 million (K201.5 million) contract to build the world's first deep-sea mining tools for Canadian mining company Nautilus Minerals in 2007. The contract in-



cludes three subsea mining machines with the associated control and launch and recovery systems. The arrival of the chassis, which was designed by SMD and fabricated in Sheffield, is the first major milestone in the production of the mining vehicles. The Bulk Cutter is the heaviest of the three vehicles, weighing 310 tonnes when fully assembled. Nautilus intends to use the vehicles at its first project, known as Solwara 1, off the coast of Papua New Guinea in about 1,600m of water. SMD's principal engineer Nick Ridley, said: "It's been around five years since the beginning of the project and we've gone through various different guises of the machine and many different designs, so today really is a big milestone in the delivery of the project." "Deep-sea mining is a fledgling industry, there are only two or three big players looking at this at the moment, but there is lots of interest worldwide so it's potentially an exciting future for Tyneside and for mining." The excavation and collection of the rich sea minerals has been split into three individual tasks, each of which will be carried out by a different vehicle. – SkyNews

### **Nautilus: Solwara 1 will push through**

The National, July 4th, 2013

NAUTILUS Minerals country manager Mel Togolo has affirmed the company's commitment to Papua New Guinea, adding that it remains confident the Solwara 1 project will be successfully implemented. Togolo went on FM 100 Talkback to reiterate that the National Government and relevant stakeholders, including the New Ireland and East New Britain provincial governments are being supportive and that Nautilus will continue to engage and take a multi-stakeholder approach to project development. "We have had very good co-operation from the New Ireland and East New Britain Provincial Governments ...we look forward to working constructively with these Provinces," Togolo said. Answering queries on why go to the sea for minerals, Togolo said due to society's desire to use technology like mobile phones, internet, computers, electricity, fridges, cars, aeroplanes, ships etc, the demand for minerals is increasing and land resources are becoming stretched and so it was only wise that the vast ocean be explored to meet the world's mineral demands.

He added that seafloor resource production is not new and Nautilus Minerals will be mining for mineralised ore at depths of 1,600m using adapted technology that has been used before in the oil, gas, dredging and land based mining operations. He also said the Solwara 1 site was a well-researched site, which has seafloor massive sulphides containing high grades in copper, gold and silver. A small extraction area of 0.1 km<sup>2</sup> also means a small impact or physical footprint. And, nobody lives at 1,600 m water depth, meaning no people need to be disturbed or relocated for mining to proceed. He assured listeners that the project will not relocate or displace any individuals or villages, it will not negatively impact livelihoods or any fish stocks and the coral reefs are safe as there won't be any blasting and that there are no tailings associated with the Solwara 1 operation. Nautilus Minerals has made a number of above and beyond commitments to ensure surface waters and fish stocks remain safe including the use of biodegradable fluids and a fully enclosed system.

### **Nautilus Questioned on Economic Viability and Environmental Risks of Deep Sea Mining**

MiningWatch Canada, June 26, 2013

(Toronto) As Nautilus Minerals gets set to present to its shareholders, concerned citizens from Papua New Guinea, Canada, and Australia continue to question the viability and environmental risks of the company's controversial plan to build the world's first deep sea mine. Nautilus is in a dispute with the Papua New Guinea Government over the financing of its Solwara 1 project, resulting in the suspension of the project in November last year. With its share price sinking from over \$2 to well under C\$0.50 the viability of Nautilus' venture is being called into question. The Solwara 1 project in Papua New Guinea has stimulated widespread opposition from many sectors of PNG society –

from scientists, students, university lecturers, church leaders, and members of local coastal communities.

Oigen Schulze, Director of Zero Inc., a community organisation in New Ireland Province, Papua New Guinea, said, “Local communities have NOT sanctioned the Solwara 1 project. Experimental mining of our seabeds is not going to provide any direct services or benefits for local communities.” “The evidence is clear – our people have already paid a high price, both socially and economically, with land-based mining – despite the best intentions of our governments. Mining revenues have not justified the costs of damage to livelihoods and environmental degradation. The uncertainties and the risks associated with deep sea mining are even greater.”

The Deep Sea Mining (DSM) campaign has released two reports highlighting flaws in Nautilus’s EIS of its Solwara 1 project. Dr. Catherine Coumans, MiningWatch Canada, said, “The EIS should have provided the basis for identifying risks and the development of strategies to manage them. Nautilus’s Solwara 1 EIS fails to do this. The many errors and omissions in the modelling and analysis of data means that the EIS underestimates the risks to local communities associated with Solwara 1. The liabilities to shareholders may be significant. Natalie Lowrey, Communications Coordinator, Deep Sea Mining campaign, said, “It is clear that with the high level of concern generated by Solwara 1 in PNG, the project should not go ahead until Nautilus has gained the consent of PNG communities – and until the company can show it has addressed the serious gaps and mistakes in the EIS.”

### **Churches say no to mining research in the Pacific**

From Pacific Council of Churches, Islands Business, 18 Jun 2013

SUVA, Fiji --- The Pacific must not be allowed to become a testing ground for deep sea mining and regional governments must stop issuing licences immediately. Pacific Conference of Churches Treaties Adviser Murray Isimeli said yesterday the region could not afford damage to the environment from testing. “There is no evidence on what effect testing or mining will have so we would caution against doing anything until there is substantial proof of the effects of disturbing the sea bed,” Mr Isimeli said. “The closest (evidence we have) is the experience of land based mining. The evidence is clear – our people have paid a high price, both socially and economically despite the best intentions of our governments. Mining revenues have not justified the associated costs of displacement, dislocation (often accompanied by state and industry violence), damage to livelihoods and environmental degradation.”

His comments came after a regional summit on deep sea mining organized by SOPAC (South Pacific Applied Geoscience Commission) in Port Vila, Vanuatu. Isimeli said the PCC member churches were mindful of the sovereign right of each state to exercise its political and economic self-determination on issues of national interest but Pacific governments needed to rethink paths to achieving sustainable development. “We recommend – in line with the PCC General Assembly resolution in Honiara in March - that, in the absence of clear scientific evidence, that our respective national governments err on the side of caution and call for a stop to the issuance of further seabed mining licenses,” Isimeli said. He told regional leaders at the summit that the Pacific Ocean was a central part of the lives of close to seven million people and the decision by one government in regards to exploration or mining could affect the lives of millions of others. “The risks and uncertainties of seabed mining are too great to allow mining activities to proceed with the expectation that the damage can be reversed,” Isimeli said.

“The leading scientific thinking, at present, states that we need to adopt a precautionary approach and institute a moratorium on seabed mining activities. “This precautionary principle is backed by

international law.” He also warned governments and their representatives about liberally using the Bible to support mining after speakers at the Vanuatu spoke of underwater minerals as divine blessings. “The Church does not claim a monopoly on theology; we are all theologians in our own right,” Mr Isimeli said. “However, if governments, civil society and other stakeholders to engage in a gainful and meaningful discussion on theology and on interpretations of the Bible and its messages to us as stewards of His perfect creation - stewards of His people, our communities, and stewards of the environment, PCC will be happy to oblige. “In fact, PCC calls on our governments and inter-governmental organisations to make available appropriate space to hear and consider the voices of the Church and other civil society organisations in their discussions on deep sea mining.”

## **SOPAC mandate claims are disingenuous**

by ramunickel, 17.6.2013

Minister’s speech exposes a fundamental flaw in the SOPAC Deepsea Mining Project: It does not have the mandate of the peoples of the Pacific Network on Globalization

Monday’s speech by the Vanuatu Minister for Lands and Natural resources, Hon. Ralph Regenvanu opens up the question of ‘mandate’ on which the SOPAC experimental seabed mining project is premised and which it uses to endorse its political legitimacy as well bring a sense of inevitability. The speech, given at the opening of a Regional Training Workshop on Social Impacts of Deep Sea Mining Activities and Stakeholder Participation, reveals how the Minister made the disconcerting discovery, that in the last five years, successive Ministers had issued 145 licences for seabed mining exploration and 3 for offshore oil exploration without the consent of the Council of Ministers or the Parliament of Vanuatu and without revealing the facts to the people of Vanuatu.

The Minister’s speech was the first time the public was told what had transpired under successive governments. As he states, the government of Vanuatu “has been preceding down a path of action without the people it is supposed to be representing agreeing to or even knowing what we (government) are doing.” Yet such situations are, unfortunately, not unique to Vanuatu; it is clear that other governments across the Pacific have not obtained the consent and mandate of their own people to pursue this untried and untested form of exploitation of our natural resources. You only have to look at the growing public opposition in PNG, the Solomon Islands and across the wider Pacific to appreciate that our own governments and SOPAC have proceeded down a path of action without the peoples’ mandate.

### **So what is the SOPAC’s mandate?**

In response to growing public criticism and anger at the SOPAC DSM project, SOPAC has been keen to assert that they are mandated by our governments and that criticisms levelled at SOPAC is misplaced. SOPAC officials have been on a Public Relations offensive arguing that they are ‘independent advisors’ and as an institution do not have a position for or against experimental seabed mining. They present themselves as being ‘neutral servants’ of our governments and therefore the people of this region and as neutral servants are simply trying their best to help engage with all relevant stakeholders. Yet on closer examination it is very clear that SOPAC (DSM Project) is one of three key drivers along with our governments and the mining industry of the race to exploit mineral resources in the region.

SOPAC was ‘expressly set up for the purpose of promoting (and now the exploitation) of mineral potential of the shelves and ocean floor of the South Pacific region’. As such we have seen just how far SOPAC DSM project will go to pursue and promote the exploitation of these natural resources. SOPAC’s relationship with industry has also come under the spot light with the recent exposure that it has been working on behalf of industry players such as Lockheed Marten rather than for the peo-

ple of the region. It has also failed miserably in its duty to provide all the necessary information to help governments make informed policy decisions. Instead it has promoted a legislative framework as the tool to reassure the peoples of the Pacific that everything is under control.

### **SOPAC have ignored the ecological, economic and social arguments against DSM**

As well as having no mandate from the people of the Pacific, SOPAC in promoting experimental seabed mining, has ignored the substantial ecological and economic arguments against this new form of mining. On the ecological front the risks and uncertainties of seabed mining are too great to allow mining activities to proceed with the expectation that the damage can be reversed. The leading scientific thinking, at present, states that we need to adopt a precautionary approach and institute a moratorium on seabed mining activities. This precautionary principle is backed by international law. While on the economic front, SOPAC has been leaning more and more towards how to better manage supposed revenues generated. Yet it is clear that there is no scientific or economic evidence to determine how experimental seabed mining will affect main industries in the Pacific namely fisheries and tourism industry on which many of our smaller Pacific island nations rely. There is also no evidence of the likely impacts on food security and the sustainable subsistence livelihoods on which so many coastal people rely.

On the social front the closest we get is the experience of land based mining. As pointed out by the Pacific Conference of Churches the evidence is clear – our people have paid a high price, both socially and economically despite the best intentions of our governments. Mining revenues have not justified the associated costs of displacement, dislocation (often accompanied by state and industry violence), damage to livelihoods and environmental degradation. SOPAC claims that legislation will ensure all of the ecological, environmental and social concerns are recognised and protected. Legislation can only ever be as good as a state's ability to manage and enforce it. Act Now! has pointed out how naive it is to believe that legislation to govern experimental seabed mining can put the checks and controls in place that will provide clarity and security, ensure the precautionary principle is followed and best environmental practice is followed. With their Deep Sea Minerals Project, SOPAC and the SPC are ignoring the realities of governance in the Pacific, unequal access to the legal system, the power of large corporations and their record of profit before the environment and people. The reality is that anything can be legalised but it doesn't necessarily mean it's a good thing; after all it's legal to own high velocity firearms in the in the United States not a great comfort to the parents of school children killed by those same legal firearms.

### **Vanuatu leads with new mandate that is people driven**

What is unique is that the Hon. Minister announced that “wide public consultations will be undertaken before any further activities to do with seabed mineral exploration can occur in Vanuatu”. Thus he has placed the question of mandate back firmly on the people of Vanuatu: they will determine whether to proceed or not. The Vanuatu Minister Hon. Ralph also demonstrated that experimental seabed mining is not inevitable as is implied by SOPAC DSM project. The challenge is whether other Governments in the region particularly in PNG, Solomon Islands, Fiji, Tonga, Nauru and the Cooks have the political will and courage to follow Vanuatu and seek a mandate from their own people.

### **Vanuatu: Nautilus defends validity of mining licences**

Post-Courier, June 17, 2013

A mining company licensed to explore Vanuatu seabeds is confident its licences are valid, despite revelations that dozens were issued without proper consultation. The recently installed Lands Minister, Ralph Regenvanu, revealed this week that 148 licenses have been issued over the past five years. He says the licences were never approved by the Council of Ministers or Parliament, but only

by previous Land Ministers. But the Vice President of Exploration at Nautilus Minerals, Jonathan Lowe, says the company has no doubt its licences are valid. "Nautilus is confident about the Vanuatu authorities following due process with respect to our applications. Obviously I can't speak to those of our competitors or what the minister does or doesn't know about his new portfolio." Lowe says Nautilus submitted renewals for the applications two weeks ago, and that departmental authorities in Vanuatu were accommodating and aware of what the due process was. Regenvanu says only one of the licences was gazetted and is now seeking legal advice about the rest.

### **PNG key player in deep sea mining regional meet**

Post-Courier, June 13, 2013

PAPUA New Guinea is one of the key players in a regional training workshop on stakeholder participation and social impacts of deep sea mining activities. This workshop commenced on Monday in Port Vila, Vanuatu and ends on Friday. The workshop is supported by the Secretariat of the Pacific Community (SPC)-EU Pacific Deep Sea Minerals Project, as part of its efforts to assist Pacific Island countries to improve the governance and management of their deep-sea mineral resources. The Pacific Deep Sea Minerals Project is funded by the European Union and managed by South Pacific Geoscience Organisation (SOPAC), the Applied Geoscience and Technology Division of the Secretariat of the Pacific Community, on behalf of 15 Pacific Island Countries: the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu and Vanuatu.

PNG's participation is crucial to the development of Offshore Mining Policy and provision of assistance in formulating participating countries' respective offshore mining laws and policies. Most Pacific Island States do not have deep sea mining policies. PNG is represented by the Department of Mineral Policy & Geohazards Management (DMPGM) and the Mineral Resources Authority (MRA). The Pacific Deep Sea Minerals Project is the first major initiative designed to regulate this new activity in a co-ordinated way within the Pacific Region. Manager of the Pacific Deep Sea Minerals Project, Mr Akuila Tawake, said one of the main objectives of the workshop on "Social Impacts of Deep Sea Mineral Activities and Stakeholder Participation" was to learn lessons from the social impacts of other extractive industries and how to minimise any potential social impacts of deep sea mining activities. Mr Tawake said the Pacific Deep Sea Minerals Project has already undertaken a number of activities designed to inform stakeholders about the technical, legal, economic and environmental impacts of deep sea mining.

### **145 Mining Exploration Licenses Issued By Vanuatu State**

Minister Regenvanu makes 'disconcerting discovery'

By Len Garae

PORT VILA, Vanuatu (Vanuatu Daily Post, June 12, 2013) – There have been 145 licenses for offshore mining exploration and prospecting and another three for offshore oil exploration issued over recent years by the Government of Vanuatu. Minister Ralph Regenvanu made this shocking revelation when he opened the weeklong regional workshop on Offshore Mining and its Social Impacts at the Holiday Inn yesterday. "When I learnt that this workshop was going to take place here (and I was going to launch it), as the Minister responsible (for lands, geology, mines, energy and rural water supply), I decided to find out what I could about this issue (about the new frontier of offshore mining). "I made a very disconcerting discovery, something that in my five years as a parliamentarian and just over one year (accumulated) as a Minister of State I never knew: that in the past five years, the Government of Vanuatu has issued about 145 licenses for offshore mining exploration and prospecting, and another 3 for offshore oil exploration."

"By announcing this discovery, I am also making this information public in Vanuatu for the first time, and I have no doubt that this will be the first time that 99% of the population of this country is aware of this," he said. "These licenses have been issued without any proper national regulatory framework for seabed mining or for scientific research, let alone any proper understanding of what the prospecting process entails and what lies on our seabed – this is, after all, the situation all our countries find ourselves in when engaging with seabed mineral issues." He said the most alarming aspect however, is that the Government has been proceeding down a path of action without the people it is supposed to represent agreeing to or even knowing about what those in Government are doing. "The Vanuatu participants in this workshop know my reputation well as someone who is in politics to increase the transparency and accountability of Government, which to me means being accountable and responsible to the people of this country whom we represent and who pay our salaries with their taxes," he said.

As Minister responsible for lands, he is now overseeing a process of a reform to the country's land laws to ensure that the principal of "Free Prior Informed Consent" to land dealings by the land-holding clans of this country becomes enshrined in law, to the extent that a substantial majority of the members of a land-owning clan are required to agree to any dealing with their land. "I hope to pass these laws in the November session of Parliament this year. Vanuatu's Council of Ministers has also just agreed to amend the Constitution to make it mandatory for the National Council of Chiefs to be consulted on all bills relating to land or kastom before they go to parliament. This amendment will go before Parliament in August," he added. To the Regional delegates he said, "I wish to address myself now specifically to the Pacific Island Government representatives here, my fellow servants of the public and the people. You are here to discuss 'social impacts'. 'Society' is the noun of 'social' – and our society is made up of people: women, men, boys and girls.

It is also made up of communities: clan and traditional communities normally led by chiefs or other forms of traditional leaders, church communities led by bishops, priests, pastors, elders, deacons and deaconesses, village communities, settlement communities. 'Society' is made up of the government bureaucracy complemented by civil society organizations and private sector commercial companies. To assess 'social impacts', therefore, as this workshop asks us to do, it is just not possible to disregard the people and the communities we serve – they are the only ones qualified to describe and to judge what the 'social impacts' of any policy is on them – and there is simply no other way to determine this. "Accordingly, I ask you as government officials to listen to these voices, the voices of our people, voices like that of the Vanuatu Council of Women and other NGOs, voices like that of the churches. Listen, consider, and do your best to accommodate their views and represent them faithfully in your policy and decision-making. I ask you to take note of the concept of 'Free Prior Informed Consent' (I see there will be a presentation on this) which is an important principle when dealing with our communities, and especially the indigenous communities which make up the majority of the national populations of most of the Pacific Islands and who are – significantly - the stewards of most of our land and sea areas.

'Free Prior Informed Consent' as a concept and process is outlined perhaps most clearly in the 'Draft Declaration of the Rights of Indigenous Peoples' (or 'UNDRIP') which was adopted by the United Nations in 2007." He asked to delegates to take note of the "Precautionary Principle" as contained in the Rio Declaration. "The leading scientific thinking at present states that we need to adopt the precautionary principle when it comes to seabed mineral exploitation. To understand exactly what the precautionary principle entails for Pacific Island countries, I recommend participants read the legal opinion about the term prepared by the Environmental Law Alliance Worldwide on the website of the Pacific Network on Globalization (PANG)", he said. The Government of the Northern Territory in Australia has established a moratorium on allowing exploration for minerals or min-

ing activities to be undertaken within the coastal waters of the Northern Territory until a review of actual or potential impacts of seabed mining has been undertaken.

They are waiting, in fact, to see what happens in the Pacific. "I see this as an example of a government correctly applying the precautionary principle, and it is an approach Pacific Island states which have not yet issued licenses for seabed mineral exploration would be wise to follow," he said. In his statement to Pacific Island churches last month, the Rev. Dr. Tevita Havea, Moderator of the Pacific Conference of Churches, said: "Whilst development aspirations are not contested, the pursuit of it must necessarily involve all parties to the covenant of citizenship in all Pacific communities. Churches, government and communities must ensure that we remain true to our collective responsibility for the most vulnerable among us and for the protection and conservation of the environment for future generations." "I hope the Reverend's sentiments, and these thoughts of mine, can assist you in your deliberations this week as you discuss how the views of your societies can be represented inclusively in policy. If the negative "social impacts" of seabed minerals development are to be minimized, it is essential that such development is determined hand in hand with our communities from the outset," he said in conclusion.

### **Seabed miner Nautilus handed breathing aid: \$40 million after shares sale**

Mining.com, June 12, 2013

Canadian Nautilus Minerals announced Wednesday it now has Cdn\$40 million in its pocket to keep up its plans of mining the deep blue frontier. The company, the first yet not the only one exploring the ocean floor for polymetallic massive sulphide deposits, said in a statement the money injection came from the successful closing of its rights offering through the issuance of 200,000,000 common shares at a subscription price of Cdn \$0.20 per common share. CEO Mike Johnston said it was "very encouraging to see such a high level of support for the company from its existing shareholders," adding that the net proceeds from the offering will be used to continue funding Nautilus' three key current contracts related to the Seafloor Production System. Johnston believes those deals will help Nautilus to be "in the best possible position" to advance its flagship Solwara 1 gold, copper and silver project, located in Papua Guinea's Bismarck Sea.

So far the seabed miner has spent nearly \$80 million on exploration programmes on the Solwara 1 since granted a mining lease in January 2011, following the environmental permit received in Dec. 2009 from the PNG government. But the firm has been swimming in choppy waters ever since. On top of the ongoing critics from environmentalists and the marine biologist community regarding the possible consequences of its Solwara 1, the company has been locked in a dispute with the government of the South East Asian nation since June 2012 over ownership of the project. Nautilus recently said the hearing date for the arbitration started by New Guinea against the firm has been set down for August 26. Meanwhile, PNG community groups increased their pressure on the government. Wednesday, demanding authorities to impose a moratorium on all experimental seabed mining immediately, reports Radio New Zealand. The move comes on the heels of neighbouring Vanuatu announcing Monday it would apply a precautionary principle and, as a result, no seabed mining will be allowed until the full environmental impacts are understood.

### **Governments join the race**

While Nautilus was the pioneer of underwater mineral exploration, now several governments and companies are busy snapping up exploration and mining rights to vast tracts of the ocean floor in international waters, with these rights administered by a UN body called the International Seabed Authority (ISA). Neptune Minerals, a US company, holds licences for Vanuatu, the Federated States of Micronesia and New Zealand. Since 2005 has been exploring massive seafloor sulphide deposits that may yield lead, zinc, copper and rare earths along the Kermadec Arc. Belgium's G-

TEC Sea Mineral Resources, backed by their government, has also signed an exploration licence with the ISA for the central Pacific. And there is renewed interest in the Clarion Clipperton Zone, where the US salvaged K-129. In March the Guardian reported that British Prime Minister David Cameron wanted to "put Britain at the forefront of a new international seabed mining industry that could be worth £40 billion (\$74 billion) to Britain's economy over the next 30 years."

### **Follow Vanuatu lead on experimental seabed mining: NGOs urge**

Islands Business, 11 Jun 2013

Community advocacy organisations ACT NOW! and the Bismarck Ramu Group (BRG) are urging the PNG government to follow the example of Vanuatu and impose a moratorium on any experimental seabed mining. The Vanuatu government announced yesterday it will apply the precautionary principle and not allow experimental seabed mining in its territorial waters until the full environmental impacts are understood and there has been extensive consultation with citizens and civil society organisations. The Vanuatu government has also emphasized the importance of ensuring the free, prior informed consent to local people to any mining. "The potential government revenues from the proposed Solwara 1 experimental seabed mine are going to be tiny compared with the LNG project and land-based mines," says Effrey Dademo, Programme Manager for Act Now!

"There is no reason for the PNG government to be rushing into this untested and potentially devastating new form of mining". "As the Vanuatu government has stated, the environmental and social impacts need to be fully understood before we allow any undersea mining". John Chittoa from the Bismarck Ramu Group agrees. "We have already seen the devastating environmental and social impacts that can follow when we rush ahead with new mining projects. We need to learn from experiences like Ok Tedi and Panguna and take things at our own pace and not be rushed by greedy foreign corporations. "We need to take our time on this one and get it right so that our people and environment are protected and not sacrificed to outside agendas".

### **Vanuatu Church Authorities Oppose Deep Sea Mining**

*National council expresses solidarity with women's group*

WELLINGTON, New Zealand (Radio New Zealand International, June 10, 2013) – The Vanuatu Council of Churches has joined the Vanuatu National Council of Women in expressing concerns over deep sea mining. The Council of Women told the minister of lands, Ralph Regenvanu and the prime minister, Moana Carcasses Kalosil in a letter last week that women don't want deep sea mining around Vanuatu as the country already faces environmental problems, natural disasters. An executive member of the Council of Churches, Pastor Alan Nafuki, who is participating in a regional workshop on deep sea mining this week, says they are also against it. He says he is surprised the government has granted licenses to foreign companies without informing the local people. "We need to be told about what would happen if they mine our sea. I mean the sea is our livelihood. We need to know and we need to have a say in this before anything is done." Alan Nafuki says there are other ways to generate income rather than deep sea mining.

### **Vanuatu Hosting Seabed Mining Workshop**

*SPC offers advice 'on avoiding environmental impacts'*

WELLINGTON, New Zealand (Radio New Zealand International, June 09, 2013) – Vanuatu will host a workshop this week for Pacific governments to be advised on the emerging industry of seabed mining. Scientists say rich deposits of gold and other precious 'rare earth' metals are found in



seabeds from Papua New Guinea, Solomon Islands and Fiji across to French Polynesia. The mining company Nautilus Minerals was given a licence by PNG in 2011 to exploit seabeds in its exclusive economic zone. Akuila Tawake, the team leader for the the Secretariat of the Pacific Community's Deep Sea Minerals Project, says advice to countries will focus on avoiding environmental impacts and problems with revenue management. "We'll do everything we can to make sure that in any economic development we make sure we look after the environment, we are supporting the economic or socio-economic development of our various communities in the region." Akuila Tawake says territories including French Polynesia are not included in the project, despite being member countries of the SPC.

## **Sea bed minerals expert says time is right for rare earth mining**

PACNEWS, 07/06/2013

An expert in sea bed minerals says 'heavy rare earth' deposits in the Pacific are some of the richest in the world. The lucrative metals, used for magnets and other items in modern technology, are in great supply in Melanesia, as well as the muds around French Polynesia. Dr Allen Clark, a senior fellow at the East-West Center in Hawaii says despite risks of damage to the ecosystem, China's market dominance and new mining capacities means the time is right for the Pacific sea bed to yield its riches.

*ALEX PERROTTET: Dr Allen Clark spoke to Radio New Zealand International's Alex Perrottet:*

*ALLEN CLARK:* Papua New Guinea down to the Solomon Islands and over to Fiji, In those areas they all have these gold-bearing deposits. And these things are truly very, very high-grade. Compared to on-land deposits they're amongst the richest that we've seen, including those on land. So the economics of them pretty much dictate that you have the opportunity to go in, and they are a potential rich source of revenue and development potential for the islands.

*AP: Why is this becoming a big issue now? Is it because of the discovery of them or is it because it's more likely that countries will actually start getting licenses and mining for these minerals?*

*AC:* I think the most important one right now is there's been this very long, dramatic increase in base metals, particularly for nickel, cobalt, lead and zinc, and an unbelievably rapid increase in the price of gold and silver. And these happen to be the major commodities that are associated with both the polymetallic nodules and the gold-bearing mass of sulphides in Papua New Guinea and around the Pacific islands. The other one that has been particularly driving this system is a very large increasing demand for these metals largely fuelled by China. That's also been the driver for the price increases. And I think the other thing that's most important is that we have over the last few decades gotten tremendous experience in deep ocean exploitation from the oil and gas industry. And a lot of these capacities that have been developed by the oil and gas are largely applicable in the mining industry.

*AP: There's been a lot of talk about what might be on the sea bed around France's Exclusive Economic Zone, particularly French Polynesia, and just what France might or might not do.*

*AC:* I don't think it will turn French Polynesia into a major source of rare earths competing with China by any means, but China has basically been trying to manipulate the rare earth market. And this has driven other countries to look for other areas for rare earths. And it certainly has the potential to dramatically impact their economy and the workforce, et cetera.

## **France yet to signal direction on rare earth exploration in Pacific**

PACNEWS, 05/06/2013

The mining of rare earth minerals in the Pacific could be a step closer, with the United Nations International Seabed Authority publishing a plan for managing the extraction of the precious metals. The metals, which are vital for manufacturers of items like cameras, computers and aeroplanes, are

reportedly in strong supply in seabeds around French Polynesia. A report from Radio New Zealand International says China currently holds a lion's share of the export market in the rare minerals, but new discoveries in Greenland and the Pacific Ocean seabed could signal significant movement in the market. Last year, a pro-independence politician Richard Tuheiava called for a law change that would allow French Polynesia to explore and mine in the exclusive economic zone that is controlled by France. The emerging industry could provide relief for France with jobs and investment opportunities. In his speech after winning this year's election, President Gaston Flosse said exploration of rare earths would be on his agenda. In French President Francois Hollande's campaign he promised French Polynesia recognition of its natural resources, but he has so far not signalled which direction France will take on the issue.

### **Prospects of riches in the deep**

**Strewn across the Pacific seabed lies a vast treasure worth thousands of billions of euros.**

David Crossland The National (Abu Dhabi Media company), May 31, 2013



Manganese nodules, as seen on the ocean floor, are packed with extremely valuable minerals such as manganese, copper and nickel. Getty Images

Strewn across the Pacific seabed lies a vast treasure worth thousands of billions of euros. And it is there for the taking. It just needs to be scooped up. No drilling required. The greyish-black, potato-sized rocks, known as "nodules", do not look very inspiring. But they are packed with minerals such as manganese, copper, nickel, cobalt, zinc and rare earths that are essential raw materials for the electronics industry and products such as solar cells. The price of these metals has surged in recent years because global demand for them is growing and their supply from mining on land is becoming increasingly scarce. Demand for copper alone is projected to double over the next 20 years, with more than half of that rise coming from China and India. The biggest undersea reserves are located in a 5 million square kilometre area known as the Clarion-Clipperton Zone in the eastern Pacific.

The problem is the nodules lie at depths of up to 6,000 metres, where the water pressure is enormous. It is pitch black and close to freezing down there and the seabed at such depths still holds as many mysteries to mankind, if not more, as the moon. Only a tiny fraction of it has ever been explored. A UN official once likened the technical challenge of deep-sea mining to someone standing on top of a New York skyscraper on a windy day and trying to vacuum up marbles from the street far below with a long hose. In fact, deep-sea mining is a tad more difficult than that. It will require large, remote-controlled machines capable of combing the seabed and collecting the rocks. Not to mention a system of transporting tonnes of rock to the surface. "I think it may take up to 10 years before the collectors and their components have been so well developed and tested that they function reliably," says Carsten Rühlemann of Germany's Federal Institute for Geosciences and Natural Resources (BGR).

"The machines have to be able to work for a long time because they would take about a week to lower to the seabed and a week to raise again," says. "So if they don't function properly it will be prohibitively expensive to fix them. It will take a while for this to be commercially viable." But despite these difficulties, the prospect of profits and access to strategic raw materials is about to trigger an underwater gold rush. Critics say the world is on the threshold of a new colonial era, a dash for precious minerals that could do irreversible damage to marine ecosystems. The UN's international seabed authority (ISA), which manages sea-bed mining, has so far granted 17 licences to national organisations and companies to prospect for minerals and more are about to follow. Licence holders include companies from China, India, South Korea, Japan, eastern Europe and Russia, Germany, France and the United Kingdom, as well as the Pacific island nations Kiribati and Tonga.



Manganese nodules above ground. Getty Images

The potential for deep-sea mining is "arguably higher now than at any other time in history", the ISA said in a study released in February. The race for minerals could lead to international tensions. The United States, which has not been allocated an exploration area because it never signed the UN convention on the law of the sea, is unlikely to stand by while others exploit the riches of the oceans, especially since the most lucrative areas are close to the western coast of the US and Mexico. The ISA, therefore, will have to rise to a huge challenge. So far, its role has largely been confined to handling bids for mineral exploration. Now, it has to work out how to licence, regulate and monitor the first real seabed-mining operations and how to share the proceeds. It proposes to provide operators with "provisional mining licences" to make sure they demonstrate real mining and environmental competence before they are granted a full licence.

"Deep ocean mining is faced with a 'Catch-22' situation, whereby competence cannot be gained without actual mining at a commercial scale but, at the same time, mining should not be allowed without prior demonstration of competence," the ISA says. According to its study, the Clarion-Clipperton Zone may have more than 27 billion tonnes of nodules containing seven billion tonnes of manganese, 340 million tonnes of nickel, 290 million tonnes of copper and 78 million tonnes of cobalt. How much of that is actually accessible is unknown, however. "The technology hasn't been properly developed for use on an industrial scale although the Koreans, Indians and Chinese have made progress with test collectors," says Mr Rühlemann, the BGR's expedition leader on a German-French research trip to the Pacific last year to assess the possible environmental impact of mining. South Korea has already undertaken 30 exploratory missions to its licence area in the Pacific and has set up its own test site for automatic deep-sea mining vehicles. Last year the Jiaolong, a Chinese manned deep-sea research submarine capable of navigating horizontally along the seabed, dived to a depth of more than 7,000 metres.

Aker Wirth, a German mining technology company, has drafted a design for a 17-metre long, 250-tonne machine resembling a combine harvester that would move across the seabed on several tracks. At the front, cylindrical drums with little shovels would scoop up the nodules and feed them into a machine where they would be ground up. An enormous pump would bring them to the surface with the help of compressed air. A major boost to deep-sea mining came from Papua New Guinea granting the first deep-seabed mining licence to the Nautilus Mining Company of Canada, in its territorial Bismarck Sea. The deal showed the private sector, and the banks supporting it, that deep-seabed mining is now commercially feasible. Nautilus planned to mine for copper and gold on the seabed, not from nodules but from so-called "massive sulphide deposits" emitted from hydrothermal vents in the ocean floor where superheated water carrying metals from deep in the earth mixes with cold seawater to form metal-rich deposits. However, that project, due to start production this year, is currently on hold due to a legal dispute with the government of Papua New Guinea. Biologists argue seabed mining of nodules will harm the environment by churning up underwater clouds of sediment and displacing deep sea creatures. The operations could wipe out unique species before they had even been discovered, they say. "Collecting manganese nodules will plough up a few thousand square kilometres per year. That would have similar consequences as cutting down rainforest," says Sven Petersen, a scientist at the Helmholtz Centre for Ocean Research in Kiel, northern Germany.

"It's not as though no animals or plants live there afterwards. But they're completely different species. And it's exactly the same with deep-sea mining." Jon Copley, a biologist from the University of Southampton, says it is a joint task to look after the oceans. "I don't think we own the deep ocean in the sense that we can do what we like with it. Instead, we share responsibility for its stewardship," he told the BBC. "We don't have a good track record of achieving balance anywhere else - think of the buffalo and the rainforest - so the question is, can we get it right?" Mr Rühlemann says the environmental damage from so-called suspension clouds churned up by the mining vehicles may be less severe than feared. "I don't think suspension clouds will drift far because the currents are very slow at such depths, just 3 to 4 centimetres per second," he says. "Besides, fine-grain sediments tend to clump together quickly and sink back down to the floor. "The collectors will squash things but due to their wide chassis the pressure on the seabed would be kept to around 200 grams per square centimetre, which is about the same as a human being standing on the seabed." But the true impact won't be known until large machines are used, he adds. "You'd have to put a machine down there and monitor what actually happens when it moves. Nobody's done that yet."

### **Pacific churches call for more study of seabed mining**

ABC Radio Australia, 31 May 2013

The Pacific Conference of Churches is again calling for an end to seabed mining. The group of Christian churches says governments must ensure proper studies are carried out before any work starts. The group's general-secretary, the Reverend Francois Pihaatae says there hasn't been enough consultation.

**Presenter:** Geraldine Coutts

**Speaker:** Reverend Francois Pihaatae, general-secretary, Pacific Conference of Churches

PIHAATAE: During our General Assembly in Honiara, there was a big concern expressed by all communities in the region, including the members of our own respective congregation. They have grown in both volume and intensity, because of the inadequacy and even total absence of appropriate consultation and dialogue with our communities on mining-related policy committee and this process is commonly expressed challenge across the region. So that's why we, and in an environment where the voices and fear of our peoples are unheard, that's why the Pacific Conference of Churches, must stand on behalf of our communities and people in the Pacific as our responsibility also as stewards of God's creation, that's we speak out to all those who extractive industries or big

powers who are trying to explore the ocean floor for rare metals and other mineral deposits to stop all the research done for seabed mining.

COUTTS: Now, is the Pacific Conference of Churches just against deep seabed mining or at this stage, you're not necessarily against it, but you want more research before it proceeds?

PIHAATAE: Yeah. Because we have look at seabed mining as a new phenomena. It has not been trialed as work, and the Pacific Ocean, a central element to any and all Pacific cultures, spiritual and life in general is expected to be testing ground, eh, for this new frontier in extractive industry. So what we are looking at is the consequences, especially in the ecological arena and the knowledge, I think is still unknown. Science remains silent on that issue.

COUTTS: Is it to late to make these kinds of objections, because Fiji's already granted exploration licences, three of them. Solomon Islands and a number of other countries, Cook Islands have all expressed interest in deep seabed mining. So do you think the gates closed on argument now that it's to late, because they're all going ahead with exploration licences anyway?

PIHAATAE: I don't think it's to late. But as our mandate to stand by our communities and our people and we still hope and believe that there will be if a forum, a platform can be created for discussion and dialogue on these issues. Because if we speak against the seabed mining, it's because we have a complete examples on the mining done the land base, like in Papua New Guinea's, Solomon or Nauru, Fiji and Maohi Nui (French Polynesia). So that's why we stand against the seabed mining and it is like repeating the same damages that have been done on the land to the ocean, that's why we strongly speak against the seabed mining.

COUTTS: Now the Pacific Conference of Churches had passed a resolution to leaders meeting in Honiara last month. Was it the call to halt the progress on deep seabed mining a unanimous vote at that conference?

PIHAATAE: Yeah, it's a unanimous voices of the conference and then the question we ask ourself why this extractive industry or big powers are always using us like guinea pigs for experiments in everything and why not do it in they're own ocean? And why we always? Because our main concern is about the whole Pacific rely on ocean resources, where we our livelihood depend on it. So if that had been damaged, where do you think we will get our foods as our resources as from the ocean.

COUTTS: Well, what's the next step for the Pacific Council of Churches. Are you going to go to each government or are involved in, or planning to be involved in deep seabed mining and express your concerns directly to them?

PIHAATAE: Yeah, that will be our next step is to approach all the constituents in the Pacific and also the governments, civil societies and mining companies. We have to have a dialogue before anything is restarted and also affect our people in this new phenomena of the new development option by our governments, given the licence expenses of our ocean floor. So I think there's still a way where we need to sit down with our governments and other constituency to speak, to dialogue and how can we move forward and not impacting and damaging again the creation of God.

## **Pacific Conference of Churches: Halt seabed mining**

Post-Courier, May 31, 2013

THE Pacific Conference of Churches (PCC) has renewed its call for a stop to all sea bed mining research in line with a resolution by regional church leaders in Honiara last month. PCC General Secretary Reverend Francois Pihaatae made the call after regional governments began to design laws which will allow them to engage in mining activities on and beneath the sea bed. "The PCC member churches were unequivocal that no further action should be taken by regional governments until there is empirical evidence on the effect that deep sea mining and exploration will have," Rev Pihaatae said. "These churches represent 6.25 million Pacific people who have serious concerns about the environmental and socio-economic impact of deep sea mining. "We urge governments to engage – not merely consult – with their people and ensure that proper studies are made before any work is done."

In April the representatives of 15 Pacific governments met in Nuku'alofa, Tonga to discuss development and resource management issues linked to seabed mining. Recent indications show that at least two multinationals – one Korean and a United States-based firm – want to conduct exploration in Fiji's Exclusive Economic Zone (EEZ). The Tonga meeting was facilitated by the joint Secretariat of the Pacific Community-European Union Deep Sea Minerals Project. Representatives of the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, the Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, the Solomon Islands, Timor Leste, Tonga, Tuvalu and Vanuatu attended the meeting.

### **Fiji: Deep sea mining could challenge sugar and tourism**

Report by: Roland Koroi, Fiji Broadcasting Corporation, 31.12.2013

Deep sea mining has the potential to become one of the biggest driving forces of the economy if it does go ahead. SPC SOPAC Director Michael Petterson says while the benefits are huge, deep sea mining must be given a precautionary approach. Petterson says Fiji has what it takes to be able to take full advantage of deep sea mining. "I think Fiji is an example of a Pacific country that theoretically, that can take a big advantage from deep sea mining. And yes the potential is there for deep sea mining to become a major element or the major element of an economy." SOPAC's proposal for a legislative and regulatory framework for deep sea mineral exploration and mining has received widespread criticism from NGO's across the Pacific. Petterson says such opposition is good as it ensures responsibility from governments and mining companies.

### **All at sea: the challenges of regulating the seabed mining industry**

Mining-technology.com, 30 May 2013, Sarah Blackman

The International Seabed Authority is considering how to license the first seabed mining operations amid a surge of interest from investors. The economic benefits of extracting polymetallic nodules are well-known, but how can a regime be developed to ensure environmentally and culturally responsible exploitation?



Licences to mine the ocean floor could be awarded as early as 2016, according to a United Nations report, which puts forward the eagerly-awaited first plan for managing the extraction of polymetallic 'nodules'.

Seabed mining has been on the radar for decades, but high production costs, low commodity prices and limited available technologies have put projects on hold. Now, with a surge of interest from

state-owned and private mining companies, the UN's International Seabed Authority (ISA) is finally considering how to license the first marine mining operations and develop a fiscal regime that will ensure the fair distribution of profits to host countries and their commercial exploiters.

### **Seabed mining: a 'rekindled' interest**

"The UN's International Seabed Authority (ISA) is finally considering how to license the first marine mining operations." This month, UK Seabed Resources, a newly-formed subsidiary of US defence and engineering group Lockheed Martin, became the latest company to join the rush for polymetallic nodules (PNs) - small rocks rich in manganese, rare earths, nickel and cobalt - from the sea floor, when it obtained a licence to explore a 58,000 sq km area of the Pacific Ocean. Speaking in London, Prime Minister David Cameron said the firm, along with the Department for Business, Innovation and Skills, will help the UK position itself at the forefront of the industry, which could be worth £40bn to the British economy during the next 30 years. It's not the first time Lockheed has spearheaded an effort to recover PNs from the seabed - the group claims to have discovered mineral riches off the US coast after a bizarre hunt in the 1970s for a lost Russian submarine paid for by US billionaire Howard Hughes. But the dash for deep-sea metals ended when commodity prices imploded.

From the early 2000s, a sharp rise in prices, combined with a dramatic increase in demand for metal; a decline in the tonnage of land-based nickel, copper and cobalt sulphide deposits; and technological advances 'rekindled' an interest in the exploitation of PN resources, according to a new technical study published by the ISA. Equally important is the impact of Papua New Guinea granting the first deep seabed mining licence, in its territorial Bismarck Sea, to the Nautilus Mining Company of Canada in 2011, the study notes. "This has demonstrated that the private sector, and the financial institutions that support it, believe that deep seabed mining can be commercially viable." China's monopoly on the global production of rare-earth minerals - and its decision to restrict exports in 2009 - has also fuelled the search for the raw materials, essential for electronics, from non-terrestrial sources.

In March 2013, Japanese scientists from Tokyo University and Japan's Agency for Marine-Earth Science said they had found vast reserves of highly-concentrated rare earth metals on the Pacific Seabed. Professor Yasuhiro Kato said a single ship drilling in a target zone close to the island of Minami-Torishima could meet Japan's demands for a year. "We don't need to mine it intensively," he said. "All we need is enough to force China to lower its prices." The number of exploration licences issued now stands at 17, with Japan, Korea, China and France prospecting minerals in the Pacific, Atlantic and Indian Oceans. But with the first contracts due to expire in 2016, the ISA is looking towards the development of a regulatory framework for PN exploitation.

### **Environmental impacts of PN exploitation**

In July 2011, the Council of the ISA requested during its seventeenth session that the ISA Secretary General prepare a work plan for the formulation of regulations for the exploitation of PNs from the ocean floor, known as 'the Area'. In complying with this request, the ISA faces the challenge of developing a framework that ensures sustainable exploitation of seabed mineral resources. "The ISA faces the challenge of developing a framework that ensures sustainable exploitation of seabed mineral resources." In its technical study published this month, the authority recognises the "inevitable environmental damage" mining will cause, but addresses the need to analyse "all environmental data" collected during exploratory projects to date, to aid an understanding of the environmental impact of all aspects of exploitation.

Activists including 'Kiwis against Seabed Mining' believe that suction dredging akin to open-cast mining, where the entire top surface of the seabed is removed to depths of up to 20 metres, will wipe out organisms, including mussels, worms and crustaceans, which in turn support larger marine

animals in the food chain. Papua New Guinea-based 'Act Now!' also stresses that experimental seabed mining will destroy underwater hydrothermal vents that contain unique eco-systems. Many would-be PN exploiters, however, are developing remote controlled technologies designed to minimise the stirring up of fine particles from the seabed. "Potential approaches include outfitting the nodule collection apparatus with skirts and water flow designs to minimise fine particle disturbances and ensure that any stirred up particles are pumped up the pipe with the nodules and not released into the surrounding water," explains UK Seabed Resources spokesperson Philip Rood. "Overall, minimising environmental impact is a core objective in the nodule collector design and will be a key factor in how the apparatus moves, collects nodules and transfers nodules to the surface."

### **A fair fiscal regime for seabed mining**

The ISA also recognises the need for mining regulations and standards to benefit 'mankind as whole' and that host country policies do not give an unfair advantage to commercial exploiters. It is hoped that the industry will learn from decades of negative social impacts from terrestrial mining operations, where legislations have given states free controlling stakes in mineral projects and corrupt government officials have frittered away mining profits at the expense of the wider public. The ISA also recognises the need for mining regulations and standards to benefit 'mankind as whole'. Papua New Guinea was one of the first countries to issue an exploration licence for companies to address the feasibility of resources development in its exclusive economic zone, but corrupt rent seekers in the country have long prevented ordinary citizens from benefitting from minerals and metals extracted onshore, according to the Human Rights Watch.

Adding fuel to the fire, maritime territorial disputes previously reserved for oil deposits could also be opened up, as miners begin to unlock mineral resources from the seabed. The ISA has only scratched the surface of what may be involved in preparing a fiscal policy that would set fiscal rates based on comparable land-based minerals, identify a tax and cost accounting code on which fiscal calculations can be made; and develop a system that does not burden the ISA or mining investors. The authority hopes to ensure that whatever resource rent legislation is adapted is simple, equitable and transparent. But the implementation of such regimes may be too big a challenge for certain governments. For now at least, a rough framework for the extraction of polymetallic nodules is in place, and extensive exploration efforts by the industry may soon begin to pay off.

### **Nautilus still committed**

Post-Courier, May 30, 2013

*By ANCILLA WRAKUALE*

NAUTILUS Minerals says it remains committed to Papua New Guinea and the Solwara 1 Project, a high grade copper-gold project located in the Bismarck Sea between East New Britain and New Ireland Provinces. Nautilus Minerals PNG Country Manager Mr Mel Togolo yesterday told a media information session, that deep sea resource production was a result of the world's demand for metal as land resources are becoming stretched and grades in land based mines declining. "The world's demand for metals continue to rise as more and more people acquire better income and buy things like fridges, houses, cars," he said. Mr Togolo said because it will be deep sea mining, Nautilus will be using advanced technology to extract metals from the sea floor. Extracting of minerals will occur at depths 1600 metres.

He said the extraction site is away from where fish such as tuna and any other edible fish exist within the top 400 metres water depth so they won't be affected. Mr Togolo said there will be minimum impact on the fish because materials going up and coming down to the sea floor will be in an enclosed pipe. He said once the ore is separated from the sea water, the same water will be filtered and



goes back to the sea floor through the same enclosed pipe, hence minimal marine impact. Togolo explained that there won't be any tailings discharged as well as no blasting. "Tailings only result as a result of processing. We are not processing in the country, we will process overseas", Togolo said. He said the five advantages of the Solwara 1 project include:

- \* MINIMAL infrastructure;
- \* MINIMAL overburden;
- \* MINIMAL waste;
- \* LIMITED social disturbance; and
- \* INCREASED worker safety because everything will be controlled from a drilling control room.

Meanwhile, Togolo said they are getting good support from the National Government, including New Ireland Provincial Government, and they look forward to having discussions with East New Britain Government soon. He said the National Government is very supportive as they see this as another way to add value to what PNG already has in terms of mining and they are now sorting out commercial issues with the Government, but otherwise the company already has the approval from the Government to go ahead through its Environment and Mining Licences. Mr Togolo said they are getting world class companies around the world to supply them with equipment and technology for the project and they will assemble everything probably in Singapore and have the vessel shipped to the project site in the Bismarck Sea. He said they estimate the commissioning of the project to take place 20-24 months from now.

### **Foreign Interests Licensed To Explore Fiji's Seabed**

*Korean institute, Nautilus, Bluewater to conduct drilling*

WELLINGTON, New Zealand (Radio New Zealand International, May 29, 2013) – The head of Fiji's Mineral Resources department says it will monitor the activities of three foreign mining companies, which have been granted licenses to explore Fiji's seabed for minerals. The department has given a total of 17 exploration licenses to the Korea Institute of Ocean Science and Technology, Nautilus Minerals and Bluewater Minerals to carry out test drilling for minerals, such as gold, copper and zinc. The Director of the Mineral Resources department, Malakai Finau, says the government will ensure the companies comply with its Environmental Management Act, which aims to protect the country's Exclusive Economic Zone. "What we do is we identify the risks and then we require them to mitigate against environmental risks that we identify and that's one of the ways in which we protect the environment from potential environmental impacts of advanced exploration." Malakai Finau says an advantage of granting the exploration licenses is the government will get updated information on Fiji's seabed minerals.

### **Nautilus meets NIP Governor, leaders**

Post-Courier, May 28, 2013

Nautilus Minerals President and Chief Executive Officer Mike Johnson was in New Ireland Province last week, where he met up with the Governor Sir Julius Chan and the Provincial Executive Council. A briefing took place at the Kavieng Hotel last week Tuesday and it was the first high level meeting between Nautilus Minerals Limited, the developer of the Solwara I deep-sea mining project and the New Ireland Provincial Government. "To meaningfully talk of development of any kind in New Ireland, we must involve our people, making sure of a win-win for everyone" emphasized the New Ireland Governor Sir Julius Chan during an open dialogue with Nautilus Executives. The meeting marks a watershed in the relationship between Nautilus Minerals and the New Ireland Government. For the first time Nautilus has at the most senior level addressed the issues and re-

quirements of the Government and people of New Ireland. The outcome of this meeting will see the establishment of a Working Group consisting of representatives from the company and the New Ireland Government.

The Working group will address many issues including, identification of a series of high impact projects that would benefit New Ireland, and particularly the people of the West Coast, with focus on road works and most importantly Bridges. New Ireland Officials expressed concern that the project must be implemented with full care and due diligence for possible environmental problems and has requested Nautilus ensure safeguards are in place to immediately address any environmental problems. The Working group will ensure an independent internationally recognized environmental specialist conducts regular assessments of environmental issues and review of the EIS. New Ireland Provincial Administrator Amani Monovi concluded the meeting by saying; "This has been a productive exchange, and the possibility that New Ireland could be at the forefront of technology is promising. As long as we continue through the newly established working group to openly and transparently consult, we can ensure that benefits are shared by all parties."

### **Pacific warned on risk of increased mining-related conflict**

ABC Radio Australia, 22 May 2013

A surge in mining-related conflict is likely to occur in developing countries over the next decade as new projects come on stream. The warning comes from one of Papua New Guinea's most respected leaders. Former PNG lawyer and diplomat Dame Meg Taylor, set up the World Bank group's mining grievance process and for the past 15 years has worked as the Bank's Vice President, Compliance Adviser and Ombudsman resolving conflict and trying to prevent it on projects in which the bank has an investment. Dame Meg told Jemima Garrett, PNG and other Pacific countries are part of a wider group of developing countries that are at risk of seeing more conflict.

### **Fiji to Conduct Deep Sea Mining Tests**

FARS NEWS Agency, 22 May 2013

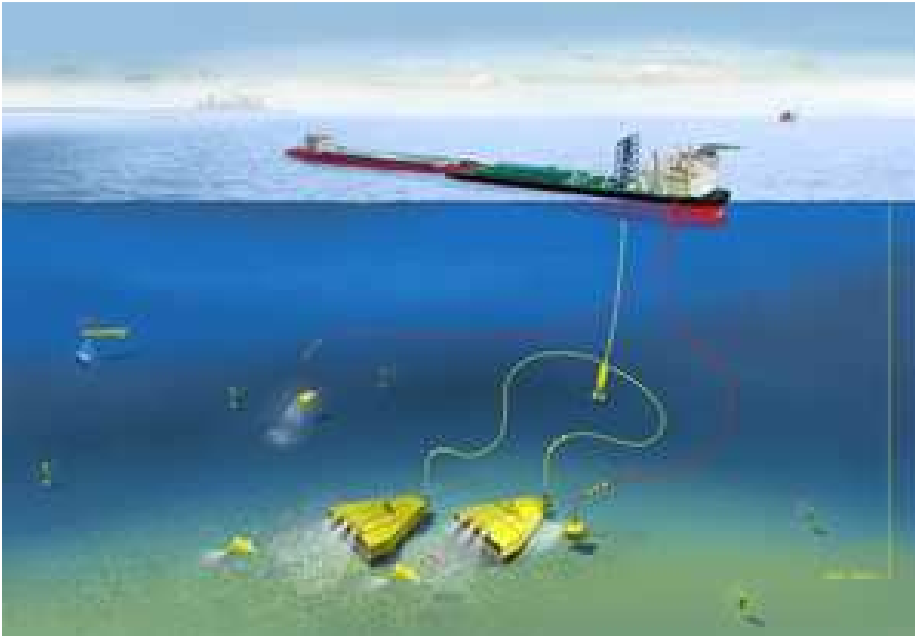
TEHRAN (FNA)- Deep sea test drilling in Fiji's exclusive economic zone for seafloor massive sulphides (SMS) is likely to begin in the next few years to see the level of minerals in Fiji's waters, a government official said Wednesday. Mineral Resources Director Malakai Finau said Fiji has the potential of minerals under the seabed within Fiji's exclusive economic zone which has been established over the years through past research. Korea Ocean Research and Development Institute (KORDI), which has been issued with a research and exploration license, has reported findings of high grade mineral potential locations in the Western waters of Fiji's exclusive economic zone, according to Fiji's Ministry of Information. KORDI Minerals Limited Director Jang Wan Bang said test drilling will begin in the next two years for further research.

### **Deep sea mining rush a step closer to reality**

Vicky Validakis, Mining Australia, 21 May, 2013

The United Nations has published its first plan for deep sea mining and says companies could apply for mining licenses as soon as 2016. After a technical study by the International Seabed Authority, the UN body managing the industry, it is taking steps on how to move from bids handling mining exploration to considering how to license the first operations. To date, the ISA has issued 17 exploration permits and another seven are being processed. They cover vast areas of the Pacific, Atlantic and Indian Oceans, BBC reported. The ISA's legal counsel, Michael Lodge, told the BBC: "We are

at the threshold of a new era of deep seabed mining." The report comes amid what a spokesman describes as "an unprecedented surge" of interest from state-owned and private mining companies. It is in the process of deciding how to handle the licensing for mining operations as well as how to share the proceeds, a portion of which are to go to developing countries.



The extraction of 'nodules' – small mineral-rich rocks from the seabed, has been around as a concept for decades but mining them has only recently become viable with advancements in technology. An assessment of the Pacific Ocean has estimated more than 27 billion tonnes of rocks could be lying on its floor, including 290 million tonnes of copper and 340 million tonnes of nickel. However, mining in the deep sea is a contentious issue. Conservation experts have long warned that mining the seabed will be highly destructive and will have disastrous long-term impacts for marine life. The ISA study itself recognises that mining will cause "inevitable environmental damage". A key factor in the ISA's report is the need for environmental safeguards. The document calls for monitoring of the seabed during mining operation however critics are sceptical if activity in the ocean depths can be policed.

Seabed mining also remains a contentious issue in Australia. After a spike in the number of seabed exploration applications off the Northern Territory coast, the state banned seabed mining until at least 2015, during which an assessment on the impact of underwater mining will be carried out. However Northern Territory Mines and Energy Minister said the moratorium on seabed mining could be lifted before 2015 following discussions with traditional owners about their concerns over seabed mining applications. The land owners, the Anindilyakwa Land Council, say operations between the island and mainland threaten sacred sites, with The Northern Land Council head Kim Hill adding that there is a lack of research regarding the method. "It is an international concern and it is a concern for all Australians," Hill told the ABC. "Importantly, it is a concern for traditional owners." Last year, former Greens leader Bob Brown called for an investigation into Pacific seabed mining. "The Australian Greens are calling for scrutiny of what deep seabed mining means for the health of our oceans and our own country's natural marine resources and fisheries into the future," Brown said at the time.

### **Deep Sea Mining: Economic Bonanza or Environmental Boondoggle?**

By Christopher Werth, The World, May 20, 2013



This computer generated image from Lockheed Martin suggests how the company could mine manganese nodules from the sea floor, using underwater vehicles that vacuum up nodules and transport them to a ship on the ocean surface. (Source: Lockheed Martin)

The World couldn't afford to send me out to sea for this story. But for Adrian Glover, a marine biologist at London's Natural History Museum, the furthest depths of the seas are familiar territory. He shows me a photograph of a flat, seemingly barren terrain nearly two and a half miles down – part of what's called the abyssal Pacific Ocean floor, off the coast of the United States. Glover says it's an area almost the size of the US, and the sea floor there is carpeted in potato-sized accretions known as manganese nodules. He hands me what looks like a lump of coal, but is surprisingly light and crumbly. "They're peculiar things," Glover says. "They were first studied in the 1960's, and people quickly realized that they're rich in minerals." Including not just manganese but also copper, cobalt, nickel and rare earths – materials essential these days in the production of everything from high-grade steel to smart phones and tablet computers. Stephen Ball of Lockheed Martin says the global appetite for these sorts of minerals is growing all the time.

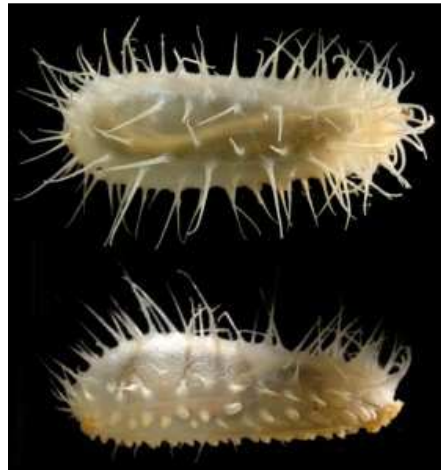


Manganese nodules from the Central Pacific Abyss litter the top of a sediment sample from the deep seabed. (Photo: Adrian Glover, The Natural History Museum, London)

Lockheed is a defense contractor that hopes to be among the first to get into the deep-sea mining game. And the company has a long, strange history in the development of the industry. It's an elab-

orate tale that involves a top-secret CIA mission during the Cold War, and the eccentric American billionaire Howard Hughes. The short version of the story begins when Hughes was hired to go look for a lost nuclear-armed Soviet submarine that sank in the deep Pacific in 1968. Ball says Lockheed worked with Hughes to help raise the submarine in the 70's to collect intelligence on the Soviet military. The connection to deep-sea mining is that the official story at the time was that the mission was actually a search for manganese nodules. Ball says the effort actually did involve surveying the ocean floor, which ended up giving the company detailed data on the nodules.

It's only now – with rising mineral prices and new technologies – that mining the deep sea finally looks economically viable. And earlier this year, the International Seabed Authority granted a British subsidiary of Lockheed an exploration license for a huge stretch of the Pacific. The company's plan calls for vehicles to rove across the sea floor scooping up nodules like a vacuum cleaner and sending them up pipes to ships on the surface. But of course this type of mining has never been done before, and it raises a raft of environmental concerns. To begin with, although the bottom of the deep ocean looks barren, it's actually teeming with life. And Rod Fujita, of the Environmental Defense Fund, says no one knows how long it would take these ecosystems to bounce back from mining. "The recovery rates are likely to be very, very, very long," Fujita says, "because biological productivity is very low, and growth rates are very low down there." In fact, some ecologists are very blunt on the matter.



Although the areas of the deep sea where manganese nodules are found may look barren, they're actually abundant with life, such as sea cucumbers like the one pictured here. (Photo: Adrian Glover, The Natural History Museum, London)

George Woodwell, of the Woods Hole Research Center in Massachusetts, calls deep-sea mining "just plain crazy." Woodwell says the operations would be highly destructive and could disrupt the chemistry of large parts of the oceans at a time when they're already under stress from climate change. Lockheed Martin says it takes environmental concerns seriously. In line with international rules, the company says it's collaborating with scientists like Adrian Glover at London's Natural History Museum to study its patch of the sea floor before it mines. In fact, some marine biologists see teaming up with industry now as an opportunity to lay effective ground rules before full-scale mining gets underway. Cindy Lee Van Dover of Duke University says the people involved "have to get it right. We don't want a hundred years from now conservation scientists to say, 'Oh my god, what they were they thinking?'"

Van Dover has worked with a company that plans to mine another type of mineral-rich deep-sea ecosystem known as hydrothermal vents. She's conflicted about the work, calling herself a tree hugger who's spent her life studying the deep sea animals. But she says she has to be pragmatic. She says the question is not "is it right or wrong? It's, I think it's going to happen. And I think it can happen in a way that we can get the minerals and still protect those animals." If it is going to happen, it's because there could be lots of money to be made—more than 60 billion dollars over thirty

years for UK businesses alone, according Lockheed Martin. The company hopes to realize that bonanza in the next decade and plans to begin environmental research in the Pacific this summer.

### **Deep sea mining 'gold rush' moves closer**

BBC News, 18 May 2013

The prospect of a deep sea "gold rush" opening a controversial new frontier for mining on the ocean floor has moved a step closer. The United Nations has published its first plan for managing the extraction of so-called "nodules" - small mineral-rich rocks - from the seabed. A technical study was carried out by the UN's International Seabed Authority - the body overseeing deep sea mining. It says companies could apply for licences from as soon as 2016. „I don't think we own the deep ocean in the sense that we can do what we like with it”, Dr Jon Copley University of Southampton. The idea of exploiting the gold, copper, manganese, cobalt and other metals of the ocean floor has been considered for decades but only recently became feasible with high commodity prices and new technology. Conservation experts have long warned that mining the seabed will be highly destructive and could have disastrous long-term consequences for marine life.

The ISA study itself recognizes that mining will cause "inevitable environmental damage". But the report comes amid what a spokesman describes as "an unprecedented surge" of interest from state-owned and private mining companies. The number of licences issued to prospect for minerals now stands at 17 with another seven due to be granted and more are likely to follow. They cover vast areas of the Pacific, Atlantic and Indian Oceans. One of the most recent to be granted was to UK Seabed Resources, a subsidiary of the British arm of Lockheed Martin, the American defence giant. Under the UN Convention on the Law of the Sea, the ISA was set up to encourage and manage seabed mining for the wider benefit of humanity - with a share of any profits going to developing countries.

Now the ISA is taking the significant step of moving from simply handling bids for mineral exploration to considering how to license the first real mining operations and how to share the proceeds. The ISA's legal counsel, Michael Lodge, told the BBC: "We are at the threshold of a new era of deep seabed mining." The lure is obvious. An assessment of the eastern Pacific - a five million sq km area known as the Clarion-Clipperton Zone - concluded that more than 27 billion tonnes of nodules could be lying on the sand. Those rocks would contain a staggering seven billion tonnes of manganese, 340 million tonnes of nickel, 290 million tonnes of copper and 78 million tonnes of cobalt - although it's not known how much of this is accessible. [A map](http://www.isa.org.jm/files/images/maps/CCZ-Sep2012-Official.jpg) shows the spread of licensed areas across the zone. Link: <http://www.isa.org.jm/files/images/maps/CCZ-Sep2012-Official.jpg>

### **Right incentives**

According to the planning study, the ISA faces the challenge of trying to ensure that nodule mining's benefits will reach beyond the companies themselves while also fostering commercially viable operations. The plan relies on providing operators with the right incentives to risk what would be expensive investments without losing the chance for developing countries to get a slice of the proceeds. But the ISA identifies what it calls a "Catch-22" in this brand new industry as it tries to assess which companies are skilled enough to carry out the work. "Competence cannot be gained," it says, "without actual mining at a commercial scale, but at the same time mining should not be allowed without prior demonstration of competence."

A key factor in the ISA's thinking is the need for environmental safeguards, so the document calls for monitoring of the seabed during any mining operation - though critics wonder if activity in the ocean depths can be policed. The prospect of deep sea mining has already sparked a vigorous debate among marine scientists, as I found earlier this year on a visit to the British research ship,

James Cook, exploring the hydrothermal vents of the Cayman Trough. The expedition's chief scientist, Dr Jon Copley, a biologist from the University of Southampton, urged caution. "I don't think we own the deep ocean in the sense that we can do what we like with it," he said. "Instead we share responsibility for its stewardship. "We don't have a good track record of achieving balance anywhere else - think of the buffalo and the rainforest - so the question is, can we get it right?"

### **Extinction risk**

And Prof Paul Tyler, also a biologist, of the National Oceanography Centre, warned that unique species would be at risk. "If you wipe out that area by mining, those animals have to do one of two things: they disperse and colonise another hydrothermal vent somewhere or they die. "And what happens when they die is that the vent will become biologically extinct." However, marine chemist Prof Rachel Mills, of the University of Southampton, called for a wider debate about mining generally on the grounds that we all use minerals and that mines on land are far larger than any would be on the seabed. She has carried out research for Nautilus Minerals, a Canadian firm planning to mine hydrothermal vents off Papua New Guinea. "Everything we are surrounded by, the way we live, relies on mineral resources and we don't often ask where they come from," she said. "We need to ask whether there is sustainable mining on land and whether there is sustainable mining in the seas. "I actually think it is the same moral questions we ask whether it's from the Andes or down in the Bismarck Sea." This debate is set to intensify as the reality of the first mining operations comes closer.

### **Mining the deep blue frontier**

By Peter Huck, New Zealand Herald, May 17, 2013



Photo / Thinkstock

Even by Howard Hughes' eccentric standards, the great manganese nodule hunt was a bizarre episode. News that the reclusive billionaire was intent on recovering metallic nodules - potato-sized rocks rich in manganese, copper, nickel, cobalt and rare earths - from the ocean floor northwest of Hawaii stoked hopes of a mining bonanza. Private companies launched probes to see if mining at the limits of technology was commercially feasible. In fact, the quest was an elaborate Cold War ruse, concocted by the CIA with Hughes' help, as a cover for US efforts to salvage a Soviet submarine, K-129, which sank in 1968. The wreck was salvaged in 1974. As for the deep-sea metals rush, it ended when nickel prices imploded. Four decades later deep-sea minerals are back in the news, following a sensational claim in July 2011 by a scientific team from the University of Tokyo.

Writing in the journal *Nature Geoscience*, the scientists, backed by the Japan Agency for Marine-Earth Science and Technology, said rare earth minerals had been found in mud on the ocean floor. Between 80 and 100 billion tonnes of rare earths - used in magnets, batteries and electronic components for smartphones, wind turbines, fuel cells, hybrid cars, catalytic converters and other high-tech gadgetry - were found at depths of 3500m to 6000m, east and west of Hawaii and east of Tahiti. "The deposits have a heavy concentration of rare earths," team leader Yasuhiro Kato told Reuters. "Just one square kilometre of deposits will be able to provide one-fifth of the current global annual consumption." Given that the US Geological Survey estimates world reserves of rare earths at 110 million tonnes, the amount found deep beneath the ocean seemed a game-changer. The Industrial Mineral Corporation of Australia (IMCA) says total world production of rare earths was 100,000 tonnes last year. Consumption was 115,000 tonnes. The shortfall was filled from stockpiles or by illegal exports from China, which produces over 95 per cent of the global supply. By 2020 IMCA predicts global demand will be 220,000 tonnes.

The Japanese paper is being treated cautiously by scientists. "It might not be possible [to extract rare earths]. You'd need a high concentration," says Dr Richard Wysoczanski, a marine geophysicist with the National Institute of Water and Atmospheric Research (Niwa). "But having said that, the mud is easy to process. It's about getting it all to the surface." Nonetheless, the Japanese announcement - and Kato's claim that nodules rich in heavy rare earths could be "readily recovered" - has fuelled business and government interest. And much of that interest is focused on the Pacific Ocean. Deep-sea technology has made big strides since the 1970s. Submersibles can dive to extraordinary depths and robots can retrieve material. Scientists have mapped wondrous subterranean landscapes and located deep hydrothermal vents, where mineral-rich water, superheated by magma in the earth's core, bubbles up into the sea. Such vents are found in the Kermadec Arc, a chain of active subterranean volcanoes northeast of the North Island.

The Kermadec vents may harbour rare earths. And Wysoczanski says rare earths could also be found in mud around manganese deposits known to exist in the Great South Basin south of the South Island, albeit at depths of 4000m in an ocean renowned for extreme weather. Last November Niwa announced a joint venture with the US National Oceanic and Atmospheric Administration, with New Zealand piggybacking on US budgets and equipment to investigate marine areas such as the Kermadec seamounts. Could the Pacific be on the verge of a rare earths boom? Maybe. But the risks are high and the odds are long. A key question is whether deep-sea mining for rare earths is profitable, compared to open-pit mines in China, the US and Australia, or the prospect of more in Canada, Greenland, Russia, Sweden, Brazil and Vietnam.

Rare earths are not, in fact, particularly rare. However, they are not often found in high concentrations and can be difficult to mine and refine. The average percentage of rare earths taken from China's Bayan Obo iron ore mine - the rare earths are a by-product - is 6 to 7 per cent, explains Gareth Hatch, co-founder of Illinois-based Technology Metal Research. Rare earths separated from clay in southern China have an even lower yield, just a few hundred grams per tonne. "Light" rare earths, such as cerium, used in glass manufacture, are more concentrated and worth less. "Heavy" rare earths, like dysprosium, used in magnets and a vital component in hybrid cars such as Toyota's Prius, are less concentrated and worth more. Kato reported that some deep-sea deposits had twice the levels of dysprosium as found in China's clay mines.

Price and availability are everything for minerals with increasing strategic value. Back in 1992 Communist Party leader Deng Xiaoping declared: "The Middle East has oil. China has rare earths." According to *Forbes* magazine, China increased rare earth production 40 per cent annually from 1978 to 1989, undercutting the US. As rare earths are crucial to missile, laser and radar systems, the US is pushing to develop its own supplies, following a dispute over China's quota system. The US, Japan and the EU accused Beijing of reducing exports to favour domestic industries, and filed a



World Trade Organisation complaint in March last year. Despite slumps in 2009, as the global recession kicked in, and in 2011, rare earths are a hot commodity. Last year usage in China alone was estimated at 80,000 tonnes, leaving Molycorp's Mountain Pass mine in California - recently reopened - and Lynas Corporation's Mt Weld mine in Western Australia (with final processing in Malaysia) to pick up the slack.

Will the Japanese discovery precipitate deep-sea mining for rare earths (Japan also claims to have found deposits in its own Exclusive Economic Zone)? No one is sure. The International Seabed Authority - the body established to regulate mining beyond Exclusive Economic Zones - says interest in deep-sea mining "has increased rapidly and significantly after decades of being 'on hold'". The IPA has issued 13 licences to private companies, state-owned organisations and Governments, including India, China, Russia and Japan. Six are pending. There are two ways to recover marine rare earths. Slurry can be pumped through pipes from the seabed to a stationary platform or ship and "dewatered". Further processing would then be done on land. Or robot bulldozers can scoop material into skips, which are then hauled to the surface. "They're very doable," says Wysoczanski. "It's just a matter of cost."

Speaking in Auckland last December at a meeting of Pacific Island states from the Pacific Economic Co-operation Council, Kato said marine rare earth concentrations were up to 10 times those on land. He estimated a single mining ship could extract 15,000 tonnes of mud each day, making US\$150 million plus in a year (\$182 million). On the surface it is a beguiling vision. But probe deeper, perhaps in stormy waters remote from help, such as parts of New Zealand's EEZ, and it is fraught with technical, environmental and financial risks. Vital as they are, demand for rare earths is expected to be only \$2 billion to \$3 billion by 2014, just 1 per cent of the present market for iron ore. "There's just no way those projects are economic, first at current rare earth prices, and second, when you have so many other projects, literally hundreds, on land that are so much easier to exploit," says Hatch.

The mining majors, BHP Billiton, Rio Tinto and Vale, appear uninterested in rare earths. Why would they sink their money into high-risk seafloor ventures? "Rare earths would have to be astronomically high in price. And that would probably kill demand anyway. I just don't see it. I really don't." Nonetheless, interest is growing. "I don't think there is a boom. There's no deep-sea mining. It's more a process," says Robert Makgill, environmental law director with Auckland-based North South Environmental Law. "It's certainly an industry in which a lot of interest has been shown." Makgill has been involved with an EU-funded effort to help Sopac, or the Secretariat of the Pacific Community (Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu and Vanuatu) develop "a legal framework to allow for deep-sea mineral exploration and mining".

Given the tiny economies of most Sopac members, this is potentially huge. "It's a big carrot for some of these Pacific Island states," says Makgill. "They don't have industry. They don't have a lot of primary resources. And this is one way for them to obtain some wealth so they can provide some decent infrastructure for their country. It really is a question of how effectively they can regulate those activities." It is a prospect that needs big outside players: investors with capital, mining companies with expertise and technology, and legal experts who can write guidelines. The move to establish a regulatory authority, licensing regime, environmental safeguards and more is led by British lawyer Hannah Lily. Certainly, deep-sea mining would have significant impacts, not least the interest they would attract from powerful states.

First cab off the rank is Canada-based Nautilus Minerals, which has a project - Solwara 1 - at 1500m in the Bismarck Archipelago in PNG waters. Tonga and Nauru have applied to the ISA for exploration licences. Neptune Minerals, a US company, holds licences for Vanuatu, the Federated

States of Micronesia and New Zealand, and since 2005 has been exploring massive seafloor sulphide deposits which may yield lead, zinc, copper and rare earths along the Kermadec Arc. Belgium's G-TEC Sea Mineral Resources, backed by their government, has also signed an exploration licence with the ISA for the central Pacific. And there is renewed interest in the Clarion Clipperton Zone, where the US salvaged K-129. In March the Guardian reported that British Prime Minister David Cameron wanted to "put Britain at the forefront of a new international seabed mining industry that could be worth £40 billion (\$74 billion) to Britain's economy over the next 30 years." Lockheed Martin would lead the charge, said Cameron, allowing Britain to compete with China and Russia "in the global race". The Prime Minister told a business group that a government-private consortium involving UK Seabed Resources - a Lockheed Martin subsidiary - has an exploration licence for 58,000sq km of the Clarion Clipperton Zone. The US has never ratified the UN Convention on the Law of the Sea, but Britain has, so a British-based company can apply for an ISA licence to explore international waters.

Seaboard Resources will use data generated by the sub hunt in a venture that Lockheed Martin acknowledged as "a complex engineering challenge". In March, *Foreign Policy in Focus*, published by the Institute for Policy Studies, a US think tank, reported that Lockheed was negotiating with Fiji's military regime "to fast-track and sponsor deep seabed mining". The report claimed the giant company was consulted well before other stakeholders and that a draft decree of the agreement "criminalised protest of the Fiji International Seabed Sponsorship Authority, which could be read as providing a blanket of coverage for Lockheed Martin to pursue experimental deep seabed mining without public protest". A robust regulatory framework allows for transparency. "That's probably the big question," says Makgill. "What kind of regulatory framework will you put in place?" And once adopted, law must be administered. "There are some big questions surrounding this. And it does need to be watched carefully."

Take the environmental price. The rare earths industry produces heavy metals and radioactive waste. Processing deposits from mud, using acid leaching, is easier. But big pitfalls remain. Critically, life in the ocean deep is sulphur-, not oxygen-based, provoking concerns about damage to fish stocks if sulphite particles enter food chains, driving acidification. For Pacific states that depend on fishing and tourism, this is a serious threat. There are also fears that mining could trigger ocean floor landslides, damage hydrothermal vents or release radiation. Then there's waste. Where do small states store waste? How do they manage the process? Wysoczanski says "more than half" of Niwa research on mining hydrothermal vents is focused on the potential impacts on biodiversity of toxic chemicals or of particulates - fine rock particles - in the water.

"They can effectively clog up organisms. Especially those that don't move. So it can wipe out vast areas. We just don't know yet." Wysoczanski is sceptical of Kato's claim that 1sq km of seabed could furnish a fifth of annual global rare earth demand. "I suspect it would be larger. And that's the problem." As arguments over oil exploration in New Zealand suggest, finding best practice rules for inherently risky deep-sea mining is not easy. "It's a hugely unknown environment," says Makgill. "Scientifically, any activities we undertake in those environments really are dependent on a precautionary approach and effective management." In the meantime, any deep-sea rare earth bonanza remains at the exploratory stage. Its future might depend as much on how China handles quotas, as on the technical, legal and financial challenges of mining the deep blue.

### **Nautilus: Seafloor mine has advantages**

Post-Courier, April 17, 2013

By *GRACE TIDEN*

SEA floor resource production offers many social and environmental advantages for mineral devel-

opment, says Nautilus PNG corporate social responsibility advisor Ray Lari. Mr Lari who did a presentation on Monday during the first day of the PNG Marine Program workshop in Kokopo in ENB said some of the advantages of sea floor resource production include minimal waste, minimal overburden or stripping, reusable infrastructure, limited social disturbance and increased worker safety. He also said Nautilus Minerals remained committed to PNG and has taken a responsible approach to develop the Solwara 1 project. In applying the precautionary approach, the company's plans on minimising the impact on the sea environment include having a fully enclosed system as well as using biodegradable fuels and oils in all subsea equipments. Mr Lari also said there will be no hazardous chemicals, no blasting and no tailings to be discharged into the sea, adding that all ore processing will be done offshore. Nautilus is also working on a concentrator solution that would mean no tailings are produced from the Solwara 1 project at all. This reiterated the "above and beyond" measures that Nautilus has taken to ensure that the project was done responsibly and the company hopes to set a good example for other companies.

Mr Lari said during awareness programs, coastal villagers continue to raise concerns on their fish resources, but he made it clear that there will be no extraction impact shallower than 1300 metres water depth, which meant that the livelihood of the people who rely on fish will not be affected as there will not be any harm done to the fish. He said that mitigation strategies have been developed by a team of independent world experts and all strategies suggested were accepted by Nautilus. Some of the protection measures include setting aside a reference site, refuge areas within Solwara 1, animal relocation and installing artificial substrates. He also said independent monitors and reviewers will be present during the actual mining of the sea floor and the company will be transparent in all its activities. Mr Lari also highlighted the company's assistance towards maritime safety in PNG. He said Nautilus exploration data has already been made available to PNG's National Maritime Safety Authority which will improve details of navigational charts.

### **Cooks seabed minerals attracts Chinese**

PACNEWS, 11/04/2013, Cook Islands

A five member team from China is due to arrive in the Cook Islands this week to explore whether it's worth investing in the country's seabed mineral resources. The China Ocean Mineral Resources Association is also visiting Fiji and Samoa to check out theirs. The Cook Islands Seabed Minerals Authority (SMA) has put out international tenders of exploration blocks and the Chinese want to examine whether the country and Government is stable. SMA Commissioner Paul Lynch told Cook Islands News that it will not necessarily accept the highest tender but will look at other things such as environmental impact and equipment. Also in Rarotonga are top officials from the Pacific Islands Applied Geoscience Commission which has been helping the Cook Islands with its deep sea mineral regulations.

### **SOPAC defends its work on Pacific undersea mining**

Radio Australia, 4 April 2013

The region's main technical organisation SOPAC has defended itself against claims it is promoting the interests of companies wanting to exploit undersea mineral deposits. SOPAC is the science arm of the Secretariat of the Pacific Community, and has been working on an EU funded "Deep Sea Mining Project". That's led to criticisms by NGO's its working for the mining industry, not the Pacific nations. With the world's richest deep sea deposits of gold, silver, cobalt manganese and other minerals found in the Pacific there has been a rush by mining companies to take up exploration leases. But the Director General of the SPC Dr Jimmie Rogers says any deep sea mining in the Pa-

cific must be sustainable and protect the environment, and he told Pacific Correspondent Campbell Cooney that that is the focus of the SOPAC project.

### **Nautilus runs financing under gun from suppliers**

*Nautilus Minerals explains the rationale for a C\$40 million rights offering amidst crisis.*

Author: Kip Keen, 04 Apr 2013, HALIFAX, NS (MINEWEB)

The timing of Nautilus Minerals' C\$40 million rights offering, announced a week ago, may have come as a surprise. Nautilus is in the midst of a battle with the Papua New Guinea government over their partnership in the Solwara 1 underwater mining project that has punished its shareprice in the past year. Meantime Nautilus President and CEO, Michael Johnston, has also recently said resolution to the PNG-Nautilus dispute may be on the horizon. Indeed, in a conference call for investors on Thursday, Johnston gave his firmest indication yet possible resolution could come and pretty soon; sometime around the third quarter this year, he said. In an ideal world, Nautilus might hope to raise cash after the crisis has been resolved. Since the news of the dispute came to the fore mid-last year Nautilus' shareprice has sunk from over \$2 to well under C\$0.50, where it has stayed for the better part of the past five months. Presumably a resolution of the dispute would help mend such shareprice damage and ease financing options. But this is not an ideal world.

The need to finance now comes down to a matter of keeping suppliers happy – invoices paid – and thus key contracts alive that would otherwise fall to the wayside, causing multi-year delays. This, according to Nautilus, is due to uncompromising order schedules of its subsea-equipment builders. To conserve cash Nautilus cancelled what it saw as non-critical contracts late last year. These, Johnston noted, would be easy to restart. But it signalled at the time, as Johnston reiterated Thursday, that it would enter talks with other suppliers – who primarily build equipment for the oil and gas industry - about whether it could easily stop and restart these other contracts. “We maintained discussions with those suppliers because of the heated nature of the oil market and our concern that those particular contracts if stopped would be very difficult to start again,” Johnston said. In short, the message from such suppliers was: if you delay the contracts, you risk being shunted to the back of the line. “Slots are pretty much taken up for the next few years on construction of these sorts of tools,” Johnston said, adding it was “very important that we maintain those slots.”

Such a state of affairs factored large in Nautilus ongoing pursuit of the awkwardly-timed C\$40 million financing through a rights offering comprising 200 million more shares @ C\$0.20, which, as a rights offering, will mostly be available to existing shareholders. It also has some firm backing on the financing that could see an already significant shareholder gain a greater stake in Nautilus. Nautilus has said MB Holdings, which owns about 16.9 percent of Nautilus shares, agreed to pick up any stock other shareholders do not take via the rights offering. “It gives us a lot more certainty,” Johnston said, speaking to the timing of the financing more generally. “Getting resolution is one thing. Getting money in the bank is another. So that's one of the reasons why we've gone for the rights issue now. “The other thing is the timing. It does take time to put together and fully close an offering like this. So if we were to wait until resolution was achieved, formerly, then we would still have, roughly, a two month closure process, which would potentially leave us hanging out in the wind a bit.” Apart from MB Holdings, Nautilus also counts Metalloinvest, Anglo American and Teck as significant shareholders with about 21 percent, 11 percent and 5 percent of Nautilus' stock, respectively. It was not clear if any of these three intended to pick up additional shares in the rights offering. They had not responded to an emailed request for comment at presstime.

## **SPREP Warns Pacific Mining Outpaces Biodiversity Studies**

*Director says companies should fund research into impacts*

By Jemima Garrett

MELBOURNE, Australia (Radio Australia, April 3, 2013) – The peak environmental body in the Pacific warns ocean research is lagging behind mining exploration of the sea floor. The Pacific sea bed has abundant deposits of gold, copper, silver, cobalt, manganese and other minerals. David Sheppard, the director of the Secretariat of the Pacific Regional Environment Program (SPREP), says the potential environmental impacts of mining can't yet be fully understood because of the limited knowledge of the Pacific's biodiversity. "There's so much that isn't known. A study of sea-mounts indicated that one-third of the species were actually new to science," he told Radio Australia's Pacific Beat. "So it's likely that the more studies that are undertaken, the more new species will be discovered."

Mr. Sheppard says Pacific countries have little money to fund such research, and it should be up to mining firms to pay for independent studies. "The companies need to allocate money for independent scientific studies of the biodiversity and the environment in the deep sea, and particularly the impacts that may be associated. "So this is an area that is lagging behind exploration of mineral resources, but it is important - it does need more attention." Mr. Sheppard says his organization is working on creating a broad coalition of expertise to improve knowledge and management of the Pacific. "The aim would be to get key stakeholders, and that includes civil society, environmental experts in the governments of Pacific countries, and also those people that are knowledgeable in this area. "So we'd like to have a cross-section to have quality participation and to really come out with some useful recommendations as we go forward."

## **German research director charts future of undersea mining**

Ivan Semeniuk, The Globe and Mail, Published Mar. 26, 2013

The ocean floor is littered with hidden treasure including gold and other valuable metals that are in high demand on world markets. This is the undersea realm that most excites Peter Herzig, an economic geologist who supports responsible development of marine resources and who heads GEOMAR, one of the world's largest centres for ocean research, based in Kiel, Germany.

No one has yet managed, on a commercial basis, to mine the seafloor for precious metals, though Toronto-based Nautilus Minerals Inc. has come close. It is currently pursuing a deal to develop the Solwara 1 gold deposit off the coast of Papua New Guinea, which Dr. Herzig first explored about a decade ago. The company (which is not connected to Dr. Herzig) now says the project is on hold while it seeks to resolve a contract dispute with the PNG government. Meanwhile, exploration licences have been granted to various countries interested in mining the central Pacific for its manganese nodules – potato-sized lumps of metal that are widely scattered throughout international waters. This week, Dr. Herzig was in Toronto to lay out the risks and benefits of mining the ocean for its resources. He also sits on an expert panel currently assessing Canada's ocean science program. Dr. Herzig's strong connections with Canada began in 1988 when he was a postdoctoral fellow at the University of Toronto. He spoke with The Globe and Mail about the coming era of ocean resource development as well as the state of Canada's presence on and under the waves.

### **What's the attraction in undersea mining for gold?**

Metal prices have increased considerably and there is growing demand from Asian markets. Even though the deposits are not particularly large, the metal concentrations are extremely high and at current prices, the deposits are commercially viable.

### **What about the impact to the seafloor environment?**

I think it's possible to do it in a sustainable way because the impact is focused only on the mining area.

**How did the gold get there?**

In volcanically dominated areas there are magma chambers that lie 2 or 3 kilometres below the sea-floor. Seawater is pushed down into cracks near these chambers where it is heated to hundreds of degrees and chemically converted, becoming very acidic. As the water comes back up, it leeches gold, copper, zinc, indium (which is used to make flat-panel video screens), and other metals. At the seafloor the metals combine with sulphur and precipitate out of the water.

**Where are the most attractive deposits located?**

They are in the western to southwestern Pacific. That includes Papua New Guinea, Fiji, The Philippines, New Zealand, and also Tonga, where the government of South Korea has applied for a licence.

**What do you say to people who argue that these deposits should be left alone?**

My answer is that in a few decades we will have ten billion people on the planet and the pressure on the oceans for food, energy and resources will undoubtedly increase. We need to be able to reach a balance between the economic use of the oceans and the protection of marine ecosystems.

**What about mining for manganese nodules?**

That's more of an ethical question. These things took millions of years to form. Do we want to go and take them? Manganese-nodule mining would mean disturbing something like 200 square kilometres per year, so you can imagine what would happen to the central Pacific. This would greatly influence biological communities and I think it would be totally unacceptable with current technology.

**What's your assessment of the state of ocean science in Canada?**

It's not that visible and it's poor in terms of support. The people are excellent. The technology developed in Canada, such as ROPOS (Remotely Operated Platform for Ocean Science) is world class. But there was no host institution to run that, so it's faded from view. And research vessels have never been a strength of Canada, which means researchers here have to go elsewhere. Given that you have the longest coastline in the world and that claiming jurisdiction in the Arctic is a big issue for Canada, I would say there is a lot of room for improvement.

**What do you recommend?**

I have suggested that Canada set up an ocean research institute. It probably would need \$100-million to start and an annual budget of \$50-million. And it would need one or two research vessels. The Canadian government has ordered the construction of patrol vessels for the Arctic and the hope of all my Canadian colleagues is that some of those would become research vessels.

**Tonga Seabed Minerals Bill to go to parliament this year**

Matangi Tonga, March 15, 2013

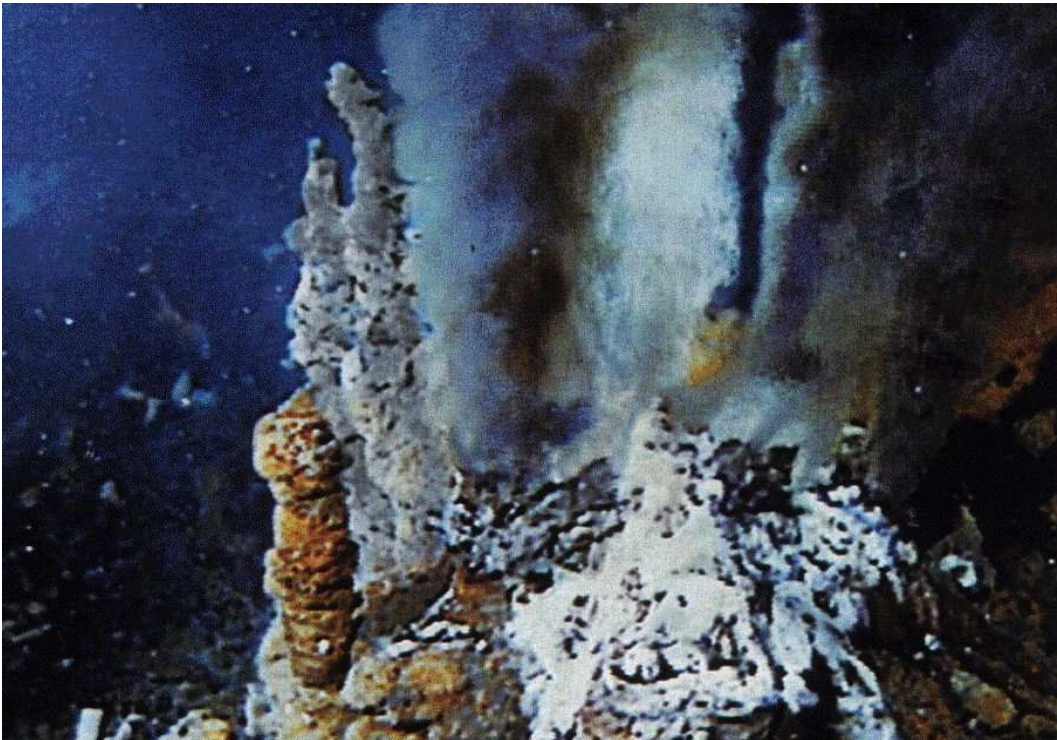
A Tonga Seabed Minerals Bill 2012 is expected to be introduced to Tonga's Parliament in July or August this year. Tonga's Attorney General Neil Adsett told Matangi Tonga when the Lands Department thinks the draft is ready to present to Cabinet for policy decisions he hoped that Cabinet would authorize the publication of the Bill for public comment before it is finalized. "The bill is on our legislative program for 2013 so we hope it will go to parliament in July or August," he said. The Attorney General talked to a Pacific-ACP States Regional Workshop on Deep Sea Minerals Law and Contract Negotiations held in Nuku'alofa this week, and gave an idea of what is in Tonga's draft Bill, at this stage. The Bill and regulations aim to cover permit regulated seabed mineral activities with an objective to efficiently manage, protect and preserve the marine environment, while promoting transparency in government decision making and to provide a stable operating environment for sea mineral companies. At the same time, it is aimed to ensure that Tonga receives appropriate financial benefit from mining companies' profits.

He said although the technology for seabed mining was new, the basic arrangements would be the same as on land. Sea mineral exploration companies need a license to prospect, explore or mine, and the environmental issues are very strictly guarded and they pay royalties to Tonga. "This is being worked out separately by the Revenue Department, who are looking at drafting a new Resources Tax Bill," he said. Tonga has a Minerals Act from 1949 that deals basically with mining on land which was amended in 1978 to cover Tonga's seabed. But it is thought that a special new Act is needed for seabed mining, said the Attorney General. Paula Taumoepeau the Country Manager of Nautilus Minerals Tonga Ltd. said that companies were asked to participate in some of the sessions at the workshop, as it dealt with legal aspects of deep sea minerals. It had provided them with a good opportunity to network with representatives from other Pacific Islands. "We learnt a lot from presentations made by leading industry members in the region like Papua New Guinea, while strengthening our network," he said.

"For Nautilus, we had the opportunity to put our views forward and updated about our project, as there were a lot of misconceptions about what we do," he said. Paula believed that Tonga needs good legislation to balance all sides from commercial, benefits, social and protection of the environment. "One workshop would not solve the issues at once, that's why it is important to have ongoing dialogues and we hope the industry will continue to be consulted on deep sea minerals," he said. This is the second of five regional technical workshops held on behalf of a SPC-EU Deep Sea Minerals Project that ends in 2014 after four years. The project was set up to provide technical assistance to states in its decision making and engagement with deep sea mineral activities. Attended by representatives from 15 Pacific Islands including government officials with some representatives from civil society, mining companies and experts from outside the region, the workshop was held at the Fa'onelua Convention Centre from March 11-15.

### **Interest in Deep Seabed Mining Increases Rapidly, Says ISA**

Subsea World News, Mar 15th, 2013



**The Secretary-General of the International Seabed Authority, Mr Nii A. Odunton says the level of interest in deep seabed mining has increased rapidly and significantly after decades of being ‘on hold’.**

Speaking at a media event in London on Thursday, 14 March for the launch of UK Seabed Resources Ltd., the latest exploration contractor with the ISA, Mr Odunton said the increase in interest was a welcome and positive development – driven by the dramatic increase in metal demand, increase in metal prices, decline in the tonnage and grade of land-based nickel, copper and cobalt sulphide deposits and technological advances in deep seabed mining and processing. He said that in recent years there have been clear signs that the private sector and the financial institutions that support it believe that deep seabed mining can be commercially viable.

He further stated that since the Authority became operational in 1996, its primary task has been a painstaking process of rule making designed to ensure that the regulatory regime for exploration is robust, predictable and providing not only for security of tenure for investors but also the necessary protection for the international community as a whole in terms of responsibility for environmental damage. The International Seabed Authority has since 2001, issued 13 licences – with another six in prospect. Established under the 1982 UN Convention on the Law of the Sea, the international community through the International Seabed Authority administers all mineral-related activities in the international seabed area beyond the limits of national jurisdiction for the common heritage of mankind, to be developed for the benefit of mankind as a whole.

**SOPAC role in Lockheed seabed mineral bid queried**

PACNEWS, 15/03/2013, Fiji

The Pacific's peak geoscience advisory body has been accused of assisting United States aerospace giant Lockheed Martin in negotiations for Fiji's new draft decree on seafloor mining. The Pacific Network on Globalisation has obtained a draft of Fiji's International Seabed Minerals Management Decree, which includes feedback from the Secretariat of the Pacific Community Applied Geoscience and Technology Division (SOPAC) in the margin. Maureen Penjuelli, the network's coordinator, has told Radio Australia's Pacific Beat those margin notes show SOPAC has taken Lockheed's Martin's side. "It is very clear that they are indeed lobbying on behalf of this one commercial entity, Lockheed Martin," she said. Lockheed Martin has approached Fiji's interim government to be the sponsoring entity for its application to explore for seabed minerals in international waters close to the Fijian coast.

SOPAC director Mike Petterson completely rejects the accusation SOPAC is advocating on behalf of a mining company. "I totally refute the allegations that SOPAC or SPC as an organisation has worked with any company of any name, on behalf of any company of any name," he said. "I totally refute that allegation." Petterson says SOPAC makes a record of stakeholder comments on the work they do, which is confidential advisory work with their member countries. "SOPAC sometimes makes a record of a specific stakeholder and then that stakeholder's views are put forward but they are not the views of SOPAC," he said.

Duncan Currie, a New Zealand barrister who has given legal advice on Fiji's draft seabed mining legislation to the Pacific Network on Globalisation says he's concerned community organisations were given just three days to comment on the draft decree. "There are a lot of important questions which have to be answered," he said. Currie says Fiji needs to take a "roots and branch approach" to developing its seabed mining legislation, ensuring requirements for environmental impact assessments, protected areas, recovery of costs and redress are covered. "One of the critical things is if there is environmental damage caused by mining, and there could very well be, then we have to be absolutely certain that money is there to clean up," he said.



## **Prime Minister Cameron says seabed mining could be worth £40bn to Britain**

PACNEWS, 15/03/2013, United Kingdom

British Prime Minister David Cameron has pledged to put Britain at the forefront of a new international seabed mining industry, which he claimed could be worth £40bn to the UK economy over the next 30 years. But the prime minister has chosen an American defence company – Lockheed Martin – to spearhead the drive to collect from the depths of the ocean the copper, nickel and rare earth minerals used in mobile phones and solar panels. Russia and China also have licences to "mine" the ocean bed but Cameron said on Thursday: "With our technology, skills, scientific and environmental expertise at the forefront, this demonstrates that the UK is open for business as we compete in the global race." Speaking at a launch at the Excel Centre in London's Docklands, he said talks were already under way with a potential supply chain of up to 100 British companies, even though the main activity will take place off the west coast of America.

The Department for Business, Innovation and Skills has, in partnership with UK Seabed Resources – a newly-formed subsidiary of Lockheed – obtained a licence and contract to explore a 58,000 sq km area of the Pacific Ocean for mineral-rich polymetallic "nodules". These rocky chunks, the size of a tennis ball, will eventually be scooped up using a seabed harvester and then broken up to release the minerals, if all goes to plan. Lockheed claims to have discovered riches in that particular area off the US coast after a bizarre hunt in the 1970s for a lost Russian submarine paid for by eccentric US billionaire Howard Hughes. The defence and aerospace group is keen to stress that its extraction measures are different from the deep-sea mining techniques that have been proposed by others and which have enraged environmentalists.

It also argues that the nodules containing rare earth minerals found on the seabed have little of the uranium content that has also been a brake on terrestrial mining in places such as Greenland. "Environmentally responsible collection of polymetallic nodules presents a complex engineering challenge but our team has the knowledge and experience to help position the UK at the forefront of this emerging industry," said Stephen Ball, the British-born chief executive of UK Seabed Resources and of Lockheed Martin UK (a company that is part of the managing consortium of the Atomic Weapons Establishment at Aldermaston as well as being a key Ministry of Defence contractor.) The science minister, David Willetts, also present at the project launch, said the UK should benefit from already being a leader in underwater robotics and autonomous systems used in the development of North Sea oil and gas.

Ball was more cautious than the prime minister about the potential to create thousands of jobs and bring in more than £1bn a year from the industry, saying he was not too keen on "aspirational promises". And while he was keen that British companies should be engaged in future deepsea production, he said they would only be chosen if they were better than the competing foreign firms. Currently the licence obtained from the International Seabed Authority (ISA) gives the UK government and Lockheed the right to explore but not extract, so a second licence would be required for that. And before any mechanical harvester is built, there will have to be a thorough environmental study, which could begin this summer.

The experience of the offshore wind industry has shown that even projects close to the coast of the UK have been driven by foreign companies using non-British suppliers. Exploration outside 200-mile territorial waters can only be undertaken through application for a licence from the ISA, established under the United Nations law of the sea convention. Russia recently signed a 15-year contract to prospect for metallic sulphides in the Atlantic, where volcanic hot springs create mineral-rich rock formations. Two applications for exploration were filed last summer for areas in the west Pacific Ocean, one from China and another from Japan. SOURCE: THE GUARDIAN/PACNEWS

## UK Seabed Resources joins deep-ocean mineral-mining rush

David Shukman, BBC News, 14.3.2013

A new and controversial frontier in mining is opening up as a British firm joins a growing rush to exploit minerals in the depths of the oceans. UK Seabed Resources is a subsidiary of the British arm of Lockheed Martin. It has plans for a major prospecting operation in the Pacific. The company says surveys have revealed huge numbers of so-called nodules - small lumps of rock rich in valuable metals - lying on the ocean floor south of Hawaii and west of Mexico. The exact value of these resources is impossible to calculate reliably, but a leading UN official described the scale of mineral deposits in the world's oceans as "staggering" with "several hundred years' worth of cobalt and nickel". An expedition to assess the potential environmental impact of extracting the nodules will be launched this summer amid concerns that massive "vacuuming" operations to harvest the nodules might cause lasting damage to ecosystems.

With the support of the British government, UK Seabed Resources has secured a licence from the United Nations to explore an area of seabed twice the size of Wales and 4,000m deep. Under the UN's Convention on the Law of the Sea, mining rights on the ocean floor are controlled by a little-known body, the International Seabed Authority, which since 2001 has issued 13 licences - with another six in prospect. These licences, valid for 15 years, have been bought for \$500,000 each by government organisations, state-owned corporations and private companies from countries including China, India, Russia, Japan and South Korea. The high prices fetched for copper, gold and rare-earth minerals are leading to a surge in interest in mining the ocean floor. The idea first surfaced in the 1970s but was dropped because the costs were too high and the technology could not cope. The nodules are known to contain up to 28% metal - 10 times the proportion found on land.



The chimneys contain many metals in high abundance

A similarly high metal content is found in another target for seabed mining: hydrothermal vents, chimneys formed by extremely hot water, rich in minerals. We reported on the discovery of the world's deepest vents last month. Stephen Ball, chief executive officer of Lockheed Martin UK, owner of UK Seabed Resources, says the engineering experience of offshore oil and gas operations and the trend to rising mineral prices have now combined to make seabed mining feasible. "It's another source of minerals - there's a shortage and there's difficulty getting access, so there's strategic value for the UK government in getting an opportunity to get these minerals," he told the BBC. China's domination of the global production of rare-earth minerals in particular has fuelled the search for other sources of materials essential for everything from electronics to wind turbines. But many marine scientists and conservationists have warned that the implications of this deep-sea gold rush are not yet understood - and that mining nodules or hydrothermal vents could prove catastrophic for seabed ecology.

Mr Ball said exploration over the next three years would establish whether a system to vacuum up the nodules could be designed to cause minimal impact. The nodules typically lie in a shallow layer of silt. He said he believed it would be "perfectly feasible to create a benign method to extract these minerals from extreme depths without disturbing the seabed." "But until we've demonstrated that, there will be a debate around that." One risk is that the mining operations could generate huge plumes of sediment that could drift through the sea - choking any marine life that feeds by ingesting water and filtering out its food sources. Michael Lodge, general counsel for the International Seabed Authority, told me that the authority's aim was to encourage a new mining industry to exploit seabed minerals but within strict environmental controls. "The nodules are generally lying in sediment that is between 2-6in (5-15cm) thick that's been there undisturbed for millions of years. We simply don't know the recovery times or the distribution of species - there are lots of uncertainties." He described mining hydrothermal vents as "more invasive" because it would involve breaking up the uppermost metre of the sea floor and piping the rock fragments to the surface.



Companies believe they can find low-impact mining methods

A Canadian company, Nautilus Minerals, is hoping to be the pioneer of vent mining with plans for operations off the coast of Papua New Guinea. However, work is currently delayed because of a legal dispute. The concern is for the impact mining could have on ecosystems. Nautilus would use massive robotic machines, which are being built in Wallsend, near Newcastle-upon-Tyne, by a firm with long experience of marine engineering, Soil Machine Dynamics. Nautilus says that it is devising strategies for minimising the environmental impact, by trying to contain any disturbed sediment and leaving parts of the seabed untouched so the mined area can be recolonised by marine life. A leading biologist, Professor Cindy Van Dover of Duke University in North Carolina, has carried out research for Nautilus and says life might recover after a single mining event but that no-one can be sure.

"How do we do this so a hundred years from now somebody doesn't look back at us - at me - and say 'Oh my God, I can't believe they were so stupid and let this happen in a particular way'. "So how do we do it right? How do we do it sustainably? Michael Lodge has also said questions will remain about profitability while the final terms of mining licences are settled. The authority was set up to encourage and manage this new sector but any future business, such as the Lockheed Martin subsidiary UK Seabed Resources, will have to pay royalties to the authority to be distributed to developing countries. The exact details have still to be negotiated. Research into seabed minerals has a long and slightly conspiratorial history, starting in the Cold War with the United States and the Soviet Union surveying the oceans ahead of possible future conflict. Surveys of seabed nodules in 1970s were also used as a cover by the US for the secret retrieval of a lost Soviet submarine. Now, the legacy of all that research and exploration is the growing likelihood of large-scale mining operations, fuelled by rising mineral prices, in many parts of the ocean in the coming decades.

## **Pacific Must Regulate Deep Sea Resources: Vaipulu**

*Deputy PM says islands must collaborate on laws*

MELBOURNE, Australia (Radio Australia, March 13, 2013) – Tongan deputy Prime Minister Samiua Vaipulu says Pacific island nations need stronger regulations to protect their deep sea mineral resources. Mr. Vaipulu told a Pacific-ACP States Regional Workshop on Deep Sea Minerals Law and Contract Negotiations in the Tongan capital, Nuku'alofa, that countries in the region need to develop more robust laws. Representatives of 15 Pacific states are attending the week-long workshop. Mr. Vaipulu told Radio Australia's Pacific Beat program that countries like his are vulnerable to big mining companies who have experience and expertise in developing contracts. "We need to train our people to negotiate and make legislation so that it should be a win-win situation," he said. His warning comes as global interest in the prospects for deep sea mining in the Pacific continues to grow. Director of the Applied Geoscience and Technology Division of the Secretariat of the Pacific Community (SOPAC), Mike Petterson, told local media the regional workshop would focus on developing legislation and regulations regarding deep sea minerals.

### **Maximising benefits**

"What we want to achieve is largely capacity building," he said. "As like any other economic activity, Pacific states are a little bit compromised by multinational and well-resourced companies coming in." As more deep sea mineral resources are identified, Pacific nations need to work to maximize the benefits and minimize impacts on the environment, Mr. Petterson says. Mr. Vaipulu says Pacific nations need to collaborate to create an effective and transparent system. "We have to look at it as a group, not as individuals," he said. "Because as a group we'll be stronger." A deep-sea mining bill drafted in Tonga in 2012 is expected to be brought before the parliament later this year.

## **Cook Islands Seabed mining rules tightened**

PACNEWS, 13/03/2013, Cook Islands

The Cook Islands has signed a declaration under the Seabed Minerals Act that no seabed mining activity will be carried out within 50km of any of its islands. Natural Resources and Minerals Minister Tom Marsters says the seabed minerals sector will be adopting the strictest international environmental standards. He says the Cook Islands EEZ contains a unique abundance of manganese nodules which are highly valuable as they contain many important minerals. The Seabed Minerals Authority has contracted English professor David Cronan to do a resource assessment which will be released to the public in a few weeks.

## **SOPAC assists Fiji/Lockheed Martin in new deep seabed mining legislation**

ImiponoProjects, March 12, 2013, By arnie

Currently, US military contractor, Lockheed Martin, is negotiating with Fiji's Bainimarama administration to fast-track and sponsor new legislation that would allow the private U.S.-based transnational titan to delve into experimental deep seabed mining. Because the U.S. has not ratified the UN Convention on the Law of the Sea (UNCLOS), U.S. industries cannot engage in deep seabed mining in international waters, outside of a country's Exclusive Economic Zone (EEZ). In the 1970s, before UNCLOS, Lockheed had conducted an analysis of the nodules found in the Clarion-Clipperton zone, just below the Hawaiian Islands. Now, large industrial mining companies are jockeying for position to be the first to successfully vacuum up Pacific resources, which include rich deposits of gold, silver, copper, nickel, manganese, and rare-earth minerals. Little is known about the deep seabed, and no conclusive environmental study has been completed. What is known is that

the life that thrives in this unusual environment is sulfur-based rather than oxygen-based and we do not know how this sulfuric sediment will impact ocean bio-diversity.

There is also no regulatory oversight guiding the technology that seeks to raze the deep ocean floor and suck up the minerals. *SOPAC* (the Applied Geoscience and Technology Division of the Secretariat of the Pacific Community) began operation on January 1, 2011 and was established by the Pacific Island Leaders Forum to include the assessment of the potential of ocean and onshore mineral resources, coastal protection and management, and geohazard assessment. However, with no conclusive Environmental Impact Assessment or statement, the concern that *SOPAC* is working on behalf of Lockheed Martin, one of the world's largest private military contractors, should not only betray the trust of Pacific Island Forum countries, but also damage the legitimacy of the scientific community at large.

In an October 2011 press release, *SOPAC* announced the contracting of Hannah Lily, Solicitor for the British Government to be their legal advisor to the Deep Sea Minerals Project and she has since been working on behalf of Lockheed Martin, advocating for legal changes to Fijian law. Her comments governing the environmental, regulatory and investment agreements concerning deep seabed mining are further troubling since Fiji's president Bainimarama is viewed to be illegitimate by many. The Bainimarama regime has not held elections since the 2006 military coup, and New Zealand and Australia have only recently restored diplomatic ties with Fiji. It could very well be that it is through Hannah Lily's contract with *SOPAC*, that British PM David Cameron has just pledged to "put Britain at the forefront of a new international seabed mining industry, which he claimed could be worth £40bn to the UK economy over the next 30 years," according to the Guardian.

Further entrenching *SOPAC* into what is beginning to look like a cover-up, on March 6, *SOPAC* requested that the Pacific Network on Globalization (PANG) remove an article, "U.S. giant using *SOPAC* and Fiji regime to access seabed minerals in international waters" from its website and we have obtained copies of both the article and Hannah Lily's comments to the draft decree. Additionally, section 46 of the draft decree criminalizes protest of the Fiji International Seabed Sponsorship Authority (FISSA), which could be read as providing a blanket of coverage for Lockheed Martin to pursue experimental deep seabed mining without public protest.

### ***SOPAC's* challenged to respond on role in controversial new decree**

Island Business, 12 March 2013

A verbal warfare is developing between the Pacific Network on Globalization (PANG) and regional organisation *SOPAC* over its role in the drafting of the controversial new laws on seabed mining. In a statement issued today, PANA is calling on *SOPAC* to respond to criticism of its role in the drafting of controversial new laws on experimental seabed mining and to clarify its relationship with the mining industry. PANG's statement said: "On March 6 *SOPAC* requested PANG remove an article "US giant using *SOPAC* and Fiji regime to access seabed minerals in international waters" from its website. PANG is not the author of the article, but believes it raises a number of key concerns that *SOPAC* should publicly respond to. "PANG has made clear its position; legislation is unnecessary and dangerous at this point in time. PANG views the "draft Fiji International Seabed Mineral Management Decree 2013" as a classic example of what is fundamentally wrong with *SOPAC's* seabed mining project: supposed consultation processes are a farce; there are serious questions over whose interests *SOPAC* is representing, there is preferential treatment given to foreign multinational corporations; and, there is a complete failure to defend and ensure inclusive, transparent and fair processes.

“The SOPAC project gave a green light to foreign companies but the consultation process was a total farce with civil society groups given less than 3 days to comment. In breach of all of the fundamental principles of legislation the decree has been drafted specifically for one commercial entity that has been given priority access to be consulted on the document. “SOPAC maintains it is mandated by Pacific Island Countries and Territories yet comments from its own staff on Lockheed Martin’s position in Fiji’s draft decree raise serious questions as to whose interest SOPAC is representing. As the “agency mandated to provide development assistance to Pacific Island Countries and Territories”, particularly with a project that seeks to regulate foreign companies, SOPAC cannot be, or even give the appearance, that it is facilitating, meeting or giving preference to these multinational foreign companies.

“In yesterday’s Fiji Times, SOPAC’s Hannah Lily is quoted as saying that, “it was important for countries to put in place strict laws and regulatory mechanisms to manage deep sea minerals before any negotiations took place”. PANG finds it hard to believe that any negotiations will be meaningful when the party you are negotiating with has commented and taken an active part in drafting the legislation before national democratic processes have been undertaken. Nowhere in the comments posted on the draft by SOPAC staff do we see any push back by SPOAC or alternative recommendations. “Finally, SOPAC asserts that one of the key aims of its project is to ensure transparency, dialogue and inclusiveness of all actors. However in the draft decree, SOPAC does not even attempt to make a case for the deletion of Clause 46 which would make illegal and criminal any attempt by civil society groups to voice opposition. Surely SOPAC cannot condone such a provision? The silence by SOPAC on this clause makes a mockery of SOPAC’s claims for transparency, dialogue and inclusiveness,” the statement.

### **Pacific Islands need robust laws to protect their deep sea minerals**

PACNEWS, 12/03/2013, Tonga

The Pacific Islands need to protect their deep sea minerals, Tonga's Deputy Prime Minister, Samiu Vaipulu told a Pacific-ACP States Regional Workshop on Deep Sea Minerals Law and Contract Negotiations that opened at the Fa'onelua Convention Centre, in Nuku'alofa Monday. Representatives of 15 Pacific States are attending the week-long workshop. Mike Petterson the Director of SOPAC, the Applied Geoscience and Technology Division of the Secretariat of the Pacific Community (SPC), said the workshop will focus on the legislative and regulatory aspects of deep sea minerals. He said the workshop is aimed at sharing information on a number of developments that SOPAC is working on, including developing legislation for the extraction of deep sea minerals. "What we want achieve is largely capacity building, as like any other economic activity, Pacific states are a little bit compromised by multinational and well-resourced companies coming in," he said.

“We need to know how to negotiate and drive a hard deal. We have to prepare ourselves as best we can by developing our negotiating skills, along with a network of people that we trust and know, and to work with industries and countries that we feel that will be responsible and want a long-term working relationship, and for our communities to benefit while the environment is protected as best we can.” Petterson said some Pacific Island Countries already have legislation for deep sea minerals. But it was a new thing for the Pacific Islanders to consider who has the rights to the minerals, who gains from it and how can we put in place a transparent system, while looking at the environmental issues, he said. He said for decades the main issue had been the lack of knowledge as to where minerals are, what type of minerals are out there, as there are many deposits to discover in the ocean.

“But we are now at a point where there are few areas in the Pacific that have been identified to be attractive and that's a breakthrough. Now it is becoming an economic reality and to make sure that countries maximize the benefits, which is never easy and requires hard work so we want representatives to walk away armed with more knowledge and be aware of the range of issues we have to cope with,” he said. Hannah Lily, the Legal Adviser for the Pacific Ocean Deep Sea Minerals Project said on 05 March that the project stresses the importance for countries to put in place robust law and regulatory mechanisms for the national management of deep sea minerals before negotiations take place. “We strongly recommend that countries have these mechanisms in place before any individual project negotiations start. Dedicated seabed minerals legislation will assist the country to meet under international law, such as protection of the main environment. It will provide clarity, stability to that country's operating environment and what it expects from mineral companies.”

She said seabed mineral resources represent an exciting new economic prospect for Pacific Islands, but, in order to make the most of this opportunity, governments will need to find responsible exploration and mining companies, and work to set terms that provide sufficient protection and financial return to the country. The workshop held on behalf of the SPC-European Union Pacific Deep Sea Minerals Project is the second of five regional technical workshops. It is attended by government officials, non-government organisations, environmental groups and others. The first Regional Workshop on Geological, Technological, Biological and Environmental Aspects of Deep Sea Minerals was held in August 2012 in Fiji. Tonga has three mineral exploration companies, the Blue-water Metals South Pacific Ltd. of Australia, Nautilus Minerals Tonga Ltd., and KORDI, the Korean Ocean Research and Development Institute. Tonga also has in place a Minerals Act which started in 1949 to establish the ownership and provide for the control of minerals found within Tonga. It is understood that a Deep Sea Mining Bill was drafted last year. MATANGI TONGA/PACNEWS

### **States urged to unite on mining**

Dawn Gibson, The Fiji Times, March 11, 2013

THE Pacific Conference of Churches has called for governments to stand together with their people in solidarity on the issue of mining. At the PCC's 10th General Assembly which ended in Honiara, Solomon Islands at the weekend, delegates spoke about the need to address the negative impacts associated with mining in the Pacific. "Churches throughout the region will develop specific positions on mining, tourism, fisheries and forestry in a resolution passed in Honiara," a statement read. This resolution was agreed upon by member churches at the meet, who confirmed that they would stand alongside others in the region who were struggling to deal with the negative impacts of mining in their respective communities. "Delegates agreed there was a need to facilitate the concerns of members by engaging on the issue with agencies such as the Pacific Islands Forum Secretariat and the Melanesian Spearhead Group," the statement said. Apart from the issue of mining in the Pacific region, other issues such as HIV/AIDS, seabed mining, nuclear testing and human rights were also discussed at the meeting.

### **Australia using its boomerang aid to push experimental seabed mining in Pacific**

PNG Mine Watch, March 11, 2013

The Australian government is spending \$900,000 to promote experimental seabed mining in the Pacific region. This is despite the widespread opposition to this untried new technology and the failure of existing mining projects to deliver meaningful benefits and their appalling environmental and social costs. The Australian government's aid agency, AusAID, has awarded the three-year contract to the Australian National University. The purpose of the project is supposedly to help 'developing countries best manage seabed mining'. The spending is part of a range of projects initiated

by the Australian government which focus on promoting a mining agenda in the Pacific region. The mining industry dominates the Australian economy and holds a powerful influence over its politicians, bureaucrats and academia.

According to AusAID this latest project has three main aspects: First, it will locate and test the assumptions underlying developing state-sponsored deep seabed mining, including assumptions that developing states will capture significant revenue, that such revenue will be directed at sustainable development, and that environmental risk can be minimised and managed. Second, it will identify and develop legal options (national and international) for the effective participation of developing states in environmentally sound mining activities in the deep seabed both within and beyond national jurisdiction. Third, it will explore developing country options for structuring strategic alliance and cooperation. The project will be focused on Papua New Guinea; Nauru; Cook Islands, Solomon Islands, Vanuatu, Tuvalu, Kiribati, Tonga, Fiji. The European Union is also funding a similar project promoting experimental seabed mining in the Pacific.

### **Pacific Church Leaders Urged To Be Environmental Stewards**

*Theologian says churches must address regional climate change*

By Bradford Theonomi

HONIARA, Solomon Islands (Solomon Star, March 7, 2013) – Pacific church leaders attending the 10th Pacific Conference of Churches (PCC) in Honiara, Solomon Islands have been challenged to be good stewards of the environment. Senior lecturer in Theology and Ethics at the Fiji-based Pacific Theological College, Solomon Islander Dr. Cliff Bird made the challenge during his presentation at the conference. "The need to address pressing environmental issues from a theological perspective, which the scriptures are silent about or do not address, is necessary," Dr. Bird said. "Climate change, global warming, sea-level rise and sinking islands are current issues of major concern in Oceania which the bible does not address. "For many people within Oceania these are issues of life and death which call for our involvement," he added.

Dr. Bird said the church needs to take stewardship towards the environment, in particular the issue of climate change. "Stewardship is a must and there are no two ways about this. It is absolutely necessary and unavoidable, and in the context of this assembly, churches and all stakeholders are obliged to exercise stewardship starting in localities where they find themselves." He said leaders in the various sectors of our island nations, governments, churches, NGO and civil society groups have expressed concern that we in Oceania contribute very minimally toward global warming and climate change and yet we are amongst the most affected and vulnerable. "This can be seen in the immediate effects of climate change and experienced more in some countries and less in others, but is known to many of us that the low-lying atoll island nations within Oceania.

"This includes Tuvalu, Kiribati, Tokelau, Marshall Islands, Cook Islands and even the low lying atolls of bigger island nations such as Carteret Islands of Papua New Guinea or Ontong Java and Lord Howe in Solomon Islands are most vulnerable to climate change." Dr. Bird said climate change is a global phenomenon so global stewardship approaches and actions are the way to go. "However, its negative and destructive impacts are seen and experienced locally in the island nations of our region. "While the push for better and bolder stewardship strategic actions and networks at the global level must continue, the stewardship role of churches at the local level must come to the fore of ecumenical consciousness, vision, understanding and partnership.

"It is sad to say but many PCC member churches in the bigger island nations of Oceania do not give the necessary attention and priority to climate change impacts that are threatening the very lives of thousands of brothers and sisters in our ecumenical family. "Thus, climate change calls for our



ecumenical stewardship solidarity and in the immediate scenario, this means putting priority to assist the most vulnerable in perhaps small but practical and meaningful ways." He added in the present time the most vulnerable countries are working on mitigation measures and actions to try to minimize the negative and destructive effects of sea level rises. "Take for example Kiribati: replanting of mangroves began in 2010 and one high profile personality who helped in the planting of mangroves was/is the Secretary General of the United Nations.

"Ecumenical stewardship solidarity for such mitigating action might mean sending some money to the Kiribati Protestant Church and the Catholic Church there to help plant an additional or two mangroves along the shorelines. "Stewardship of resources must, as a matter of urgency and necessity be jointly seen and accepted as the role of governments, churches as well as environmental NGO's and civil society groups in our region." Dr. Bird said for the church, the following three areas are worth our consideration:

- Revisit our use of language. The educational, creative and transformative power of language must never be underestimated ever.
- Actively participate in forums and processes as ways and means to inform and educate communities on critical issues such as land reforms, resource use and management.
- Revisit, strengthen and expand our understanding of and commitment to 'home'. In our churches we must strive to inculcate and nurture the view and vision that as a metaphor home (oikos) does not end where the house or residence ends.

### **Pacific governments cautioned not to rush into seabed mining**

PACNEWS, 01/03/2013, Solomon Islands

Governments should not rush into seabed mining despite promises of major monetary benefits from the industry, regional churches will be told in a meeting next week. Advisers to the Pacific Conference of Churches' 10th General Assembly in Honiara, the Solomon Islands will tell delegates that seabed mining is the next potential threat to the Pacific. The warning will come on the same week that Fiji's Cabinet will hear a proposed seabed mining legislation drafted by the Ministry of Foreign Affairs. Correspondence obtained last week shows that the ministry invited a number of local and regional organizations to what it described as a consultation on the proposed laws. The letter confirmed that the draft would be placed before Cabinet next Tuesday (March 5).

But the Pacific Conference of Churches will encourage member organisations to consider all extractive industry carefully before making decisions. It will also suggest that churches – as advocates for their members – address the issue of seabed mining with their respective governments. PCC Environment Spokesman Peter Emberson said it was important that Pacific nations were fully aware of the impact of seabed and land-based mining. "The general assembly will hear a proposal calling for churches to work together and with civil society to ensure that governments do not rush into these issues," Emberson said.

"Extractive industry must be thoroughly researched and people made aware of the possible impacts on the environmental and social impacts before any work takes place." Recent studies show that communities in Bougainville continue to suffer from skin diseases and respiratory illnesses more than two decades after copper mines closed. Fisheries and logging are also considered to be extractive industries. Fiji, the Solomons, New Caledonia and Papua New Guinea are the countries most affected by land-based mining and logging. All Pacific countries, however, will be affected by seabed mining and fisheries. Late last week revelations surfaced in Fiji that two multinational corporations – Lockheed Martin of the United States and KORDI of South Korea – have shown interest in seabed mining in the Pacific.

## **PNG Activists Say PM 'Silent' On Risks Of Deep Sea Mining**

*Government yet to answer questions about environmental concerns*

AUCKLAND, New Zealand (Pacific Scoop, Feb. 28, 2013) – A Papuan New Guinea environmental advocacy group has accused Prime Minister Peter O'Neill of "falling silent" on the controversial Solwara 1 deep sea mining venture planned off the coast of Madang. "Why has our Prime Minister fallen silent on this core issue?" asked Wence Magun, national coordinator for the Madang-based Mas Kagin Tapani and also a steering committee member of the Deep Sea Mining (DSM) Campaign. The campaign wrote to O'Neill last December about its environmental concerns about the Solwara 1 mine and asked for documents relating to the approvals process of Nautilus Minerals Solwara 1 deep sea mine be made publicly available.

The campaign is still awaiting a response from the PNG government. The group's statement today said: Wence Magun, national coordinator for Mas Kagin Tapani, said: "After receiving our letter last December, Our Prime Minister described the environment as a "core issue". "But communities are still waiting to hear how he will address the many risks associated with the Solwara 1 mine – and they want to hear this before his Government re-opens any discussions with Nautilus. Why has our PM fallen silent on this core issue?" Nautilus has been in dispute with the PNG government since last year and the company suspended operations relating to the Solwara 1 project in November 2012.

### **High hopes**

Michael Johnston, Nautilus president and CEO, expressed just a few days ago that the company has high hopes for a resolution to the dispute. Patrick Kaiku, lecturer in political science at the University of Papua New Guinea and another DSM campaign steering committee member, said: "Not only is a response from the Prime Minister overdue, the petitions from the various coastal communities in the proposed Solwara project areas, that were submitted in November last year to Hon. Byron Chan, PNG Mining Minister, are yet to receive a formal response. "Our campaign's two reports show that there are many errors and omissions in the Solwara 1 Environmental Impact Statement (EIS). "This means that we don't yet understand the risks to our coastal communities posed by this mine. How could the PNG government have granted Nautilus its 20-year operating licence when so many questions remain unanswered?"

"In the interests of transparency and informed debate the PNG government should now release the documents we requested in the letter we sent late last year. We don't want discussions to be held with the company behind closed doors while the people of PNG are left in the dark." Oigen Schulze, director of Zero Inc, a community organisation in New Ireland province, said: "Local communities have not sanctioned the Solwara 1 project. No one knows what the impacts of this form of mining will be. "Communities want to know what concrete steps the Prime Minister will now take to ensure we are not being used as guinea pigs in a seabed mining experiment. 'Secret visits'

"We know that Nautilus are secretly visiting remote communities in New Ireland province and trying to convince them to agree to deep sea mining. This is not informed consent – these communities have not been provided with information about the risks they also face." Dr Helen Rosenbaum, coordinator of the Deep Sea Mining campaign, said: "Solwara 1 is the world's first deep sea mining experiment. The eyes of the world are watching to see how the PNG government deals with the flaws in the Nautilus EIS and the high level of community concern. "The people of PNG deserve to know that their government is acting in their best interests and is not putting their lives and livelihoods at risk."

## US giant using SOPAC and illegal Fiji regime to access seabed minerals in international waters

PNG Mine Watch, 28.2.2013

The illegal government in Fiji is being squeezed by the American corporate giant, Lockheed Martin, to sponsor its search for seabed minerals in international waters. To that end, Lockheed is pushing the Fiji regime to fast track legislation and is being assisted in this endeavor by the Deep Sea Minerals Project (run by SOPAC, part of the Secretariat of the Pacific Community) and its British lawyer, Hannah Lily. Fiji's cabinet is expected to approve a new Decree on seabed mineral management by March the 5th. Consultation on the draft Decree has been fast tracked with relevant stakeholders given less than 3 days to make submissions whilst US giants Lockheed were consulted well in advance. The new law is required before Lockheed will enter into a formal joint-venture with the Fiji regime. Lockheed will then apply in April to the International Seabed Authority for a new exploration licence.

The new law, which SOPAC, has assisted in drafting, makes vague statements about applying a precautionary approach and best environment practices and requiring Environment Impact Assessments but without specifying where or how Fiji is suddenly to get the expertise to manage and enforce these. Lockheed has already been granted approval by the International Seabed Authority to explore for polymetallic nodules in one area in partnership with the UK government. It now wants to join Fiji as its official national partner for further exploration licences – but first Fiji needs to have the necessary laws to allow seabed mining in place. The proposed legislation covers the various aspects and issues arising out of experimental seabed mining operations, including establishing a regulatory authority within Fiji, and introducing a licensing regime, provisions on the protection of the marine environment, and delineating Fiji's and the company's duties and responsibilities.

Hannah Lily, employed as a legal adviser by SOPAC, seems to have been advising on the drafting process directly on behalf of Lockheed (LH). Here are some of her comments on a draft version of the new law:

- “LH would not accept the jurisdiction of the courts of Fiji, in case of dispute. The sub-contract would specify that the parties would be subject to UK law and courts. LH therefore suggest section 14 be deleted to avoid confusion. However UNCLOS Art 235 requires that: “States shall ensure that recourse is available in accordance with their legal systems for prompt and adequate compensation or other relief in respect of damage caused by pollution of the marine environment by natural or juridical persons under their jurisdiction”. the ITLOS Advisory Opinion summarises this as ‘requiring the sponsoring State to establish procedures, and, if necessary, substantive rules governing claims for damages before its domestic courts’. Whether the proposed Fiji / LH model can navigate this requirement and LH's requirement for UK arbitration remains a point to be explored”
- “LH consider it unfair both to be charged the admin fee and to require the Company to cover its application costs. They suggest it should be one or the other, not both. “LH would expect a standalone non-disclosure agreement to cover Fiji's handling of their commercial data”
- “Query whether there is a reason Fiji would like this notice period to be so lengthy? LH would prefer this to be shorter, or if that is not possible to clarify that they would not be penalised for failure to conduct activities during that 6-month notice period”
- “LH request to delete, otherwise Fiji could unilaterally revoke the licence after 2 years' inaction, which creates too great an uncertainty for the company”
- “LH request that these specific figures are removed from the Decree and replaced with a provision permitting the Government to negotiate financial terms in a Sponsorship Agreement. NB The suggested fees are too high for LH. The UK rates (GBP 10k for application, 15k for first year, 25k after 6 years, 25k on each extension), which use an actual cost recov-

ery mechanism would be more feasible for LH - perhaps with some small room for negotiation, given that this is a developing country”

- “LH would require that the contract stipulates the UK as the prevailing law and dispute resolution mechanism”

The International Sea Bed Authority (ISBA) which regulates the leasing of seabed deposits have not yet developed a mining code to regulate the exploitation of minerals in international waters. NGOs have raised serious concerns about the experimental nature of the industry as well as its relevance as a development option for island nations. In addition NGOs have raised concerns about the need to protect the marine environment, prevention of pollution from seabed activities and whether states such as Fiji have the ability to monitor the environment impact.

### **Pacific Church leaders to discuss environmental impacts on mining**

By Online Editor, PACNEWS, 26/02/2013, Solomon Islands

Regional church leaders will address the need for legislation to protect communities from the environmental effects of mining, logging and other extractive industries this week. A report to the Pacific Conference of Churches 10th General Assembly in Honiara, the Solomon Islands, will outline the need for a concerted effort by regional organizations to ensure that islanders do not suffer from mining and logging. Recent studies show that communities in Bougainville continue to suffer from skin diseases and respiratory illnesses more than two decades after copper mines closed. The PCC General Assembly will hear suggestions for national churches – especially in Fiji and Papua New Guinea – increase their efforts to ensure that landowners are fully aware of the impacts of mining and logging. Recent work by the PCC on behalf of its 34 church groups has involved creating partnerships with regional and international environmental groups with common interests in the area of extractive industry.

General Secretary Revered Francois Pihaatae said this move was taken after the conference’s 9th General Assembly at Kananafou in American Samoa. “In the Christian context we believe that God has given us – the landowners – stewardship of the earth and its resources,” Rev Pihaatae said. “Therefore we need to make decisions on the use of these resources in a way which ensures that the earth is cared for and not misused or abused. “Our people need to have all possible information on these industries to allow them to make constructive and informed decisions on mining – whether land or sea-based – and logging.” Rev Pihaatae said it was important to note that not all Pacific communities were united in their stand on extractive industries including recent moves to introduce seabed mining. “In the case of seabed mining there is already a framework drawn up at regional level but as yet there are no programmes to educate the people on the effects of such an industry nor are there national laws or policies,” he said. “This is one of the issues the regional churches will look at before addressing extractive industries.”.

SOURCE: PACIFIC CONFERENCE OF CHURCHES/PACNEWS

### **Nautilus CEO opens up on PNG dispute**

Nautilus Mining CEO, Michael Johnston, walks shareholders through the various points of contention between it, the PNG government and the launch of its Solwara 1 mining project.

Author: Kip Keen, 23 Feb 2013, HALIFAX, NS (MINEWEB) -

Nautilus Minerals has concluded quasi-secret negotiations with project partners over intellectual property rights in the hopes of resolving what has emerged as a major point of contention for the Papua New Guinea government in a broader dispute over the Solwara 1 underwater mining project and the state's 30 percent equity interest in it. Speaking in a conference call on Thursday, Michael

Johnston, Nautilus president and CEO, said that Nautilus has been willing to provide Papua New Guinea ownership of intellectual property rights. But the problem, as Johnston told it, was that many of the deeds covering proprietary technology and subsea mining methods, which Nautilus and several partners developed over the years, did not contain clauses allowing for a third party, such as the Papua New Guinea government, to come on board as an additional partner and owner of the intellectual property rights.

Thus, Johnston described sensitive negotiations over the past few months in which Nautilus had to go to its partners, “household names” in the dredging business he gave as examples, to convince them to redraw the deeds to allow the Papua New Guinea government to gain direct 30-percent ownership of the intellectual property rights. Now, Johnston said, Nautilus has redrawn the deeds with its partners and delivered the new terms to the Papua New Guinea government. Johnston said he had hoped to hear back from the government last week on its view of the new deeds, but that Nautilus has yet to be contacted by Papua New Guinea officials. Nonetheless, Johnston, who said he had just returned from a trip to Papua New Guinea on the morning of the conference call, stated that he has high hopes about an overall resolution to the dispute. “We had a number of very good meetings with senior politicians and I’m quite confident that we will get resolution to this dispute in the not too distant future.”

### **Apology to investors**

While not a secret, hitherto Nautilus had not publicly explained in any great depth the importance of the intellectual property rights issue to the Papua New Guinea government. Thus, responding to a question from a private investor, Johnston was apologetic in describing why Nautilus had needed, in his view, to be tight-lipped about negotiations with its technology partners. “It’s always very hard,” Johnston said. “When we’re negotiating with the other third parties involved on the IP (intellectual property) you can imagine it’s very difficult for us having conference calls, update calls like this. If I was to tell people that that particular piece of IP is quite critical to us closing this agreement, you can imagine someone’s ears would prick up. “I apologize if we’ve come across as being a little secretive, if you like...but it has been commercially difficult for us to be able to tell people exactly what was going on with that IP.

“But now...we believe those deeds are sorted out and we’re now quite open about what those issues were. And, as I said, it goes right back to those design challenges that we had in the very early stages to develop and come up with the best system for seafloor mining. And, unfortunately, during that process we didn’t think at the time we would require another party’s name on the deeds.” By getting rights to the subsea mining technology, the Papua New Guinea government will be allowed to use the same methods as Nautilus intends to employ at Solwara 1 on its own non-Nautilus projects. This fact raised the question of whether Papua New Guinea could then go and license the technology to potential competitors (assuming Papua New Guinea consents to the new deeds). In response, Johnston said, the terms of the renegotiated deeds required approval from Nautilus and its partners were such a situation to arise. Further, Johnston noted that as part of the redrawn deeds, were the Papua New Guinea government to employ the technology on its own or through an approved partner Nautilus would get royalty payments from any other mining project.

### **30 percent participating interest**

There also remains the issue of an outstanding bill of roughly \$80 million that Nautilus maintains the Papua New Guinea government owes it for work on the Solwara 1 project. Last year, as the dispute between Nautilus and the Papua New Guinea government escalated, the parties initiated a dispute resolution mechanism for arbitration on the matter, with the Papua New Guinea government alleging Nautilus had not met contractual obligations. Johnston said a hearing date would be made in mid April, at which point there could be final resolution on the outstanding bill - a key reason why Nautilus has put the Solwara project on hold. While Johnston would not comment on the mat-

ter, some participants on the conference call wondered if the resolution on intellectual property rights - not in the bag yet but seemingly closer than ever - might expedite an ultimate solution. On this Johnston would only say that the arbitration process is "firmly underway in parallel with discussions, without prejudice, with the state."

### **Takeover, financing**

Meantime, Johnston threw cold water on the takeover and financing proposals made by Ottawa businessmen Michael Bailey in early January that, as covered in these pages, contained numerous discrepancies. (See: Discrepancies, denials in C\$238m hostile bid for Nautilus Minerals and "Ottawa businessman shifts tactic from takeover to financing in Nautilus bid.") "No formal bid was ever received by Nautilus during this process," Johnston said. "None of our major shareholders were ever contacted. And then on the 15th of January Mr. Bailey proposed an equity line finance facility. On reviewing those terms it was obvious that they did not comply with TSX or Canadian corporate laws. And the takeover just quietly seems to have gone away."

But that quiet may soon be broken. Bailey said in an interview Thursday that it was news to him that Nautilus had rejected the financing proposal, which he argued was in the best interest of Nautilus shareholders. He also maintained that, as previously stated in a press release, he intended to go ahead with a takeover, which he has previously claimed is fully funded by unnamed sources, if Nautilus did not agree to the equity line financing for \$80 million. "The whole situation is exactly how it reads in the news," Bailey said. "If they don't proceed with the financing then we're going to proceed with the takeover." He then said, "We're in discussions with them about the financing." Such discussions were not recent according to Nautilus chief financial officer Shontel Norgate. Norgate said in an email on Friday that "We have had no communication with Mr. Bailey since mid January."

### **Deepest undersea vents discovered by UK team**

By David Shukman Science editor, BBC News, 21 February 2013

UK scientists exploring the ocean floor in the Caribbean have discovered an "astounding" set of hydrothermal vents, the deepest anywhere in the world. Deploying a remotely-operated vehicle (ROV) in the Cayman Trough, they stumbled across a previously-unknown site nearly 5000m below the surface. Video pictures relayed live back to the research ship mounting the operation show spindly chimneys up to 10m high. They are belching out dark water - "a stunning sight", one scientist said. In the immense pressure of the sea three miles down, the ROV, known as ISIS, was gently steered around the vents, taking pictures and gathering samples.



ADRIAN GLOVER, NATURAL HISTORY MUSEUM

Despite the hostile environment around the vents, they are home to a stunning array of species, such as this fireworm

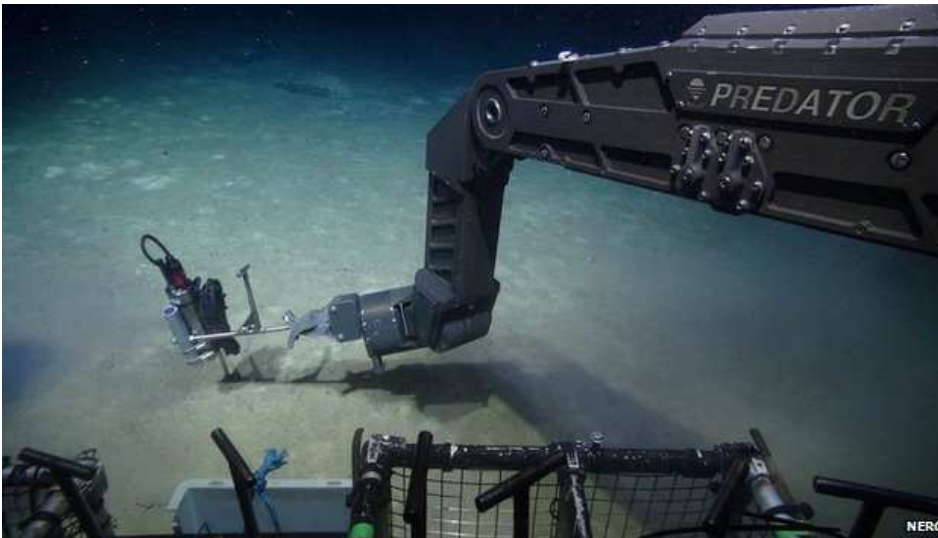
One of the people "piloting" the ROV said seabed smokestacks remind him of "the industrial Midlands". Hydrothermal vents are among the strangest features of the deep ocean and their existence was not known until the 1970s. Since then they have been discovered at about 200 sites around the world including the Southern Ocean and the Atlantic. But it was only three years ago that vents were first detected in the Cayman Trough, a deep trench formed by the boundary between two tectonic plates. One set of vents, known as Beebe, was established as the deepest on record - until the discovery last night of another slightly deeper set nearby, at 4,968m. or about three miles.

The water being blasted from the newly-found vents was measured at 401C, making this set among the hottest on the planet. The expedition, funded by the Natural Environment Research Council, is being run from a British research ship, the James Cook, named after the 18th century explorer who blazed a trail of discovery around the Pacific. Now the ship bearing his name is using the latest technology to open up and understand an underwater world of eerie landscapes and unusual life forms. A live stream of video is relayed back to a control room on board - where a cheer went up when the ROV's lights and high definition cameras picked out the new vents amid total darkness. The team had been looking for a set first identified a year ago but their search took them unexpectedly into an entirely new field.



Vent shrimp have special organs that alert the animal to super-heated water

The tallest of vents reaches about 10m. The chief scientist, Dr Jon Copley of the National Oceanography Centre, said the discovery of "astounding mineral spires" was a "complete surprise". "We initially thought it was a site we'd been to before but it looked so different we thought it had changed. But eventually we realised it looked different because it was different," Dr Copley told BBC News. "The beauty of working in the deep oceans is that you're always stumbling over things that are completely new. "It's teaching us how little we know and for a few minutes it's not about the science, it's about the wonder of the planet, something that's been hidden for so long." The ROV remained on station for nearly 24 hours - a typical length for a dive - before being returned to the James Cook bearing samples of water and wildlife. For the biologists on board, the vents act as a highly unusual habitat with a massive contrast between the water from the vents measuring just over 400C, compared to the surrounding sea temperature of around 4C. The narrow interface between the two extremes of water - sometimes as narrow as a few centimetres - provides a unique environment for an array of creatures.



Instruments on ISIS' arm were used to collect temperature data

Ghostly-white shrimp - clustered on the rocks in teeming crowds - appear to have lost the ability to see because their eyes are fused together. Verity Nye is one of the researchers studying the blind shrimp, brought up in the ROV's containers, filled at the seabed. "We don't think they have functioning eyes but they have a really unusual organ on their backs which is like a warning system for them to tell them when they're getting too hot so they don't get too close to the hot water from the vents. "But we really don't know how life operates down there so we're still trying to understand it." According to Dr Copley, the expedition has already yielded finds that are likely, after lab analysis back home, to prove to be new species including a white anemone and starfish. Further dives are scheduled in the coming days, with Japanese and American researchers planning investigations here later in the year. The scientists on the James Cook hope the research will eventually answer two key questions: why and how life evolved in such a seemingly hostile environment.

### **China: West Pacific exploration gets initial OK**

By Wang Qian (chinadaily.com.cn), 2013-02-19

China's application to explore cobalt-rich ferromanganese crusts in the West Pacific Ocean in 2013 received an initial OK after evaluation by the Legal and Technical Commission under the International Seabed Authority in early February. Jin Jiancai, secretary-general of the China Ocean Mineral Resources Research and Development Association, said the International Seabed Authority will make the final decision on whether to approve the application in July, China Mining newspaper reported on Feb 19. He added China began exploring cobalt-rich ferromanganese resources in the 1990s, and an approval of the application will enhance the country's scientific acknowledgement and environment assessment capacity. Cobalt-rich ferromanganese crusts are composed of mineral resources such as manganese, cobalt, copper and rare earths, which are usually found on the flanks and summits of seamounts, 2,000 meters below sea level. According to the research and development association, it applied to the International Seabed Authority, a United Nations body overseeing mining in international waters, to search an area of about 3,000 square kilometers in the West Pacific Ocean in July. In the application, the association offers an equity interest in a joint venture arrangement with the authority to share at least 20 percent of its profits in the applied area in future exploration.



## New subsea mining concepts developed

Mining Australia, 5 February, 2013, Cole Latimer



As the groundswell for subsea mining grows, new technology and seabed mining techniques are being developed. From 2009 to last year, Aker Wirth has worked with the German Federal Institute for Geosciences and Natural Resources (BGR) to develop a new method for accessing underwater minerals and metals. Subsea mining has come into the fore in recent years, particularly in the Pacific, which has vast quantities of seabed mineral deposits. While the economic costs seem prohibitive, there are rich pickings to be found on the seabed.

### Under the sea

The minerals are characteristically found near hydrothermal vents which form above cracks in the ocean floor, typically in volcanic areas of the seabed. They are created when water seeps into the bowels of the earth, dissolving the minerals found under the crust which is then spewed forth once more into the ocean, bringing it with the metal rich fluids. This creates massive plumes of debris that shoot upwards and then fall back to the ocean floor; gradually building up the vents, layer by layer, until they reach a height where they eventually collapse on themselves, creating the mineral rich and often high grade, sulphide deposits over the shell of the vent. These deposits can be up to seven times the grades typically mined on the surface. It just so happens that a high number of these vents are found near Australia and right around the Western Pacific's rim.



Exploration licences have already been granted for seafloor exploration off New Zealand, Japan, Fiji, Tonga, the Solomon Islands and Papua New Guinea. Australia has seen a spike in the number of applications for seabed mining, particularly in the Northern Territory, a move that forced the region to institute a moratorium on the practice. Japan is also changing its laws after discovering a massive potential seabed rare earths deposit approximately 100 times larger than those on land. The enormous rare earths minerals are estimated to be as large as 100 billion tonnes. The deposit lies approximately 3.5 to 6 kilometres under the sea and cover an area of more than 11 million square metres.

At the start of this year the nation announced additional surveys of the seafloor around Japan in an attempt to uncover more deposits. Nautilus is the most well known subsea miner currently operating. Its Solwara 1 operation, off the coast of Papua New Guinea, has drawn intense scrutiny from both traditional miners and environmentalists.

### **Risks and rewards**

While the rewards of subsea mining can be high, so too are the risks. The extreme deep-sea conditions – enormous water pressure, ice-cold temperatures and complete darkness – all present huge financial and technical challenges to the mining industry when extracting the high value materials. With this in mind, Aker Wirth and the BGR have created a new concept that allows miners to access metalliferous deposits, particularly rare earth and manganese nodules. According to the company the system consists of two manganese nodule collectors, a transport system for conveying the material and a specially-designed production vessel. Steffen Knodt, vice president of technology and innovation at Aker Wirth, explained: “To ensure efficient mining, a continuous transportation of raw material from the collectors via risers that are several kilometres in length is required. At such water depths, this places considerable demands on the robustness of the single components as well as on the control unit for the complete system.”

It uses airlift technology to lift the manganese nodules to the drilling vessel. Last year it carried out studies on the system and its potential to access very deep seabed resources. The study addressed the entire process chain from the collecting of manganese nodules to the transport of materials and right through to land-based processing; coming to the conclusion that deep-sea mining is very lucrative, even given the current prices of raw materials and anticipated price developments. “At present, efforts are being made at an international level to first of all establish the regulations regarding mining of manganese nodules, which will then serve as a basis for the development of mining and transport systems,” Knodt explained. “As a consequence, the mining of manganese nodules will probably reach an industrial scale in five to ten years’ time,” he added.

### **Nautilus Minerals wants to resolve seabed mining issues with PNG.**

ABC Radio Australia, 5 February 2013

The Canadian mining company Nautilus Minerals says it remains committed to developing Papua New Guinea's first sea-bed mining, despite unresolved financial issues with the PNG government. Nautilus Minerals wants to resolve seabed mining issues with PNG. (Credit: ABC) It has a license to mine copper and zinc under the floor of the Bismarck sea, in waters off the New Britain, New Ireland and Manus provinces. However, the construction of the equipment for its Solwara One Project remains terminated as a result of a disagreement with the PNG government, which is yet to pay more than 23 million US dollars for its 22 per cent equity in the project. The company now says it's dedicated to resolving the issues amicably with the PNG government for the benefit of both parties. Nautilus Minerals' Country Manager, in PNG Mel Togolo says they look forward to achieving a resolution to ensure the project goes into production successfully. He's told our reporter, Firmin Nanol, the project has many environmental advantages compared to land based mines, as it is working towards a zero tailings system and that no people need to be relocated.

### **MP wants Nautilus to mine**

Post-Courier, February 1, 2013

*By ISAAC NICHOLAS*

MEMBER for Pomio Paul Tiensten has called on the National Government to ensure that Nautilus starts undersea mining immediately in the islands region. “The Government and the people of PNG

need to also give that project the same opportunity like all the other projects that have gone through the processes to be given a license to start mining,” Mr Tiensten said. He said the New Guinea Islands region needed a bigger project like that of the LNG for Highlands region and next one to come out in Gulf Province. “We need these big projects to support regional development as well. Right now, NGI got Lihir, Simberi, Sinivit and fisheries there but most of the processing plants are in the Momase region so we have very little to support regional development,” he said.

Mr Tiensten said people talk about the environment but 15 scientific institutions have done study on environment impact. Unfortunately, people are still calling for other independent studies to ascertain whether waste from that kind of development will affect the sea. “We are talking about so much depth in the sea that a lot of waste will be pumped into has no life and it will not affect the fish and I think the people of Papua New Guinea need to see the project in its own merits,” he said. “When we bring in development we also expect at least a minimal environmental damage. We need to have that project.” He said people are saying that Papua New Guinea is being used as a guinea pig in testing these new kind of technology but Misima and Lihir are using the same technology in pumping waste into the ocean but there is still fish there and life. Mr Tiensten said these were the same technology used in Lihir, Misima and now Ramu Nico.

### **Commentary: Seabed mining still lacks ground rules**

Wylie Spicer, Special to The Northern Miner, 2013-01-16

As the natural resources available on land become less and our need for them grows, exploration activities move offshore. The oil and gas industry is the most advanced and over the years has developed more and more sophisticated technology to permit it to extract oil and gas from wells in very deep water and in formations thousands of metres below the ocean floor. It's not surprising that the mining industry is now actively investigating the recovery of orebodies from the ocean floor. Minerals recoverable from seabed mining include coal, copper, lead, zinc, gold, silver, manganese, cobalt, nickel and rare earth elements. These can be available from seabed mining at higher grades than are obtainable through mining on land. The deposits occur in the territorial waters of a number of nations and are present on the seabed in international waters. Higher commodity prices, better technology and robotics, and the promise of stable legal frameworks within which to operate have brought this industry to a place where we can reasonably expect that it will start to take a prominent role in satisfying the world's increasing need for these metals in the near future. At the moment the desire of the industry to begin producing is compromised by the fact that both within territorial and international waters, the legal framework for exploitation and production is lacking. It is difficult to carry on business without certainty about the ground rules.

Seabed mining is the search for three types of mineral deposits: polymetallic nodules, seafloor massive sulphides (SMS), and deposits located in the crusts that form around mountains, ridges, and plateaus in the ocean. These deposits are on the surface of the seabed floor. Mining requires a technology that can prepare the seafloor for the deposits to be picked up and brought to the surface. The deposits that are in international waters are more difficult to collect because of the depths and pressures involved. Having said that, it was not too many years ago that the oil and gas industry would not have expected to be drilling in the very deep waters where it now carries on business. Need drives technology and the technology for seabed mining has kept pace with the need. There are SMSs located in the coastal waters of several Pacific island countries. A number of these countries have granted leases to companies wishing to explore in this region. In August 2012 the Secretariat of the Pacific Community launched a regional protocol intended to ensure that deep seabed mining in the Pacific island countries is conducted in a “conserved manner”. This framework is needed because many of these countries have considerable deep sea mineral potential within their authority but do not have the legislation or regulatory structure to govern exploitation of the minerals.

The secretariat sees seabed mineral potential in Papua New Guinea (PNG), Fiji, Federated States of Micronesia, Kiribati, Tuvalu, Solomon Islands, Vanuatu, Cook Islands, Samoa, and Niue. Most of these countries have already issued licenses for prospecting. The lack of a legislative framework can be highlighted by reference to a resolution of the Congress of the Federated States of Micronesia in 2012. The preamble to this resolution articulately states the problem: "Urging the President to review a mining proposal and authorize a foreign company to engage in a seabed mining survey pending applicable legislation that regulates seabed mining, and to propose new or amendments to existing national legislation that explicitly provides for the procedures, fees, and regulatory mechanisms over mining activities in the Exclusive Economic Zone of the Federated States of Micronesia." In the vernacular this can be seen as the cart before the horse conundrum. The Pacific island countries stand on the verge of benefiting from deep seabed mining, but the lack of a regulatory framework and consensus on the scientific issues stands in the way of reliable and stable development.

In international waters the leasing of seabed deposits is regulated by the International Seabed Authority (ISA), which derives its powers from the UN Convention on the Law of the Sea. The ISA has granted 17 contracts for exploration in areas of the Indian, Atlantic and Pacific oceans. These licenses are held by states parties to UN law of the sea and by companies sponsored by states parties. National government participants include those from South Korea, India, France, Japan, Germany, the Inter Ocean in Metal Joint Organization (a consortium of Bulgaria, Cuba, the Czech Republic, Poland, Russia, and Slovakia). Countries that have sponsored companies to explore include France, the U.K., Kiribati and Belgium. The ISA is developing a complete regulatory framework. While it has in place regulations that address issues related to prospecting and exploration, it has not yet developed a "mining code" to regulate the exploitation of the deposits. The most recent indication from the ISA is that such a code will not be in place until at least 2016. The ISA is also developing financial arrangements between it and the licensees as work moves into the exploitation phase. A study concerning these issues is to be presented to the Legal and Technical committee of the ISA in February 2013.

The ISA is conversant with the environmental management issues in connection with both exploration and exploitation of deep seabed deposits. In an ISA technical study emanating from a workshop in December 2011, a working group on legal issues identified a number of international obligations that are required in any statutory framework for offshore mining. This list gives a flavour of the approach that the ISA considers necessary to move deep seabed mining forward. These are partly based on the articles of UN law of the sea itself, and include a duty to protect and preserve the marine environment (Article 192), a duty to prevent, reduce, and control pollution from seabed activities (Article 208), and ongoing monitoring of environmental impacts (Article 204). The Pacific island countries are also taking steps to put ground rules in place that complement the ISA's effort. At this point the nascent deep seabed mining industry awaits rules within which participants can confidently invest and operate.

### **Prospects for underwater goldmine in Pacific decline**

*London-listed exploration firm Nautilus runs into dispute with Papua New Guinea government about cost of Solwara 1 project*

The Guardian, Tuesday 1 January 2013

A London-listed company's plans to create the world's first underwater goldmine on the Pacific seabed have hit the rocks. Nautilus Minerals' problems come as China and Russia's duel for riches at the bottom of the ocean intensifies. Nautilus was planning to mine gold, copper and silver under the Pacific Ocean but has run into conflict with its partner, the government of Papua New Guinea, about the cost of the project. The company, part-owned by the Anglo American mining group, has

put its Solwara 1 prospect on ice, laid off staff and postponed equipment orders, and is looking at taking its subsea mineral operations elsewhere. State-owned Chinese and Japanese firms, meanwhile, have unveiled plans to search for cobalt-rich ferromanganese "crusts" in the western Pacific, and Russia has signed a 15-year contract to prospect for metallic sulphides in the Atlantic, where volcanic hot springs create mineral-rich rock formations.



A Nautilus operation. The company claims to be the first to properly explore the ocean floor for sulphide systems as a potential source of gold, zinc, copper and silver.

Last month international lawyers met in Beijing to try to hammer out details of a seabed mining code to prevent conflict over deepwater resources. The sudden interest in this sector has been fed by the boom in commodity prices as well as soaring costs and environmental opposition to many large onshore mining projects. There have been growing tensions over mineral and seabed rights, with China in dispute with the Philippines, Vietnam and other countries over areas of the South China Sea. Nautilus, listed on London's Aim junior stock market and owned 11% by Anglo and 21% by Russia's huge iron ore producer Metalloinvest, claims to be the first company to properly explore the ocean floor for polymetallic sulphide deposits.

It was granted the first mining lease at Solwara, in territorial waters off New Guinea, but also holds more than half a million square kilometres of highly prospective acreage in the western Pacific. An Anglo American spokesman said the group, which operates onshore mines in South Africa and elsewhere, saw its investment in Nautilus as speculative. "We are a shareholder because we think [seabed mining] may prove interesting in future." De Beers, the diamond producer that was brought under sole Anglo American control last year, already does a limited "hoovering" of likely mineral deposits from the seabed off Namibia in south-west Africa. But Solwara 1 in the Bismarck Sea, which borrows techniques from the offshore oil and gas industry, is a much more ambitious project that could involve upfront capital costs of nearly \$400m to bring ore from the seabed to the shore. The Papua New Guinea government took a 30% stake in the scheme but has since questioned whether it should be legally obliged to contribute to funding, running at \$4m a week.

Ministers have since switched their attention to an ExxonMobil project to produce liquefied natural gas for export to Australia, leaving Nautilus look for other funders or a change in location. Solwara 1 – there were also to be 2 and 3 – has also attracted considerable opposition from environmentalists worried about the impact of seabed mining on biodiversity. But Nautilus has not given up. Mike Johnston, its chief executive, told shareholders toward the end of last year: "Despite this [funding] setback, the company remains committed to maximising shareholder value by achieving its objective of developing the world's first commercial sea-floor copper-gold project and launching the deep water sea-floor resource production industry, while maintaining an environmentally and socially re-

sponsible approach." Exploration outside normal 200-mile territorial waters can only be undertaken through application for a licence from the International Seabed Authority established under the United Nations law of the sea convention. Two new applications for exploration were filed last summer for areas in the west Pacific Ocean, one from the China Ocean Mineral Resources Research and Development Association and another from the Japan Oil, Gas and Metals National Corporation.

### **Native Control Of Seabed In French Polynesia Discussed**

*President Temaru links seabed ownership to decolonization efforts*

WELLINGTON, New Zealand (Radio New Zealand International, Dec. 20, 2012) – French Polynesian leaders have been in talks with the International Seabed Authority as part of a bid to get seabed deposits recognized as belonging to the territory's indigenous Maohi population. The president Oscar Temaru and Richard Tuheiava, who is a member of the French Senate, say to attain this, it is a necessary step to re-inscribe French Polynesia on the UN list of territories to be decolonized. A statement by the presidency says during his visit in North America, which will end later this week, he will have more talks about the decolonization issue. It also says the French nuclear weapons test compensation law needs to be reformed to end the long hypocrisy surrounding the issue. France is strongly opposed to French Polynesia's decolonization, but Mr. Temaru's campaign has the backing of the Melanesian Spearhead Group and reportedly of the Non-Aligned Movement. However, Australia and New Zealand have sided with Paris and oppose Mr. Temaru's decolonization plan.

### **Solomons Official Warns Against Marine Mineral Exploration**

*Mining exploration 'threat' to environment, says Maelanga*

By Denver Newter

HONIARA, Solomon Islands (Solomon Star, Dec. 17, 2012) – Deputy Prime Minister Manasseh Maelanga has appealed to resource owners in the Solomon Islands not to support underwater mineral exploration. He was referring to Temotu Province's decision to invite an Australian exploration company, Blue Water Mining Company, to search for potential minerals within its waters. Mr. Maelanga said underwater mineral exploration is a threat to the sea environment. "I urge resource owners not to support this type of development," he told the Solomon Star in an interview yesterday. He said the government finds it hard to deal with exploration companies operating on land. "If under-water exploration is allowed around the country, it would be very difficult for the government to control." He said the nation must protect its waters from potential pollution from underwater exploration. Temotu Premier Fr. Brown Beu said his executive had granted Blue Water a license to search for minerals in waters between Vanikoro island and Vanuatu. He said the company had promised to upgrade Lata airport and the province's hospital as part of the deal.

### **Nautilus rockets 27% as investors speculate on what's next for seabed mining**

Mining.com, Frik Els, December 11, 2012

Nautilus Minerals shot up 26.8% to \$0.355 in heavy volumes on Monday as investors speculated about the future of the embattled company after it decided to stop working on specialized seabed mining equipment for its Papua New Guinea gold-silver-copper project. "We were paying for it all ourselves and it was becoming too costly," Mike Johnston, interim president and CEO Johnston told SciDev.Net. "We were at an expensive stage of the build. We were spending US\$3 million or US\$4 million a week. For a company of our size, we couldn't continue to pay for that ourselves." The Toronto-based company has run into serious troubles at its flagship project off the Papua New Guinea

coast, most recently with the departure of a long-time CEO, layoffs and a petition landowners sent to the PNG government to cancel the firm's seabed mining permit. The company's Solwara project – what would be the world's first seabed mine – is already half built and was slated to begin production in the fourth quarter of 2013, but a dispute with the PNG government over ownership and funding issues with its partners building a surface vessel for the operation have put the project on ice.

Shareholders in Nautilus – even after today's jump worth only \$84 million on the Toronto big board – have seen the value of their investments evaporate by more than 80% since the company initiated a legal battle on June 1 over the copper-gold-silver project in the Bismarck Sea and the troubles with its German shipbuilders. Nautilus also owns vast exploration tracts in the central Pacific Ocean and in September announced it has found nodules that occur in 4,000 and 6,000 meter deep waters that contain significant grades of manganese, nickel, copper and cobalt. Nautilus said at the time the regulatory framework the International Seabed Authority has put in place since 1994 and what the company terms "reduced social disturbance" due to the nature of deep water mining versus "large land based resource developments" counts heavily in favour of this project, to be managed through a 100%-owned Tonga subsidiary.

### **Nautilus value may be hidden in territorial security, not just deep sea mining**

Stockhouse, 8.12.2012

Nautilus is hoping to be the first deep sea mining company in the world. For the past couple years they have been developing and building proprietary deep sea mining equipment with its first high grade project located 30km off the coast of Papua New Guinea (PNG). On November 13, the share price collapsed from 72 cents to 41 cents after announcing they were suspending their equipment build to conserve their large cash position during a dispute with the PNG government over equity, intellectual property and the environment. Since that time, the stock has been under constant selling pressure to a point now where it makes very little sense. Most small stocks (especially resource related) have suffered a similar fate this past month but given the significant underlying asset value of Nautilus and the exceptionally strong shareholders, now may be a very good time to take a serious look at this company.....

### **There is a lot more to Nautilus than mining rock at the bottom of the ocean - International Politics**

Nautilus collapsed three weeks ago following problems with the government of Papua New Guinea (PNG). PNG has a long history of being difficult to deal with and I suspect Nautilus said "enough is enough" and terminated construction so that they could focus on other opportunities and pursue legal recourse to recover over \$50 million owed them by the PNG government. It is important to know that 49% of the stock outstanding is controlled by three International powerhouses; 1) Metalloinvest 21%; 2) Anglo American 11%; 3) MB Holding Company 17%. Anglo American is one of the world's largest mining companies, Metalloinvest is a Russian iron ore giant controlled by Alisher Usmanov (Russia's richest man) and MB Holdings based in Oman does business in 20 countries with 6000 employees - it is controlled by Dr. Mohammed Ali Al Barwani who sits on the board of Nautilus.

### **Important insight from Stratfor**

Stratfor ([www.stratfor.com](http://www.stratfor.com)) is a global intelligence service that is very well respected and has a large international following. Back in August they issued a very interesting report on "Sub Sea Mining." Because their content is copyright, I cannot repost it here, however I have summarized the most relevant points as I believe they pertain to Nautilus going forward. South Korea this year was awarded exclusive mineral rights to a 10,000 sq.km block of seabed in the central Indian Ocean.

Seoul will retain those rights from 2013 to 2027. A period in which it is believed they could generate approx. \$300 million annually in sub-sea mining revenue.

- For countries, deep-sea mining is a means of accessing and monitoring international or disputed waters. Aside from generating revenue, it serves a significant political purpose.
- According to the Stratfor report, "several private companies have shown a continued interest in deep-sea mineral exploration. The industry leader is Canadian firm Nautilus Minerals." In addition to the handful of private companies, China, Japan and South Korea are also pursuing the technology to deep-sea mine.
- This process would allow China to extend its influence across the South China Sea, the East China Sea and the Indian Ocean. This year the International Seabed Authority approved China's bid to explore a 10,000 sq.km area in the SW Indian Ocean for 15 years.
- All of this becomes a serious threat to countries bordered by an ocean. As just one example, India is obviously threatened by China's movement in this area and is pursuing their own initiatives. For most of these countries it is about sovereignty and security. Far more important than the actual mining. France and Russia have also shown serious interest this year in sub-sea mining.

Many feel this industry will struggle to be profitable but no one has advanced far enough to know. While the mining has potential, I think it goes much deeper than profit - **territorial security** - as Stratfor has called it. "Initial exploration becomes a useful political tool because it provides an excuse to operate in disputed or international waters." Nautilus right now trades just below cash value but has invested years and over \$100 million in studying this industry and building technology and equipment that will work best. If you view their presentation you will see significant advancements in design and fabrication to date. Obviously I could be wrong, but I feel confident we need to look at this company much deeper than just "mining." Only last week China announced new rules that would allow them to board vessels in territorial waters – even “disputed” territorial waters. This is of grave concern to many countries across Asia (Japan in particular). In the years ahead territorial water and national security will take on greater importance globally (not just in Asia). Companies like Nautilus may provide the technology and equipment necessary to help enforce those territorial rights – but we have to hope they survive long enough to prove that point.

Nautilus has serious strength behind them with the three primary shareholders and I believe the points that Stratfor made (with this being more about politics) will eventually make Nautilus valuable again. Right now investors have an opportunity to pick away following a price collapse that in my opinion was grossly over-exaggerated. In theory we will see more selling before Christmas (tax losses) but that will also create liquidity. I am personally prepared to tuck NUS away for 2013 – as I am doing with several of these cash-rich companies that have attractive (but grossly discounted) underlying assets. Go through their corporate presentation and you may see why this makes an attractive speculation near or below 30 cents. On November 14, the CEO held a conference call and my notes are shown below:

- \$34 million raised at 90 cents from all their major shareholders
- \$91 million cash to the end of September
- Terminating PNG relationship allows them to move forward with Tonga (very large land position)
- Construction termination designed to preserve large cash position
- View photos on presentation - dramatic amount of work done to date - 53% complete - page 8-11
- Significant investment in design, engineering, fabrication, testing
- The company will update before the end of December
- Reasons for termination make perfect sense (PNG difficult country to deal with)



- Sea floor mining advantage is that equipment is built in a controlled factory environment (vs. land based mining builds)
- Costs capitalized on the books is in excess of \$100 million
- Tonga potential significant (high-grade precious metal grades) - 19 systems / prospects
- Company has 600,000 sq.km of tenements in South Pacific
- Plan is to: maintain cash, discussions with PNG, maintain permits
- Tonga region a focus if PNG cannot be resolved
- New CEO sounded very confident and well spoken

Q&A from conference call listeners (there were limited questions so I summarized them here):

1) What is PNG arguing about - confidential so cannot discuss. State has contractual obligation of \$23 million to date. PNG Government must pay their fair share of costs (independently audited and previously agreed upon). PNG also owes Nautilus \$51 million associated with equipment built to date. No arbitration date has been set but they will update people as often as possible. 2) Ship status - discontinued discussions in light of PNG but many options available for ship design and finance. Ready to go when time is appropriate. 3) Is the equipment useable in Tonga or elsewhere - yes.

### **Discounting PNG's importance**

Currently the investment community is ignoring the strong underlying asset value of Nautilus and basing their valuation simply on the company's relationship with Papua New Guinea (PNG) – it is important to put PNG into perspective. While it is a country rich in natural resources, it has a long history of questionable business ethics and corruption. In fact, annually PNG is ranked as one of the leading countries for corruption by Transparency International. In addition, the Ease of Doing Business Index was created by the World Bank. It is based on the study of a country's laws and regulations, with input and verification from over 9,000 government officials, lawyers, business consultants, accountants and other professionals in approx. 180 economies. The "Doing Business 2012" report ranked Singapore #1 and PNG #101 (the U.S. is ranked #4 and Canada #13). The problems with PNG will hopefully be resolved as Nautilus has spent a lot of time and money there. However, this should not be a deal breaker for the company. Nautilus was likely tired of being bullied by the PNG government. And I am not sure where PNG expects they are going with this. Unlike traditional mining or oil & gas exploration, no one will be knocking on their door to mine the sub-sea floor 1km from shore – let alone 30km.

In addition to Teck, which owns 4.5% of Nautilus, the other three principal shareholders (who combined own 53.5%) are four of the most powerful partners/shareholders a small company could hope for. They are no doubt fed up with PNG's games and have decided to look at alternatives. If Nautilus walks away from PNG, this government will have made a huge error in judgement – which given past history, may not be surprising. The PNG government is looking a gift horse in the mouth. They had every opportunity to work closer with Nautilus and create taxation revenue and jobs. Now their greed may force Nautilus elsewhere and while it may mean short-term pain for shareholders, it could result in strong long-term gains if the right development partner is found.

After this many years in PNG, a person would hate to see that relationship go to waste. However, I don't believe it should be viewed as a dagger in the heart of Nautilus (as we are seeing with the share price below 30 cents). Read more at <http://www.stockhouse.com/opinion/ticker-trax/dec/7/micro-cap-miner-trades-at-75--discount-to-its-net-.aspx#tkrfuXVEzLZhbGej.99>

### **Nautilus confident of reconciling with PNG government**

Radio Australia, 4 December 2012

The Canadian mining company, Nautilus Minerals, says it's confident Papua New Guinea's government will support its controversial seafloor mining project. The company is hoping to be the first

in the world to mine the deep seafloor for copper, gold, zinc and silver at its PNG site. However the project is currently on hold, because of a dispute with the government on issues related to equity, intellectual property and the environment. Mike Johnson, Vice-President of Nautilus Minerals, says many of the environmental concerns are based on misinformation and that the project's impact will be very minimal. "The entire project has been carefully thought-out and engineered to eliminate most of the concerns that people who aren't fully aware of the project have made," he said. "[These are] points of contention based on their misunderstanding of the project." He said he was confident that by educating people about their intentions they would be able to get the project back on track.



Nautilus Minerals has been exploring the territorial waters of Papua New Guinea (PNG) for mineral deposits since 1997, when the first offshore mineral exploration licenses were granted. (Credit: ABC)

### **14 clans back Solwara 1**

The National, 20th November, 2012

By AGNES FIFI UKI

THE 14 clans of west coast central in New Ireland want Canadian sea-bed mining company, Nautilus Minerals, to continue its Solwara 1 project in the Bismarck Sea. They have threatened to take the government to court after Nautilus decided to stop developing its mining equipment because it had been at loggerheads with the government over some issues for about six months. The clans opposed the closing down of Nautilus' Port Moresby and Kavieng offices and declared their support for the company to continue working in PNG. A spokesman for the clans and leader of the Bares clan, Buarang Vaiimuru, said leaders of the 14 clans agreed that Nautilus should go ahead with developing the seabed poly metallic sulphide deposit. "These 14 clans around the west coast central New Ireland, who own a substantial amount of shoreline, in a meeting on Sept 15 agreed for Nautilus to carry out deep-sea mining in the area and approved its first project – Solwara 1," Vaiimuru said.

He said their clans would be impacted the most by the development and they wanted people, who opposed the project and claimed the mining would destroy the environment and fish stocks, to verify their claims. He said they were not happy with Northern Governor Gary Juffa's claims in the media and his opposition to the first deep-sea project in the world. "This is the first underwater project in the world and we, the people from west coast central New Ireland, wish to be part of it and to benefit from it," Vaiimuru said. "We also plan to request the government that we source an offshore loan to facilitate our 30% equity in the operations of Nautilus on Solwara 1 to 12 in the Bismarck Sea and to take up 30% patent rights in the project." He said west coast central was one of the most

underdeveloped areas in New Ireland. The 14 clan leaders said they did not want any logging operations in the area.

### **Researcher welcomes news on Solwara 1**

The National, 19th November, 2012

By MOUA OMOA

NAUTILUS Minerals' move to withhold the Solwara 1 project is good news for the people and the environment, National Research Institute Research fellow Nalau Bingeding said last Friday. Bingeding said the department of environment and conservation, as the country's environmental regulator, should now engage a consultant to do a proper research into the deep sea mining project. "A lot of people in that area depend on the sea and the marine life for their livelihood and, therefore, it has to be scientifically proven that the project will not affect them," he said. "I haven't sighted an environmental impact statement from Nautilus Minerals and I don't know if it has been thoroughly screened under the Environmental Act, if that was done, then scientists working on it will prove that it is worth it." Bingeding is concerned that if the project gets underway, the marine life and the way the people have used their marine environment will be affected.

"From a scientific view the digging up of the ocean floor for minerals is going to create a great impact," he said. "The ocean is acidic and this is likely to cause a chemical reaction that will defuse the ocean water column and kill the algae on the reefs leading to coral bleaching, which means the reefs turn white and they die. "This has not happened anywhere in the world," Bingeding said. He said the government and mining companies must ensure that any project they undertook should be done in a social, economic and environmentally sustainable manner. "We have 10 large scale mines and not one of them has improved or developed the lives of the people, they are still poor, so who is to say that deep sea mining will change anything?" he asked.

### **Nautilus eager to resolve dispute with PNG leaders**

Radio Australia, 16 November 2012

By Corinne Podger

Nautilus Minerals has defended the accuracy of the environmental assessment prepared for its Solwara 1 seafloor mining project in Papua New Guinea. Canadian mining firm Nautilus Minerals says it is hopeful of resolving a financing dispute with the Papua New Guinea government over a project off New Ireland. But, it's also facing questions about the Environmental Impact Statement used to secure its license, as Corinne Podger reports. (Credit: ABC) The EIS was prepared by an external consultancy, Coffey Natural Systems, and helped Nautilus secure a 20-year mining lease last year. Last week an independent review commissioned by the Deep Sea Mining Campaign, which has an association with the environmental lobby group Friends of the Earth, and conducted by Austides Consulting, raised concerns about the EIS. Austides Consulting's general manager, Dr John Luick, told ABC Radio Australia's Pacific Beat program that the statement did not include data on ocean currents, which could carry mining waste into PNG's coastal waters and potentially affect fishing and other activities. However, Nautilus' Chief Executive Mike Johnson, denied this.

### **Peer reviewed**

"Their allegations are somewhat flawed," he said. "The current data and all the environmental data that was collected and submitted to the government was reviewed externally." The EIS was subjected to a peer review by the Australian-based consultancy, Cardno, but the PNG government has yet to make the results of that review public. Dr Brian King, the oceanographer who used ocean current data to simulate the effect of the mining process for the EIS, said he is confident his assessment is

correct. "I can confirm that the ocean current data was used in those calculations," Dr King said. "We found that those currents were weak, and they're significantly tidal . . . and because the currents are so weak, it was not surprising that any discharges that take place at that depth are likely to remain localised."

### **Money troubles**

Meanwhile, Mr Johnson said he wants to resolve a financing dispute with the Papua New Guinea government that prompted it to suspend work at a site near New Ireland Province. Building work at the site stopped on Tuesday night, with Nautilus saying it was owed more than \$US70 million in development funding and capital contributions by the PNG government. Mr Johnson said he is hopeful of reaching a deal that would satisfy both sides, but said no timeframe had been set.

### **PNG Prime Minister Seeks Better Information About Sea Mining Operation**

Nautilus Minerals suspends construction after information request

WELLINGTON, New Zealand (Radio New Zealand International, Nov. 16, 2012) – The Prime Minister of Papua New Guinea says his government wants to be fully satisfied on core issues such as environmental impact before it participates in the Solwara 1 deep sea mining project. The developer of the project planned for PNG's Bismarck Sea has decided to terminate construction amid a dispute with the government over costs of up to 80 million US dollars. The Canadian company Nautilus Minerals planned to mine gold and copper in the seabed, the first such deep sea mining operation in the world. Peter O'Neill says he regrets that Nautilus has had to freeze its plans. But he says data that PNG has sought about the project has not been forthcoming. "We are trying to expend public funds so we need to be comforted. We've indicated that we want to participate in this project, including issues like intellectual property rights and issues of that nature need to be resolved properly before we make the final investments," said O'Neill.

### **PNG's Solwara 1 bill stands at US\$75-80million**

The National, 16th November, 2012

IT now appears that Papua New Guinea's bill for its involvement in the Solwara 1 deep sea mining project with Canadian company Nautilus Minerals in the Bismarck Sea is between US\$75 million and US\$80 million. Nautilus, seeking to become the first sea floor gold and copper mining company, pulled the plug on the project on Tuesday, saying it was owed millions by the PNG government, a sum Port Moresby said Nautilus should pay. "We are only a small mining company by mining standards and we have been solely funding the build-up of the equipment for a bit over a year and we believe that the state's nominee, Petromin, owed us about US\$75-80 million – they dispute that, of course,"

Nautilus Minerals chief executive Mike Johnston told Radio Australia yesterday. "We are in the process of talking to our suppliers and contractors but we have stopped bleeding cash, if you like, and now we are focused on talking to the PNG government about the project and the dispute and we want to get that resolved. "But now, we can talk in a manner where both parties can talk sensibly – and one party doesn't have to worry about spending more than US\$3 million a week." Johnston said there was no timeframe to resolve the dispute although "we would like it resolved sooner rather than later". "We have no intention of walking away from PNG. We have put a lot of time and money into it."

## **Nautilus Minerals Halts Construction Activities In PNG**

Government allegedly failing to meet shared funding obligations

MELBOURNE, Australia (Radio Australia, Nov. 14, 2012) – Nautilus Minerals has stopped construction of its Seafloor Production System citing funding issues arising from a dispute with the government of Papua New Guinea. According to a statement, the company said the government was refusing to meet its obligation under a shared funding agreement, and it could no longer afford to back the project alone. Nautilus' CEO, Mike Johnston, said the situation would result in about 60 staff members being made redundant. "While terminating the equipment build for the Seafloor Production System and reducing staff numbers to this extent was a difficult decision, it was appropriate," Mr. Johnston said.

"Despite this setback, the Company remains committed to maximizing shareholder value by achieving its objective of developing the world's first commercial seafloor copper-gold project and launching the deep water seafloor resource production industry." Mr. Johnson said the company would maintain its "highly prospective ground position," which includes 19 identified prospects in Tonga. PNG's government awarded Nautilus the world's first deep-sea mining lease in January 2011. Australian National University mining issues specialist, Associate Professor Colin Filer, told Radio Australia's Pacific Beat that PNG's government has been interested in mining projects for a number of years. "The government has for the past few years, made a notional commitment at least, to purchase equity in these [mining] projects, but in this case it seems to have decided it wasn't such a good idea after all," he said.

## **Nautilus Minerals stops making equipment to mine PNG's seafloor**

Radio Australia, 14 November 2012

The Canadian mining company, Nautilus Minerals, has suspended work on a seafloor mining project in Papua New Guinea. Nautilus Minerals stops making equipment to mine PNG's seafloor (Credit: ABC) The company's been in a dispute with the PNG government over the cost of developing the project. Nautilus claims it's already owed \$25 million, but the government has refused to pay, arguing it's Nautilus that should bear the costs. News of the suspension prompted a 40 percent drop in Nautilus' share price and more than 60 jobs have been cut. So is the PNG mining project doomed to fail ?

Associate Professor Colin Filer from the Crawford School of Public Policy at ANU's College of Asia and Pacific is a specialist in mining issues associated with Papua New Guinea.

**Presenter:** Richard Ewart

**Speaker:** Associate Professor Colin Filer from the Crawford School of Public Policy at ANU's College of Asia and Pacific

**FILER:** The project's become very contentious over the course of the past 12 months and clearly there's a lot of political and popular opposition to it. The dispute, however, has lasted at least that long between the government and Nautilus with regard to the government's equity stake in the project and it seems the government has been trying to wangle its way out of whatever commitment it might have made to purchase equity in the project and take a share of the development costs.

**EWART:** So in essence, does Nautilus now go back to square one and look to finance this project in a different way and marginalising the PNG Government to some degree?

**FILER::** Hmm, well many people would say that the PNG Government shouldn't be purchasing equity in any mining or petroleum project and the saga of the LNG Project is a case in point of how that can go very sadly wrong.

The government has for the past few years at least made a notional commitment to purchase equity in these projects at its own cost, but in this case, it seems to have decided that this wasn't such a good idea after all.

EWART: So why do you think that this situation has come about? I mean it seems to me that there is a basic lack of trust here, that perhaps the Papua New Guinea Government is keen that the country should plainly benefit from a project like this, but perhaps is a little suspicious of the motives of the company involved?

FILER: I'm not sure there's suspicion about motives. I think there is simply a recognition now on the part of the government perhaps to late, but buying equity, taking the option to purchase equity in every single mining and petroleum project that comes along is not necessarily good policy. And in this particular case, the issue is compounded by the fact that the government has really never developed a policy framework for development of seabed mining projects. It should have done so and was on the point of doing so about ten years ago, but the policy framework is still not there and this is one of the reasons why provincial governments and local interest groups in this particular case have voiced opposition to the project and that voice has got stronger and stronger over the past few months, because nobody knows quite what how they stand to benefit from development of this project.

EWART: So is this a case to some degree of Nautilus not doing its due diligence if there were already those doubts existing?

FILER: No, I don't think it's anything to do with due diligence. The fact is that Nautilus is trying to develop a new kind of mining project in a context where the government hasn't set out the rules in any clear way and this has simply led to a lot of confusion and disputation amongst the various stakeholders within the country, which, of course, has made life more difficult for Nautilus, because they thought perhaps that they had a clear commitment from the National Government to take its share of the development costs, purchase equity in the project and basically therefore provide a measure of security for the development.

EWART: So can this project, let's come back to my starting point. I mean can this project go ahead in reality now and if so, what will it take to make it work?

FILER: Well, to secure additional finance for development of the project without the state equity and the expression of political support that that would imply from a National Government is going to be quite difficult, because Papua New Guinea is a pretty hazardous place to do business whatever sector you're in and if the government appears to have volunteered the kind of financial support, which it is now withdrawing, then other potential investors are going to think twice before they buy into the project.

EWART: And you mentioned earlier the situation as far as the LNG Project is concerned. I mean that now is involving a massive cost blowout, around about three million dollars is the estimate. I mean is?

FILER: Three billion I believe.

EWART: Indeed, is it getting ludicrously difficult perhaps to do business in Papua New Guinea under those conditions?

FILER: Well, the LNG Project agreements are in place and the government is certainly obliged to honour the agreements it has made to purchase equity in that project. But what it now has to do is to raise a very substantial amount of additional money over and beyond what it had to raise already in order to carry its share of an increased development cost, which has gone from 16 billion to 19 billion as of today and had already increased beyond the original estimates during a previous phase in the construction of the project.

EWART: So not a terribly happy picture, when plainly you would think that the priority for the Papua New Guinea Government is to see these projects developed so that they can benefit as a nation?

FILER: Eh yes, but what this latest increase in the LNG construction costs means is that it defers the point at which the PNG Government itself will start to receive significant taxes and dividends from the project, because every increase in the project development costs postpones the point at

which the project will start to make a profit and the government, therefore will start to collect revenues from it.

EWART: So are we talking in essence really about what you might call lack of experience as it were in working on schemes of this nature and coming back to the seafloor mining project. Of course, this is new technology, largely untested technology. So I guess everybody is literally in unchartered waters?

FILER: Well, with the seabed mining project, there would certainly be a higher element of risk in the investment, just from a technological point of view and an economic point of view than there would be for an onshore mining project. There's little doubt about that. And that should have been the reason why the government would have thought twice originally before wanting to take an equity share in it. But it doesn't seem to have occurred to them or if it did occur to them, it occurred to them after they had made some kind of commitment or agreement which is now the subject of legal dispute with Nautilus.

### **Nautilus Minerals halts construction in Papua New Guinea**

StockMarketWire.com, 13 November 2012

Nautilus Minerals has decided to preserve its cash position by terminating the construction of the equipment for its Seafloor Production System. It announced in June 1, 2012 that it was in dispute Papua New Guinea as to the parties' obligations to complete the agreement entered into in March 2011. To date, an agreed commercial resolution has not been achieved and Nautilus believes the avenues for achieving such a resolution within the timeframe that Nautilus could reasonably continue to carry the total development costs for the project have now been exhausted. It has decided to terminate construction and all of the relevant supplier agreements contain provisions for termination without penalty. The company has also been forced to reduce staff numbers with approximately 60 positions being made redundant.

Nautilus' CEO, Mike Johnston, commented: "While terminating the equipment build for the Seafloor Production System and reducing staff numbers to this extent was a difficult decision, it was appropriate. Nautilus has a highly prospective ground position, which includes 19 identified prospects in Tonga, including the recent high grade discoveries in the NE Lau Basin and a 410m tonne Inferred Mineral Resource in the Central Pacific. "Despite this setback, the Company remains committed to maximising shareholder value by achieving its objective of developing the world's first commercial seafloor copper-gold project and launching the deep water seafloor resource production industry, whilst maintaining an environmentally and socially responsible approach."

### **Warning on deep-sea mining**

The National, 12th November, 2012

By STARZA PAUL

DEEP sea mining should be given more consideration before mining starts, the National Research Institute's Dr Nalau Bingeding says. Bingeding made the comment last Friday in Port Moresby amid speculation by landowner groups, public, politicians and other concerned institutions that deep-sea mining was still not safe for marine life. "Amid the on-going debate on the pros and cons of deep-sea mining, there are still questions to be asked. "The concerned groups and public should ask if the government of Papua New Guinea is going ahead to allow Nautilus to carry out the world's first deep-sea mining in the Bismarck Sea," he said. He said Nautilus Minerals Ltd was adamant that it had spent millions of dollars exploring the floor of the Bismarck Sea and would mine the seabed regardless of concerns raised on the environmental consequences of such mining.

“Nautilus is determined to see PNG become the first country in the world to use state-of-the-art technology to do deep-sea mining because it has been given the green light to do so by the PNG government. “The government should consider the 2009 Coral Triangle Initiative that the Department of Environment and Conservation (DEC) agreed to on behalf of the government,” he said. “This is a 10-year regional action plan to protect coral reefs and other marine ecosystems and in line with the fourth goal and directive principle of PNG’s Constitution on natural resources and environment.” Binging said global warming should be given consideration as deep sea mining would contribute towards it. “Warming of the world’s ocean surfaces has resulted in bleaching of coral reefs in some parts of the world.” “In the Pacific, the warming of the oceans has not had any profound effect but it is predicted that these impacts will be more pronounced in the near future,” he said.

### **Oceanographer questions analysis of PNG seafloor mine data**

Radio Australia, 8 November 2012

An Australian scientist has raised further concerns about the environmental impact statement for the world's first seafloor mine off New Ireland in Papua New Guinea. Oceanographer questions analysis of PNG seafloor mine data (Credit: ABC) The Canadian company, Nautilus Minerals, is set to begin mining operations at the Solwara One Project next year, despite concerns from people in the New Ireland region about cloudy water, dead tuna, and a lack of response of sharks to an age old tradition of shark calling. John Luick an oceanographer from Austides Consulting - a firm which works on mining projects around the world - was engaged by the Deep Sea Mining Campaign to examine part of the environmental impact statement. Dr Luick told Alexandra Wake, he found nothing wrong with the field work, but has major concerns with the quality of the scientific analysis, particularly as it relates to currents and the dispersion of mine waste material.

Presenter: Alexandra Wake,

Speaker: Dr John Luick, the general manager of Austides Consulting, who completed the report for the Deep Sea Mining Campaign; Link:

<http://www.radioaustralia.net.au/international/radio/program/pacific-beat/oceanographer-questions-analysis-of-png-seafloor-mine-data/1043352>

### **Pundari speaks out on Deep Sea Tailings**

Post-Courier, November 6, 2012

*By JASON GIMA WURI*

MINISTER for Environment and Conservation John Pundari has expressed concern over the issue of Deep Sea Tailings placement and its potential impact on the marine environment and fisheries recently. Mr Pundari made these comments in his Ministerial Parliament Statement during the Parliament session last week. “I understand that it is probably the safest method of waste disposal for most mining projects in PNG, given the difficulty of land-based waste management in areas of high seismic activity and complex terrain. However we need to be confident that the practice will not harm the environment. “I have directed my Department to work with the Department of Mineral Policy and Geohazards and the Mineral Resources Authority to finalise new guidelines for deep sea tailings placement. “The guidelines will assist us to better understand the potential impacts of mining waste disposal and to have improved monitoring systems in place,” Mr Pundari said.



## **Oceanographic assessment blows Nautilus out of the water**

PNG Mine Watch, 6.11.2012

A new report finds that the Environmental Impact Assessment (EIS) for Nautilus Mineral's Solwara 1 deep sea mining project seriously downplays the risks facing local communities and the marine environment. The report released by the Deep Sea Mining Campaign reviews the oceanographic elements of the EIS. Its focus is on currents and upwelling that may bring pollutants into contact with local populations and marine species. At only 30km away New Ireland is especially at risk, with the possibility of upwelling and currents carrying mine-derived metals towards its coastline. The report finds that the oceanographic aspects of the EIS suffer from a lack of rigour. There are many errors and omissions in the modelling, presentation and analysis of data. The report's author is oceanographer, Dr John Luick, who has many years experience working for mining, gas and oil companies in Australia, Papua New Guinea, Saudi Arabia, California and Alaska.

Dr Luick said: "The physical oceanography and hydrodynamic components of the EIS are second-rate. The shortcomings in these elements of the Solwara 1 EIS are so basic that I could have written the same review 27 years ago while still a student. The modeling is completely unacceptable by scientific standards." Dr. Luick continued: "The People of PNG deserve better. They should be able to feel confident that the approvals process is open and based on the best available science." The EIS for the Solwara 1 Project was the key document considered by the PNG National Government in granting the 20 year operating licence to Nautilus in 2011. Professor Chalapan Kaluwin, of the Environmental Science & Geography department at the University of Papua New Guinea emphasised: "The EIS should have provided a solid basis for the Government of PNG to decide whether to approve this project and if so, under what conditions. The findings of this new report suggest these important decisions were made on the basis of junk science."

Professor Kaluwin adds: "We know an earlier review of the oceanographic aspects of the EIS was conducted by an Australian company, Cardno Investments. We don't know what that review found or even if that review itself was of high quality. The key elements of this project's approvals process are not in the public arena. They must now be made available in a form that can be easily understood, especially by the people of New Ireland and East New Britain who are most at risk from Solwara 1." Dr. Helen Rosenbaum, campaign coordinator for the Deep Sea Mining campaign in Australia and author of *Out of Our Depth: Mining the Ocean Floor in Papua New Guinea* states: "Solwara 1 is the world's first deep sea mining experiment. As such it demands extremely careful attention to scientific detail and transparency in decision making. This new report indicates that both of these elements have been lacking. Important next steps are to make available the full data set behind the EIS, the earlier Cardno review of oceanographic components of the EIS and the conditions of the permits issued by DEC."

### ***Press Release***

## **Nautilus Minerals Discovers More High Grade Systems in Tonga**

Nautilus Minerals Inc., 1.11.2012

TORONTO, ONTARIO--(Marketwire - Nov. 1, 2012) - Nautilus Minerals Inc. (the "Company" or "Nautilus Minerals") is pleased to announce the discovery of two (2), high grade, Seafloor Massive Sulfide ("SMS") systems on its wholly owned exploration tenements in the territorial waters of the Kingdom of Tonga ("Tonga"). Grab samples from these discoveries assayed up to 11.9% copper, 59.8% zinc, 28.6 g/t gold and 673 g/t silver. Mike Johnston, Nautilus Minerals' CEO commented, "These discoveries further highlight the prospectivity of our Tongan exploration tenements, particularly the high precious metal grades we continue to encounter in the NE Lau Basin. They will be

added to the 17 SMS systems, as previously reported on our Tongan prospecting licenses\*, which are being considered for further evaluation." The SMS systems were sampled during an 18 day marine scientific research cruise between the 9th and 26th of September 2012. The samples were collected as a part of a broader research effort in the NE Lau Basin.

#### About Nautilus Minerals Inc.

Nautilus is the first company to explore the ocean floor for polymetallic seafloor massive sulphide deposits and is developing its first project at Solwara 1, in the territorial waters of Papua New Guinea, where it is aiming to produce copper, gold and silver. The company has been granted all necessary environmental and mining permits. Nautilus also holds more than 500,000 km<sup>2</sup> of highly prospective exploration acreage in the western Pacific; in PNG, the Solomon Islands, Fiji, Vanuatu and Tonga, as well as in international waters in the eastern Pacific. A Canadian registered company, Nautilus is listed on the TSX:NUS and AIM:NUS stock exchanges and OTCQX:NUSMF. Its corporate office is in Brisbane, Australia. Its major shareholders include Metalloinvest, the largest iron ore producer in Europe and the CIS, which has a 21% holding, global mining group Anglo American, which holds an 11.1% interest and MB Holdings, an Oman based group with interests in mining, oil & gas, which holds a 16.9% interest.

Neither the TSX, London Stock Exchange, nor the OTCQX accepts responsibility for the adequacy or accuracy of this press release.

Source: <http://www.stockhouse.com/news/canadianreleasesdetail.aspx?n=8655657>

#### **Kalinoe: Nautilus has to settle row**

The National, 30th October, 2012

By MALUM NALU

PETROMIN chief executive officer and managing director Joshua Kalinoe is waiting for a dispute between the state and Nautilus Minerals to be resolved before Petromin can take a 30% stake in the Nautilus development worth up to US\$500 million. Kalinoe said this yesterday at a luncheon he held with members of the media while refusing to go into details of the dispute between state and Nautilus. "There's a dispute between the state and the developer (Nautilus)," he said. "Because of that, we can't do much. "We have been nominated (by the state) to participate in the project. "Until the dispute is resolved, we can't do much. "The issue has been disputed by Nautilus, not by the state. "By doing so, they (Nautilus) are delaying the project, not the state."

In June Nautilus chief executive Stephen Rogers said that he expects to settle things with Petromin within "months" once the election was over, but that now seemed a more remote possibility. Nautilus says PNG undertook to help fund the Solwara 1 project – almost half built – as part of an agreement signed last year that gave the country 30% ownership, but the government appears to be digging in its heels over the issue. In a response in June, Petromin alleged that Nautilus was the party that breached the terms of the deal and that the state was "therefore entitled to terminate the agreement". In late April, Nautilus announced it had signed China's Tongling Non-Ferrous Metals Group as the first customer for its pioneering PNG sea-floor mine.

The undersea mine was slated to begin production in the fourth quarter of next year, but Nautilus is also facing funding problems concerning its German partner building the US\$160 million surface vessel, which is the base for the entire underwater operation. Nautilus still has some US\$100 million cash in the bank. Kalinoe, meantime, said Petromin was waiting for the final decision on the Gulf LNG project and the Wafi-Golpu project in Morobe to make final decisions. "Again, we're waiting for a decision by state on when the project will get formally off the ground," he said of the Gulf LNG. On Wafi-Golpu, Kalinoe said Petromin had been nominated by the state and was doing desktop studies as well as those on technical and economic aspects. "We're just waiting for the de-

veloper Wafi-Golpu Joint Venture to go through the process and wait for the final decisions," he said. "This is normal. "The state nominated us through the minister for mining and the minister for petroleum."

## **PNG Opposition Strongly Opposed to Seabed Mining**

Claims 'proper feasibility studies' weren't completed

PORT MORESBY, Papua New Guinea (The National, Oct. 29, 2012) – Opposition Leader Belden Namah has voiced strong opposition to seabed mining in the country. "We again tell the government that we are totally against the Nautilus seabed mining in the country," Namah said. "It has serious implications that the government didn't consider when it gave licence to the developer." He said there was no proper feasibility studies carried out prior to licensing of the company. "Prominent leaders such as Sir Julius Chan are against the seabed mining and government needs to take this into consideration. "I know that some aliens have influenced public policy and I'm calling on the O'Neill government to reconsider its decision for the good of this country," he said.

Namah said many coastal people were dependent on the marine eco-system and any fault in the development of the project could cause a major catastrophe. "Disasters on land could be contained but sea is hard to contain as we have witnessed like the oil spill in the Gulf of Mexico recently." Deputy opposition leader Sam Basil said PNG did not have the expertise and technology to carry forward this project. "My question to the government is why does the Ministry of Mining, Environment and Conservation keep on issuing licence when they know that some of these projects will have negative effects," Basil said. The two leaders urged the government to stop the project. "Papua New Guinea's economy is not even dependent upon this one project as we have a lot of mineral prospects on land."

## **Rough sailing for Nautilus**

The National, 26th October, 2012

SHARES of Canadian miner Nautilus Minerals Inc sank to fresh lows on the London stock market on Wednesday, falling almost 5%, to 51 pence, following the news of a Papua New Guinea landowners' petition for the government to cancel the firm's seabed mining permit. The company, the first to explore the ocean floor for polymetallic massive sulphide deposits, was granted a mining lease by the PNG government in January last year following the environmental permit award in December 2009. But the mine developer has been swimming in choppy waters ever since. It faces criticisms from the environmentalist and the marine biologist community on the feared ecological consequences of its Solwara 1 gold, copper and silver project. The company has also been locked in a dispute with the government since June over ownership of the project located in the Bismarck Sea.

More than 20,000 signatures have been submitted to Mining Minister Byron Chan by residents from the provinces of Madang, Oro and New Britain, stating that they do not want the project to go ahead. Locals insist they have seen dead fish washing up on beaches and that the water has been polluted by the exploration work. The Canadian mine developer was granted a 20-year permit by the previous government under Sir Michael Somare to mine an area in the Bismarck Sea at a depth of 1.6km. Nautilus said it plans to begin extracting minerals from the Solwara 1 deposit in 2014. The new government under Peter O'Neill is reportedly challenging the deal and wants to make a number of amendments. Shareholder in Nautilus have seen the value of their investments plummet by more than half since the company initiated the legal battle last June 1 over Solwara1.

## **24,000 Petition PNG Government to Stop Solwara 1 Mining**

*Residents call for moratorium on all deep sea mining*

By Caldron Laepa

PORT MORESBY, Papua New Guinea (The National, Oct. 25, 2012) – A petition, signed by 24,000 people living in the immediate area of the controversial seabed mining site in the Bismarck Sea, has requested the government to stop the project and review its approval process. Bismarck-Solomon Sea Indigenous People's Council president John Simoi presented the petition to Mining Minister Byron Chan and government representatives this week. Simoi said the petition was over dissatisfaction with the project's environmental impact studies (EIS). He said the project had commissioned Prof. Richard Steiner from the University of Alaska in 2010 to produce a report that showed the EIS approved by the Department of Environment and Conservation was not satisfactory.

"The sea is our garden. That is where we get our food to survive. "We cannot let the investor destroy this. We are asking the government to put a moratorium for, say 10 years, on deep-sea mining or stop deep-sea mining," he said. The people, including landowners from Madang, Northern and New Britain provinces signed the petition, saying they did not want Canadian-owned Nautilus Minerals' Solwara 1 project to go ahead. The project is the first of its kind in the world and will see minerals – mostly copper and gold – extracted from the ocean floor. Nautilus was granted a 20-year lease by the government of Sir Michael Somare and plans to mine an area 1.6 kilometers beneath the ocean, 50 kilometers off the coast of New Britain.

## **Pacific Activists Working to Protect Natural Resources**

Monitoring will keep tabs on agreements from overseas companies

WELLINGTON, New Zealand (Radio New Zealand International, Oct. 23, 2012) – Pacific Island activists are fine-tuning plans to vet large overseas companies' access to the region's natural resources. A New Zealand-based researcher and activist, Ali'itasi Stewart, says the development of agreements like the Trans Pacific Partnership and the international accounting framework, the SEEA, have spurred like-minded activists around the region into action. She says the plan is to set up a think tank as well as a monitoring agency made up of local decision-makers aimed at better protecting the interests of small island nations. "Basically it will actually stop quick agreements being drawn up and it will also monitor what these conglomerates are actually doing in the Pacific so just ensuring that the fishing industry is not overfished, the mining is at a sustainable rate, that the environment is actually returned back to its natural state." Ali'itasi Stewart says they are trying to get agreement from Pacific Island countries to take part in the monitoring agency which she hopes will be operating within five years.

## **Students against seabed mine**

Post-Courier, October 16, 2012

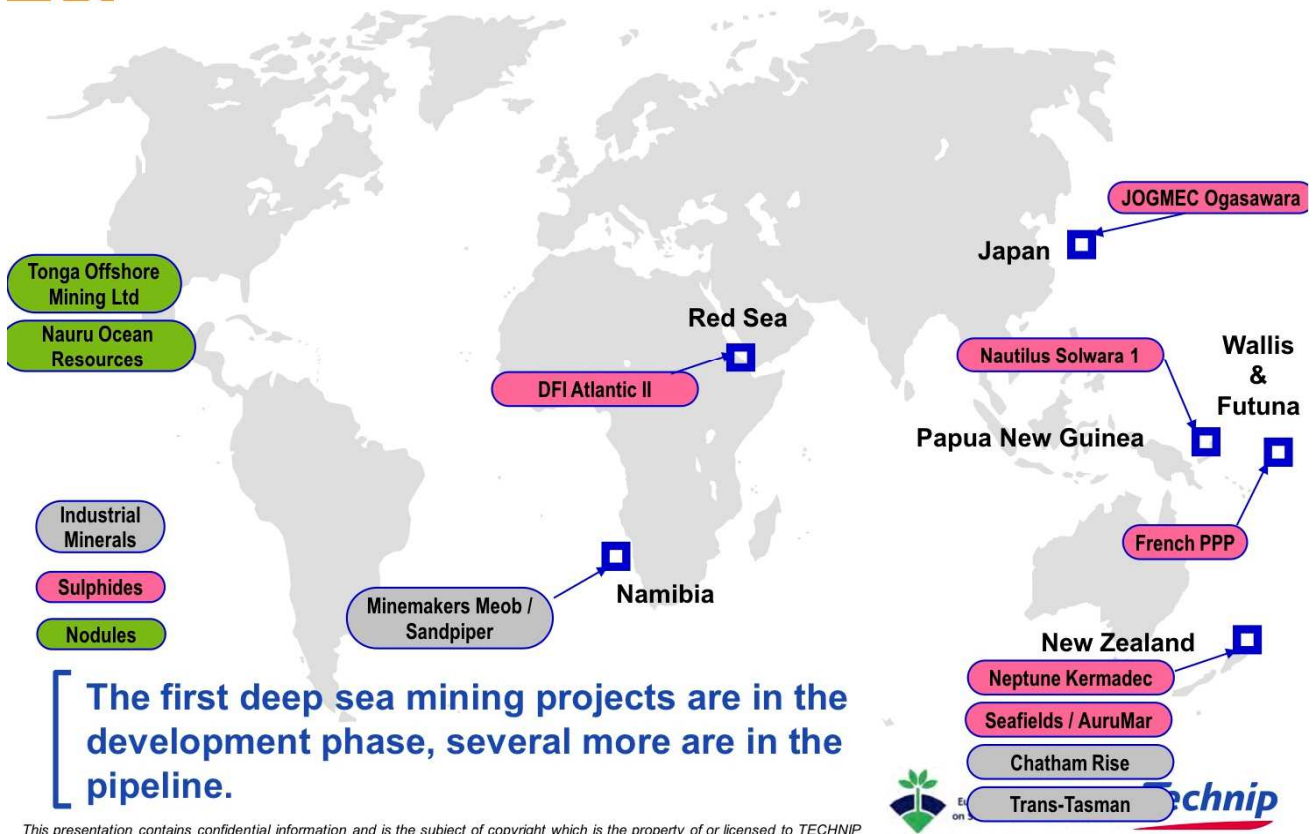
By GRACE TIDEN

STUDENTS of the PNG University of Natural Resources and Environment are calling on the state to rethink the deep sea mining project. In their petition to state representatives last Friday, the students outlined a number of concerns including environmental issues. The student body met with representatives from the Mineral Resources Authority, Department of Treasury, Department of Environment and Conservation, Department of Justice and Attorney General's office and East New Britain Provincial Administrator Aquila Tubal at the school campus at Vudal. The gathering followed a protest march staged by students, civil societies and community leaders last Thursday in

Kokopo to carry out awareness to the general public on environmental issues. PNGUNRE Student Association President Rodney Aku said they were concerned that there would be minimal job opportunities for the local people, no direct benefits to the local people and minimum opportunities for spin off benefits. He said they were concerned that the Environmental Permit for Solwara 1 Project which was granted by the Department of Environment and Conservation in 2009 was not predicated on comprehensive understanding of such new ventures.



## Market trends



Source: <http://ramumine.files.wordpress.com/2012/10/market-trends.jpg>; accessed: 11.10.2012

### Scholar against deep sea mine

Post-Courier, October 11, 2012

By *JASON GIMA WURI*

THE poor application of international laws and Papua New Guinea laws and policies on deep sea mining is a very serious challenge in managing and protecting the resources of the oceans, and the health of communities in PNG. Head of environmental sciences and geology at the University of PNG (UPNG), Professor Chalapan Kaluwin, made these comments recently in light of the seabed mining debate. He said that international laws such as the United Nations Law of the Sea, UNCLOS, International Maritime Organisation (IMO) Laws, Noumea Treaty, UNCED agreement and PNG's laws and policies such as the Mining Act, Environmental Act etc, were poorly or misapplied. Especially with regard to the Deep Sea Mining (Solowara 1) project. "It is important to know that there is no Deep Sea Mining Policy or Act in the world. In managing such resource for PNG government and its stakeholders must understand this status.

“In addition, the relative short term (2-3 years) scientific and environment results, studies, (mainly desk top models) and reports carried in the Solowara 1 region (EIS/EIA report) that were submitted to the PNG government for Phase 1 (30 Months Project) should be treated with caution and precautionary principles must be applied until full scientific proof is available,” Professor Chalapan said. Those reports, he said, do not carry any substance on being proactive in getting the PNG Govt to ensure that there is a policy in place, and especially in developing a PNG Ocean Policy to protect its fisheries, minerals, biodiversity, environment, culture and its people as priorities. Looking at mining in the ocean is a small part of resources in the PNG EEZ. There must be a holistic approach to manage our resources in this oceans and EEZ. He said the Nautilus company has not done much research and monitoring work in the area to provide confidence for PNG people, especially provincial communities. There is no socio-economic assessment by Nautilus and the PNG Government to provide a long term strategy for fisheries, biodiversity, environment, cultures, or people’s health.

“Can we guarantee that the health of our people and oceans will be protected? No you cannot. “Application of adaptive technology in the tropical marine ecosystem has very serious limitation in PNG; and deep sea mining must be evaluated and monitored for mitigation purposes. “Given the sustainable development (economic, environment and livelihoods) scenarios and assessments of PNG, coupled with too many questions and uncertainty on the Solowara 1 project, the PNG government and its people must defer the implementation of this pilot project for the time being, if the Bougainville Copper lesson is to be model for the Bismarck Seas and its provinces. “Our review and analysis on other documents, our experiences and based on the above and the EIS for Phase 1 of Solowara 1, strongly believe that Solowara 1 pilot project will be a long term disaster for PNG and the health of its people,” Professor Chalapan said in conclusion.

### **Nordatlantik: Lebende Fossilien bevölkern Tiefsee**

Von Christoph Seidler, SpiegelOnline, 10.10.2012

*Die Tiefsee birgt unzählige geheimnisvolle Tierarten - viele haben sich offenbar seit Millionen von Jahren kaum verändert. Forscher haben in Sedimenten vom Boden des Atlantiks verblüffende lebende Fossilien entdeckt.*



Univ. Göttingen/ Ben Thuy; Heutiger Schlangensterne aus der Tiefsee

Berlin - Erschreckend wenig ist es, was die Menschheit über die Tiefsee weiß. Weniger sogar, so heißt es jedenfalls gemeinhin, als über die Oberfläche des Mondes. Forscher aus Deutschland, Österreich, Schweden und Großbritannien haben nun immerhin zeigen können, dass die Ökosysteme in der ewigen Finsternis am Ozeangrund erstaunlich stabil sind. Das heißt: Die Bewohner der Tiefsee haben sich in der Vergangenheit nur sehr langsam weiterentwickelt. Arten, die heute dort leben, unterscheiden sich nur wenig von ihren Millionen Jahre alten Vorfahren. Die Wissenschaftler um Ben Thuy vom Geowissenschaftlichen Zentrum der Universität Göttingen berichten im Fachmagazin "PLoS ONE" von Analysen an Material, das vom Meeresboden vor Florida stammt. Vor mehr als zehn Jahren hatte das Forschungsschiff "JOIDES Resolution" dort einen inzwischen beinahe legendären, wenige Zentimeter dicken Sedimentkern erbohrt.

Das Expeditionsmaterial mit dem Archivnamen "IODP 1049" ist inzwischen ein akribisch studiertes Archiv der Erdgeschichte. In ihm findet sich beispielsweise eine zentimeterdicke Schicht, die von einem gigantischen Meteoriteneinschlag vor 65 Millionen Jahren kündigt. Der dabei aufgewirbelte Staub hat den gängigen Theorien zufolge das Ende der Saurier zumindest mit verursacht. Paläoklimatologen können mit Hilfe solcher Sedimentkerne, die -etwa im Rahmen des Integrated Ocean Drilling Program - in den vergangenen Jahren rund um die Erde gesammelt wurden, das Klima der Vergangenheit rekonstruieren. Dafür suchen sie im Schlick der Sedimente beispielsweise nach den Kalkgehäusen winziger Einzeller. Interessant sind die sogenannten Foraminiferen, die sehr sensibel auf Änderungen in ihrem Lebensraum reagierten - und damit ein perfekter Indikator für Veränderungen sind. Thuy und seine Kollegen fahndeten nun allerdings nach Skelettresten anderer Meeresbewohner - und zwar größerer. Für ihre Analysen suchten sie in den ältesten Bereichen des Sedimentskerns. Dort findet sich Material, das vor 114 Millionen Jahren, also in der frühen Kreidezeit, am Meeresgrund abgelagert wurde. "Ab und zu findet man Überbleibsel von größeren Tieren: Muschelreste oder Fragmente von Stachelhäutern zum Beispiel", erklärt Thuy. Zu den Stachelhäutern gehören Seeigel, Seesterne und Schlangensterne.

Die Ausbeute war beeindruckend: Insgesamt 7000 solcher Skeletteile fanden die Forscher. Sie schwärmen daher von einem "einmaligen und bisher völlig unbeachteten Fenster in die Geschichte der Tiefsee". Denn aus ihrer Sicht hat sich bisher niemand ernsthaft mit der Suche nach ähnlichen Bruchstücken befasst. "Das hat die Tiefsee nicht besonders gestört". Freilich, längst nicht alle der bestenfalls wenige Millimeter großen Bruchstücke ließen sich einer bestimmten Tierart zuordnen. Trotzdem lohnte sich die Suche offenbar: Allein für rund 980 der winzigen Puzzlestücke vermelden die Wissenschaftler Entsprechungen in der Tierklasse der Schlangensterne. Und diese Meeresbewohner gibt es noch heute in der Tiefsee, sogar ausgesprochen häufig. Was die Forscher besonders verblüffte: Zwischen den Fossilien und den noch lebenden Arten waren kaum Unterschiede feststellbar. "In fast allen Fällen kann man sagen, dass sich fast nichts geändert hat", sagt Forscher Ben Thuy.

Die Funde bedeuten nach Ansicht der Forscher zum einen, dass es schon früher als bisher vermutet Ökosysteme in der Tiefsee gab - und zum anderen, dass die aktuellen Bewohner dort kaum von Fossilien unterscheiden. Das könnte darauf hindeuten, dass der Grund der Ozeane ein - sogar von globalen Katastrophen - weitestgehend ungestörter Rückzugsort des Lebens ist. Oder es zumindest war. Das große Artensterben am Ende der Kreidezeit, als etwa die Hälfte aller Arten von der Erde verschwand? "Das hat die Tiefsee nicht besonders gestört", sagt Forscher Thuy. Während es an Land und in flacheren Meeresgebieten große Umwälzungen gab, ging fernab des Trubels alles seinen geregelten Gang. Zumindest im Nordatlantik, von wo die nun untersuchte Sedimentprobe stammt, war das wohl so. Heute mögen die Dinge ohnehin anders liegen. "Was der Mensch gerade veranstaltet - selektives Wegfischen bestimmter Arten oder die Verschmutzung mit Öl zum Beispiel -, so etwas gab es noch nie", sagt Ben Thuy. Man könne wegen ihrer Geschichte zwar die Hoffnung haben, dass die Tiefsee robuster sei als bisher angenommen. Doch wissen könne man das nicht.

## **Asset management firm's devastating evaluation of Nautilus experimental seabed mining plan** PNG Mine Watch 4.10.2012

In 2008, a global asset management firm produced a devastating evaluation of Canadian miner Nautilus Minerals plans for experimental seabed mining in Papua New Guinea. M-CAM provides financial and business solutions to some of the world's largest financial institutions as well as working with marginalized groups in developing countries. Among the findings presented in the M-CAM are:

- Undersea mining of massive sulfides will have a potentially devastating environmental impact
- PNG offers a lax regulatory environment and the undersea mining could be effectively unregulated
- Environmental impacts could spread beyond PNG and affect other nearby countries
- There is a high probability of social and economic disruptions for local people
- Nautilus sponsorship of research means there is no guarantee of accuracy or independence in the findings
- The mining will infringe on significant international intellectual property rights that Nautilus neither owns nor has any licensed rights to
- The mining is unlikely to create significant numbers of local jobs
- Despite its dominant role in PNG, most of the benefits from the mining industry flow to foreign investors

Here are some of the key parts from the M-Cam report:

Undersea mining of massive sulfides has potentially devastating environmental impacts. Damage is possible to undersea vent ecosystems from the mining itself, fish and sea life in nearby waters from sediment spills, and surface marine and bird life from barge activity. While Nautilus states that mining will only occur on dormant vents, these are often found in close proximity to live vents and their fragile ecosystems. These ecosystems could easily be damaged by mining disruption and are potential sources for significant amounts of biodiversity that could be used for new medications and technologies. Algae blooms are also possible if care is not taken to use or process nutrient-rich cold water from the sea-floor before release. Any disruptions are likely to long-term in nature since sediment plumes could take between ten and forty years to fully resettle, causing significant damage to nearby marine life populations.

Since Nautilus is operating entirely within PNG's exclusive economic zone, they are not subject to International Seabed Authority regulation and can operate in the more lax regulatory environment of PNG. Given the poor track record of easily monitored terrestrial mining, the difficulty to monitor undersea mining has the possibility to easily go unregulated. Unlike land-based pollution, the effects of undersea disruptions can easily spread beyond PNG waters to affect other nearby countries. In addition to environmental impact, there is a high probability that lightly regulated undersea mining will cause social and economic disruption for Papua New Guineans. Like many others from the 200 high islands and 2500 low islands and atolls in the Pacific, the people of Papua New Guinea have an important relationship with the sea. The ocean surrounding these islands is more than just water; it represents food, economic livelihood, and highly important cultural symbols that are all crucial to the way of life for the people of PNG. Further, there is deep cultural and spiritual significance to the areas contemplated for barge traffic and on-shore processing.

Without proper oversight and internal discipline on the part of the Government of Papua New Guinea, Nautilus and its partners, this undersea mining has the potential to be socially, economically, and environmentally destructive. Although Nautilus has participated in Environmental Impact Studies, the lenient regulatory environment and previous sponsorship of research institutions means



there is no guarantee that the methodology or results of these studies will be fully accurate or subject to independent review from bodies with objective disinterest in the enterprise's operations. Further, these studies have not covered the social or economic consequences facing the people of PNG, particularly taking into consideration the cultural values attendant to both the land and sea resources and their role in communal values

Mining is a dominant industry in PNG, accounting for as much as 25% of GDP and two thirds of exports<sup>2</sup>. Despite this large presence, few jobs go to the people of PNG and most of the benefits flow to foreign investors. Despite billions of dollars of mineral exports, poverty rates and unemployment both remain high. Mining has also caused social unrest. Exploitative mining practices led to a severe civil war in Bougainville, leading to significant government weakening. While the central Government has launched a number of initiatives to rectify a legacy of public sector accountability deficits, oversight – particularly in exploration and environmental management – has been lax in PNG, with large amounts of corruption and a long history of resource exploitation.

It was abundantly clear that local and regional leadership have inadequate information regarding both the Nautilus company and its explicit technical plans. It was further clear that no participant in any of the meetings had been aware of the degree to which the proposed technology deployment was likely subject to significant international intellectual property considerations that were neither owned nor overtly documented to have been licensed to the company. It was further obvious that the awareness of local biological diversity and its documented (and in some cases, expropriated) uses was inadequate to insure any appropriate oversight and management of indigenous resources by the Government of Papua New Guinea. Without exception, the participants were unaware of the degree to which the company has contracted with worldwide corporate, academic, and scientific organizations to assist them in framing the marketing and environmental message. Because the mining operation is largely automated, Nautilus currently employs only about a dozen Papua New Guineans; that number is unlikely to grow significantly.

### **PNG: Islands unite against mining**

Post-Courier, October 3, 2012

*By GRACE TIDEN*

CIVIL societies in East New Britain and New Ireland Provinces are planning a peaceful protest march to raise concerns on sea bed mining. They will also be presenting a petition to local parliamentarians. The East New Britain Sospel Eksen Komiti (ENB SEK) is currently facilitating the arrangements. Peter Tutuai from the ENB SEK said a working committee was established in one of their recent forums to organise the petition and protest march. The committee members include Mr Tutuai, former Education Secretary Betual Peril, Father Mathias Lopa, former provincial education adviser Boas Koro, Jack Ephraim, Nerrie Wilson from the Kokopo District Council of Women and Sir Henry Torobert. He said they have spoken to ENB Governor Ereman ToBaining Junior as well as the police hierarchy in the province for their approval and everything is now in place.

Mr Tutuai said they have also been consulting with leaders in New Ireland Province. A date for the peaceful protest march is yet to be set by the working committee but committee members want the event to take place before the end of this month. Mr Tutuai said they plan to carry out the march and present the petition before the next parliament session. "We think it should be an agenda in the next parliament sitting," he said. He said the committee will have to finalise the petition before calling on respected community leaders and other important people both in ENB and NIP who will be signatories to the petition on behalf of their people. Mr Tutuai said they wanted all MPs in both provinces to be present when they submit the petition after the protest march.

## **Coalition against Solwara 1 project throws support behind Oro Governor**

Post-Courier, October 1, 2012

By *BENJAMIN HOWARD*

THE community coalition against the proposed Solwara 1 project in the Bismarck Sea has thrown its support behind Oro Governor, Gary Juffa's initiatives to seek legal clarification on the activities of Nautilus Minerals in this area. Prominent community development advocate and social commentator, Patrick Kaiku revealed last Saturday that "like-minded groups and citizens, including members of social media group Sharp Talk and affiliated civil society groups have initiated the idea of raising financial contributions" to support legal proceedings undertaken by Mr Juffa. "We the concerned citizens have started the process of raising financial donations towards meeting certain associated costs in this legal process. Papua New Guineans of all walks of life are kindly invited to put into a trust account whatever amount they can afford", Mr Kaiku said. He said that other fundraising activities are being planned to complement this drive and will be announced publicly as soon as they are finalized.

Meanwhile, Mr Juffa has told the Post Courier that the legal proceedings he initiated is primarily aimed at highlighting flaws in the country's legislations in areas where proper checks and balances are concerned, particularly for companies engaging in projects that have a significant and severe effect on the environment and lives of people, but who are not being held as accountable as they should be. He said the standard practise where a developer retains an organization to produce an Environment Impact Statement before commencement of any project in Papua New Guinea does not provide for sufficient check and balance and does not allow for transparency and representation of the rights and interests of the people of Papua New Guinea.

Mr Juffa further stated that government agencies tasked to protect the country's interest must not be act as rubber stamps as this can result in resource and land owners becoming mere spectators without avenues for seeking recourse to the plunder of their environment perpetrated by powerful foreign owned multinational corporations. "The effort we intend to undertake will allow for the development of proper checks and balances, necessary and appropriate legislation to protect the interests of Papua Guinea. "I am taking this legal stance on behalf of the people of Papua New Guinea, in particular those who live along the coastal shores and on islands and who depend on the sea for their survival and who stand to be adversely affected by the proposed Solwara 1 Project", Mr Juffa said.

## **Minister for Environment: Debate Nautilus**

Post-Courier, September 28, 2012

By *JASON GIMA WURI*

THE Minister for Environment and Conservation, John Pundari, has directed the Department of Environment and Conservation (DEC) to hold public forums to debate environmental risks and issues associated with the Nautilus Solwara 1 Project in Papua New Guinea. Mr Pundari wants the forums to be staged in Port Moresby's National Research Institute (NRI) and Madang's Divine Word Institute, to bring together experts in the areas of ocean and current modeling, ocean and marine sedimentology, deep sea geology and vulcanology, bioaccumulation and marine ecology and deep sea fisheries, to present their cases on the Solwara 1 Project. "These experts will be from PNG and overseas, including Universities, National Research Institutions, Academia as well as NGOs, Leaders and interested individuals," he said.

Minister Pundari explained that the Deep Sea Mining Solwara 1 Project was a new frontier project in PNG and the project comes with its own environmental risks. He said these risks were assessed

by competent experts from the world and the region that included some of the world's renowned scientific institutions and experts, and management strategies were developed to mitigate those risks through the development of a comprehensive Environmental Management and Monitoring Program. "I want these experts in oceanography, sedimentology, vulcanology, fisheries and marine ecology including organizations such as the Universities, National Research Institutions, international and National NGOs and other experts and leaders to come together, present their cases and debate the facts on aspects of the Solwara 1 project so we can all determine whether the Government's decision to approve the project was good or bad," Mr Pundari said.

### **Public forum on Solwara 1**

The Nationl, 27th September, 2012

By MALUM NALU

MINISTER for Environment and Conservation John Pundari has directed the Department of Environment and Conservation to hold public forums in Port Moresby and Madang to discuss, debate and present their cases on the Solwara 1 project. He said the forums would be held at the National Research Institute in Port Moresby and Divine Word University in Madang, and would bring together experts in the areas of ocean and current modelling, ocean and marine sedimentology, deep sea geology and volcanologists, bioaccumulation and marine ecologists, and deep sea fisheries. "These experts will be from within PNG and international, including universities, national research institutions, academia, as well as NGOs, leaders and interested individuals," Pundari said. "Deep sea mining Solwara 1 project is a new frontier project in PNG and the project comes with its own environmental risks.

"But those risks were assessed by competent experts from the world and region that included some of the world's renowned scientific institutions and experts, and management strategies were developed to mitigate those risks through the development of a comprehensive environmental management and monitoring programme. "I want these experts in oceanography, sedimentology, volcanologists, fisheries and marine ecology – including organisations such as universities, national research institutions, international and national NGOs, and other experts and leaders – to come together, present their cases, and debate the facts on aspects of the Solwara 1 project so we can all determine whether the government's decision to approve the project was a good or bad decision." Pundari said the environmental permit for the project was granted to the developer, Nautilus Minerals, after the state was satisfied that it had followed all due processes.

He urged stakeholders to understand that the issuance of an environmental permit was not the end of the process, "but the beginning of the legal contractual relationship and commitment between the state and the developer to manage the environmental impacts of the project in a responsible and transparent manner". "In the light of the public concerns being raised regarding seabed mining by various sectors of the community, I have directed the Department of Environment and Conservation (DEC) to facilitate the public forums to explain the regulatory processes to stakeholders," Pundari said. "The discussions will also provide an opportunity for stakeholders to bring forth their views to the state. "No doubt Papua New Guinea is going to be the first country in the world to venture into deep sea mining. "We want to go into these new frontiers with full backing of good science and the way to do it is to bring together all experts to debate the facts in a public forum so that the public is informed of how decisions are made by the government to approve or disapprove a development project."

## **Governor Gary Juffa Condemns Deep Sea Mining In PNG**

Opposes Solwara 1 to 'protect' coastal residents' interests

PORT MORESBY, Papua New Guinea (The National, Sept. 26, 2012) – Northern Governor Gary Juffa has vowed to stop the Solwara 1 project on behalf of his people and those of the affected areas of Papua New Guinea. Juffa made the commitment in front of a crowd of university students and other interested groups at the University of PNG main lecture theatre in Port Moresby last week. He presented a short brief outlining the strategies he was employing and the reasons behind his actions. He was taking this step to protect the interests of the people of Northern living along the coastline and islands and those of Papua New Guineans who were reliant on the sea for survival.

“The lawyers engaged are now studying the process of awarding of permits and licences and so forth for Nautilus Ltd for their so-called project. “They will determine whether there were sufficient checks and balances, conflict of interest and corruption by the company and Mining Department. “While the company has gone out of its way to assure the people and the government about its commitment, the reality is that the process appears flawed and improper,” Juffa said. He said the project was yet another example of a flaw in the country’s system where a company was expected to deliver an environmental impact statement that it paid for. Juffa said the company would never get away with this in Canada or Australia.

### **Nautilus research announced**

Post-Courier, September 25, 2012

NAUTILUS Minerals has announced last week that its 100 percent owned subsidiary, Tonga Off-shore Mining Limited (“TOML”) confirmed that Golder Associates Pty Ltd., (“Golder”) has completed a maiden Mineral Resource estimate for TOML’s Clarion-Clipperton Fracture Zone (“CCZ”) polymetallic nodule project, located within the Central Pacific Ocean . The Inferred Mineral Resource has been reported at a range of abundance cut-offs. Nautilus President and CEO Steve Rogers commented, “Our maiden mineral resource estimate for the CCZ again highlights the enormous potential of seafloor resources. We believe that the advance in processing and offshore technologies over the last 20 years now makes the extraction of these significant resources technically feasible.” The reduced social disturbance associated with deep sea mineral production and the development of a strong regulatory framework by the International Seabed Authority since 1994 are key elements that set this project apart from large land based resource developments.

Steve Rogers added that, “At Nautilus Minerals we are hugely excited to be leading the development of this enormous, currently untapped potential on the seafloor. Our priority focus must remain with our high grade Solwara 1 seafloor massive sulphide (“SMS”) project, and other prospective SMS systems in PNG and Tonga. With the immense polymetallic nodule mineral resources of the CCZ however, we have to start the engineering and evaluation processes now to realise this opportunity at the appropriate time in the future. There is the potential for a further update of this mineral resource estimate, in that approximately 30 percent of our licence area is not included in the estimate, but both of these areas are known to have nodules present from limited sampling work carried out to date.”

*Letter to the editor***James Cameron proof; there's life in deepest seas**

Post-Courier, September 20, 2012

LET me express my views against the Nautilus Minerals-PNG boss Mel Togolo who said that there is no fish existing below the depth of 1600m. Obviously, you know you are an Islander who should be standing with the majority of the people in the province to oppose this project. If you know a bit on Marine Science, you would definitely feel a deep guilt in yourself that your comments recently are totally false, unreal and very misleading. How can you say that fish do not live at depths where there is no light and oxygen when science has proven that fish actually live far below the 1600m depths? You must come to the fact and accept that whatever your Nautilus does at the ocean floor will still have huge impact on the marine ecosystem in that area. Do you know anything about Ocean Upwelling and Bottom Up Control regarding the food chain in the marine environment? I think that you have been misled by the minds of greedy money making people.

Let me open up your mind about the deepest depths of the ocean. You must believe that there is life at the very bottom of where you want to do your mining. Fish species and invertebrates like crabs; octopus etc are down there. And where do you think most of the rich nutrients that the fish and other pelagic species feed on come from? These nutrients come from the Benthic zone exactly like the place where you want to do your so-called mining. This happens through the process of Upwelling where rich nutrients from the deeper cooler waters flows up to the pelagic zone and allows species like tuna, travellies, dolphins, sharks, marlins etc to feed on. Some months ago James Cameron went down to the deepest oceanic trench in the world (about 11 000m deep) and proved that there is life even at the most deepest part of the ocean. He even took photographs of bizarre marine species that haven't been identified before. Didn't you read or even watch 60 minutes on EMTV before commenting? Please tell us where fish in that area will get their nutrients from.

Ashley XVI, Pioneer Fidalian

*Letter to the editor***Solwara 1 won't threaten fish**

Post-Courier, September 20, 2012

NAUTILUS Minerals recognises and respects the particular importance of the commercial and traditional fisheries in the Bismarck Sea to Papua New Guinea's economy and culture. Our approach with Solwara 1 was methodical, cautious and respectful of Papua New Guinea's traditions. That is why we have given the time and resources to understand, mitigate and eliminate any potential impact from our operations on the fisheries:

- \* As determined in consultation with the National Fisheries Authority during the Environmental Impact Assessment process, Solwara 1 is not located in a primary fishing ground.
- \* Solwara 1 is located approximately 30 km from the coast and 1600 m below the surface of the sea, well beyond coral reefs and fish stocks. Fish such as tuna are concentrated in the zone of light in the top 200 to 400 m of the surface of the sea, so there is a "buffer" of more than a kilometre between where the fish are concentrated and any extraction impact.
- \* Robotic equipment on the seafloor will recover the resource to the production vessel where the mineralised material is separated from the seawater using gravity. The seawater is then filtered and returned to depth where it is discharged about 25-50 m above the seafloor, close to its source.
- \* The fully enclosed pipe and pumping system ensures that the copper resource is taken from the seafloor to the surface vessel without ever coming into contact with the seawater above the Solwara

1 site. This is not the cheapest option, but it is the most environmentally and socially responsible solution to ensure fish stocks would not be impacted.

\* Unlike other resource projects, there will be no blasting at Solwara 1.

\* Solwara 1 will use biodegradable fluids and oils in all equipment operated in the sea. No hazardous chemicals or tailings will be discharged to the sea.

Since 2007, Nautilus has consulted extensively and in good faith, through public forums with government, including officials from the National Fisheries Authority, NGO stakeholders and communities in New Ireland, East New Britain and elsewhere in PNG. More than 20,000 people have participated in these meetings and multi-stakeholder workshops addressing technical, environmental and socio-economic issues. Nautilus is currently developing its Environmental Management Plan, due for submission before commercial production starts in 2013. I and my team continue to welcome the input of concerned individuals and organisation.

Steve Rogers, CEO, Nautilus Minerals

### **Video: Lutherans join fight against seabed mining in PNG**

EM TV, PNG Mine Watch 17.9.2012

Senior members of the Lutheran Church in Madang and Morobe have joined an international chorus of opposition against the government's move to allow Nautilus minerals to Mine PNG's seabed. The group which includes former pastors and bishops say they don't want to be guinea pigs in what they're calling experimental seabed mining.

**Link:** [http://www.youtube.com/watch?feature=player\\_embedded&v=4q\\_KDF044XQ](http://www.youtube.com/watch?feature=player_embedded&v=4q_KDF044XQ)

### **PROF: SEABED MINE A DISASTER**

Post-Courier, September 15, 2012

*By JASON GIMA WURI*

THE poor application of international laws and Papua New Guinea laws and policies on the Deep Sea Mining is a very serious challenge in managing and protecting the resources of the oceans and health of communities in PNG. Head of Environmental Sciences and Geology at the University of PNG (UPNG) Professor Chalapan Kaluwin made these comments when summarising the Seabed mining forum this week. He said such international laws as the United Nations Law of the Sea, UNCLOS, International Maritime Organisation (IMO) Laws, Noumea Treaty, UNCED agreement and PNG's laws and policies which were Mining Acts, Environmental Act etc on the Deep Sea Mining (Solowara 1). "It is important to know that there is no Deep Sea Mining Policy in the world in managing such resource for PNG government and its stakeholders must understand this status.

"In addition coupled with the relative short term (2-3 years) scientific and environment results, studies (mainly desk top models) and reports carried in the Solowara 1 region (EIS/EIA report) submitted to the PNG government for Phase 1 (30 Months Project) should be treated with caution and precautionary principles must be applied until full scientific proof is available," Professor Chalapan said. The forum raised questions such as; why should PNG government agree to mine in the Ocean floor at a depth of more than 1,500 meters if the land resources are abundant and plentiful for a 7 million people for more than 50 years and beyond, with lack of capacity and expertise in these sectors? "Can we tell the developer to go back into its back yard or other countries to trial this initiative worth US\$1 billion (EIS-Phase 1 for 30 months) if their ocean mining policies are in place? Yes you can.

“Application of adaptive technology in the tropical marine ecosystem has very serious limitation on PNG in deep sea mining must be evaluated and monitored for its mitigation purpose. Given the Sustainable Development (economic, environment and livelihoods) scenarios and assessments of PNG and coupled with too questions and uncertainty on the Solowara 1 project, the PNG government and its people must defer the implementation of this pilot project for the time being, if the Bougainville Copper Limited lesson is to be model for the Bismarck Seas and its provinces. Our review and analysis on documents, our experiences and based on the above and the EIS for Phase One of Solowara 1 strongly believe that Solowara 1 pilot project will be a long Term Disaster for PNG and the health of its people,” Professor Chalapan said.

### **Nautilus: Sir Julius remains steadfast**

The National, 14th September 2012

NEW Ireland’s position on the Solwara 1 project remains unchanged, Governor Sir Julius Chan says. In a letter dated Sept 12 to country manager Mel Togolo, Sir Julius said until it received clear indications that its demands would be met, it would continue to boycott meetings with Nautilus Minerals, the Mineral Resources Authority and other representatives, whose intent to convince us to sanction Solwara 1 under the current conditions and under the current mining regime. He said the province wanted answers to the questions that the provincial government had reiterated over the years. He said they wanted an independent review of the environmental impact statement. Sir Julius said many international experts had questioned the accuracy of that statement and the provincial government needed a full review before it would help in any further discussions.

He said there had been no response from Nautilus or the national government on that demand. The provincial government asked for a disaster preparedness fund to cover the possibility of a major environmental disaster but that too had not been responded too. “I feel that the risks are so great that US\$100 million standby is without a doubt not asking too much,” he said. The government’s third demand was that the province would not entertain new mining activities until the Mining Act 1992 was revised to return control of minerals on land and in sea to the people. “We insist on the raising of the level of royalty, SGG and tax credit payments before we consider any new mining ventures.” Sir Julius said there was no point in having additional meetings as the province’s position remained clear and unchanged.

### **Oro Governor against seabed mining**

Post-Courier, September 13, 2012

By *JASON GIMA WURI*

ORO Governor Garry Juffa has once again strongly echoed his stance against the introduction of sea bed mining here in Papua New Guinea. Governor Juffa, who was a guest speaker at the seabed mining forum hosted by the University of Papua New Guinea yesterday, warned that the nation belonged to its 7 million citizens and not to just a minority who were selfishly pursuing the underwater mining venture for their own good. “I am very concerned about seabed mining, it is a project that should not go on. We do not need it because it will have little positive impacts for PNG. “My province, Oro, has a coastline and we will be directly affected. “With other colleagues in parliament like Morobe Governor Kelly Naru, Bire Kimisopa, Labi Amaiu, we are standing against such a project which will have a lot of negative implications if introduced.

“We want to constitute the middle bench, we want to represent our people as middle bench,” Mr Juffa said. He said SABL was another issue that needed to be addressed accordingly, including the Joko Tjandra case where citizenship was given. “We have cheapened our nation, I am worried

about our nation, especially our children and the future of this land. Where will they be in 10 to 20 years time?" He said. "Government Departments like the Department of Environment and Conservation (DEC) and Mineral Resource Authority (MRA) have become rubber stamps. "MRA is dishing out licenses and permits at will and appropriate legislation is not properly sought. "Corporate entities come into our country and do anything they want and leave after draining all our resources. These entities are becoming more in control of government departments. "We need a group of like minded people to come together and fight these issues together. Let your voices be heard, keep speaking, I am in parliament, I will do my part for the sake of our people. For too long we have elected politicians, we need leaders to fight the real issues for the people, not politicians," Mr Juffa said.

### **Nautilus: "Fishing will not be affected"**

Mel Togolo, Nautilus Minerals, PNG Mine Watch 13.9.2012

As the Country Manager for Nautilus Minerals, I would like to address one of the concerns people of our country have expressed, and that is the perceived effect of Nautilus' activities on fishing and fish stocks. I know how important fishing is to the livelihood of many residents in New Ireland Province and elsewhere in Papua New Guinea. As a Papua New Guinean from the islands region, I would not be involved with the Nautilus project if I felt our livelihoods and fish stocks were in any way at risk. In fact, one of the things that excited me most about joining this company six years ago was its desire to be responsible towards the environment and people. I saw an opportunity for the mining industry and PNG alike to start with a clean sheet and to offer the world a minerals solution with less environmental and social impacts. This opportunity for PNG to change the face of mining is exciting to me and as a Papua New Guinean I am proud to be involved.

There are a number of reasons I feel confident that our fish stocks and livelihoods will not be impacted. First of all, Solwara 1 is located some 30km away from the coast and 1600m below the surface of the sea, so the location of Solwara 1 is far away from coral reefs and fish stocks. On top of this, the environmental and engineering teams of Nautilus have worked closely together with world experts to design the project in such a way so as to ensure that any extraction impacts are kept below 1300m water depth, including taking into account environmental conditions such as currents. We must remember that fish such as tuna live in the light and oxygen zone where their food is – i.e. the top 200m of the surface of the sea. So, there is a "buffer" which is over a kilometre long between the fish and any extraction impact.

One of the design achievements involved working with world-class offshore experts to design a pipe and pumping system which is fully enclosed. What this means is that the copper-, gold- and silver- rich material is taken from the seafloor to the surface vessel without ever coming into contact with the seawater above the Solwara 1 site. This was not the cheapest solution, but it is the most environmentally and socially responsible solution to ensure fish stocks and people's livelihoods will not be impacted. Nautilus has made other commitments too: unlike other projects, there will be no blasting at Solwara 1. We have committed to using biodegradable fluids and oils in all equipment operated in the sea and no hazardous chemicals or tailings will be discharged to the sea.

As an aside, another aspect of the project that excites me is that we are working on a processing solution that will mean there are no tailings in PNG from our operations. To me this is a great achievement! I am proud to be part of a team that thinks about these things and which aims to deliver these sorts of environmentally sound solutions to the world. All of the measures that Nautilus has undertaken have not been developed in isolation. In preparing the Environmental and Social Impact Assessment, for example, we have collaborated with the world's leading scientists (including marine scientists), local experts, communities and organisations to ensure that we minimise and



mitigate the impact of our activities. We will continue to be open and transparent in preparing our Environmental Management Plan and monitoring program and welcome the input of concerned individuals and organisations.

### **International scientific team find extensive biodiversity in areas threatened by experimental seabed mining**

PNG Mine Watch 12.9.2012

The supporters of experimental seabed mining say the seabed is deep, dark and cold and there is nothing down there. The scientists strongly disagree, and in a recent quick assessment, international scientists collected more than 500 species of crabs and prawns alone from the waters of PNG - including four totally new genera. Around 15% of the species collected were totally new to science. The findings of the scientific team are reported in the latest issue of *Oceanography*\*. The research was coordinated by two French institutions - the Museum national D'Histoire Naturelle and the Institut de Recherche pour le Développement - and the University of PNG. Together they formed an international team of 11 scientists from six countries to explore the deep waters of eastern Papua New Guinea. They concluded that not enough is currently known about the seafloor massive sulfides that Canadian company Nautilus minerals wants to exploit to say what the environmental impacts will be.

*"Very little is known of the biodiversity and biogeography of deep-sea animals from PNG. Preliminary data suggest that deep New Guinean fauna is highly diversified. As an example, a rapid assessment of decapod crustacean biodiversity revealed more than 500 species collected including four new genera and about 15% new species". "While we are just beginning to fathom the amplitude of biodiversity in deep New Guinean waters, mining exploration and exploitation of seafloor massive sulfides is flourishing in the region. The exploitation of metals from SMS deposits is an emerging industry, and adverse environmental effects are hard to predict, as hydrothermal vent and adjacent ecosystems are still poorly known."* **Read the Oceanography magazine article:**  
<http://online.qmags.com/OCG0912?sessionID=8A078861BEE4A968D8FCD9FD1&cid=2458667&eid=17460#pg216&mode2>

### **Call to suspend mining in PNG**

Post-Courier, September 12, 2012

By GRACE TIDEN

SOME of the country's natural resources should be left aside for future generations says senior statesman Sir Ronald Tovue. He said much of Papua New Guinea's financial activities such as mining projects and most recently the LNG and Sea Bed projects were all happening at the same time. He said the future generation will be left with nothing if PNG exploits its natural resources in only a small space of time. The former East New Britain premier and current chairman of the East New Britain Autonomy Committee said the committee had raised its objections to sea bed mining. "It was not a matter of stopping the project but it is too early for another mining project to be developed and especially when it has not been done anywhere else," he added.

He said the project should eventuate much later because there were currently a lot of mines in PNG. Sir Ronald said the current government should withdraw the license that was issued to Canadian firm Nautilus Minerals. He further said the company will benefit more from the project in the next 20 years and the people will be left with nothing. "They will become rich from our resources...our children will be left with nothing," he said. Sir Ronald said those people from PNG who were assisting the company to mine the sea bed have hidden agendas and should be more careful. "We have

had the experience of Bougainville. That experience should teach us a lesson,” he said. “It is the people who have spoken. The government should withdraw that license,” he added.

### **Another legal opinion supporting a precautionary approach to seabed mining**

PNG Mine Watch, 7.9.2012

Another legal opinion has surfaced, this one published by academics from the University of Stuttgart in Germany, and Environmental Defense in California, supporting a precautionary approach to experimental seabed mining. The full article can be downloaded below; this is the conclusion:

It is well known that terrestrial and aquatic ecosystems can be disrupted, damaged, or destroyed by terrestrial mining operations. Relative to terrestrial and aquatic systems, deep-sea ecosystems are much less understood and more difficult to monitor. Until and unless a better understanding of these ecosystems has been reached, the threats posed by deep-sea mining will be uncertain but potentially serious. The current consumption rate and the projected increase of consumption of minerals may increase incentives to proceed with deep-sea mining. Because the environmental impacts of deep-sea mining are uncertain but potentially serious, a prudent policy approach would consist of:

- conserving mineral resources,
- increasing the recycling of minerals, and
- exploiting land based mineral resources with much greater efficiency and more stringent environmental regulation.

Mining on land has caused environmental devastation, certainly, but environmental risks of terrestrial mining are better known and perhaps could be more easily contained than those of deep-sea mining. Environmental impacts associated with terrestrial mining should be reduced before deep-sea mining is allowed to proceed. Once these concerns are addressed, comprehensive risk assessment for commercial deep sea mining can be conducted. A precautionary approach can create incentives for reducing uncertainty and minimizing ecological impacts associated with deep-sea mining. A presumption that deep-sea mining will have adverse ecological impacts until compelling evidence shows that it will not creates a strong incentive to conduct credible research on impacts. We therefore recommend the establishment of Marine Protected Areas around hydrothermal vents to facilitate monitoring and regulation of all activities in these zones. Conditions on the expansion of a mining operation from pilot phase to commercial phase and a mechanism to halt mining if adverse impacts are detected create incentives for minimizing ecological impacts.

Since there are no physical borders, mining of one area can affect other areas. This is especially true for mining within the EEZs where sediment plumes can not only drift towards the shelf or coastline, but also into international waters. Therefore the international community should be concerned about pollution of international waters by unregulated mining activities within the EEZs of individual countries. This problem is similar to that posed by air pollution that crosses borders. While there are legal mechanisms for controlling transboundary air pollution (e.g., European and Canadian agreements to control acid rain), to our knowledge there is no regulatory policy in effect in international law to control this kind of pollution in the sea. Hence, a binding treaty may be required to prohibit pollution of international waters resulting from activities conducted within EEZs.

Since less developed nations may lack adequate environmental regulations or sufficient funds for environmental studies, mining within the EEZs of the above countries could cause serious marine environmental degradation. Incentives and financial resources to study and reduce environmental impacts related to the mining activities will likely be needed. New discoveries of rich and massive

mineral deposits could spur a great deal of investment in deep-sea mining. Historically, environmental regulations have followed the development of new technologies and industries, rather than anticipating and guiding them. Massive investment in economic activities tends to result in resistance to environmental regulation. Performance standards and other types of regulations that anticipate potential environmental impacts have the potential for guiding technological innovation and industry operations toward the goal of minimizing such impacts. Lack of regulation within EEZs could result in harm to deep-sea ecosystems rich in species. Presently, a window of opportunity exists for the international community to implement scientific, technological, and legal measures to minimize negative environmental impacts before a sudden rush to commercialization (and attendant opposition to regulation) develops. Precautionary Management of Deep Sea Mining: [www.ramumine.files.wordpress.com/2012/09/precautionary-management-of-deep-sea-mining.pdf](http://www.ramumine.files.wordpress.com/2012/09/precautionary-management-of-deep-sea-mining.pdf)

## **Government says Nautilus not offering PNG a fair deal for K150m investment**

PNG Mine Watch 6.9.2012

The prospects of Canadian miner Nautilus Minerals delivering its proposed Solwara 1 seabed mine in PNG look increasingly bleak as details emerge of the extent of the dispute between the miner and the PNG government. The PNG government believes the deal being offered by Nautilus to the people of PNG in return for an investment of \$154 million is fundamentally unfair and it has identified a list of terms that it wants to see changed. Confidential documents reveal the government is insisting Nautilus Minerals must:

Give PNG a full 30% stake in the mine

Give PNG a stake in the intellectual property rights arising from the mine

Give the PNG government a veto in major decision making

Reveal the full extent of possible future financial liabilities for PNG as a stakeholder

The PNG government also says Nautilus has failed to show it has in place all the required additional financing for the mine. Nautilus was supposed to demonstrate it had all the required \$407 million funding secured as long ago as April, but in a letter to the government as late as 29 July Nautilus referred to an outstanding amount of \$130 million. Nautilus said it planned to raise this money in two tranches, the first being \$75 million. It is this second issue that is at the centre of the formal dispute between the PNG government and Nautilus Minerals which is due to be heard in an arbitration process overseen by an Australian judge.

### **A 30% stake**

The PNG government is insisting that Nautilus must grant the State a full 30% interest in all the legal and beneficial returns from the mine, including the intellectual property, as it is making an investment equivalent to 30% of all the development costs. As part of the complex ownership structure for the mining operation Nautilus has set up two joint-venture companies, Nautilus Minerals Niugini Ltd and Nautilus Minerals Singapore Ltd (see illustration below) but it is not offering the State a full 30% stake in both of the companies. At the same time Nautilus has offered the German ship building company Harren and Partners a 50.1% stake in Nautilus Minerals Singapore while the PNG government believes Harrens should “have zero interest”.

### **Intellectual property**

The government also says Nautilus is not offering a fair deal to the people of PNG because it is not giving a 30% stake in the ownership and control of the intellectual property rights. In particular Nautilus wants to shut PNG out from any benefits from future licensing and use of the Seafloor Mining Tools, Riser and Lifting System, the Dewatering plant and the mining vessel. The National Executive Council has ordered the State Negotiating Team “to secure more balanced terms for the State”.

**Future liabilities**

As a shareholder in Nautilus Minerals Niugini Ltd PNG could be liable to fund any amounts Nautilus Minerals Singapore Ltd is required to pay “its subsidiary or any other person under relevant documents”. The PNG government has asked Nautilus to specify what those liabilities could be but has not received any satisfactory answer.

**Voting control**

Although PNG will have a 30% stake in the joint venture companies Nautilus wants all decisions to be made on a simple 51% majority basis, giving PNG no control over major decisions that could adversely affect its interests. The PNG government is demanding “a 90% threshold to be applied to all major decisions relating to the joint venture” and a 51% threshold “for less material decisions”.

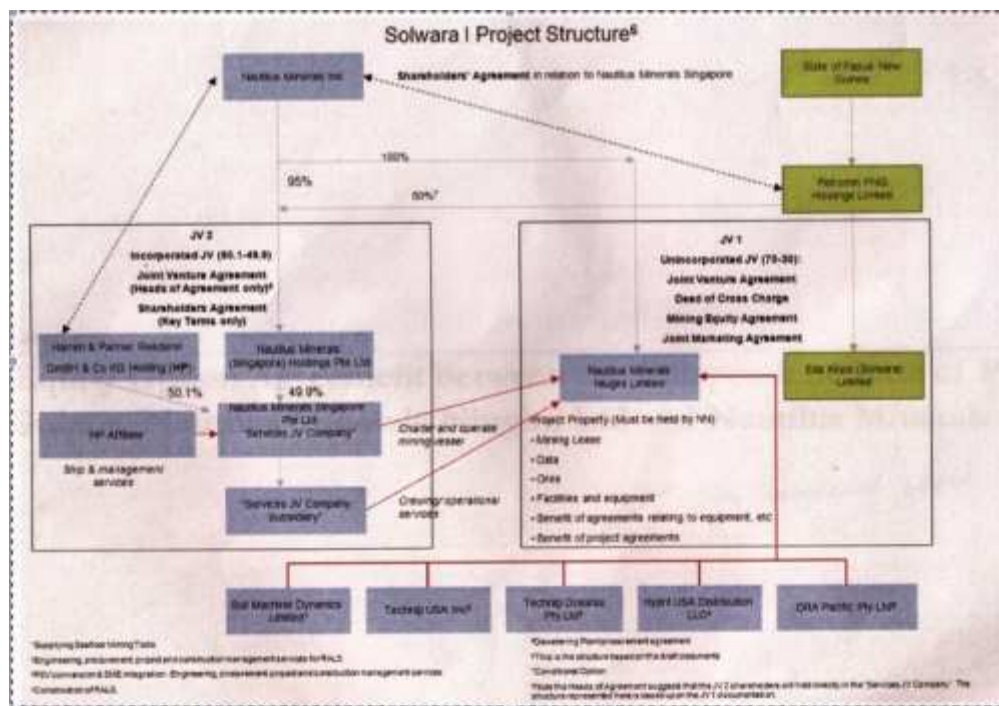
**Other information**

The PNG government is also frustrated that Nautilus has not complied with requests to provide full and complete information and documentation. This applies in particular to unanswered requests for: “a full briefing on the current status of construction of the mining vessel” especially given Nautilus have announced they have financing difficulties for the vessel

“full and complete documentation of the proposed terms on which the vessel is to be made available”, and

“a full briefing on the current status of construction of the mining plant and equipment, and the provision of all documents relating to the financing of the plant and equipment”

The National Executive Council has also warned the Prime Minister and State Ministers they “should not undermine the State position by making undertakings to Nautilus without first seeking advice from State Team members”.



**Nautilus gets 10-year lease, licence**

The National, 6th September, 2012

By MALUM NALU

MINING Minister Byron Chan says a licence and 10-year lease have already been given to Nautilus for its Solwara 1 project off the coast of East New Britain and New Ireland provinces. He said this

yesterday when asked by The National to comment on the issue, which has created controversy both in PNG and overseas. “The fact is that Nautilus already has a licence,” Chan said. “The mining lease is for 10 years. “Licence was given in March 2011 before I came in as (mining) minister. “I’ll make sure that I’m in a capacity to put systems in place to monitor the whole activity (underwater mining). “As the local MP (Namatanai), I’m in control. “I’m the most-affected person in this whole issue. “I’ll deal with it appropriately when the time comes and make sure that everyone’s views are reflected in the memorandum of agreement.”

Chan said he was mining minister and all matters to do with the environment would have to be dealt with by the minister for environment and conservation. “Environmental matters for the minister for environment and conservation,” he said. “However, it is in my electorate, and as the minister for mining, I’ll make sure that everything is monitored appropriately. Asked if he supported the Solwara 1 project, Chan said: “We have to deal with it. “There’s nothing that’s been given away on a golden plate (to Nautilus). “There were a lot of scientists from all over the world who carried out environmental impact studies before the permit was approved. “There were thorough scientific assessments before providing the licence to Nautilus.” Nautilus chief operating officer Anthony O’Sullivan said last week the Solwara 1 project was a “Level 3” activity under the PNG Environment Act 2000 (Section 53), which required that an Environment Impact Statement (EIS) be submitted to the PNG Department of Environment and Conservation (DEC) for review.

“An extensive multi-stakeholder approach has been used in preparing the Environmental Impact Assessment (EIA) and the EIS for the Solwara 1 project,” he said, “Workshops were held involving local and international NGOs, PNG government, and local and international scientists to determine the studies that were required to properly evaluate the environment, to identify which groups should conduct these studies, and to estimate project impacts.” The EIS was submitted to the DEC in September 2009, and public hearings for the EIS were held on November 2009. “The EIS was then reviewed by the DEC and an independent international consulting group was engaged by the DEC over a six-month period,” O’Sullivan said. “The EIS was then reviewed by the Environment Council, a group of leading PNG scientists who recommended to the environment minister to issue an approval-in-principle of the EIS in August 2009.”

## **Deep-sea mining: Marat responds to Sir J’s outburst**

Post-Courier, September 6, 2012

By TODAGIA KELOLA

FORMER Attorney-General and Member for Rabaul Dr Allan Marat has expressed disappointment in the manner in which New Ireland Governor Sir Julius Chan had responded to his question on his stance on the Solwara One project. Sir Julius had come out on the radio and a weekly newspaper branding Dr Marat as “embarrassingly ignorant” and a “fool” in not knowing about a publication in August 2010 and which “everyone else – even the grassroots people – know about whilst he as a former Attorney-General in the Somare Government and then later the O’Neill/Namah Government was not aware of what the Government was doing”. In reply Dr Marat said: “A fool shows his annoyance at once but a prudent man overlooks an insult in simple questions. That I am, the NIP Government, and the ENBP Government, are against deep sea-bed mining in Solwara 1, is not an issue.”

He said: “Sir Julius Chan, who claims himself a knight, and former Prime Minister, does not know that I have never been in a Government where John Pundari was Minister for Mining. Sir Julius Chan does not even know that I was never a part of any Government that granted the Mining Lease to Nautilus Minerals in January 2011 to mine the deep sea bed in Solwara 1. And he does not even know about the exchanges I had with the MRA in the newspapers and radio about my objections to

the Solwara 1 project. A prudent man keeps his knowledge to himself, but the heart of fools blurts out folly.” He also said the environmental effect from the mine would affect not only NIP and New Guinea Islands but all other coastal waters in PNG.

### **Prime Minister: Sea mine still an issue**

Post-Courier, September 5, 2012

*By Gorethy Kenneth*

THE Papua New Guinea Government is only waiting for the Nautilus Minerals company to present their development proposal in order for Cabinet to make a further decision. Prime Minister Peter O’Neill has backed the sea bed mining company, arguing that the licence had already been issued, but the Government was also ready to take in all arguments and criticism from the non-government organisations. “...the issue of Sea Bed Mining, of course the NGOs as usual, are coming up with all sorts of allegations and arguments. They have every right to do so and we welcome those arguments. These arguments must be based on facts and evidence,” Mr O’Neill said. “I also consulted this Government through our Department of Environment and Conservations from memory and we are consulting some of the best mines in environmental advice in the world — they are giving world advice to our government. “We will want to argue these facts on merits rather than on emotion, and then we can make informed decision about — we are going to develop our new ventures that are coming into our country. ...” he said. Mr O’Neill said PNG needed to take a lead role in mining issues and in this case the Government was waiting for a development proposal and assess arguments raised and let the Cabinet make its decision.

### **PNG Minister Defends National Deep Sea Mining Plans**

Claims Nautilus Minerals has complied with regulations

PORT MORESBY, Papua New Guinea (The National, Sept. 4, 2012) – Mining Minister Byron Chan is defending deep-sea mining investor, Nautilus Mineral’s Solwara 1 project in the Bismarck Sea. Chan said recent media publicity had been misleading that the O’Neill government had initiated the deep sea mining project. He said the investor was given a mining licence 19 months ago by the then Somare Government. However, he said as a responsible government, the O’Neill government, had taken on board the project and would ensure that all stakeholders benefited from it. “I want to again assure the various stakeholders that this government is committed to ensuring that our mineral wealth is harnessed in the most optimal and responsible way,” Chan said. He said issues relating to deep-sea mining were its environmental impact, lack of baseline data, lack of specific policies and the social and economical benefits. He said he would not respond to the concerns raised as they did not fall within the direct responsibilities of the mining minister.

Chan said Nautilus Minerals had complied with all laws of the country. He said Nautilus was issued an environmental permit after independent studies carried out by environmental consultants engaged by the Department of Environment and Conservation. He said Nautilus was now in the process of putting together an environmental management plan. Chan said the Papua New Guinea government had been complying with national and international laws. He said mining laws covered both sea and land, “thus mining activities offshore or on land is guided by the mining law”. He said Nautilus Minerals had to comply with the Mining Act, Environment Act 2000 and the United Nation’s Law on Seabed. He said that legislation was used and Nautilus Minerals had complied with all of them. Chan said deep-sea mining was not new to the country. He said the first was done in Madang and baseline data had been taken from there to do the Solwara 1 project. He said Nautilus, through the data in the deep-sea project in Madang, had come with more innovative technology and that the Bismarck Sea Solwara 1 project was not completely new.

## **Deep-sea mining: Legal opinion launched**

The National, 4th September, 2012

PACIFIC civil society organisations launched a 10-page legal opinion on the application of the precautionary principle to deep-sea mining in the Pacific region forum last week. Pacific Network on Globalisation (PANG) coordinator Maureen Penjuli said the legal opinion came at a very important time when Pacific Islands Forum leaders were meeting in the Cook Islands. “It’s clear that we don’t know the impacts of seabed mining on our ocean environment and international law makes clear our responsibility to proceed with unprecedented caution in this area,” she said. “Given the considerable risks and uncertainties surrounding the environmental impacts of mining activities, the correct interpretation of the precautionary principle leads to only one plausible result a moratorium on deep seabed mining. She said the Environment Law Alliance Worldwide concluded that the application of the precautionary principle supported a halt on seabed mining until the risks of harm to the marine environment and coastal people were better understood.

## **NGO opposes seabed mining**

Post-Courier, September 4, 2012

THE board and management of PNG Eco Forestry Forum has urged the Government to ban the deep sea mining project spearheaded by Nautilus Minerals. Executive Director of the forum Thomas Paka, through a statement, says this undersea project is being rushed and is not in the best interest of the people. “There are already ongoing mine exploration projects on land which the forum thinks is sufficient and the country should not venture into a project that is not properly researched and poses a lot of uncertainties.” Mr Paka highlighted that PNG would be used as a guinea pig for this project and that impacts of seabed mining could not be accurately predicted. He also said there was not enough research to understand the seabed ecology, and added that there were no laws and or policies to manage the activities of deep sea mining in PNG. He said from these issues highlighted by the forum and all concerned, the forum urged the Government to reconsider this rushed decision.

“The biggest question again asked by the forum and all concerned is; ‘What are the risks?’ “As yet there is no clear answer from the Government or others to this crucial question. “From experience, mineral exploitation on land has brought a lot of negative impacts both environmentally and socially.” Mr Paka went on to say that the Government at the moment was not able to monitor and mitigate all the environmental and social impacts of mines in this country. “It will definitely not have the funds nor the capacity to regulate and monitor this project properly which is a very grave concern because this Government will definitely not be able to mitigate if there are negative impacts and the livelihood of the coastal population will be affected,” said Mr Paka. Therefore, he said, the forum believed that deep sea mining was not in the best interest of the people and asked the Government to stop it.

## **Query on sea mine**

Post-Courier, September 4, 2012

By JASON GIMA WURI

SEA bed mining in the proposed area will destroy the very habitats by which small organisms, some known and many still unknown, depend upon. These organisms whether sedentary or free swimming will have less to depend on for their survival when their habitats are destroyed. This was stated by Narakobi Lawyers in a written statement regarding seabed mining in Papua New Guinea. It said the chain effect from the mine could easily affect bigger organisms or fish that depend on the smaller organisms found around the surface of the sulfide vents. In fact, just around the selected ar-

ea exists what is called the Magado Square or Okuk Square. This area is well known as a breeding ground for tuna fish and had been a protected area for a long time. “Could this ground be dependent on the origin of food chain from hydro thermal chimneys? Abundance of fishery could be dependent on life on the chimney?” questioned the statement.

The statement indicated that environmental damage of some magnitude would occur and it was sufficient to prevent mining of the Bismark Archipelagic sea floor. Furthermore, it said the scientific data, be it baseline or other, must be available to all stakeholders and the public to access with other best scientific advice before and not after mining. “Following which a properly constituted Board or Council be mandated under the law to make a decision, advisory to make decisions on political expediency, economic or environmental reasons. “It has the duty as Government for the people to pay attention to all those who might be affected,” it said. The paper stated that there was already one call from a leading university of the world that states that “Underwater mining will decimate deep water organisms” and surely this is enough to be cautious. “PNG must not repeat mistakes in Ok Tedi and others that warnings by most reputable international entities were ignored, resulting in massive environmental damage and degradation of environment which will last for many years to come,” the statement reported.

### **VIDEO: PNG locals fight sea mining project**

World News Australia, SBS, 2.9.2012

The ocean floor is the last great frontier for the resources sector. But what could be the world’s first deep sea gold and copper mine is mired in controversy. The battlelines are drawn, one and a half kilometres under the Bismarck Sea off Papua New Guinea. Canadian miner Nautilus Minerals says risks are low but locals say it will pollute the water on which they rely so heavily.

Link: <http://ramumine.wordpress.com/2012/09/02/video-png-locals-fight-sea-mining-project/>

### **SPC defends criticisms against regional framework on deep sea mining**

By Makereta Komai, PACNEWS Editor in Rarotonga, 31.8.2012

The Director General of the Secretariat of the Pacific Community (SPC), Dr Jimmie Rogers has defended criticisms leveled at the regional legislative and regulatory framework for Deep Sea Mining (DSM) launched in Rarotonga at the margins of the Pacific Forum Leaders meeting Tuesday. A coalition of regional civil society groups had earlier in the week called for a moratorium on deep sea mining activities in the Pacific until all risks and uncertainties are properly analysed. The civil society groups sought legal opinion from the U.S Office of the Environmental Law Alliance Worldwide to provide clarity on the appropriate level of action that must be undertaken by Pacific governments to meet their national obligations on the ‘precautionary’ principle in seabed mining.

Dr Jimmie Rodgers does not agree with the interpretation of the civil society groups. “The regional framework provides our countries and territories of the Pacific a set of tools that will allow them to assess, firstly do we want to engage in deep sea mineral mining, if the answer is yes, what are the steps we go through. “For any legislation to work, it must have a regulatory framework, similar to what we are recommending. We are saying, if you do this, these are benefits and you have to make sure there are safeguard mechanisms to protect your resources. Dr Rogers said the DSM framework is a tool that enables countries to engage in the development process of the legislative framework. “Most of them don’t have that. This is our concern, if commercial companies come into the region and push the agenda for mining, our resource owners might see and love the dollar sign and agree to allow companies to come in without any legislative base.



The SPC head argued the new regional framework will allow Pacific countries and territories to think through their options before developing a legislative and regulatory framework for deep sea mining activity. “Our agenda is to enable countries to be knowledgeable and have the tools they require to think through the process. And if they want to engage, they should know who they want to be engaged with at the national level, with NGOs, civil societies, churches, governments and industries. Dr Rogers assured the DSM framework launched by Pacific Forum Leaders was developed with stakeholders. “I understand these NGOs are here. I’d like to talk to them because I think we are operating at two different levels. I don’t think we necessarily disagree with the principles they are saying that should be safeguarded, they are in the framework.

“Their concerns are real. I am not belittling their concerns but I think they can be too closed shop and not opened to looking at what the framework is trying to achieve – to enable the countries to develop. “Let me pose these questions – would these NGOs prefer that Pacific Island Countries don’t have any legislation and commercial companies walk in, offer money and buy off the minerals? “I don’t think so, and if what I think is what they want, then the framework provides a protection, said Dr Rogers. The framework was launched by Dr Rogers and Cook Islands Deputy Prime Minister, Tom Masters in the presence of a number of Pacific Islands Forum Leaders.

### **Cook Islands lead the push for deep sea mining**

*By Makereta Komai, PACNEWS Editor in Rarotonga, 31.8.2012*

Cook Islands is one of the first countries in the world to enact the Seabed Minerals Act 2009, which will commence in March 2013. Launching the regional legislative and regulatory framework for deep sea mining in Rarotonga this week, Deputy Prime Minister, Tom Marsters said the Act was designed to regulate any future sea bed mining activities within Cook Islands exclusive economic zone (EEZ), in particular the island’s huge manganese nodules resource. “I believe now, as ever before, it is very exciting time to be a Pacific Islander. We are sitting in a region that is looking to grow, develop and be part of an emerging deep sea minerals industry, both in national and international jurisdiction. “Indeed, the opportunity these previously untapped resources may present, for improving economic well being of our Pacific people was once just a dream our past leaders and that dream I believe is fast becoming a reality.

However, with all the excitement, DPM Marsters called for caution. “We would not want to do anything today that will ruin the lives of our children and grandchildren, in cultural, social, environmental and economic terms. He called on all Pacific Island Countries and Territories to ‘enter this new seabed mineral frontier with common standards and best advice available.’ The proposed regional framework for deep sea mining seeks to provide Pacific Islands with tools necessary to make a decision about whether or not to engage with the emerging deep sea mining industry. In 2009 Pacific Leaders at their meeting in Cairns called for the development of a regional framework on sea bed mining to allow countries to realize the economic benefits from their marine mineral resources, while supporting the environmental monitoring that preserves fragile marine ecosystems and biodiversity.

### **Nautilus Minerals-PNG set to begin operations**

Post-Courier, August 31, 2012

*By Gorethy Kenneth*

NAUTILUS Minerals-PNG has spent more than \$US400 million (K820m) so far on their operation since inception in Papua New Guinea and is likely to spend another \$US400 million to bring the project into production. And the company has agreed to form an unincorporated mining joint ven-

ture with the State of PNG through its nominee Petromin PNG Holdings Limited. The State of PNG has exercised its option to take a 30 percent stake in the Solwara 1 Project and other assets within the Mining Lease (ML154) area. Nautilus Minerals-PNG boss Mel Togolo said this yesterday, adding that the company would kickstart its three-year operation hopefully by the end of 2013. Reporters in Port Moresby were taken on a conference presentation by Mr Togolo and Chief Operating officer Anthony O'Sullivan, specifically on the awareness of the project and its impact. They were given an outline of the whole operation in PNG and abroad – Vanuatu, Tonga, New Zealand and Solomon Islands.

Both executives stressed that Nautilus Minerals has met world-class standards and that its sea floor production was safe and environmentally friendly. They said this project was different from the rest, adding that it would help generate money for the people of PNG. “Any money we make, any dividend to be declared, 30 per cent of that dividend will go to Papua new Guineans. And this is very important, because then our Government will use that money to build schools, hospitals, aid posts, teacher’s houses, roads and bridges,” Mr Togolo said. “We are probably the biggest country in the South Pacific but we have lots of demand on our leaders to deliver goods and services and our leaders depend on businesses also helping in terms of taxes to the Government to implement the demands of our people. “...in our discussion, our awareness with the communities, we’ve listened to their concerns. The main concerns were from the fisheries, they want their fish to be protected. They also want their reefs to be safe...we’ve designed the delivery system to make sure that ...probably no impact on fish stock or low impact on marine fish...we are out in the big ocean....

“This project, when in operation, will not impact on the reefs at all. We are operating 1600 metres deep, there are no fish down there...fish only live on the top warm water where there’s oxygen, so fish will not be affected. “We will deliver this project at the end of next year, but there may be some delays and we are still looking at the end of next year or early 2014. “This project is a bit different from the rest and the life span of the project is about three years, but we are looking at others close by, that’s why we can move the ship from this one to the other. “We are going there to make sure it is profitable and the shareholders are rewarded because they are putting money. “Nautilus Minerals will commence its seabed mining operations hopefully at the end of 2013. It has spent \$US400 million and expects to spend another \$US400 million to get the project to production stage,” he said. Mr Togolo said that there are positive issues also surrounding the company and they included:

The exploration of territorial waters of PNG since 1997, when the first offshore mineral exploration license was granted; Nautilus and PNG are leading the world in the exploration of seafloor massive sulphide (SMS) deposits;

- Different risk profile to oil and gas;
- Compared to land-based counterparts: Smaller physical footprint;
- Training in state-of-the-art techniques under the supervision of world renowned deep sea ecologists;
- No direct impact to (human) communities;
- Supporting Education and so far, four PNG Nationals have been awarded a chance to study at Duke University (USA);
- About 15 per cent of Nautilus full time employees are PNG Nationals (as of April 2012); and
- Nautilus’ ultimate goal is for project workforce to be PNG Nationals.

“Nautilus Minerals has been committed to creating a voluntary Community Development Fund in PNG, additional to taxes and royalty payments, once production begins,” Mr Togolo said. “Its aim is to contribute to community projects, focusing on health and education. The fund will see two Kina for every tonne of mineralized material produced put towards community projects and activities and an independent board will advise Nautilus on the management of the fund, working with relevant Provincial Governments to identify community priorities. “

## **Nautilus: Prof: Beware of breach**

Post-Courier, August 31, 2012

By JASON GIMA WURI

UNIVERSITY of Papua New Guinea's Professor Chalapan Kaluwin confirmed in a discussion that issuing the license for Solwara 1, without implementing the steps described in the precautionary approach, the PNG Government may be in breach of its obligations under a number of important treaties.

- 1982 United Nations Convention on the Law of the Sea;
- 1986 Convention for the Protection of Natural Resources and the Environment of the South Pacific Region (Noumea Convention)
- UNFCCC and Kyoto Protocol
- UN Biodiversity Conventions
- Waigani Agreement

He said the issues and details raised in the draft were equally important and as we start this process we will ensure we address these concerns for the country. "There is a draft document from the SOPAC team's legal advisors and is prepared in collaboration with Secretary of the Pacific Regional Environment Program (SPREP) and other regional organisations and provides guidelines for the application of the precautionary principle. "If we applied this document on precautionary principles it holds some promise and value that PNG government could be made not to proceed with deep sea mining projects, given the serious lack of appropriate policies and Laws in mining sectors in the Oceans, coupled with fisheries and environmental Act ( 2000) in the country . Most importantly the lack of full scientific understanding of the issue.

"States pursuing DSM activities have a responsibility to ensure the DSM operators under their sponsorship or operating in their waters comply with international law obligations to protect the marine environment. If a State does not undertake its best efforts to do this – including the application of the precautionary principle - liability for any damage incurred as a result will fall to the State," he said. "I will write to the University of PNG ( Law School ) and CLRC for their comments as well on this important draft paper if the Pacific countries and PNG are to pursue this matter and its implications to other sectors," Professor Chalapan said.

## **Nautilus: MP appeals: Do not grant licence**

Post-Courier, August 31, 2012

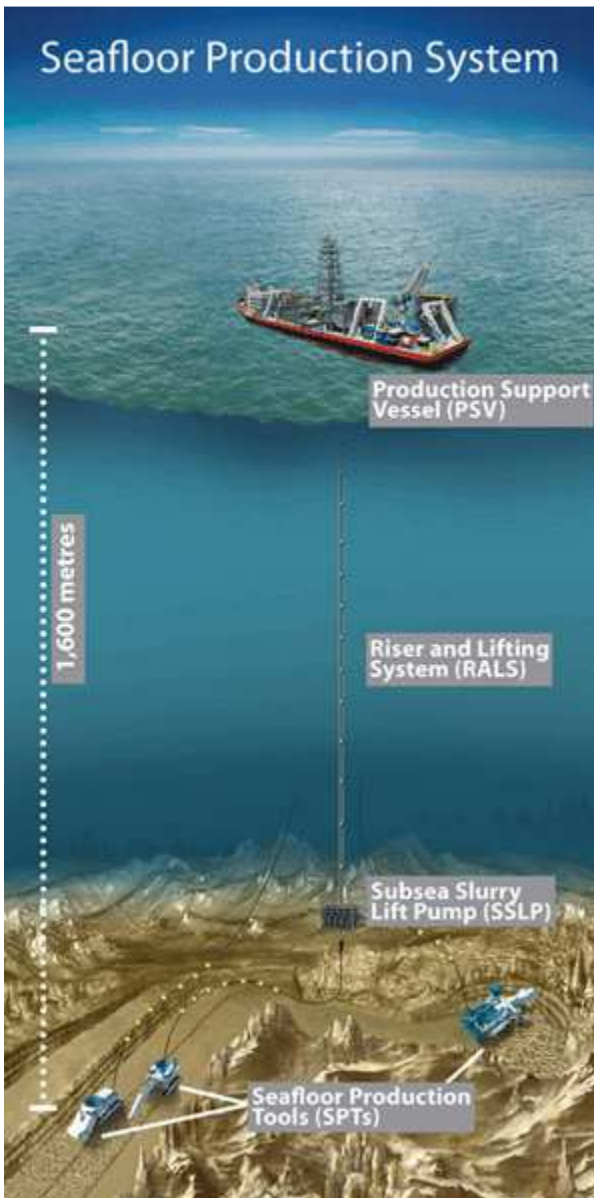
By GRACE TIDEN

PRIME Minister Peter O'Neil and Deputy Prime Minister Leo Dion must see common sense and rescind their decision on a license for Nautilus says Gazelle MP Malakai Tabar. Mr Tabar said the government must listen to common appeal to stop this project. "The people pushing this whole project, from within government and also outside of this country have no understanding of our living systems and would not give a hoot of how much we all lose," he said. The Gazelle MP said he attended a few presentations and had difficulty trying to understand how this sea bed "grading and digging" would not affect marine life. "As the member for this electorate, mandated by my people, I believe my people and the other coastal communities throughout the eastern shoreline of Papua New Guinea would be worst affected," he said. "Apart from the Environment Impact Study report that was obviously done by somebody from Nautilus office in Canada, the question of how much we will gain and benefit from stands tall against Papua New Guineans. There is nothing in this project for Papua New Guineans. There is no proper or long term employment, there is no royalty and there is no business influence, especially for and by nationals," Mr Tabar said.

## Nautilus: Modern technology machines can go underwater

Post-Courier, August 30, 2012

Nautilus Minerals chief executive officer Stephen Rogers says there are misconceptions and misinformation about their plans. In email and to the Post-Courier Editor in Chief and the Editor he said: “In an effort to clear up misconceptions and misinformation about our plans to retrieve minerals from the the Solwara 1 project in the Bismarck Sea, here are some key facts. “Seafloor resource production is not new. Oil and gas turned to the oceans after World War II and today, a third of the world’s oil and a quarter of the world’s natural gas are produced from offshore. “Diamonds are recovered off the coast of West Africa. Much of the world’s heavy mineral sands containing zirconium and titanium come from under the sea, as do large quantities of aggregate for Europe and the USA. While what we are doing is not new, Nautilus Minerals uses the world’s best technologies and safest processes to meet and surpass international risk management standards.”



Mr Rogers said advanced robotics and remotely operated vehicles monitor seafloor activities. He said Nautilus Minerals also invites and supports independent scientific and research observation. “One question many ask however, is ‘Why go under the ocean when these minerals can be found on land?’” There are several good reasons he said. “ The grade of sea deposits can be more than 10 times better than on land. This offers commercial advantages. There are environmental benefits too.

At the Solwara 1 project for example, no mountains need to be stripped or moved. No trees need to be cleared and the physical footprint will be very small — about a tenth of a square kilometre.

“There is little or no inconvenience to communities. No-one needs to move home. The Solwara 1 site is 30 kilometres away from its nearest coastal community and 1600m below the waves. Site activity poses minimal risk to fish stocks and people’s livelihoods. This has been confirmed by extensive data gathering, modeling and scientific testing,” he said.

Mr Rogers said Solwara 1 will not use any blasting and will not discharge toxic chemicals into the water. “In contrast to what some have claimed, the system is ‘closed’, and only filtered seawater is returned to the deep sea, where it came from. No tailings will be discharged into the ocean. Everyone familiar with the project knows we are open and transparent. We have (so far) consulted with over 20,000 people, from remote villages to provincial capitals. “In this spirit, our invitation remains open: if after reviewing our materials, anyone has concerns, we welcome the chance to meet them, to answer questions and address concerns — and if necessary, to do more work,” Mr Rogers said. He said the economic, community and environmental benefits of seafloor resource production are compelling. “As land based grades continue to decline and the cost of recovery continues to rise, seafloor production provides an economically attractive, environmentally safe and socially responsible alternative to serve worldwide mineral needs,” he said. Mr Rogers said This is also an opportunity for Papua New Guinea to be at the forefront of evolutionary developments in the resource industry, sharing in the profits, gaining new skills and commanding worldwide recognition.

## **Regional Seabed Mining Framework Launched At Pacific Forum**

*Framework provides 'guidance' to enact mineral legislation*

By Henry Yamo

AUCKLAND, New Zealand (Pacific Scoop, Aug. 29, 2012) – With looming exploitation of the Pacific Ocean’s mineral riches on the horizon, a regional protocol was launched today to ensure deep seabed mining was controlled in a “conserved manner”. This is the first regional legislative and regulatory framework for deep seabed mineral exploration and exploitation, introduced at the Pacific Island Leaders Forum in the Cook Islands. Cook Islands Deputy Prime Minister Tom Marsters launched the regional framework put together by the Secretariat of the Pacific Community (SPC) in response to the leaders’ call in the 2009 Forum. “The completion of this important framework and its release by the Secretariat of the Pacific Community (SPC) provides a key message from us gathered for the Forum, themed ‘large Ocean island states: The Pacific challenge’,” he said. The framework was called for by Pacific leaders as one of the key priorities of the Pacific Plan for the 2009-2012 period. The framework seeks to provide Pacific Island nations with the tools necessary to make a decision about whether or not to engage with the emerging deep seabed mining industry. SPC Director-General Dr Jimmie Rodgers said the legal framework was targeted at providing tools and guidelines for Pacific Island countries to develop their own national legislation in for seabed minerals.

### **Framework needed**

“The framework is needed here in the region due to the fact that many Pacific Island countries have substantial deep sea minerals within their exclusive economic zones but lack the capacity to develop their own legislation,” he said. “This new framework will now enable respective countries to comply with relevant standards for the deep-sea mining industry within the region.” Marsters said that because of growing commercial interest in deep sea minerals in the Pacific, nations needed to develop national policies and regulations for “sensible management”. He pointed out that the Cook Islands was the first country in the world to have enacted legislation, the Seabed Minerals Act which was designed to regulate future seabed mining in its exclusive economic zone. Papua New Guinea

had issued a seabed mining licence to the Canadian company Nautilus Minerals Niugini to commercially develop the seafloor for high grade massive sulphide deposits – a major source of the world’s copper, gold, zinc and silver – in its exclusive economic zone in the first such operation in the world. The government faces mounting opposition over this project. Other Pacific island nations – including Fiji, Federated States of Micronesia, Solomon Islands, Tonga and Vanuatu – also have or intend to issue exploration licences within their exclusive economic zones.

### **Sponsored companies**

Nauru and Kiribati had each sponsored companies that had been granted approved programmes to work by the International Seabed Authority “within the area” (being the seabed areas outside the national jurisdiction), the first developing states to do so and the programmes were expected to take place over the next 15 years. He said that with “exciting times” the region had shared responsibility to protect and preserve the health of the Pacific Ocean and this objective needed to continue to be at the forefront of national, regional and global agendas. The framework was completed by the SPC Applied Geoscience and Technology Division (SOPAC) for the Pacific (ACP) African, Caribbean and Pacific states.

## **The Promise and Perils of Seafloor Mining**

### **Can minerals be extracted from the seafloor without environmental impacts?**

Lisa W. Drew, *Oceanus*, 29.8.2012

A year ago, the Canadian mining company Nautilus Minerals was poised to launch a new industry: mining the deep ocean floor. All Nautilus had to do was finish building special equipment and arranging permits to work at a site it had leased off the shores of Papua New Guinea (PNG). Then it would commence grinding copper-rich rock on the seafloor into a slurry, vacuuming it up, and pumping it to a ship on the surface. The company would also recover precious metals such as gold and silver, as well as zinc and other commercially traded metals. Nautilus’ plans alarmed many scientists. The mining was targeted at hydrothermal vents, where chemical-rich fluids spewing from the seafloor spur the accumulation of not only metals, but also lush communities of exotic life. Ever since deep-sea vents were first discovered in 1977, they have yielded a treasure trove of scientific clues about how our planet’s surface formed, how the oceans’ chemistry works, even how life may have started on Earth.

What if a gold rush into these unique ecosystems were to produce a subsea version of the environmental damage that mining has caused on land? “It seemed like Nautilus was in a real fast race to get the first mine on the seafloor,” said geophysicist Maurice Tivey of Woods Hole Oceanographic Institution (WHOI). “A lot of people thought it was too early.” But then copper prices plummeted with the global economic slowdown, and Nautilus put many of its plans on hold. “I think a lot of us on the science side were actually relieved,” Tivey said. But will the pause in the action make a difference? In April 2009, a wide range of stakeholders from 20 countries pondered that and other issues at a conference on seabed mining convened by scientists at WHOI. Environmentalists, representatives from Nautilus and other major mining companies, international policymakers, and 98 scientists in a diverse range of fields gathered to share knowledge, seek common ground, and discuss seabed mining guidelines. With scientists just beginning to understand the geological, chemical, and biological forces that conspire to create vents, mineral deposits, and vent life communities, the conference explored how the scientific community can best bring its knowledge to bear. How can scientists help locate and evaluate mineral-rich sites? How can they help protect the unique oases of deep-sea life at vents?

### **Where the minerals are**

The metals lie in what are called seafloor massive sulfide deposits. They form as the result of a series of chemical reactions that start when seawater filters down through permeable ocean crust into rocks heated by magma below. The heat catalyzes reactions that leach metals from the rocks into the fluids. The hot fluids—which can reach up to 750°F (400°C) under the pressure in the deep—rise buoyantly back to the seafloor. As they emerge from the crust, they encounter cold water, which causes metal sulfides to precipitate out of the fluids and form solid deposits near and on the seafloor. The ocean's known sulfide deposits may be only a fraction of what's actually there. "There's a lot of real estate out there where no data have been collected," said WHOI geochemist Chris German. Scientists think most are either in or near the 40,000-mile (60,000-kilometer) long mid-ocean ridge system. There, the Earth's tectonic plates are forming and actively spreading apart, creating volcanically active mountains that blister across the oceans' floors in patterns roughly resembling the stitched seams on a baseball.

Minerals precipitating from fluids coming out of hydrothermal vents can create chimney-like structures jutting out of the seafloor. The fluids billow out of the growing chimneys in smoky-looking, dark or white plumes. These were first discovered on fast-spreading ridges where volcanic activity occurs relatively frequently. But it turns out that venting can take many forms and also occurs on slow- and even ultra-slow spreading ridges. Scientists now think that slower spreading ridges produce larger massive sulfide deposits. That's because in these places, huge ramp-like faults penetrate deep into the crust and act as conduits. They bring a long-lasting supply of heated fluid from deep inside the Earth and deliver the minerals over tens of thousands of years to the same spot near the seafloor. Many massive sulfide deposits mined on land may have formed in the deep sea and then were raised or thrust above the water during the formation of islands and continents. The island of Cyprus, for example, holds 30 massive sulfide deposits, which were a main source of copper for ancient Rome.

### **Estimating the potential**

So far, about 200 active vent fields have been found. Most would probably not be of much interest to the mining industry. "The vast majority of deposits are really small," said German. Some, however, are fairly large. One at a site called "TAG" on the slow-spreading mid-Atlantic ridge is the size of a baseball stadium. Hydrothermal vents also can occur in areas called back arc basins. They often form behind islands in subduction zones, where two tectonic plates are colliding, forcing one plate to slide deep into the Earth and form a deep-sea trench. For the mining industry, the western Pacific Ocean's many back arc basins are particularly attractive. These potential seafloor mining sites are near land and often fall within the 200-mile exclusive economic zones of island nations, putting them under local, rather than international, jurisdiction (see "[Who regulates seafloor mining?](#)," below).

No one knows how many hydrothermal vent sites are in the oceans, but there is a best guess. Amazingly, when scientists who have studied different parts of the ridge system compared notes at the April WHOI conference, they realized they were all coming up with the same distance between known, large active vent sites: 100 kilometers. If those numbers hold true, about 600 districts spewing metal-rich fluids and potentially holding sulfide deposits may decorate the mid-ocean ridge. Nautilus Minerals estimates in a September 2009 corporate presentation that "thousands of underwater sulphide systems exist," and "if only half of underwater systems are geographically viable, seafloor production would represent several billion tons of copper per annum." Meg Tivey, a geochemist at WHOI, said scientists are examining fluids coming out of the seafloor—the end-products of subsea chemical reactions—as clues to understand where and why different types of mineral deposits form. But many more deposits may have formed at vent sites that are no longer active. These sites, lacking billowing plumes, are much harder to find and haven't been studied much.

### **Exotic life at risk**

Just as each vent site is different, so are the ecosystems they foster. What each has in common are conditions that would be incredibly hostile to most other life—utter darkness, intense ocean pressure, hot acidic fluids. Yet most host rich communities of life, including microbes that harness energy from chemicals, instead of from sunlight as plants do. Scientists have observed that after undersea volcanic eruptions kill off animals around a vent, life can be quick to recolonize the habitats. “One argument that can be made—but we need to be careful about it—is that hydrothermal systems naturally are violent environments anyway, and therefore we can do what we like because the biological communities will always recover,” said German. Biologists who study the life around hydrothermal vents are still finding remarkable numbers of new species, and many are exquisitely adapted to different terrains and mixes of fluids. “There are many rare species that are difficult to count with statistical accuracy,” said Duke University biologist Cindy Van Dover. If vent sites are mined, “we don’t yet understand what will be lost,” she said. Any strategies to mitigate damage at various vent sites or to restore them, she added, must take into account that animal life differs at each site.

Larvae of vent animals, moved by ocean currents, play an important role in establishing new colonies of life, and it seems the larvae of some vent species can travel very long distances. But “we’re just starting to get a handle on dispersal distances of vent larvae, so we can’t yet design ways to ensure protection of species,” said WHOI biologist Lauren Mullineaux. If larvae from snails arrive first at a site formerly inhabited by mussels, for example, they might create a thriving—but alternative—community, she said. Maybe disturbed vent sites are rapidly recolonized by “weed species adapted to handle great rates of disturbance,” suggested ecologist Kim Juniper of the University of Victoria. The result could be the subsea equivalent of replacing an old-growth forest with a field of dandelions. On the other hand, animals similar to those that originally inhabited the vent site could eventually return. Too little research has been conducted to know for sure. The argument for protecting species is the same as that on land—diversity is at the heart of functioning ecosystems; it helps life adapt to changing conditions; and it offers the potential for as-yet unknown insights into biochemistry and potential commercial biotech products.

### **An interest in inactive sites**

The concern over the fate of life at hydrothermal vents led many scientists at the April conference to a frequent refrain: Perhaps only inactive sites, where volcanism has “turned off,” should be mined. “We need to properly develop these deposits,” said marine geologist Peter Rona of Rutgers University. “By properly, I mean in an environmentally conservative manner, respectful of the life that exists at these sites. I think there’s general recognition we should go for the relict rather than the active sites.” “Personally, I don’t think there should be a hard and fast rule about whether active or inactive sites should be mined,” said Samantha Smith, environmental manager at Nautilus. “Each site needs to be assessed, ensuring that the benefits outweigh the impacts.” Just because a site is inactive doesn’t mean it is lifeless. Indeed, inactive systems host animals, too, but they are different from those at active sites and perhaps still vulnerable to damage. But to date few inactive sites have been studied.

“Maybe there will be a drive to finally find and examine inactive massive sulfide deposits,” said Meg Tivey, who is interested in understanding the entire evolution of vent sites. “From a purely scientific view, we want to see what a vent site looks like once it’s turned off,” she said. “The other thing you want to see is how valuable it is. In the back of our minds is the question: ‘Is this a potential source of minerals?’ With no plumes of hot fluids emanating from inactive sites, they are the most difficult to find and the least studied. “How do we find the inactive ones? That’s the big question,” said Maurice Tivey. He and other scientists are investigating ways to use magnetometers on underwater vehicles to detect the magnetic effects of minerals; gravity-measuring devices to detect dense sulfide mineralization; and other devices to locate massive sulfide deposits—especially at



hard-to-find sites that are inactive, or buried by lava or sediments, or in places where hot fluids ooze slowly up through a latticework of the crust, cooling enough on the way to drop their metals well below the seabed. “What we’re seeing coming up from black smoker vents appears to be only a fraction of the metals that are below or on the seafloor,” said geologist Mark Hannington of the University of Ottawa. In the future, experimental methods like those proposed by Maurice Tivey could also help mining companies and others efficiently estimate deposits without drilling, which is routinely done on land but has been prohibitively expensive at sea, he said.

### **Input from the scientific community**

In 2006, Maurice Tivey led a 32-day research cruise, funded by the National Science Foundation, to explore the geology and chemistry of several active hydrothermal vent sites in the Manus Basin in the Bismarck Sea, which encompasses Nautilus’s Solwara 1 site. Interested in learning as much as possible about the region, Nautilus funded an additional 10 days of research at sea and the costs of using WHOI’s deep-sea robot, the Autonomous Benthic Explorer, for mapping. Scientists may prefer that mining be done at inactive sites, but Nautilus Minerals and other mining companies are investigating deposits that have already been found (largely *because* they are active). Nautilus Minerals’ first target site, called Solwara 1, is a 0.43-square-mile (0.112-square-kilometer) area that is hydrothermally active in some parts and quiescent in others. The good news is that the company seems to want to do the right thing, say scientists who were invited by Nautilus to review the environmental impact statement for its first mine. “We were impressed,” said marine ecologist Kim Juniper. “They looked at just about everything that could possibly be considered.”

He cited Nautilus’ plans, adapted in consultation with marine scientists, to not mine areas with similar organisms as the Solwara 1 site and to establish temporary refuge areas within the proposed mining area where animals can progressively return. The company has conducted small-scale experiments installing appropriate artificial substrates to encourage animals to land and recolonize sites, as well as relocating animals out of the path of mining. “It’s certainly a model for the way things should be done,” Juniper said. These strategies, however, remain untested for the most part. Van Dover said scientists probably would not be able to assess and prevent damage, “unless we monitor and can say, ‘Stop, that’s enough.’” “The problem is cumulative impacts,” she said. “Mining one site probably won’t make much of a difference, but intensive and exhaustive mining of a region over a very short period of years could be disastrous to the ecosystem.”

### **Weighing the pros and cons**

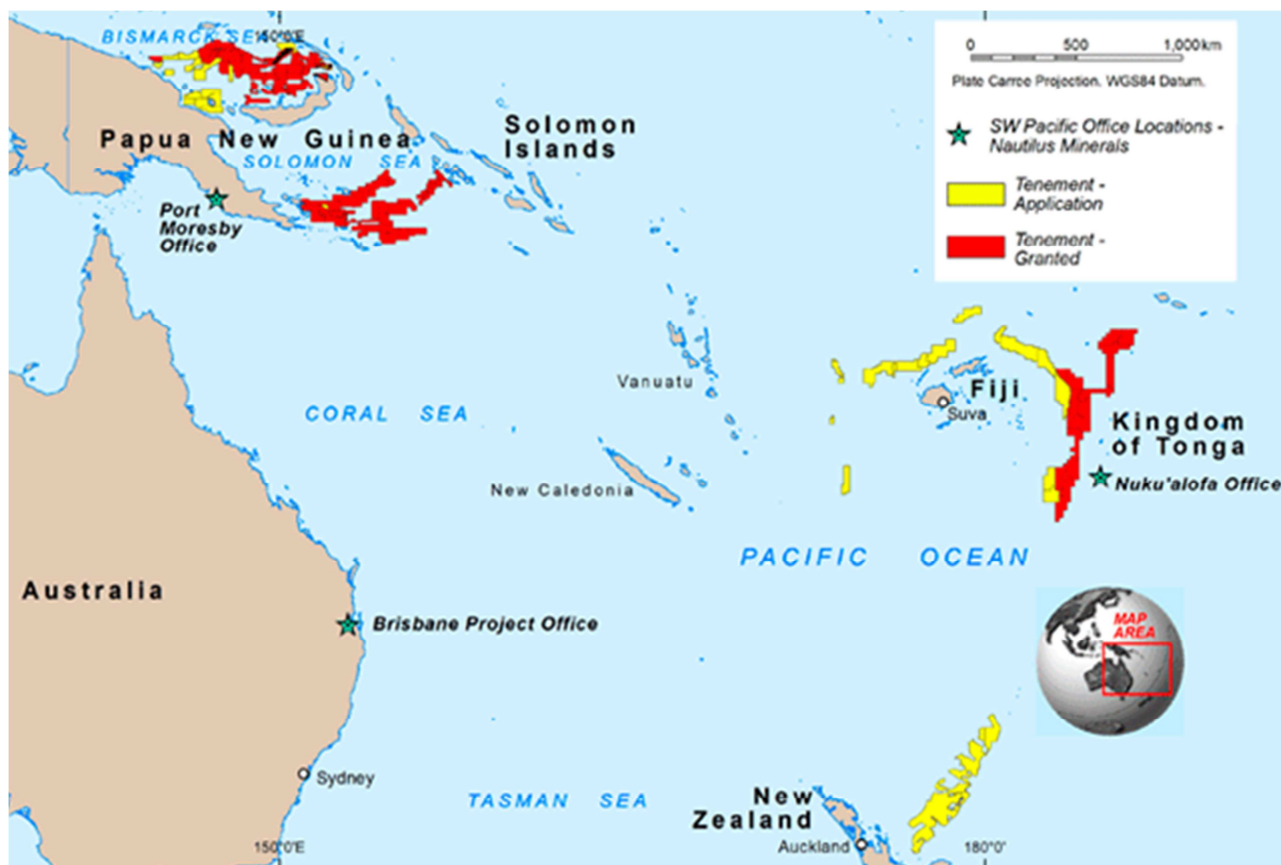
Some argue that seabed mining offers an alternative that could be *less* environmentally destructive than land-based mining. The Solwara 1 deposit boasts copper deposits that are about 10 times more concentrated than a typical land-based copper mine, so less material needs to be extracted to achieve a similar production rate, Smith said. In addition, the Solwara deposits are at the surface, so large amounts of material don’t need to be removed to get to the ore, she said. Unlike land-based mining, seabed mining occurs where people do not live and requires little production infrastructure, all of which can be moved after mining is complete. And it offers “increased worker safety with the operations being conducted remotely and no one at the cutting face,” Smith said. Those arguments don’t convince Sabine Christiansen of the World Wildlife Fund. “In [seafloor] mining, you take away the substrate; you add filtered water, and you never know how good that will be; you may raise clouds [of sediments],” she said. “There are a lot of open questions on acidification of the water, questions on bringing nutrients up with the water and disturbing the water column processes.”

Nautilus shares these concerns, Smith said, and has engineered systems to prevent disturbances through the water column up the surface. “Some sediment plumes [from mining activities] are expected to occur at the seafloor, but detailed modeling indicates these will not rise in the water column above 1,300 meters water depth,” she said. “At the surface, the only impacts envisaged are the production support vessel and barges, which will only be present while the mining is taking place.”

Nevertheless, after Nautilus representatives described its plans to people on Bagabag Island in Papua New Guinea two years ago, local villagers told marine biologist Rick Steiner of the University of Alaska Anchorage that they were not happy. Through an interpreter, the villagers asked Steiner if he would come help them attack the Nautilus ship. “I said, ‘I was thinking I’ll help you review the Nautilus EIS [environmental impact statement],’” he recalled.

Bagabag Island is 300 miles (500 kilometers) away from the Solawara 1 site, but Nautilus has exploration leases and lease applications for vast areas elsewhere in the Bismarck Sea, including near Bagabag Island and the main island of Papua New Guinea. In 2008, the newly formed Bismarck-Solomon Seas Indigenous Peoples Council met in the village of Karkum for a seabed mining forum and issued a statement that concluded, “. . . we do not consent to the sea bed mining activities in our waters and seas,” and asked for all mining activities to cease until the council’s concerns are satisfactorily addressed. In a 26-page review Steiner prepared on behalf of the council, he wrote, “Clearly, the project is not sustainable, as it exploits a relatively finite mineral deposit, lasts only 30 months, contributes a relatively small amount of money to [Papua New Guinea], severely damages the benthic habitat for a rare deep-sea sulfide mound ecosystem, and poses risk to other marine resources in the region.”

Among his concerns is that boats, barges, and heavy equipment could accidentally pollute the local waters and shorelines. That includes several shuttle barges a day, each holding thousands of tons of wet sulfide slurry, fuel, and other hazardous materials. Sulfides can rapidly oxidize once they’re out of the low-oxygen deep sea. If they’re wet, they can turn into sulfuric acid. “We learned that the hard way,” said Meg Tivey, who once put some wet sulfide rock samples from a hydrothermal vent in a refrigerator in sealed plastic bags. “We came back and there was a jumbled mass of oxidized junk in the bag,” she said. “We completely neglected how much oxygen there was in the air, even wrapped in the plastic.”



Nautilus Minerals' first targeted mining site, Solwara 1, is in the eastern Bismarck Sea. The company also has exploration licenses (red areas) and applications (yellow areas) to search for potential minable sites in more than 525,000

square kilometers of seafloor off the shores of Papua New Guinea, the Solomon Islands, Tonga, Fiji, and New Zealand. Exploration licenses give the company the right to look for potential mineral deposits within designated areas. If it finds any, it must still receive a license to mine the sites, which are considerably smaller than the exploration areas. Solwara 1, for example, is about 10,000 times smaller than the size of the exploration license area in which it was found. (Map courtesy of Nautilus Minerals)

### Next steps

Meanwhile, a working group from InterRidge, an international consortium of scientists working on mid-ocean ridge studies, used what it learned at the WHOI colloquium to suggest areas for future research. It presented its questions and recommendations to the International Seabed Authority, the independent treaty agency charged with managing seabed mining in international waters. Many of the InterRidge questions are fundamental, reflecting just how young this scientific field is—from how long seafloor massive sulfides take to develop to how vent biological communities change over time. The recommendations include developing criteria for determining just how active or inactive a vent site is, working on ways to locate inactive deposits, and encouraging studies of organisms living at inactive sites.

In April, it looked as if the slowdown in Nautilus Minerals' plans might give scientists “a bit of breathing space for us to get our acts together,” said benthic ecologist Ashley Rowden of New Zealand's National Institute of Water & Atmospheric Research. “So we can see what we should know before we mine a hydrothermal vent.” Just how much breathing space is not clear. Copper prices are recovering, and in September, the PNG minister for environment approved Nautilus' environmental impact statement for Solwara 1. PNG still must approve environmental permit applications before it grants the company a mining lease to commence mining operations. Nautilus also has exploration licenses and applications ([see map](#)) to search for potential minable sites in more than 525,000 square kilometers of seafloor off the shores of Papua New Guinea, the Solomon Islands, Tonga, Fiji, and New Zealand.

## Who regulates seafloor mining?

The rules that govern mining on most of the world's seabed are no ordinary rules. They got their start back in the 1970s and 1980s, when it looked as if there were untold riches in manganese nodules scattered across the ocean floor.

Although that didn't pan out, mining companies and nations around the world are eyeing anew the riches of the deep. The more recent discovery of metals at hydrothermal vents rekindled interest in the seabed, said Porter Hoagland of the Marine Policy Center at Woods Hole Oceanographic Institution (WHOI). “Technology makes it more possible, and the economics make it more likely.”

To regulate seafloor mining, in 1994 the United Nations Convention on the Law of the Sea spawned the International Seabed Authority, or ISA, an independent treaty organization. It has jurisdiction over the seabed outside the exclusive economic zones that surround nations' shorelines—an area it efficiently calls The Area. The term refers only to the seafloor, not to the waters above it (they're called the “high seas” in legal parlance). The rules dictate that the ISA make licensing decisions and, remarkably, that a portion of all profits from mining in The Area be used to benefit the world's developing countries.

An ISA working group—which includes academic, government, and industry experts for advice on environmental and economic issues—is developing specific regulations, said ISA Secretary-General Nii A. Odunton. “But we could use the international science community to get more information,” he told a gathering of almost 100 scientists from 20 countries and other seabed mining stakeholders

at a conference in April at WHOI. “The more we can get scientists to help us get the information we need, the better we think our regulations will be.”

The ISA has 159 member nations. The United States is not one of them, because it has not ratified the Law of the Sea treaty, though it has “observer” status. Political conservatives have successfully blocked the move so far, even though President George W. Bush in 2007 urged the Senate to approve the agreement. Current U.S. Secretary of State Hillary Clinton has made clear that U.S. ratification of the treaty is a priority for the Obama administration. The new ISA regulations are expected to open up The Area to commercial prospecting for seafloor minerals.

Meanwhile, the industry-sponsored International Marine Minerals Society is in the process of finalizing an environmental code of conduct for seabed mining. “The code is voluntary, but it will likely be the only international instrument (to regulate seafloor mining) for a while and will likely be the framework for an eventual international legal framework,” Philomene Verlaan, an attorney and oceanographer at the University of Hawaii and the society’s environmental code coordinator, said at the April conference.

Beyond the seabed, all sorts of international, governmental, environmental and scientific organizations have been working on how best to conserve the oceans’ resources. “The deep and high seas are now on everyone’s agenda,” Jeff Ardron, director of the Marine Conservation Biology Institute’s High Seas Program, said at the April WHOI conference. “But talking to one another, with all due respect, has barely begun.”

One example of the fractured nature of ocean management is the lack of governance of bioprospecting—the hunt for life that can be exploited commercially. It seems that under current rules, which were written to cover mining and fishing, even if one company must have a license from the International Seabed Authority for mining a particular site (and must share the profits), another company can remove some of the site’s microbes, discover it has reaped the cure to cancer, and keep all the money it makes.

And that’s not as far-fetched as it may seem. Biochemical properties of organisms that can tolerate extremes of hot and cold and find nourishment in toxic fluids are of great interest to the biotech industry. Wonder enzymes from organisms at hydrothermal vents are already being used commercially in a variety of ways, from ethanol production to a French skin lotion that protects against damaging free radicals.

—[\*Lisa W. Drew\*](#)

Source: <http://www.whoi.edu/oceanus/viewArticle.do?id=62986&sectionid=1000>

### **Deep sea mining is risky business!**

By Nalau Bingeding, NRI/PACNEWS 29.8.2012

This is a reality of life. Every development comes at a cost to any organism (including man) that occupies an area of land, air or sea. The cost of that development can be environmental, social or economical, and the impact of that development can be spread over time and space. Therefore, the proposed deep sea mining by Nautilus cannot merely be assumed to have no impact on the environment and organisms that occupy the Bismarck Sea and beyond, in both space and time. Papua New Guinea (PNG) is a land blessed with abundant mineral resources, and much of the land and sea have been mapped out for exploration and mining. Currently more than 10 large scale mines are in

operation on land, and there is possibility for more mines on land to be opened up in the near future. However, the socio-economic impacts of these 10 or more so large scale mines have had little rub-off effect on the country's population at large. So what is the point of opening up more mines when 80% of the country's population sees little or no benefit of mining activities?

It is a fact of life that minerals are non-renewable resources because they cannot be re-grown like trees if they are depleted. It is possible for mineral resources to be renewed through the activities of nature, but that will simply not happen in the lifetime of our current generation. Therefore, the sustainability of mineral resources is paramount to the well-being of every organism that will occupy time and space in this nation right now and into the unforeseeable future. We do not need to look far to understand the need for sustainability of mineral resources to the economy of our nation. Our neighboring Pacific Island nation of Nauru is a good example of what can go wrong with poor management of mineral resources. In 1906 the Germans began mining phosphate on Nauru. Later on the British, the Australians and New Zealanders joined in the mining of phosphate on Nauru. With a very small population, the phosphate mining made Nauruans some of the richest people on Earth on a per capita basis. However, it was not until the 2000s that phosphate reserves on Nauru ran out.

Today Nauru is bankrupt because the Trust Fund set up from phosphate money had been tampered with by politicians. The shipping company and a bank set up from phosphate money are not doing well right now, and Nauru cannot resuscitate its economy. What are left of Nauru right now are a degraded landscape and about 10 thousand people, most of whom are diabetics who continuously need dialysis because their kidneys are not functioning normally. The country could not depend on ecotourism or other sectors to resuscitate its economy since nothing was done to rehabilitate the environment or fund other sectors of the economy since the 1900s. The case of Nauru is a lesson to PNG. Although we are blessed with abundant mineral reserves, the sustainability of these resources is not guaranteed if we cannot manage them properly.

What needs to be done is for us to develop our minerals and other natural resources in concert with the basic needs of our increasing population – this is known as “Need Based Development”. We do not have to play to the tune of multinational corporations who are here today and gone tomorrow and will not face the consequences of unsustainable mining that our present and future generations will face. Gold dredging in the Bulolo valley in the 1930s and the recent civil war on Bougainville are some historical lessons on mineral sustainability to our economy we should learn from and not repeat the same mistakes. Moreover, we do not need to rush the development of our mineral resources based on the whims of a few politicians and bureaucrats who see mining as a bridge to becoming filthy rich overnight.

Furthermore, the Environment Act 2000 is a technically flawed document. This Act has compromised the value of the terrestrial environment and deprived customary landowners of their rights to adequate equity and compensation for the loss of their pristine environments in regard to large scale developments in this country. Forest die-back along the banks of the Fly River and the recent spate of dead fish in the Watut and Markham rivers are some of the testimonies that demonstrate how pathetic this document is. Therefore, what benefit is the Environment Act 2000 to the marine environment and the coastal people who sustain their livelihood and subsistence from the sea? The magnitude and scope of deep sea mining on the marine environment is an unknown quantity, so what guarantee of protection does the Environment Act give to the marine environment and peoples whose lives depends on the sea? Our record with monitoring land based mining activities is pathetic. DEC does not have the capability to monitor mine discharges from land based mines into rivers and the seas. DEC depends on mining companies to provide it with data on a weekly basis, but there is no guarantee that the data provided has not been tampered with or if it has any scientific integrity. If DEC cannot handle discharge from land based mines into the rivers and seas, what could it do with mining that takes place at 1600m below the sea surface?

Environmental Impact Statements produced by developers and submitted to DEC have become the ridicule of some academics and NGOs in recent years. The quality of many of these Environmental Impact Statements do not meet scientific scrutiny but are entertained by DEC, and in many cases, Environmental Permits have been issued without due diligence. One Environmental Impact Statement for an SABL in one area had pictures of birds from Siberia (Russia) incorporated as proof of wildlife from that particular area, but this document was accepted by DEC. This is hilarious, and shows how low DEC can stoop to compromise the value of the natural environment and the lives of the people of this country. Therefore, what guarantee is there that an Environmental Permit will not be issued even if the Environmental Impact Statement submitted by Nautilus for the deep sea mining does not meet rigorous scientific scrutiny?

The process to which large scale developments are scrutinized and Environmental Permits are granted in this country is technically flawed. The process gives ultimate authority for issuing an Environmental Permit for any level 3 or 2 projects to the Director of DEC. The Minister for Environment and Conservation only approves the Environmental Impact Statement in principal, but the issuance of the Environmental Permit is the prerogative of the DEC Director. The process does not even allow for Environmental Impact Statements or other documents of projects to be taken to the NEC for perusal and endorsement – after the Minister for Environment and Conservation approves the document in principal, the DEC Director handles everything thereafter. So what guarantee is there that this technically flawed process is not going to be used for the deep sea mining project? There is no process available for stakeholders to sit around a table and rigorously scrutinize an Environmental Impact Statement for a large scale development before it is taken to the NEC for endorsement. Despite DEC making the Environmental Impact Statement available to the public for viewing, the roundtable discussion is the most important step where civil societies, government agencies, the developer and other interested parties sit around the table and grill each other over the quality and benefit of the project to all parties concern.

Currently, DEC implements most of the formalities in relation to Environmental Impact Statements, and Environmental Permits while other government agencies are used as rubber-stamps for large scale projects, and civil societies and customary landowners are mere spectators. Therefore, unless something drastic is done otherwise the same procedure will be applied to the deep sea mine project. As a regulator of the environment, DEC is required to carry out a Baseline Study in a proposed project area before any actual work begins. The data collected by DEC is to be analyzed, compiled, and used as reference data to monitor the operations of the project throughout its lifespan. If DEC finds through its regular monitoring that the operations of a project has caused an environmental parameter to be abnormally different from the compiled baseline data, the department can then advise the developer to make adjustments to rectify the situation or shut down the operations until corrective measures are put in place. Nevertheless, Baseline Studies have rarely been carried out by DEC, and developers easily get away with environmental issues at the expense of the natural environment and customary landowners because there is no Baseline Data to prove that something abnormal has happened. The recent case of dead fishes in the Watut and Markham rivers is an example of what can happen with compensation claims when there is no Baseline Data to prove that something unusual has happened. So, the question is, do we already have a Baseline Data for the deep sea mine?

### **Nautilus seeks partner**

The National, 29th August, 2012

NAUTILUS Minerals Inc, seeking to be the first large-scale miner of copper and gold from the ocean floor, is in talks with potential partners to sell a stake in the project off the coast of Papua New Guinea. Nautilus may sell shares to help raise US\$100 million if it cannot find a partner for the project 1,600m deep in the Bismarck Sea, where the Toronto-based company plans to start pro-

duction in 2014, chief executive officer Stephen Rogers said. “We’ve had discussions and continue discussions with a number of parties,” Rogers said. “There are a lot of people interested in what we are doing, interested in this potential new frontier for the metals sector.” Nautilus is exploring underwater for metals as rising demand in the past 10 years pushed up prices, while conventional miners battle increasing costs.

The average industry cost to produce a pound of copper climbed 30% to US\$1.30 last year, according to data compiled by Bloomberg. “Land-based grades are getting thinner, costs are obviously going up as a result of that, and of course, we have to push into more pristine wilderness areas to find these metals,” Rogers said. “There are some benefits offered up by looking at the oceans as a potential source of minerals in the future.” Nautilus’s biggest shareholders are Moscow-based Metalloinvest Holding Ltd, which owned 21% of the company’s shares as of May 1, London-based Anglo American Plc (AAL) and MB Holding Company LLC, according to data compiled by Bloomberg. The US\$100 million figure does not include the funds that Nautilus still needs to pay for the vessel that will be used at the project, Solwara 1. The company said on June 1 that there may be a delay in finalising the financing amid tighter banking rules in Europe and a “depressed” shipping market.

Germany’s Harren and Partner is building the vessel and will own 50.01% after it’s delivered. “We still have to get our vessel programme back on track, but we have a way of doing that, we’re not uncomfortable with that situation,” Rogers said in a recent interview,” Rogers said. The company may arrange a type of ship mortgage, he said. Nautilus also is seeking an “amicable” solution before full arbitration begins in a dispute with the PNG government, which owns 30% of the project, Rogers said. The government agreed in March last year to exercise an option to buy a 30% stake in Solwara 1. The pact included a deal that PNG pay 30% of the funds Nautilus had already spent, as well as its share of development costs going forward. Nautilus said on June 1 the government asserted the company had not met certain obligations required for the March 2011 deal and an arbitrator in the dispute was named last month.

### **Oro Governor to take on Nautilus Minerals**

Post-Courier, August 29, 2012

*By SIMON ERORO*

ORO Governor Gary Juffa has confirmed that he will initiate court proceedings to challenge the Government’s decision on the Nautilus Solwara seabed mining project in the interest of his people. Mr Juffa said he is not afraid to tackle the issues confronting the country and has encouraged his fellow members of Parliament to do likewise. He said leaders must not allow themselves to be bullied, coerced or induced into agreeing to anything that does not benefit Papua New Guinea, Papua New Guineans or threatens our interests and the future. “I intend to stand up and be vocal. I have put my hand up for the various parliamentary committees to bring about meaningful change in PNG and act as a check and balance,” he said. He said the ninth Parliament must not follow the past by engaging in rhetoric and shy away from major issues but instead confront, protect, develop and fight for the people’s interests. Meanwhile, he has called on the Government to remove Indonesian fugitive Djoko Tjandra, shelve the Naime Rice Project and revoke the mining license given to Nautilus Minerals. “Mr Tjandra is a fugitive. I do not care how much he has brought into PNG or claims to be investing in the country, he said. “Those responsible have betrayed Papua New Guinea and should pay for their crimes,” Mr Juffa said.

## **Government erred in seabed mine: Prof**

Post-Courier, August 29, 2012

By *JASON GIMA WURI*

UNIVERSITY of Papua New Guinea academic professor Chalapan Kaluwin has said that the Government has breached a number of international conventions when it issued a mining license to Nautilus Minerals for its Solwara 1 seabed mining project. These conventions include the 1982 United Nations Convention on the Law of the Sea; 1986 Convention for the Protection of Natural Resources and the Environment of the South Pacific Region (Noumea Convention); UNFCCC and Kyoto Protocol; UN Biodiversity Conventions and the Waigani Agreement. Prof Chalapan said the issues and details raised in the draft were equally important "as we start the process and work with our friends to ensure we address these concerns for the country".

"There is a draft document from the SOPAC team's legal advisors that has been prepared in collaboration with Secretary of the Pacific Regional Environment Program (SPREP) and other regional organisations which provides guidelines for the application of the precautionary principle," he said. "If we applied this document on precautionary principles it holds some promise and value that PNG Government could have made not to proceed with deep sea mining projects, given the serious lack of appropriate policies and laws in mining sectors in the oceans, coupled with the Fisheries and Environment Acts (2000) in the country." Prof Kaluwin said most importantly, there appeared to be lack of full scientific understanding of the issues involved. He said states pursuing such activities had a responsibility to ensure that they followed international laws to protect the marine environment.

## **Groups Rally Against Seabed Mining At Pacific Forum Meeting**

Moratorium on mining proposed until effects are better understood

By Rachel Reeves

AUCKLAND, New Zealand (Pacific Scoop, Aug. 28, 2012) – A petition bearing more than 8,000 signatures is being circulated among Forum participants this week as part of a regional effort to arrest seabed mining projects in the Pacific. A coalition of non-government organizations, which includes the Pacific Network on Globalisation (PANG) and Act Now! PNG, is here on Rarotonga to raise awareness about deep seabed mining in the Pacific, taking advantage of the opportunity to reach leaders from around the region who are gathering for the Pacific Islands Leaders Forum. Their petition is based on a legal opinion from U.S.-based Environmental Law Alliance Worldwide (eLAW) that the "precautionary principle" – the theory that if an action or policy is suspected of being harmful to the public or environment and there is no scientific consensus, those people or groups taking the action have a responsibility to prove it is not – applies to seabed mining in the Pacific.

The opinion concludes: "There is great uncertainty whether undersea ecosystems, especially vent features that have been created over thousands of years, can withstand the damage and destruction caused by deep seabed mining. "In accordance with the precautionary principle, Pacific Island nations should follow the example set by Australia's northern territory and institute a moratorium on deep seabed mining. The risks and uncertainties of seabed mining are too great to allow mining activities to proceed with the expectation that the damage can be reversed." PANG coordinator Maureen Penjuli convened a press conference with Pacific media today to talk about the petition and publicly launch the eLAW legal opinion. She is alarmed at the pace of a Secretariat of the Pacific Community (SPC) deep sea minerals project – which is providing technical assistance to the 15 Pacific-African, Caribbean Pacific states, of which the Cook Islands is one – as she says it is



proceeding too quickly for her coalition to be able to raise ample regional awareness of its petition in time.

### **Presence paramount**

That's why she considers it paramount to be present at this week's Forum. Penjuli today launched eLAW's 10-page legal opinion, which does not condemn mining activity, but supports a moratorium until gaps in the research and science around deep seabed mining have been filled. At present Tonga, Nauru and the Cook Islands are pursuing exploratory mining programs, and a Korean company is reportedly in the process of procuring a license to mine in Fiji's seabed. Canadian company Nautilus Minerals plans to mining 50 kilometers off the coast New Britain island in Papua New Guinea, where communities are rallying to protest against the political processes that led to the licensing of the project and mining in general. The area being marked off for exploration of mining potential in the region is twice the size of the combined land mass of all Pacific nations.

### **Opposition to seabed mining massively outnumberers supporters in PNG**

PNG Mine Watch 27.8.2012

Public opposition to experimental seabed mining in Papua New Guinea massively outnumberers its supporters and is continuing to grow. MPs, newspapers, churches, local and provincial government, civil society organisations, academics and ordinary men and women are all speaking out against plans by Canadian company Nautilus to mine the seabed.

<b>Opposing</b>	<b>In favor</b>
<ul style="list-style-type: none"> <li>▪ Parliamentary Opposition Parties</li> <li>▪ The National newspaper (Editorial 24/8)</li> <li>▪ Ken Fairweather (MP)</li> <li>▪ Gary Juffa (MP, Governor Oro Province)</li> <li>▪ Theo Zuranuoc (MP, Speaker of Parliament)</li> <li>▪ Titus Philemon (MP, Governor Milne Bay Province)</li> <li>▪ Anton Yagama (MP)</li> <li>▪ Charles Abel (MP, National Planning Minister)</li> <li>▪ Belden Namah (MP, Leader of the Opposition)</li> <li>▪ Gordon Wesley (MP)</li> <li>▪ Catholic Bishops Conference</li> <li>▪ Pacific Council of Churches</li> <li>▪ National Fisheries Authority</li> <li>▪ New Ireland Provincial Government</li> <li>▪ The Drum, Post Courier newspaper</li> <li>▪ Trobriand leaders</li> <li>▪ Anir islanders</li> <li>▪ Naka Blood (Musicians)</li> <li>▪ ACT NOW!</li> <li>▪ Pacific Network on Globalization</li> <li>▪ Bismark Ramu Group</li> <li>▪ Mas Kagin</li> <li>▪ Alctau Environment</li> <li>▪ Christians for Environmental Stewardship</li> <li>▪ Four Massim Milne Bay</li> <li>▪ Baining Environmental Heritage Foundation</li> <li>▪ Wide Bay Conservation Association</li> <li>▪ Madang People's Forum</li> <li>▪ Kokopo Fisheries Cooperative Association</li> <li>▪ 30,000 on-line petition signatories</li> </ul>	<ul style="list-style-type: none"> <li>▪ Nautilus Minerals (Canadian)</li> <li>▪ Chamber of Mines (Foreign mining companies)</li> <li>▪ Mineral Resource Authority</li> <li>▪ Department of Environment and Conservation</li> </ul>

## Canada's Nautilus says PNG sea mining project will be transparent

Radio New Zealand, 26 August, 2012

The chief executive officer of Nautilus Minerals says the Canadian-based company is committed to an open and transparent approach to its Solwara 1 deep sea mining project in Papua New Guinea. In the world's first major deep sea mining operation, Nautilus has a twenty-year license to mine the Bismarck Sea for copper and gold. Nautilus faces strong local opposition to the project, with environmentalists warning that too much is unknown about the impacts for it to proceed. But the CEO, Stephen Rogers says that they're confident the project's closed system of mineral extraction will minimise damage in surface waters from mining the seabed. "And what I would say to the people of Papua New Guinea is that we've got a very well-engineered system, we've used world leading practice. We've brought in technologies from the mining industry and the deep water oil and gas industry, that allow us to bring this material to the surface. it's going to be done safely. And we're not going to impact commercial fisheries or local fisheries with the activities that we're doing here." Stephen Rogers says they have consulted widely with both local communities and scientists about the likely impacts.

### Seabed mining queried

Post-Courier, August 25, 2012

By *KONOPA KANA*

CANADIAN Firm Nautilus Minerals who is the operator of the Solwara 1 seabed mining project faces stiff opposition from Pacific communities to stop its project after the PNG government granted a 20-year mining lease last year. Opposition Leader Belden Namah has condemned the action and told the Peter O'Neill-Leo Dion Government that he will do everything in his power to make sure that the project is stalled or abandoned. Mr Namah said the Government must explain to the people of Papua New Guinea of the sudden rush to approve a mining project, which is the first of its kind in the world. He said PNG's exclusive economic zone has valuable resources like fisheries and the project will endanger the country's marine environment and the resources it has in its territory. Mr Namah and other parties in his Opposition want the Government to explain to the people of PNG if someone or people in the current have any incentives to give the green light to this controversial project.

"As senior executive officer in the Opposition I would like to make it clear that the Opposition team is fully against that seabed mining project because the citizens of Canada are standing in solidarity with civil society in the Pacific against project," a source with the Opposition who did not wish to be named told the Post Courier yesterday (Friday). "Our main concern is not to allow Nautilus Minerals to come and take advantage of our resources and marginalise the 7.5 million people and the future generation of this country," the source said. Dr. Catherine Coumans of Mining Watch Canada said that Canadian mining companies operate around the world and dominate the sector, but Canada does not regulate their activities to prevent them from profiting from weak protection for the environment, workers and human rights in some host countries.

"Now, in spite of very serious concerns that have been raised by scientists and local citizens, we have Nautilus proposing to mine environmentally, socially and culturally significant sea beds in the Pacific, an activity that would not be allowed in Canadian waters," Dr Coumans said. Sharon Diave-Nerius from the East New Britain Social Action Committee said that public reaction against Nautilus is welcome news for communities in Papua New Guinea but there are plenty of other companies and governments pushing for this experimental industry in the Pacific to get started. "The speed with which the PNG Government approved the EIS and granted the mining license to Nautilus did not pay respect to the customary norms and cultural heritage of the indigenous people

of the Bismarck Archipelago,” he said. “Experimental mining of our sea beds is not going to provide any direct services or benefits for local communities.”

## **PNG Opposition Questions Rush Into Sea Bed Mining**

Belden Namah calls decision ‘careless and reckless’

By Jason Gima Wuri

PORT MORESBY, Papua New Guinea (PNG Post-Courier, Aug. 24, 2012) – The Opposition has declared that the O’Neill caretaker government rushed to approve the controversial sea bed mining in Papua New Guinea immediately after the 2012 general elections. Opposition Leader Belden Namah with his opposition members in a press conference yesterday questioned the governments stand on sea bed mining. "Was Papua New Guinea on Economic Life Support to warrant such a mad and reckless decision? "We believe it is morally and ethically wrong and economically unnecessary. The government has by this careless and reckless decision neglected its duty to protect the livelihood of our people who are heavily dependent on land and marine resources.

"Our country has more than enough to mine on land yet this government is unduly determined to exhaust all mineral extraction avenues in one’s life time. This is a government blinded by economic wealth with no regard of future catastrophic consequences. "Is O’Neill blinded by economic wealth or by foreign influence? Why is PNG used as a ‘guinea pig’ on the first sea bed mining operation reported worldwide? Why aren’t these investors not practicing seabed mining in their own waters and yet prey on developing countries where corruption is deeply entrenched," Mr Namah questioned. Mr Namah said that the country had just concluded and signed a multi-billion kina LNG Project which no doubt would propel and sustain the economy of our country for the next 30-50 years, hence the government had to explain to the satisfaction of the people of PNG why it had rushed into approving this high risk seabed mining project.

The controversial decision to approve sea bed mining in PNG is a demonstration of a careless and reckless government making decisions without constructive and meaningful debate by full cabinet or through proper debate on the floor of Parliament and or through wider consultation with relevant stakeholders. "Our Opposition is well organised and structured than the government so we keep them in check," Mr Namah said. "The marine eco system will be destroyed. Was there thorough consultation with the Department of Environment and Conservation including line agencies like National Fisheries Authority, Research Institutes such as National Research Institute, even NGOs like World Wildlife Fund for impartial opinion on the adverse impacts of sea bed mining in PNG? "In this opposition, we will stand against and fight to stop such projects."

## **Anir joins fight against deep sea mine plan**

Post-Courier 23.8.2012

ANIR islanders in the far stretches of New Ireland Province have aired their support against the seabed mining in the Bismark Sea. The Anir Island Resource Owners Association chairman Paul Penua Mimfin announced their support with Chairman for Mining Marius Soiat, the New Ireland Students of University of Papua New Guinea and the rest of the New Ireland communities that are opposing the seabed mining in the Bismark Sea, especially in the waters of New Ireland Province. "I in fact sent an objection letter in 2007 to the Governor of New Ireland Sir Julius Chan, stressing our Islanders’ concerns to refrain from or not to be involved in this type of mining method because of its unscrupulous operation and the serious impact it will have on our seas which is the most vital habitat and provider for us islanders but sadly we were dwarfed by the might of the Government and its regulators," Mr Mimfin said.

He said the remarks opposing our stance currently heard in the media were simply total arrogance against basic environmental conscience towards humanity from the Government and its regulator, the Minera. He said the Government must understand that the New Guinea Islands had more scattered outlying islands than any other region whereby 90 percent of which rely on small scale fishing to sustain their livelihood every day. "Do not forget that we have the largest sea zone in the Pacific tapping in Tuna commercial fishing which is enough to involve our young people in the fishing industry," he said. "I am overwhelmed by the opposition against the Nautilus Mining Seabed activities and that is the way we should be protecting our habitat." "This is the fight Anir Islanders together with New Irelanders' will take to show international communities that we are not another cheap nuclear or mining testing ground as what happened to Mororua Atolls in the early 1990s," Mr Mimfin said.

### *Letter to the editor*

#### **Shelve Solwara 1 until right time**

Post-Courier, August 24, 2012

I REFER to Mining and Petroleum CEO Greg Anderson's comments in the recent stakeholders meeting in Divine Word University; "PNG hopes to be the First Deep Sea Miner". Why am I not surprised that this is the main reason why the Government had gone ahead to approve this controversial project. It's not the economic incentives, as PNG does not need a mine of such magnitude when we have currently other gold, copper, silver mines in existence, with new ones being developed, like Wafi Mine in Morobe Province having the potential to be among the largest gold-copper producer in the world! And of course the LNG project due for production 2014. The projected revenue from this projects into the country's economy and national purse looks promising in the years to come. My question is simply this: Why pursuing the glory to be the world's 'First Deep Sea Mine' when it would have no real benefit to the people at this point in time? Why at the possible expense of our local marine resources? Does this mining clause : "anything below six feet under ground belongs to the state" have any implication in the Government treatment of this project? How does this apply to territorial sea boundaries and fishing rights?

The best way forward is to shelve this project for a later period when the country's economy is in dire need for additional capital injection or alternatively for our future generation to enjoy. We don't need any further lucrative and highly flamboyant promotion of our natural rich mineral deposits, we are better off where we are now in terms of our mineral and natural resource rate of utilization, more marketing and popularity and it would be sad if this so-called "first deep sea mine" project proceeds, as it will only accelerate the consumption rate of our natural resources, further posing more threat to our already diminishing rich natural resource diversity. Papua New Guinea is still too young a nation to trial a deep sea mine project, let it be conducted in some industrialised countries first before we can accept this technology, its not a question of who comes first, rather what's the cost involved! Not on our waters where PNG coastal villages predominate still survive on marine life, no way! Any citizen who supports this project either wants to go to Canada or wants to work for Nautilus or does not have any geneological link to his/her people/land, economic benefit is not a dictator here for God's sake, no, it is fame and simple greed! Samuel Ilau, LAE

#### **Deep sea mining: Temu defends government stand**

Post-Courier, August 22, 2012

THE President of the PNG Mines and Petroleum Dr Ila Temu yesterday in a press statement defended the Government decision claiming that resource projects should not be officially stalled after

government development approvals are granted. Dr Temu said the Nautilus deep sea mining project had attracted comments based on emotion rather than, facts well after full assessments and approvals have been given by the PNG Government. Making this point today, he said it was unfair for a resources project to be stalled once environmental and other approvals have been received after many years of exploration, research and community consultations. "This would also raise concerns in the international investment community of the dangers of sovereign risk," Dr Temu said.

Dr Temu urged members of the public to seek facts from relevant government ministries or from the companies so that comments were based on accurate information and not on emotion. "In one recent case a well known individual told a radio station that sea bed mining would involve the dumping of waste over the side of a boat. I can assure the public that no reputable company would conduct its activities in this manner and no responsible government would permit such conduct," he said. Dr Temu commended the Mining Minister Byron Chan for publicly reiterating his support for the deep sea mining project since his Ministry had granted the company a Mining Lease in January 2011. "Granting of this lease is public acknowledgement that Nautilus Mining, which has been exploring its Solwara 1 deep water prospect in the Bismarck Sea since 1997, has satisfactorily conducted consultations with relevant stakeholders, including landowners, and received other necessary approvals for development to go ahead.

"On the environment issue, the Chamber understands Nautilus submitted its Environmental Impact Statement and Mining Lease Application in September 2008, which was followed by public hearings and a review by an independent consultant engaged by the Department of Environment and Conservation. "It was only after these procedures had been followed that ministerial approval was given for issue of the Environmental Permit in January 2009," Dr Temu said. Dr Temu said that recent media reports critical of the deep sea mining venture had occurred after it was reported that the Government had only recently approved the project when in fact this happened 19 months ago in January 2011. "It is a poor reflection on PNG's sovereign risk profile and unfair for a project to be officially stalled after a Mining Lease has been granted," he said. Dr Temu said the Chamber was of the view that continuing government support was vital.

## **Seabed mining impact huge: NGO**

Post-Courier, August 22, 2012

By *GRACE TIDEN*

THE impact of seabed mining on the coastal people of West Coast New Ireland, Duke of York, Rabaul and Lassul Baining will be significant despite Nautilus saying otherwise says a non-government organisation in East New Britain Province. The Baining Environmental Heritage Foundation Executive Director Alois Balar said deep sea mining was controversially known for destroying marine lives and habitat and effectively this was collateral damages. "The government must address the issue of social and environmental insurance for the local people affected," he said. Mr Balar said these various groups of people have different social and cultural structures as well as cultural heritage that have allowed them to sustain robust stable social institutions. "These coastal communities face imminent loss of livelihood support, loss of subsistence income and loss of food sources. "These coastal people, for generations, relied on and lived off their resource-rich environment rather than wealth/cash rich economy," he said.

Mr Balar said the local people had an obsession for the protection of their cultures including the surrounding and the entire environment in its natural form and this had been the main driving factor that had always kept them intact with their cultures and the land and sea over generations. He said whilst the state owned the sea and all that was underneath as stipulated under law, the user rights of these various groups of indigenous people should be respected and accounted for in the develop-

ment process. “Human rights law recognises the right to land and sea territories to indigenous people as an element of the right to property. Human rights law also recognises the right to natural resources in indigenous lands and sea territories that are essential to their survival as an element of the right to property,” he said. Mr Balar further said at the same time, the government was attempting to address food security as a national policy. “Again, it is ironic that it sanctioned for loss of food sources (threatening food security) and economic loss through impact on fishing and tourism, with the granting of the seabed mining lease,” he said.

## **Governor fires broadside against Nautilus**

Post-Courier, August 21, 2012

By *SIMON ERORO*

ORO Governor Gary Juffa has described the Government’s decision to give the green light to Nautilus Minerals to commence seabed mining in the waters of New Ireland as disgraceful, total insanity and a crime against the people of Papua New Guinea. Mr Juffa also confirmed that he was against the project and called on all Papua New Guineans to rise up and stage public protests against what he described as the controversial seabed mining project spearheaded by Nautilus Minerals. The former PNG Customs boss said there is a growing tide of public resentment against the project and urged Papua New Guineans to do something to protect their marine environment. Mr Juffa said as the Governor of a province with a vast coastline which could be affected by any seabed mining activity, he will not stand by and allow the project to proceed.

The world is reeling from environmental disasters, either directly or indirectly as a result of human activity, forests the size of football fields are disappearing each day and species of flora and fauna are becoming extinct every day, the first-term parliamentarian said. “Global warming and rising sea levels are rapidly occurring and entire nations will disappear in some years. Already we have such an example in the Tulun or Carterets Islands in Bougainville,” Mr Juffa said. “Melting ice caps and desalination of the oceans is causing the demise of marine life and causing an imbalance in the ecosystems of the world rapidly. Our air is polluted. “Our fish and marine resources are being depleted fast, and yet we have added to this situation by endangering our marine environment and threaten the livelihood of our island and coastal communities by allowing this disgraceful project to continue. Where is our sanity and consideration?” the Governor said.

Mr Juffa urged Mining Minister Byron Chan to immediately take the interests of the people of New Ireland Province and PNG into consideration first before claiming that there was nothing to be done about the project. “We are elected to represent our people and our country and this project, the first of its kind (in the world), is far too dangerous to allow. There is a reason why no other country is allowing this project – it is far too dangerous,” he said. Mr Juffa said very little is known about the repercussions of seabed mining and despite the fact that scientists and other experts consider it very dangerous and warn of their severe negative impacts on the environment the PNG Government has seen fit and given its blessing to Nautilus Minerals, he said. PNG is a tiny undeveloped island nation with no resources or means to ensure environmental standards and safety, no mechanism to react to man-made disasters and no knowledge and experience of the impacts or consequences of seabed mining, yet it has gone ahead and given the green light,” Mr Juffa said.

“Are we that stupid and ignorant? The green light was granted by the Minister of Environment and Conservation last September without ensuring that a thorough independent research was carried out. “Why were important verifications not carried out? Why have we gone against the concerns of the scientific community and experts? It is only a few weeks after the elections and already many leaders are shying away from addressing this issue,” the Oro Governor said. “Who is benefiting? Only a tiny minority of extremely wealthy people in foreign nations who have no idea about where PNG is

and who do not care. We do not benefit.” Mr Juffa said the Government will most likely grant all manner of exemptions to Nautilus Minerals and the people will merely be onlookers and given crumbs, but they must pay for the resources that they own if they want to participate in the project and benefit from it.

### **Milne Bay residents reject Nautilus**

The National, 21st August, 2012

MILNE Bay people have called on the newly elected Governor Titus Philemon to stop a foreign miner’s plans from exploring their seabed for minerals. The Four Massim group of Milne Bay citizens and students have urged Philemon to cancel a mining warden’s hearing in Alotau tomorrow. The hearing will consider applications by Canadian miner Nautilus Minerals to explore for seabed mining potential off Milne Bay, where it already has about 3,000sqkm of exploration tenements. Four Massim’s Sineina Tosali said the government was supporting a high risk mining experiment, which could destroy Milne Bay people’s main means of livelihood – the ocean – without understanding the impacts or informing the affected communities. “No-one has told us anything,” she said. “We know Nautilus is using technology that hasn’t been used before and that there are going to be permanent scars from this ... yet lots of people from Milne Bay don’t know what’s going on.

“We’re calling for information about the risks of impacts on locals, for assurances of marine protection and for recognition of customary ownership before any agreements are made.” Four Massim formed following a public awareness forum about experimental seabed mining in Milne Bay last month. Tosali said the group’s purpose was to create awareness among Milne Bay residents as well as other provinces targeted by Nautilus for experimental seabed mining. Philemon was reportedly opposed to the experimental seabed mining even before he was elected. Other MPs including Sumkar’s Ken Fairweather and Northern Governor Gary Juffa have publicly expressed their opposition to Nautilus’ plans.

Four Massim will also seek to hold an awareness campaign with all LLG presidents and the general public in Milne Bay province. The move to advance exploration in Milne Bay comes after Nautilus received government approval for a 20-year licence to mine the Bismarck Sea for gold and copper at its Solwara-1 mine, located 50km off the coast of New Britain. Tosali said rather than supporting such high-risk projects, the government should engage in development based on existing strengths in the local economy. “Fishing projects are good for locals because that’s what people do, they have the skills to do it and it poses less risk to our environment and food security,” she said. “We are a maritime province. “We have already seen environmental impacts resulting from the Misima mine polluting our creeks and rivers.”

### **Seabed mining: More national experts needed**

Post-Courier 21.8.2012

By *JASON GIMA WURI*

PROFESSOR Chalapan Kaluwin of the University of Papua New Guinea has called for more national experts and scientists to be involved in research when it comes to the seabed mining issue in the country. “UPNG and other universities are important resource bases for research and technical expertise and they should be part of the development process instead leaving everything to a few government departments and their friends,” Prof Chalapan said in an email from Australia where he is currently carrying out some research. He is with the Environmental Science and Geography School of Natural and Physical Science at UPNG. He said this topic is of interest to all stakeholders, both nationally and abroad, and requires broader consultations. “I have included the team

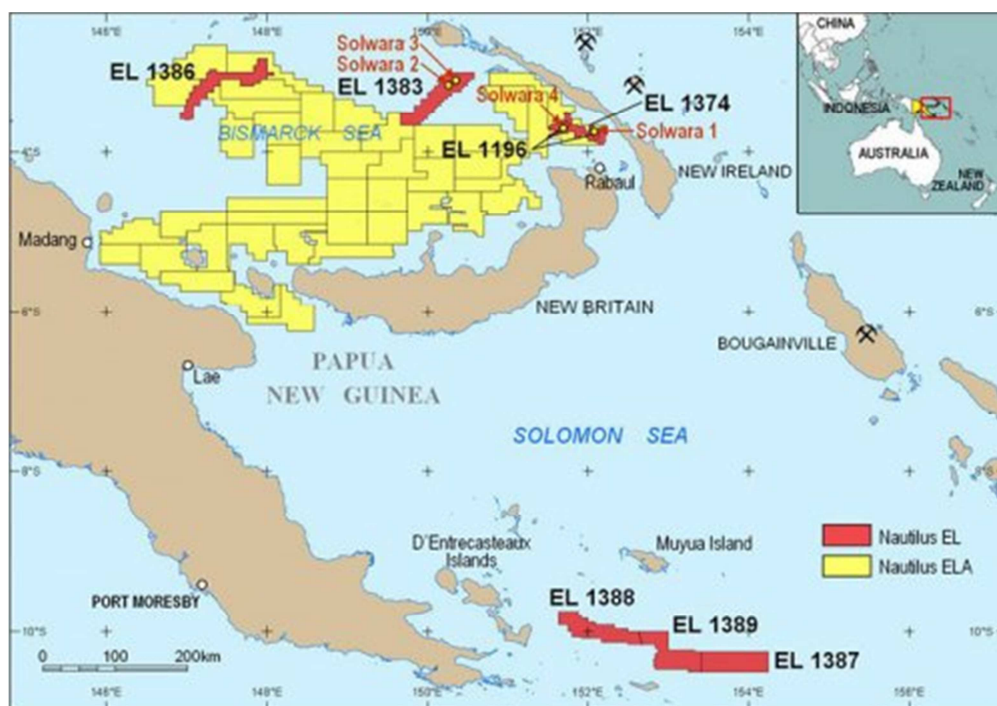
members of the Extended Continental Shelf Project and interest groups to contribute to this discussion, and I'm also aware of Professor Karl Gena of University of Technology who has done research work on mineral deposits and geochemistry from this area and so is Dr Espi.

"We just need to establish facts and figures to make progress in this issue and must be done with some urgency as the politicians and investors may get better of it if is delayed further. "The most important thing is to ensure the Government and our people realise that after 35 years of experiences in the field of sciences with expertise to contribute meaningfully to any development whether on land, ocean or atmosphere in the PNG, institutions and people like us should be able contribute in any new developments in PNG," he said. In off shore seabed mining in the oceans in PNG, a lot of experts who have done work in this area but no one is able to get technical advice from UPNG or PNG's expertise, Prof Chalapan said. He said Bougainville Copper Limited and OK Tedi were great examples of foreigners or developers making the final decisions.

"We need to put our hands up and advise the Government that there are technical experts who can assist the process in determining the most appropriate solution, he said. Prof Chalapan said in terms of strategy, PNG experts could do the following: Write discussion papers for the Government and the people of PNG, organise a consultative meeting or conference of New Guinea Islands' provincial government leaders and Milne Bay, support students, NGOs and provincial governments with their campaign activities and for NGI and Momase provincial governments to sponsor and organise a seabed mining summit to gauge a national perspective on the project? "Too many times we read about mining conferences being held in Australia and Papua New Guinea continues to be left out," Prof Chalapan said.

### Greg Anderson lobbying PNG politicians on behalf of Nautilus

PNG Mine Watch, 20.8.2012



Greg Anderson, Executive Director of Papua New Guinea's Chamber of Mines, has been personally calling politicians to lobby them to support the controversial experimental seabed mining plans of Nautilus Minerals. Nautilus is suffering from unprecedented levels of bad publicity with opposition to its mining plans coming from politicians, the Catholic church, academics, civil society groups



and local people. The Canadian company is also in a formal dispute with the PNG government, has lost funding support from its German shipbuilding partner and is facing a number of on-line petitions running in opposition to its mining plans.

But Anderson is telling the politicians the mining “will not be as bad as people fear” and that mainland politicians shouldn’t be worried as the mining will be “nowhere near their coastline” – which isn’t actually true! As the image below, published by Nautilus, clearly shows Nautilus has applied to explore very close to the mainland for suitable mine sites and there are no guarantees pollution and other negative environmental impacts from its existing proposed mines will not be carried by ocean currents and through the food chain to the mainland.

## **SOPAC role in seabed mining queried**

RNZI/PACNEWS 20/08/2012

There are questions over the role of the Secretariat of the Pacific Community’s Applied Geoscience and Technology Division (SOPAC), in deep sea mining in the region. SOPAC has been holding workshops to prepare Pacific Island communities for seabed mining. SOPAC’s director, Russell Howorth, said island governments need to establish regulatory frameworks for the emerging seabed mining industry. However, Phil McCabe from the group Kiwis Against Seabed Mining, said it’s unclear why SOPAC is promoting deep sea mining when the risks are unknown. “I think they’re setting up a framework to facilitate the sell-off of the resources that are in the oceans. They’re setting up that framework before people are even aware of what they’re doing. The consultation hasn’t even started.” McCabe also questions the European Union’s funding of SOPAC’s work in this area. He said it’s at odds with the EU’s Precautionary Principle, advocating thorough risk analysis.

## **PNG can’t monitor seabed mining**

Post-Courier, August 20, 2012

*By ANCILLA WRAKUALE*

PAPUA New Guinea does not have the capacity to monitor deep sea mining as shown from experiences with other mines says an academic. Associate Professor with the Department of Mining Engineering at the University of Technology Associate Professor Dr Kaul Gena said we were not able to effectively assess and monitor submarine tailing disposal system used by Misima, Lihir Gold and Ramu Nickel Mines. “The country continues to engage consultants who sometimes produce technically flawed reports and walk away with millions of kina at the expense of the tax payers,” he said. “There is no such thing as “no environmental impact” from such deep sea mining activity.” He said there are countless mineral deposits on the ocean floor that were explored since 1969. “Most of these mineral deposits are either base metals or polymetallic type deposits like those in the Manus basin. “Why is it that Nautilus is trying to develop Solwara 1 project when it is not giving due diligence to the environmental consequences of deep sea mining,” Dr Gena asked.

He said there are still so many doubts among many Papua New Guineans about the Solwara 1 Project and the developer Nautilus Minerals has to come out clear on this. “From scientific studies, we know that a small submarine hydrothermal activity on the ocean floor can discharge hydrothermal fumes that can diffuse through the seawater column both vertical and lateral from the point of discharge for up to 1000 metres. “So the current mining method that Nautilus is planning to use for the Solwara 1 project will cause a severe environment impact that will affect the entire Eastern Manus Basin because this is an open environment,” he said. “The submarine hydrothermal vent communities that live around the sulfide mound and on the chimney structures will go into extinction because they survive solely on the hot hydrothermal fluids as a food source. “Most of the marine inverte-

brates such as tubeworms and bivalve mollusk derive their nutrition from methane-oxidising and if their habitats are destroyed than these organisms will die instantly. These are some issues that Nautilus needs to inform the people of this country,” said Dr Gena.

## **Opposition To Deep Sea Mining Gaining Momentum In PNG**

*Coastal communities resisting planned deep sea mining*

PORT MORESBY, Papua New Guinea (PNG Post-Courier, Aug. 20, 2012) – Members of Parliament in Papua New Guinea that have made a stand against seabed mining in the country have been acknowledged. Chairman for Madang People’s Forum Alfred Kaket has acknowledged and thanked new MP for Usino Bundi Anton Yagama and MP for Sumkar Ken Fairweather for supporting the people of Madang in their fight against experimental seabed mining. Mr Kaket said they had stood up against seabed mining since 2006 and it was very timely that now they were getting political support. This campaign has also received international attention because it is an experiment to be tested in our PNG waters. “We do not want tests in our waters,” Mr Kaket reiterated. Mr Kaket said even though Mr Yagama’s electorate was not near the sea he had come forward in the true spirit of a leader to support the coastal people of Madang. He has invited other members of parliament in the Nautilus Project Solwara 1 region to come forward and support the people of Madang, New Ireland and East New Britain and West New Britain provinces.

According to professor Rick Steiner, this project would affect the tuna breeding grounds known as the Megado Square, said Mr Kaket. “Communities in these regions depend on the sea and we do not see this way of life being affected,” he stressed. Also in this region Mr Kaket said, was the migratory route for the leatherback turtle for nesting. “We currently have an active monitoring program running and we see no sense in a mining project disrupting this activity,” he said. The people of Madang also thanked Northern Province Governor Gary Juffa for his stand on this issue. “If Northern Province Governor can stand up for the people of PNG then I would like to call on all other governors in PNG’s maritime provinces to take some clear stand on this issue,” he said. “We thank our members for supporting us and we will continue our protests on the ground to see that this project does not happen at all in our waters.” He said the people of Madang would ensure all that was in its sea was protected.

## **Nautilus: We have complied with laws**

The National, 16th August 2012

By GYNNIE KERO

NAUTILUS Minerals has complied, and will continue to comply, with all relevant legislation as a minimum standard, the company said yesterday. Responding to criticisms levelled at the company, Nautilus said the Solwara 1 Project was governed by two principle pieces of legislation: the Mining Act 1992 and the Environment Act 2000. “A multi-stakeholder approach has been taken throughout the development of the project, in the design of the Environmental and social impact assessment (ESIA) and to develop the environmental impact statement (EIS),” it said. “Stakeholders included representatives from government, universities, anthropologists, marine scientists – including world-renowned deep sea ecology experts – local and international NGOs and other groups.

“Leading international institutions and consultant groups then conducted the studies for the ESIA. “Nautilus Minerals collaborated with some of the world’s best experts to conduct the studies and collaborating scientists are free to publish their findings, maintaining transparency.” Nautilus said in September 2008, the EIS was submitted to the PNG Department of Environment and Conservation (DEC), which engaged an international consultant group to undertake a rigorous independent re-

view. “The PNG Environment Council, a body created under the Environmental Act, also conducted a review and recommended to the Environment Minister to approve the EIS. “The EIS was approved in principle in August 2009 and the environment permit was granted in December 2009.

“As required under legislation, public hearings of the EIS were initiated in November 2008, with a focus on New Ireland and East New Britain provinces. “Nautilus Minerals maintained its open and transparent approach by placing the EIS on website for everyone to be able to review. “In addition, awareness meetings and consultations are ongoing, to date, we have met with more than 20,000 individuals in relation to the Solwara 1 Project, and will continue for many years ahead. “It is important to note that the ESIA and EIS are only part of the process towards responsible environmental management. “Nautilus is currently working with a number of relevant experts to develop the Environmental Management Plan (EMP) and monitoring programmes for the Solwara 1.”

### **Catholic Bishops Conference: Deep-sea mining stand**

The National, 15th August 2012

By CALDRON LAEPA

THE Catholic Bishops’ Conference has joined several non-governmental organisations in making a stand against deep-sea mining and called on the government to stop the project. Catholic Bishops’ Conference of the Solomon Islands and Papua New Guinea general secretary Fr Victor Roche said the church did not support the mining because the impact it would have on the people and the country was unknown. “We do not have evidence to substantiate our claim but we are concerned that the mine would affect the marine life. We do not know how much exactly it would impact the people or the government,” Fr Roche said. “This project was never tested anywhere in the world and we cannot be used like guinea pigs.”

Canadian company Nautilus Mines was granted licence to carry out deep-sea mining in the Bismarck Sea between East New Britain and New Ireland. This is despite research showing there has been no clear national legislative and policy guidelines in operating a deep-sea mine. The project called “Solwara 1” is owned by Nautilus Mineral Niugini. Researcher Syble Michelle Pennington said PNG did not have any specific legislative guidelines to show how the mining should operate. Pennington said several general legislations for deep-sea mining were used to create one for PNG. These guidelines were drawn from the Environment Act 2000, Mineral Resource Authority Act 2007, Mining Act 1992 and the United Nations Conventions on Laws of Seabed (UNCLOS) 1994.

Nautilus Marine Niugini claims mining activities would not affect marine life because of the nature of the project. Nautilus Cares, a forum of the company, reported on Sept 29, 2008, that the mine would be operated 1,600m deep and 30km off the coastline. The report said mineral from vents would be extracted using robots. It said mining activities would not have such a severe impact on marine life as the impact of ships travelling in the Rabaul and Kavieng seas. There will be no impacts on marine life because at such depth there was hardly or little marine life due to lack of sunlight, the report said. Attempts to obtain comments from acting secretary for the Department of Environment and Conservation Varigini Badira were unsuccessful.

### **MP Fairweather opposes seabed mining**

Post-Courier, August 15, 2012

SUMKAR MP Ken Fairweather yesterday joined forces with activists to slam the Canadian owned Nautilus Minerals experimental seabed mining in Papua New Guinea. Mr Fairweather has campaigned against sea pollution and exploitation of fishing stock in Madang. He said his people of

Sumkar had given him a clear mandate to represent them against the evil Pacific Marine Industrial Zone, the Canadian Nautilus mining and over fishing. "My people do not want this evil project so I will not let it happen in Madang," Mr Fairweather said. The people of New Ireland do not want experimental seabed mining nor do the people of Milne Bay and definitely not in Madang. "I will not allow it," he said. "If there are reports of a flawed Environmental Impact Statement (EIS) then this activity should not go ahead at all," he said.

The Madang people's forum are planning a protest next week and Mr Fairweather said he would support them. To kick start its official business, the PNG Government has early last week given approval to the Canadian miner to kick start its operations in the Solwara 1 project but protests continue. Mr Fairweather said these protests have been going since 2008. Mr Fairweather has also attacked the Pacific Marine Industrial Zone saying, "We do not want this evil development in Madang." He has also called on Madang Governor Jim Kas to come clear on his stand on these issues and to contact him so that they can work out some strategies for Madang.

### **Seabed mining opposed by MPs**

Post-Courier, August 14, 2012

By *ROSALYN ALBANIEL-EVARA*

CANADIAN firm Nautilus Minerals, the developers of the proposed Solwara 1 sea-bed mining project are in for a fight as the people of Madang are dead set against this project. Two of the province's MP's namely Ken Fairweather (Sumkar) and Anton Yagama (Usino/Bundi) have made their stance on this development known. Mr Fairweather has gone a step further by not only calling on the new Governor Jim Kas but also the leaders of New Ireland and East New Britain that are likely to be affected by this proposed project to join forces and to put a stop to it. In a press conference that Mr Fairweather held over the weekend, he stated that his people did not want the project and it would not happen. The two-term MP who has been vigourously campaigning against sea pollution and overfishing of fish stocks said his people had given him a clear mandate to represent them against these issues and he would do his level best to do so.

He said while he did not think it would rank high as an agenda of the MP's from the Highlands region, he hoped it would be given some importance by the Madang leaders as well as Governor New Ireland Sir Julius Chan and Deputy Prime Minister Leo Dion. "...I am hoping that this issue will be given prominence by people like Sir Julius and Mr Dion as they by now would be aware of the likely impacts. "I will not let up in parliament. I will give it sixty even box if I have to," Mr Fairweather said. The Sumkar MP said what was more disturbing was that the proposed developer to date, had yet to extend common courtesy to the people, to brief them and that they were still in the dark. "...no one from Nautilus has bothered to call me or paid me a visit to brief me on this project. This is great disrespect, never mind to me as a person, but to the people of Sumkar whom I am mandated to serve," he said.

Mr Yagama said he was especially concerned that this project was being allowed to go ahead when it had not been tried anywhere else yet in the world. He said PNG already had enough mines in the country and did not need any more at this stage. "We are not guinea pigs to be used by overseas developers. I am from the bush and do not know what sort of effects this project will have but if it will affect Madang, then I am concerned," he said. Meanwhile John Simoi a community leader from Bagabag has also raised grave concerns over the government's decision to allow this project to go ahead. Mr Simoi said his people were happy that their local MP had, their interest at heart and had taken a bold stand on sea-bed mining. He said to date relevant government authorities including the Department of Environment and Conservation had yet to brief them on this project.

He said with the people still in the dark it was shocking that the government would want to rush this project. "The government has failed the people. The country Director Mel Togolo visited the island once to push this project and was told outrightly by the people that it was not welcomed. "Nautilus is a sea pirate company as it does not respect the people," he said. Mr Simoi said he was also concerned that government would want to allow this project to go ahead when the DEC officials lack the knowledge and skills to monitor and evaluate this project and the impact it will have.

### **Madang: No to deep-sea mining**

The National, 14th August 2012

By GYNNIE KERO

SINCE deep-sea mining will affect highly-productive tuna fishing grounds, it will not be allowed in Madang waters, Sumkar MP Ken Fairweather said. He told The National from Madang yesterday his people were not aware of the activities or effects of seabed mining but they would not allow to happen in their waters. Fairweather said many questions about the socio-cultural and environmental impacts of seabed mining and of its underlying science were left unanswered. He said the experimental mining was being fast-tracked without the benefit of adequate scientific debates or any prior public dialogue. The setting up of seven additional fishing factories by the Pacific Marine Industrial Zone (PMIZ) also raised serious concerns by the locals.

"Bagbag islanders do not fully understand the seabed mining prospect and are concerned with the outcome," Fairweather said. "They depend on the sea for sustainability of livelihood. "Our main income comes from the sea. "We, as resource owners, should not tamper with natural habitats like sea mountains or reefs. "Another concern is of companies overfishing in our waters ... we have to be careful. "Before long, we might not have anything left." Fairweather said he campaigned against sea pollution and exploitation of fishing stock and the people of Sumkar gave him a clear mandate to represent them against PMIZ and Nautilus Minerals and to prevent overfishing of tuna stocks.

### **Miner Newcrest Cautious on New Projects as Costs Rise**

BY RHIANNON HOYLE, The Wall Street Journal 13.8.2012

SYDNEY—The world's fourth-largest gold miner Newcrest Mining Ltd. suggested Monday that potential developments at Namosi in Fiji, O'Callaghans in Western Australia and Wafi-Golpu in Papua New Guinea may be delayed following a sustained rise in the cost of setting up new mining operations. Sharply rising capital costs have put pressure on the gold sector in recent years, with overruns on new projects a recurring theme. Australia's largest investment bank Macquarie said that recently Australian gold miners have had to increase their initial capital expenditure estimates by 20% after continued increases in labor and energy costs. Mining companies more generally have been tightening their focus on cost control, and several of the largest diversified miners, including BHP Billiton Ltd. BHP +0.57% and Vale, have recently cautioned that they were reviewing or cutting capital expenditure as margins from their operations have fallen.

Newcrest, which owns Australia's Cadia Valley and Telfer mines, said rising costs would make the company "a little bit more conservative" when it comes to deciding when its projects may move ahead, Chief Executive Officer Greg Robinson told analysts on a conference call. "In the current environment, we will certainly spend within our means," he said. "Newcrest will be very careful in committing capital to all new projects to make sure we don't unwittingly absorb the peak cost cycle." "The time will come to do [these projects], but we will look at that timing very carefully," Mr. Robinson said, adding that Newcrest's focus is currently on the completion of its Cadia East project, in the Australian state of New South Wales, and the plant expansion at its Lihir deposit, in the New

Ireland province of Papua New Guinea. ATI Asset Management portfolio manager Ben Lyons, a shareholder in Newcrest, said cautious comments on future capital expenditure were "common-sense" given continued jitters among investors over the global outlook. "The market is not in the mood to entertain lofty ambitions and highly-g geared balance sheets," he said.

Newcrest, which is in the process of renewing its bilateral debt facilities with a number of banks, is already considering expanding those debt facilities this quarter, said Chief Financial Officer Gerard Bond, without elaborating further. Still, Newcrest plans to cut costs and improve operational performance in the year ahead and the company could improve productivity "significantly" through a range of measures, including training and technological innovation, Mr. Robinson said, "Management is focused on a large program of operational improvement and cost reduction across the company, with particular attention continuing to being directed to Lihir reliability," Newcrest said in its full-year earnings report. The Melbourne-based miner aims to produce between 2.3 million and 2.5 million troy ounces of gold this financial year, up from 2.29 million ounces in the 12 months to June 30. It described production volumes for last year as "disappointing."

Newcrest reported a 23% rise in net profit for the year to June 30, to 1.12 billion Australian dollars (US\$1.18 billion) from \$908 million Australian dollars in the previous year, thanks to a jump in the precious metal's price, which rose to a record of US\$1,920 an ounce last September. Macquarie analyst Mitch Ryan described Newcrest's full-year results as "another step in the right direction...We believe it will be another marker to arrest concerns and provide positive momentum for the stock," Mr. Ryan said. On Monday, Newcrest shares closed up 4.4% at \$25.40 Australian dollars, while the benchmark S&P/ASX 200 index rose 0.1%. The shares are down 18% year-to-date but have rebounded 21% over the past three weeks. Newcrest, with a market capitalization of \$18.6 billion Australian dollars, is the world's fourth largest gold miner behind Barrick Gold Corp., Goldcorp Inc. and Newmont Mining Corp.

### **Pacific Islands encouraged to prepare for growth in seabed mining sector**

Radio New Zealand, 13 August 2012

The Secretariat of the Pacific Community says Pacific Island nations and territories need to prepare for potential growth in the deep sea minerals industry. The SPC's Applied Geoscience and Technology Division, or SOPAC, is this week hosting the first of three workshops to inform Pacific Island stakeholders on how to understand and address the risks of deep sea mining in the region. The Director of SOPAC, Russell Howorth says there is substantial economic potential in seabed mining and the Pacific needs to be ready when the industry expands. "Countries need to be understanding, need to be gathering data so that their knowledge base does increase and national capacity builds to enable them to have nationally owned and nationally implemented regulatory arrangements ready for the day when someone actually does want to engage with them in extraction of minerals from the seabed."

### **NFA: PNG should enact sea laws before sea-bed mining takes place**

Post-Courier, August 13, 2012

*By ANCILLA WRAKUALE*

THE area in the Bismark Sea where the first commercial deep sea mining will occur is a highly productive fishing ground for tuna says National Fisheries Authority (NFA) Managing Director Mr Sylvester Pokajam. Pokajam said this when responding to questions posed by Post-Courier to NFA on their perspective on the first commercial sea bed mining by Nautilus Minerals in the Bismark Sea and its impact on the marine life, especially for tuna. "Also the area is in abundance with other

marine resources and mammals,” he said. Mr Pokajam said PNG is one of the world’s largest producers of tuna and contributing 15 percent of the world’s catch, especially skipjack and yellow fin tunas. He said PNG should have waited until it has all Sea Law and Policies enacted and in place. “In addition to tunas, our EEZ (Exclusive Economic Zone) is one of the most productive in the world.

“Oceanic (tuna and other straddling fish) and coastal fishery (snapper and reef fish) is highly sustainable and we as a country and custodians of this precious resource should not tamper with its natural habitat especially sea mounts and reefs where they supply planktons to our fish and mammals. “With my limited knowledge of the sea bed mining, I would have humbly thought that we should not allow it until PNG has an Ocean Policy and Ocean Act enacted and put in place. Currently we have no Act and Policy. “Personally PNG should ban sea bed mining in our territorial and archipelagic waters. “These waters are very close to our people quarantining them sustainable food security and stable diet. I believe mining can be carried out in EEZ which is 200 miles from the outward bound of the 12 mile territorial seas. “All in all, we should not allow sea bed mining until we have our delimitation and maritime boundaries annexed by United Nation (UN) currently only temporary and revised National Seas Act and Ocean Policy enacted and put in place,” he said.

### **Residents want scientific report on seabed mining**

The National, 13th August 2012

By GYNNIE KERO

DEEP-sea exploration and mining in the waters of Milne Bay province will not continue until a scientific report on deep-sea environmental impact is tabled in Parliament, founder of Massim Milne Bay Tonny Wesley said during a petition drive against experimental seabed mining at Boroko last Friday. He said Milne Bay residents were not totally against the foreign investment through the harvest of renewable and non-renewable resources. However, all arrangements must be done transparently, Wesley said. He said seabed mining would affect the province’s marine and tourism industries, which is Milne Bay major source of livelihood. “Milne Bay people depend on fish and beche-de-mer (sea cucumber) for livelihood,” he said. “We need to know if the arrangements are transparent and a workable government policy is in place before we agree.”

### **Seabed miner still eyeing Solwara project**

Post-Courier, August 13, 2012 by *Papua New Guinea Mine Watch*

Try as we might, humanity just can’t stop consuming non-renewable resources. It’s a quandary that has us literally searching high and low for new resources to mine. A Google-backed asteroid mining venture is rapidly getting off the ground, and now Papua New Guinea has approved the world’s first commercial deep sea mining project, dubbed Solwara 1. But while it doesn’t really matter if an asteroid gets trashed during a resource-harvesting project, there are consequences to mining the seabed. The venture, which is being spearheaded by Canada’s Nautilus Minerals, now has a 20-year license to operate nearly a mile underwater off the coast of New Britain, an island in Papua New Guinea. According to its website, Nautilus will be the first company to commercially explore massive sulfide deposits on the seafloor, which can harbor high grade copper, gold, zinc and silver. “The contiguous nature of the ocean means that impacts will not be isolated to the area of the site.”

Steve Rogers, the CEO of Nautilus, told the Guardian that he’s not concerned about environmental impacts: “This will be a relatively small footprint compared to a mine on land, on an area about the size of a dozen football pitches... This isn’t in a fishing area and won’t impact coral. Even if it were in a fishing area, it won’t affect that upper area where the fish are.” Not so, says the Deep Sea Min-

ing campaign, which is protesting the Solwara 1 project. The group is concerned that deep sea mining could hurt undiscovered organisms lurking around the seabed, while toxic sediment plumes could harm all sorts of marine life--and eventually, the humans that eat them.

Dr Helen Rosenbaum, campaign co-ordinator for the Deep Sea Mining campaign in Australia, explained in a statement: "Investors should be aware that contiguous nature of the ocean means that impacts will not be isolated to the 11 ha area of the Solwara 1 site...For example, stocks of tuna and other migratory species are likely to be contaminated by heavy metals and health of communities and ecosystems across the Pacific could be affected." If the Solwara project is successful in its initial stages, there are more deep sea mining projects waiting to get started. Nautilus is applying for or has exploration rights in Tonga, the Solomon Islands, Fiji and New Zealand, according to the Deep Sea Mining campaign. DeepGreen Resources, another Canadian company, plans to begin mining the seabed between Mexico and Hawaii by 2020. It's possible that there will never be a deep sea mining accident and the ocean's ecosystem will remain unharmed--but considering how many human-bred accidents have walloped the ocean just in the past few years, that's unlikely.

### **Nautilus fighting to stay on course**

The Northern Miner, 10.8.2012

Starting the world's first seabed mining operation was never going to be simple, but for Nautilus Minerals, the challenges have been multiplying. The logistics of commercially mining 1.6 km below sea level, which would seem like the most obvious difficulty, has, however, not been one of main barriers. Instead, trouble has come from a disagreement with the Papua New Guinea (PNG) government, in whose waters Nautilus plans to mine; financing issues for its ship-building partner in Europe; and growing concern over the environmental implications of the whole endeavour. As to the mining itself, while still untested in full production, Nautilus is confident it has solved the technical hurdles and is well on its way to having the project ready to go. At the end of June the company was just over half-way to finishing the seafloor production equipment and recently started working on the pump assembly that will bring the material to surface. The company continues to target late 2013 for a production start-up.

The company has also been adding to the potential of Solwara 1, the first of many targets in PNG's Guinea's Bismark Sea that it hopes to mine. As of a November 2011 update, Solwara 1 hosts an indicated resource of 1 million tonnes grading 7.2% copper, 5 grams gold per tonne, 23 grams silver per tonne and 0.4% zinc, while inferred resources stand at 1.5 million tonnes grading 8.1% copper, 6.4 grams gold, 34 grams silver and 0.9% zinc. And Nautilus has a ready buyer for the material after signing a binding off-take agreement with China-based Tongling Nonferrous Metals Group for 1.1 million tonnes of material per year for three years.

But while the technical aspects continue to advance, cracks have appeared in the company's business relations with the PNG government. Early last year the government decided it would take a 30% stake in the Solwara 1 project, for which it would pay \$24 million in sunk costs and 30% of costs thereafter. The government, however, has yet to pay Nautilus anything, and as of early July the total bill stood at about \$47 million. PNG says it won't pay because Nautilus has not met certain obligations in the equity option agreement, is in breach of the agreement, and the state is entitled to terminate the agreement. Nautilus clearly disagrees. "Let it be said that we don't believe the allegations against us are correct or valid," said Stephen Rogers, president and CEO of Nautilus by phone from Brisbane. "We do think this is something they're using to get better conditions...and it's quite frustrating."



Because of confidentiality agreements neither Nautilus nor the government have disclose what exactly the obligations are that Nautilus has apparently not met. The disagreement is now in arbitration, but that is expected to take three or four months at a minimum so Nautilus is hoping to resolve the issue outside of the process. “I believe there is a very good chance we will be able to resolve this amicably without waiting for the arbitration outcome,” Rogers said. “I’m upset and disappointed, but I believe we’ll be able to get things back on track.” But with no money forthcoming from PNG until the disagreement is resolved, Nautilus has decided to raise \$34 million in a non-brokered private placement with its major existing shareholders. The placement, at 90¢ a share, is a far cry from the \$2 price its shares were trading at just before the dispute emerged, and even further off the \$3.60 the company traded at in early 2011 when it first secured the mining lease.

Rogers said the financing was necessary, despite the company having roughly \$87 million in cash at the end of June, because the company wanted to make sure the project was not shut down. “It’s far from desirable to do at the low price we’ve got today,” said Rogers “but we wanted a bit of comfort in our capital capacity to be sure that, if it took longer than we thought to resolve the matter, we could carry on with the build of the equipment.” The dispute has been made all the more complicated by the protracted PNG election process that started in June but only saw Peter O’Neill declared Prime Minister in early August. But with the new government now formed, Rogers says the situation is looking more stable. “I believe that what we’ve seen here is a unique situation that’s really come about due to some of the political instability that’s existed over the last six months there,” Rogers said. “Prior to that the former government had been in place four or five years and we had enjoyed positive relations with the government throughout that period. I’m expecting that stability to restore and, whilst it takes time for things to process in PNG, typically in the past it’s been a reliable place to do business.”

Outside of PNG, the other concern for Nautilus is that its ship-building partner, Harren & Partners, can no longer put up as much equity to build the ship as it originally planned because of tightened banking rules in Europe. Already the vessel construction is behind, having been scheduled to start in early June, but both Nautilus and Harren are working to find a financing solution through alternate sources and also looking at ways to make up the lost time. And then there are the environmental concerns. The company secured its environmental permit in early 2010, but as the project gains attention more critics of the plan are emerging. PNG newspaper *The National* has quoted Marius Soiat, chairman of mining and infrastructure for the New Ireland province (off of which Solwara 1 sits), as saying that “Nautilus may have a mining lease ... but we have just begun to fight,” that “the environmental impact statement (EIS) Nautilus did is deeply flawed and has been criticised as deficient and misleading by several international experts,” and that “The people of New Ireland do not want seabed mining in our province.”

Just the day before, MP and Governor of Oro Province Gary Juffa was quoted by *The National* for raising concerns over the project, saying “I will suggest to the prime minister and the government to put a stop to this and a thorough research and study be carried out first before any decision be made.” And shortly before that the new Speaker of PNG’s Parliament Theo Zuranuoc described the project a destructive and called on people to ‘drown Nautilus forever’, according to the blog PNG Mine Watch. Politicians are joined by local and NGO opposition, including the Deep Sea Mining Campaign. Friends of the Earth Australia, Mining Watch Canada, and local PNG groups started the campaign to halt the Solwara 1 project and any other deep sea mining operations in the Pacific. The campaign put out a report highlighting the risks of deep sea mining, especially the threats to the unique ecology of hydrothermal vents and the general uncertainty surrounding potential impacts.

Rogers, however, says that the company enjoys strong support in the country and its environmental program is sound, and that most opposition comes from those who don’t fully understanding what the company plans to do. “We have gained a lot of support in Papua New Guinea,” Rogers said.

“Our environmental assessment was a thorough job, we set a really good benchmark I think for the new industry.” Rogers cited measures such as the refuge sites in the mine area and a reference site 2 km away as part of the plan to regenerate the site and minimizing any long-term impact, while the company’s plans to pump any seafloor water lifted up straight back to the bottom will ensure other ecosystems aren’t affected. “We believe the environmental impact is minimal,” Rogers said. “We’re not impacting fishing...everything is contained in the lower levels of the ocean.”

Rogers also pointed to the much smaller overall footprint of the operation compared with land-based mining, with Solwara 1 covering about 11 hectares, thanks to the high-grade nature of the deposit. “There’s a lot of misconceptions about what we’re doing, and people fueling fear I would say,” Rogers said. Rogers, however, is confident the project will go forward and, despite current wranglings with the government, has faith Nautilus can work with the newly-formed government. “Generally our relationship remains quite positive with the government,” Rogers said. “We’re expecting that we can pick up that good relationship and try to get things back on an even keel.”

### **New Ireland Province against Nautilus**

The National, August 10th, 2012

By GYNNIE KERO

NAUTILUS Minerals is not welcome to carry out seabed mining off the shores of New Ireland province, New Ireland chairman of mining and infrastructure Marius Soiat said yesterday. He said the mining lease was granted 18 months ago, despite objections by the people and the government of New Ireland. “I don’t know why they are announcing the granting of a mining licence again,” Soiat said. “The mining licence was granted a year and a half ago.” The National called Nautilus yesterday for comment, but was told that PNG country manager Mel Togolo was overseas. Soiat claimed that the announcement was very much an attempt by Nautilus to inflate its stock price and was the kind of behaviour companies like this engaged in all the time. “We, New Ireland people, depend on the sea for food and will not allow outsiders to destroy our source of life for their benefit,” he said.

“Nautilus may have a mining lease ... but we have just begun to fight. “The environmental impact statement (EIS) Nautilus did is deeply flawed and has been criticised as deficient and misleading by several international experts. “We have asked for years for a full independent review of the EIS, but no action has been taken ... Nautilus simply ignores us. “Whether or not the EIS is independently reviewed, I want to say directly to Nautilus, to the national government and to anyone thinking of investing in Nautilus ... Nautilus is not welcome in New Ireland. “The people of New Ireland do not want seabed mining in our province.”

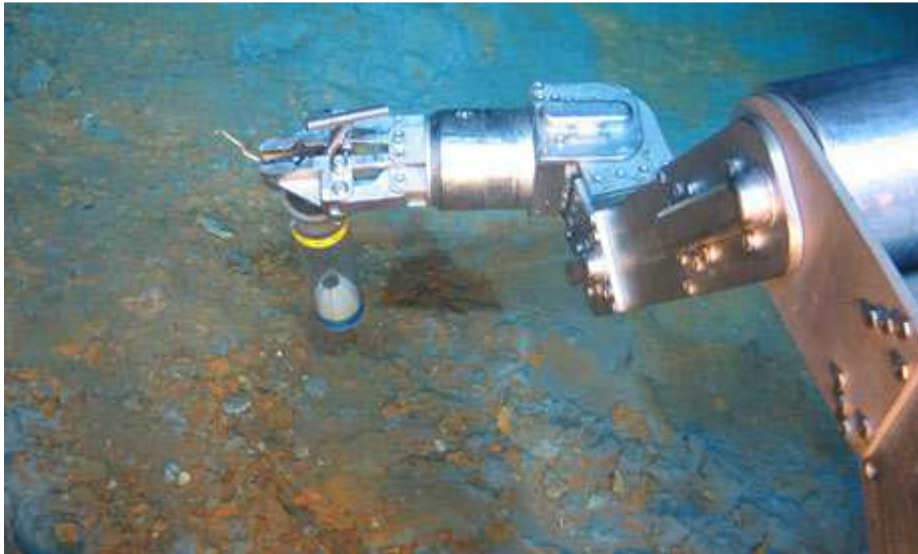
### **Papua New Guinea's seabed to be mined for gold and copper**

*Government approves world's first commercial deep-sea mining project despite vehement objections over threat to marine life*

guardian.co.uk, 6 August 2012, by Oliver Milman

A "new frontier" in mining is set to be opened up by the underwater extraction of resources from the seabed off the coast of Papua New Guinea, despite vehement objections from environmentalists and local activists. Canadian firm Nautilus Minerals has been granted a 20-year licence by the PNG government to commence the Solwara 1 project, the world's first commercial deep sea mining operation. Nautilus will mine an area 1.6km beneath the Bismarck Sea, 50km off the coast of the PNG island of New Britain. The ore extracted contains high-grade copper and gold. The project is being carefully watched by other mining companies keen to exploit opportunities beneath the waves. The Deep Sea Mining (DSM) campaign, a coalition of groups opposing the PNG drilling, estimates that

1 million sq km of sea floor in the Asia-Pacific region is under exploration licence. Nautilus alone has around 524,000 sq km under licence, or pending licence, in PNG, Tonga, New Zealand and Fiji.



Nautilus minerals team taking rock samples during a deep sea mining exploration drill. Photograph: Nautilus Minerals

"PNG is the guinea pig for deep-sea mining," says Helen Rosenbaum, the campaign's co-ordinator. "The mining companies are waiting in the wings ready to pile in. It's a new frontier, which is a worrying development. "The big question the locals are asking is 'What are the risks?' There is no certain answer to that, which should trigger a precautionary principle. "But Nautilus has found a place so far away from people that they can get away with any impacts. They've picked an underfunded government without the regulation of developed countries that will have no way of monitoring this properly." The mining process will involve levelling underwater hydrothermal "chimneys", which spew out vast amounts of minerals. Sediment is then piped to a waiting vessel, which will separate the ore from the water before pumping the remaining liquid back to the seafloor.

The DSM campaign has compiled a report, co-authored by a professor of zoology from University of Oxford, which warns that underwater mining will decimate deep water organisms yet to be discovered by science, while sediment plumes could expose marine life to toxic metals that will work their way up the food chain to tuna, dolphins and even humans. "There are indirect impacts that could clog the gills of fish, affect photosynthesis and damage reefs," says Rosenbaum. Activists also claim that an environmental analysis by Nautilus (<http://www.cares.nautilusminerals.com/responsiblevision.aspx?npath=1>) fails to properly address the impact of the mining on ecosystems, nor explains any contingency plan should there be a major accident. Wenceslaus Magun, a PNG-based activist, told the Guardian that local fishing communities are concerned about the mining and are planning to challenge the exploration licence. "We are really concerned because the sea is the source of our spirituality and sustenance," he said. "The company has not explained to us the risks of deep sea mining. They haven't responded to my requests for information." "The government has turned a blind eye to the concern of its own people. We are mobilising people to raise funds to take this to court and retract Nautilus' licence."

However, proponents of deep-sea mining point out that it is potentially far less damaging than land-based extraction. "The material is very high grade so you have to mine less in order to get the same amount of metal," said Chris Yeats, a geologist at CSIRO, the Australian government's scientific arm. "At those depths there are bacteria, but there's a cut off at around 1,000m where most fish are, so it should have little impact." "Unlike a terrestrial mine, you don't have to build infrastructure such as roads and you don't displace people. You chop off one of these venting chimneys and another one will grow back, so it's a little like the mining equivalent of cutting grass." Steve Rogers, the CEO of Nautilus, said the company had gone through a "rigorous" study of environmental im-

pact over the past six years. "This will be a relatively small footprint compared to a mine on land, on an area about the size of a dozen football pitches," he said. "We've sought out the best scientists in the world. We aren't trying to pull the wool over anyone's eyes." "This isn't in a fishing area and won't impact coral. Even if it were in a fishing area, it won't affect that upper area where the fish are."

Rogers said that Nautilus had contacted 15,000 local people in PNG to hold workshops on the project. The company estimates that the 30-month first phase of the mining will bring \$142m (£92m) in benefits to the PNG economy, with a plan to employ 70% of the project's staff from the country within three years. Despite these assurances, the project has been delayed by an undisclosed commercial dispute between Nautilus and the PNG government, which is currently under arbitration in Sydney. The PNG government has come under fire for taking a 30% equity stake in the project, which will require it to contribute about \$25m (£16m) towards infrastructure, provoking accusations of a flagrant conflict of interest. In return, PNG will receive \$40.8mn (£26m) in tax from a project estimated to generate \$1bn (£642m) although Rogers said revenue would be "a long way short of that") along with a 30% return on what is still a highly experimental mining process.

"It was the government's choice to take a stake, we didn't ask them to do it," says Rogers. "I'd stress that the government isn't threatening any of our mining permits. We're disappointed to be in a dispute with the government but I'm confident we will resolve this." What isn't in dispute is that the mining industry is starting to eye major opportunities on the seabed. "A number of governments are exploring for minerals in this way, such as Russia, Japan, China and the UK," said Rogers. "It will take time, it's not a gold rush, but the demand is increasing." Yeats added: "As the global population increases, we're likely to see large-scale marine mining. How far away that is depends on how successful they are. But we will have to turn to the 70% of the world we currently aren't mining for minerals."

### **Add German complications to Papua New Guinea problems for Nautilus undersea mine**

Frik Els, Mining.com, August 2, 2012

Nautilus Minerals (TSX/AIM:NUS) opened in positive territory on the TSX on Thursday, but shed 4.4% in London after the embattled seabed mining company released its unaudited consolidated financial results for the second quarter ended June 30. The company initiated a legal battle on June 1 over a marine copper-gold-silver project off the Papua New Guinea coast in the Bismarck Sea, which saw its value on the Toronto market more than halved. The Toronto-based company said in the Q2 report it continues to engage the government of PNG in legal proceedings held in Sydney Australia over ownership and funding for its Solwara 1 project which is now just over half built. Nautilus said it has completed its Bismarck exploration program and signed an offtake agreement for Solwara 1 with a Chinese concern during the quarter, but that it has run into trouble with its German partners building a surface vessel for the operation which would lead to delays.

"On June 1, 2012 Nautilus announced that Harren & Partner advised that it will no longer be able to contribute the full amount of the equity to the Vessel JV contemplated by the Agreement signed by the parties in April 2011. The change in Harren & Partner's position, linked to a tightening of banking rules in the current European crisis and the depressed shipping market, may delay the finalisation of the terms of the third party funding and result in a consequential delay to the program for the vessel build." The undersea mine was initially slated to begin production in the fourth quarter of 2013. The company said it now has \$87.1 million in cash and cash equivalents as at June 30, 2012 and yesterday the firm announced it is raising \$34 million through a private placement to continue to build its Seafloor Production System. The offer is priced at \$0.90 per share compared to a year-low for the company on the TSX of \$0.92. The price convinced major shareholders of the \$214 mil-

lion market cap company to support the offer – Oman's MB Holdings will increase its stake to just under 17% and get a seat on the board, Metalloinvest holds at 21% while Anglo American has subscribed for 4.4 million shares to maintain its interest at 11%. Other large shareholders will take up the remaining 5 million shares of the total 37.7 million to be issued.

### **Nautilus continues to develop seafloor system despite arbitration**

By: Henry Lazenby, Mining Weekly Online, 2nd August 2012

TORONTO (miningweekly.com) – Aspirant seafloor miner Nautilus Minerals announced that it was to raise C\$34-million to complete the development of its proprietary seafloor production system, which it intends to use in its Solwara 1 copper/gold project off the coast of Papua New Guinea (PNG). The placement would involve issuing about 37.7-million shares to a number of investors at a price of 90 Canadian cents a share. Nautilus president and CEO Steve Rogers said the private placement would provide funds to continue the build of key pieces of equipment, such as the seafloor production tools, and riser and lift system. "At the end of June, the major equipment items of the system were 51% complete, and a significant percentage of the subcomponents have been delivered," Rogers said on Wednesday. Existing Nautilus strategic shareholders, MB Holdings, Metalloinvest and Anglo American were participating in the private placement.

Rogers said that there was strong support from the major shareholders for the company to maintain the build programme for the system and ensure the realisation of deep-sea resource production as an industry. The company is currently embroiled in a legal spat with the PNG government over contractual issues. Nautilus had initiated a dispute resolution process by filing a notice of arbitration against the PNG government on June 1, owing to a disagreement about the parties' obligations in the completion of the contract and alleging that the State had not paid its share of project development costs. But the PNG government countered by asserting that Nautilus had not met certain obligations on which completion of the transaction was dependent, arguing that the company had breached the agreement and that the State was entitled to terminate the agreement.

Nautilus refuted these claims, maintaining that it was the State that had breached the agreement. The two parties had now agreed on the appointment of former Chief Justice of the High Court of Australia, the Honourable Murray Gleeson, as the arbitrator. The arbitration would be conducted in Sydney, Australia, under the United Nations Commission on International Trade Law's arbitration rules, and might take several months to conclude, provided that Nautilus and the State comply with the timetable set by the arbitrator and otherwise acted within the rules.

### **Cook Islands Moves To Establish Seabed Minerals Commission**

*Advisory body would oversee permits, licensing for undersea mining*

By Rachel Reeves

RAROTONGA, Cook Islands (Cook Islands News, July 31, 2012) – The Cook Islands government is taking steps to set up a formal seabed minerals commission, more than two years after it was legislated into existence. The Seabed Minerals Act, passed in 2009, allows for the minister of marine resources – who at present is also the deputy prime minister – to appoint a commissioner for the forthcoming seabed minerals commission. It also provides a legal framework for government to establish an advisory board to the authority, comprising community representatives and House of Ariki nominations. The act provides for the granting of prospecting permits, exploration licenses, mining licenses and retention leases in respect of seabed minerals. These activities are expected to bring millions, if not billions, in income to the country within the next decade.

Currently government is seeking applications for the positions of chief executive officer, geographic information system specialist and administration officer to staff the seabed minerals unit. Members of the unit "will need to have expertise in marine sciences, an understanding of marine geology and environmental science," the Ministry of Marine Resource's seabed minerals adviser Darryl Thorburn explained. The unit will be an interim arrangement that will precede the establishment of the authority and the appointment of its commissioner, and will be housed at the deputy prime minister's office. It will be working in conjunction with the National Environment Service and the Ministry of Marine Resources.

"It won't be a big unit because at the moment no mineral resources have been developed or explored or mined, but depending on how all that evolves the unit will need to be resourced accordingly," Thorburn said. This year's Budget allocates NZ\$320,000 [US\$259,488] per annum for the next three financial years to the seabed minerals commission. Its allocation falls under the Ministry of Marine Resources header. The deadline to apply for the position of seabed minerals commissioner – which was advertised for the requisite period of time – has passed. Thorburn declined to confirm how many applications had been submitted and received. Of the commissioner's position, he said: "That person's role will be to set up the authority and then slowly move on in terms of assisting with development of the Cook Islands seabed minerals." The commissioner, under the act, will report to the responsible minister.

### **Former Australian Judge To Arbitrate PNG Solwara Mineral Dispute**

*PNG government allegedly failed to honor investment agreement*

MELBOURNE, Australia (Radio Australia, July 18, 2012) – A former Australian chief justice has been appointed to resolve a dispute between the Papua New Guinea (PNG) Government and mining company, Nautilus Minerals. The dispute is delaying the opening of the world's first seafloor gold and copper mine. The PNG Government signed an agreement with Nautilus last March to take a 30 percent stake in the firm's Solwara 1 site in the Bismark Sea. Since then environment groups have waged a vociferous campaign against seafloor mining, and PNG has failed to pay its share of the initial investment. Nautilus and PNG both accuse each other of breaching the agreement. In a statement, Nautilus says the parties have agreed to the appointment of Australia's former chief Justice Murray Gleeson as arbitrator. Arbitration will take place in Sydney and is expected to take several months. Nautilus hopes to start mining gold and copper deposits off the coast of PNG next year.

### **A Gold Rush in the Abyss**

By WILLIAM J. BROAD, New York Times, July 9, 2012

Tom Dettweiler makes his living miles down. He helped find the Titanic. After that, his teams located a lost submarine heavy with gold. In all, he has cast light on dozens of vanished ships. Mr. Dettweiler has now turned from recovering lost treasures to prospecting for natural ones that litter the seabed: craggy deposits rich in gold and silver, copper and cobalt, lead and zinc. A new understanding of marine geology has led to the discovery of hundreds of these unexpected ore bodies, known as massive sulfides because of their sulfurous nature. These finds are fueling a gold rush as nations, companies and entrepreneurs race to stake claims to the sulfide-rich areas, which dot the volcanic springs of the frigid seabed. The prospectors — motivated by dwindling resources on land as well as record prices for gold and other metals — are busy hauling up samples and assessing deposits valued at trillions of dollars. "We've had extreme success," Mr. Dettweiler said in a recent interview about the deepwater efforts of his company, Odyssey Marine Exploration of Tampa, Fla.

Skeptics once likened mining the deep to looking for riches on the moon. No more. Progress in marine geology, predictions of metal shortages in the decades ahead and improving access to the abyss are combining to make it real.

Environmentalists have expressed growing alarm, saying too little research has been done on the risks of seabed mining. The industry has responded with studies, reassurance and upbeat conferences. The technological advances center on new robots, sensors and other equipment, some of it derived from the offshore oil and gas industry. Ships lower exploratory gear on long tethers and send down sharp drills that gnaw into the rocky seabed. All of this underwater machinery is making it more and more feasible to find, map and recover seabed riches. Industrial powers — including government-supported groups in China, Japan and South Korea — are hunting for sulfides in the Atlantic, Indian and Pacific Oceans. And private companies like Odyssey have made hundreds of deep assessments and claims in the volcanic zones around Pacific island nations: Fiji, Tonga, Vanuatu, New Zealand, the Solomon Islands and Papua New Guinea. The International Seabed Authority, a sleepy United Nations body located in Jamaica that presides over mineral rights on the high seas, an area its officials like to characterize as 51 percent of the earth's surface, has found itself besieged with sulfide queries. "We are entering a new stage," Nii Allotey Odunton of Ghana, secretary general of the authority, told a meeting in November.

Since the Pacific islands control mineral rights in their territorial waters, they can negotiate mining deals more easily than the seabed authority, which tends to plod along by international consensus. Odyssey Marine Exploration, which recently expanded from shipwreck recovery into deep prospecting, began scouring the Pacific waters in 2010, discovering far more gold, silver and copper than expected. "There's a lot at stake," Mr. Dettweiler said. If metal prices go up, he added, "a billion-dollar deposit can turn into a hundred billion." Scientists once thought the main source of wealth in the deep sea lay in beds of potato-size rocks that could be mined for such common metals as iron and nickel. In the 1960s and '70s, entrepreneurs tried to scoop them up, but the rewards never offset the high cost of exploration, retrieval and transportation. Things began to change in 1979 with the discovery of "black smokers", sulfurous mounds and towers that gush blistering-hot water. The smokers turned out to dot the 46,000 miles of volcanic fissures that gird the global seabed like seams on a baseball.

Scientists found that the smokers formed as hot water rose through the volcanic rocks, hit icy seawater and shed a variety of minerals that slowly coalesced into eerie mounds and chimneys. One, found off Washington State and nicknamed Godzilla, stood more than 15 stories high. The first wave of discovery showed that the volcanic springs harbored riots of bizarre creatures, including thickets of tube worms. The second wave showed that the mounds and chimneys — hot and cold, new and old, active and inactive — were composed of complex minerals that contained surprising amounts of copper, silver and gold. Today, increasingly, mines on land lack rich supplies of copper, a staple of modern life found in everything from pipes to computers. Many commercial ores have concentrations of only a half a percent. But seabed explorers have found purities of 10 percent and higher — turning the obscure deposits into potential bonanzas. The same turned out to be true of silver and gold.

Fifteen years ago, would-be underwater miners staked the world's first claim: Nautilus Minerals won title to about 2,000 square miles of the Papua New Guinea seabed rich in volcanic features. The company, based in Toronto, inched toward mining but quickly expanded its prospecting to hundreds of Pacific sites and has since identified dozens of areas as potential candidates for seabed mining. Last year, Nautilus won a 20-year lease to mine a rich deposit in the Bismarck Sea, in the southwestern Pacific. The mounds are a mile down. The company says the site holds about 10 tons of gold and 125,000 tons of copper. Nautilus plans to start mining next year but also cites possible delays. It is building robots up to 25 feet tall that are to collect sulfides and pump them to the sur-

face. Barges are then to carry the seabed minerals to Rabaul, a Papua New Guinea port some 30 miles away. “We’re making good progress,” Stephen Rogers, the company’s chief executive, recently told analysts.

Critics say the plan is potentially dangerous for fisheries, islanders and ecosystems. In a 32-page report, “Out of Our Depth,” (<http://www.deepseaminingoutofourdepth.org/report/>) an international group of environmentalists that calls itself the Deep Sea Mining Campaign noted that the volcanic sites shelter hundreds of species previously unknown to science. The group said information gaps should be filled and mitigation plans developed “before mining begins.” In an interview, Mr. Rogers called the group’s analysis unfair. “We’re developing detailed environmental plans and have an obligation to do that,” he said. “We’re very proud of what we’ve done.” He added that his company was working closely with some of the world’s leading oceanographers and that its operations were shedding light on the sulfide mysteries. “We’re advancing the science,” he said. Experts around the globe are watching Nautilus closely to see how it navigates the perils of environmental politics, novel technologies and unpredictable markets. “Any success will work as a trigger for other mining companies,” said Georgy Cherkashov, a Russian marine geologist and president of the International Marine Minerals Society.

China, the world’s largest consumer of gold, copper and many other industrial metals, has shown little interest in waiting for declarations of success. When the seabed authority adopted rules for sulfide prospecting in May 2010, Beijing’s representative filed the country’s application on the same day. China does its mineral hunting from ships. It is also developing a submersible known as Jiaolong, after a mythical sea dragon, that can carry three people down deep enough to investigate the sulfide areas. Last year, it signed a contract with the authority for exclusive sulfide rights to 3,860 square miles, about the size of Puerto Rico, on a volcanic rift nearly two miles below the Indian Ocean. Jin Jiancai, secretary general of China’s ocean mineral resources agency, told reporters that such deposits “will help China meet the increasing demand” for refined metals.

Meanwhile, Tong Ling, China’s largest importer of copper concentrates and one of the world’s largest copper smelters, recently signed a deal with Nautilus for more than a million tons of Pacific sulfide ores per year — an amount equal to about 5 percent of the world’s copper production. Russia joined the high-seas rush in 2011, and France and South Korea in May. Recently, Seoul also cut a deal for sulfide prospecting in the waters of Fiji, letting it tap the mineral bounty of Pacific volcanism. John R. Delaney, an oceanographer at the University of Washington who has studied the volcanic springs for decades, said the threat of environmental harm from seabed mining probably centered less on the high-seas projects of developed states than those in the territorial waters of the Pacific islanders. “They’re more worried about their economies than the environment,” he said in an interview. Dr. Cherkashov of the minerals society played down the environmental concerns, saying one reason for the global rush is that seabed mining has a relatively low impact compared with land operations. “It’s first come, first get,” he said of the multiplying claims. The wide maneuvering for the most promising sites, he added, represents “the last redivision of the world.”

### **Election affect Solwara1 project**

Post-Courier, July 5, 2012

SHARES for the developer of Solwara 1 project Nautilus Mineral has dropped 9.7% to \$0.93 in late-afternoon trade on the Toront Stock Exchange on Thursday, hurt by news of violence, kidnapping, vote rigging, delays and incomplete electoral rolls after the first week of general elections in Papua New Guinea. The Canadian mine developer who is to develop the first underwater or deep sea mine has been locked in a dispute with the National Government since the start of June over ownership of a seabed mining project located in the territorial waters in the Bismarck Sea. Accord-



ing to Radio Australia reports, among many other incidents, “in one province, police arrested a group dressed as policemen, one of who was armed with a gun, after they tried to remove ballot boxes from a polling station,” while The Australia News Network reports of villages being torched and roads being blocked with heavy machinery and logs.

A leading copper producer before both BHP Billiton and Rio Tinto were forced to abandon two massive mines over land and environmental disputes, PNG is one of the poorest countries in the world. It is the impoverished country’s eighth poll since it gained independence from Australia in 1975 and most observers now expect the balloting to continue beyond the initial deadline of July 6. Shareholder in Nautilus have seen the value of their investments plummet by more than half since the company initiated the legal battle on June 1 over the copper-gold-silver project. A week ago Nautilus Chief Executive Officer Stephen Rogers told Reuters that he expects to settle things with PNG’s nominee Petromin PNG Holdings within “months” once the election is over, but that now seems a more remote possibility. Nautilus says PNG undertook to help fund the Solwara 1 project – almost half built – as part of an agreement signed last year that gave the country 30% ownership, but the government appears to be digging in its heels over the issue.

In a response last week it alleges that Nautilus is the party that breached the terms of the deal and that the state is “therefore entitled to terminate the agreement”. Not long ago, the future looked promising for Nautilus, the first company to explore the ocean floor for polymetallic seafloor massive sulphide deposits. In late April, the company announced it had signed China’s Tongling Non-ferrous Metals Group as the first customer for its pioneering Papua New Guinean sea-floor mine. The undersea mine was slated to begin production in the fourth quarter of 2013, but Nautilus is also facing funding problems concerning its German partner building the \$160 million surface vessel which is the base for the entire underwater operation. Nautilus still has some \$100 million cash in the bank. Petromin when contacted could not comment and referred the Post-Courier to the Treasury Department and the National Government. Also attempted contact to Nautilus Country Manager Mel Togolo was unsuccessful.

### **Growing opposition to seabed mining**

Patrick Matbob, Islands Business July 2012

Discussions between Nautilus Minerals and the state of PNG have failed to resolve a dispute that has halted the progress of experimental Solwara 1 seabed mining in PNG waters. Nautilus has reported that a number of meetings have been held between senior representatives of the two parties and discussions would continue until a conclusion was reached. Meanwhile, opposition to experimental seabed mining plans is growing in PNG and the Pacific region. One of PNG’s vocal local environment group, Mas Kagin Tapani Association (known as Makata), has called on Nautilus to stop exploiting the pristine Bismarck and Solomon Seas with its experimental seabed mining. It has also called on the PNG state not to pay Nautilus the 30% equity which it was taking up in the project. National coordinator for the local not-for-profit group Wenceslaus Magun said: “There is no justification for the PNG government to pay 30% to Nautilus. “This foreign-owned corporation does not own the resources by birth right. They cannot ask the PNG government to make such a contribution to help develop their experimental seabed mining project.

“By doing so, would imply that Papua New Guineans will remain beggars on our own land: that we cannot determine our own destiny but allow outsiders, particularly the multi-billion dollar corporate industries, to dictate our future.” The Canada-based Nautilus Minerals is in dispute with PNG as to the state’s obligations to complete the agreement reached in March last year for its Solwara 1 copper project. Nautilus warned the dispute could delay or cancel the project which it is experimenting with in PNG waters. The company is the first to explore the ocean floor for polymetallic seafloor

massive sulphide deposits. PNG had exercised its option to acquire 30 percent of the Solwara 1 project, located in the Manus basin of Bismarck Sea. As part of the agreement, PNG has to pay its share of the development cost for the mine. Nautilus said: “Unless and until the dispute is resolved, completion will be delayed or may not occur and Nautilus must continue to carry these costs”. However, PNG says Nautilus has not met certain obligations on which completion is dependent and that it has breached the agreement. Nautilus, however, has refuted the assertions.

The dispute has resulted in a dramatic 40% plunge in Nautilus shares. The company also suffered another blow when its partner—European ship builder Harrens—announced it will no longer be able to contribute its full part to the financing of the mining support vessel as agreed in April 2011. Harrens’ decision is a reflection of the debt crisis in Europe and the tighter bank lending rules and also the depressed shipping market. Local and regional environmental groups and advocates have continued to oppose the development of seabed mining. Author of a recent report ‘*Out of Our Depth: Mining the Ocean Floor in Papua New Guinea*’ Dr Helen Rosenbaum said that very little was understood about the possible impacts of the Solwara 1 project. “They say they’ve continued to do research that addressed a lot of the concerns that we addressed in that report. But every time we’ve gone back to them to say, well can you share this research with us, we’ve been unsuccessful. So we’re totally unconvinced that this research has been conducted.” Dr Rosenbaum said the campaign’s concerns were similar for the many projects in which deep-sea mining exploration was starting throughout the Pacific.

Recent discoveries by scientists of the National Institute of Water and Atmospheric Research (NIWA) in New Zealand have shown that life was plentiful on the deep seabed despite arguments to the contrary. The scientists have found more than 5000 samples and footage of never-before-seen undersea volcanoes after a three-week voyage in waters off Bay of Plenty and north-east along the Kermadec Ridge. The NIWA scientists studied four different undersea habitats—seamounts, hydrothermal vents, continental slope and canyons within a 10,000-square kilometre area. They found that life was plentiful on the seamounts, particularly around the hydrothermal vents. Little life was seen on the surface of the soft sediment on the seafloor of the canyons, but within the sediment were large numbers and many different types of worms. Meanwhile, it’s been suggested that Pacific Islands Countries and territories wishing to make use of resources on the deep seafloor for economic returns must adopt a ‘precautionary approach’. This can simply be interpreted as “in any development where there are threats of serious harm to the marine environment, the lack of full scientific data shall not be used as a reason for postponing that development,” said Dr Russell Howorth, director of the SOPAC Division of the Secretariat of the Pacific Community (SPC).

But, that particular development, he added should use cost-effective measures to prevent environmental degradation. The ‘precautionary approach’ has been in existence in Rio Declaration Principle 15 for 20 years but hardly used in the context of bringing economic benefits of the resources of Pacific islanders to improve their livelihoods, said Dr Howorth while addressing Oceans Day at the Rio+20 conference in Rio de Janeiro last month. Under Principle 15 of the Rio Declaration on Environment and Development (1992), the application of the Precautionary Approach is defined as: “In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.” Dr Howorth also revealed a ground breaking advisory opinion by the International Tribunal of the Law of the Sea Seabed Disputes Chamber which ruled that the precautionary approach is a legal requirement for states sponsoring deep sea mining activities.

## **SOPAC tries to undermine the precautionary principal**

PNG Mine Watch 22.6.2012

Pacific Island Countries have been told they should effectively abandon the protection afforded by the precautionary principle to allow the development of experimental seabed mining in the region. Dr Russell Howarth, director of SOPAC Division of the Secretariat of the Pacific Community (SPC) has said in Rio De Janeiro, the precautionary principle needs to be re-interpreted so that rather than stopping any industrial activity where the negative environmental and social impacts are not known until further research is completed we should instead "...in any development where there are threats of serious harm to the marine environment, the lack of full scientific data shall not be used as a reason for postponing that development..." Maureen Penjueli, coordinator of the Pacific Network on Globalization, says: "Dr. Howarth's statement is a complete bastardization of the Precautionary Principal which is supposed to protect the public from exposure to harm, when scientific investigation has found a plausible risk by stopping any development until further scientific findings emerge that provide sound evidence that no harm will result.

Effrey Dademo, Program Manager of Act Now!, an advocacy group in Papua New Guinea says: "Experimental Seabed mining involves two major uncertainties. First, there are significant questions and unknowns about the mining technology, its efficacy, safety, and the impacts that may arise from the process. Second, the seabed environment is a unique and diverse realm that has not been extensively researched and is not well understood. Both of these uncertainties warrant unprecedented caution and attention before proceeding with full-scale development of experiment on seabed mining". SOPAC is being funded by the European Union to draft a Legislative Framework to facilitate experimental seabed mining that does not incorporate the precautionary approach, and instead advocates the use of adaptive management, or "learning by doing." "Dr Howarth is trying to over-turn the principles agreed by the international community in the original Rio Treaty 20 years ago", says Chantelle Khan from the Social Empowerment and Education Program. "He is doing this to benefit the mining industry at the expense of Pacific people and our livelihoods".

## **Nautilus on notice of arbitration**

Post-Courier, June 22, 2012

By PATRICK TALU

NAUTILUS Minerals Inc. announces that the National Government has issued a Notice of Arbitration in relation to the dispute which has arisen under the Agreement between the parties dated 29 March 2011. Following the initiation of the dispute resolution process by the Company on June 1, 2012 and subsequent meetings between the parties, the Company had understood the State wanted to resolve the dispute, particularly in light of a letter to the Company from Prime Minister Peter O'Neill dated June 6, 2012. Nautilus said in that letter, Mr O'Neill outlined a number of key principles to be reflected in relation to the joint venture for the Solwara 1 Project. "Nautilus considered this to be a suitable basis for continuation of the discussions in an attempt to resolve the dispute. The State has now issued a Notice of Arbitration to the Company which asserts that Nautilus has not met certain obligations on which completion of the transactions contemplated by the Agreement is dependent, that Nautilus has breached the Agreement and that the State is entitled to terminate the Agreement.

Nautilus has and continues to refute these assertions and maintains that it is the State who has breached the Agreement, not Nautilus. As previously disclosed, under the Agreement the State's nominee (a subsidiary of Petromin PNG Holdings Limited) must pay (among other amounts) its share of costs incurred in the development of the Project up to completion to acquire its Project interest. Unless and until the dispute is resolved, completion will be delayed or may not occur and

Nautilus must continue to carry these costs. This may lead to Nautilus needing to slow or defer the build program for Project equipment, which would have consequential impacts on the scheduled commencement of operations and overall Project costs. Nautilus will continue to attempt to resolve the dispute with the State in an effort to avoid a costly arbitration process. On completion of its review of the Notice and further meetings in PNG, Nautilus will provide further details of its plans by Friday, June 29, 2012,” Nautilus said in a statement. When Petromin was asked to comment on the dispute last week, a senior executive of Petromin said it has got anything to do with the company.

### **Nautilus seabed mining experiment falters**

*Dispute with PNG government, opposition by Pacific and Canadian citizens, financing woes*

PNG Mine Watch, 21.6.2012

Today Canadians are standing in solidarity with civil society in the Pacific against experimental seabed mining. Canadian company, Nautilus Inc, is leading the rush to mine the sea floor in the Pacific. If it goes ahead, its Solwara 1 project in the Bismark Sea of Papua New Guinea will be the world’s first commercial seabed mine. However, a growing call from Pacific communities to stop seabed mining, the PNG Government’s refusal to contribute to development costs and the breakdown of a financing agreement with an European ship builder questions the viability of an already uncertain venture. Not a good look as Nautilus faces its AGM in Toronto today. Nautilus stocks have already dropped dramatically over the past couple of weeks. Dr. Catherine Coumans, Mining Watch Canada said: *“Canadian mining companies operate around the world and dominate the sector in number. But Canada does not regulate their activities to prevent them profiting from weak protection for the environment, workers, and human rights in some host countries.”* *“Now, in spite of very serious concerns that have been raised by scientists and local citizens, we have Nautilus proposing to mine environmentally, socially and culturally significant seabeds in the Pacific, an activity that would not be allowed in Canadian waters.”*

Wences Magun, national coordinator for Mas Kagin Tapani in Papua New Guinea said:

*“At this point local communities have NOT sanctioned this project. We can't rely on our governments or companies like Nautilus to tell us that seabed mining is good, is safe.”* *“No one knows what the impacts of this form of mining will be. We are being used as guinea pigs in a sea bed mining experiment.”* Sharon Diave-Nerius from the East New Britain Social Action Committee said: *“The recent blows to Nautilus are welcome news for communities in Papua New Guinea. But there are plenty of other companies and governments pushing for this experimental industry in the Pacific to get started.”* *“The speed with which the PNG Government approved the EIS and granted the licence to Nautilus did not pay respect to the customary norms and cultural heritage of the indigenous people of the Bismarck Archipelago. “Experimental mining of our seabeds is not going to provide any direct services or benefits for local communities.”*

Dr. Helen Rosenbaum, campaign coordinator for the Deep Sea Mining campaign in Australia and author of [\*Out of Our Depth: Mining the Ocean Floor in Papua New Guinea\*](#) said: *“The Nautilus EIS is deeply flawed. Even the company admits to moderate environmental risk. Independent analysis of the EIS indicates far higher risks.”* *“Investors should be aware that contiguous nature of the ocean means that impacts will not be isolated to the 11 ha area of the Solwara 1 site. They will spread far and wide with liabilities to match. For example, stocks of tuna and other migratory species are likely to be contaminated by heavy metals and health of communities and ecosystems across the Pacific could be affected.”* Groups across the Pacific have a petition calling for Pacific governments to stop experimental seabed mining. Pacific women are currently promoting the 'stop experimental seabed mining' message at the international Rio+20 conference in Brazil. In New Zealand community have come together to campaign against seabed mining of their black sands.

Meanwhile local groups and fishing industries opposing marine phosphate mining off the coast of Namibia have started to make links with people in the Pacific region.

### **Solwara 1 project talks continuing**

Post-Courier, June 20, 2012

NAUTILUS Minerals Inc, the operator of the Solwara1 project said it has met with the Government of Papua New Guinea over the last two weeks in a bid to resolve a dispute relating to the company's seabed exploration project and discussions will continue until a conclusion is reached. Nautilus is the first company to explore the ocean floor for polymetallic seafloor massive sulphide deposits and is developing its first project at Solwara 1, in the territorial waters of PNG, where it is aiming to produce copper, gold and silver. On June 1, 2012 Nautilus initiated the dispute resolution process under an agreement between Nautilus and the State signed in March 2011. A press release on March 29, 2011 stated that the government of PNG signed an agreement and exercised its option to take up a 30% stake in Nautilus Minerals' Solwara 1 project in the Bismarck Sea. Currently, the State asserts that Nautilus has not met certain obligations on which completion is dependent, and that Nautilus has breached the Agreement. Nautilus refutes these assertions. Nautilus will provide updates following any further developments. On Monday Nautilus was trading at \$1.47. Their market cap is \$294. 7 million based on \$196.4 million shares outstanding. The 52-week high and low was \$3.40 and \$0.92 respectively.

### **Pacific countries told to adopt 'precautionary approach' to seabed mineral mining**

By Makereta Komai, PACNEWS Editor in Rio de Janeiro, 18/06/2012

It's been suggested that Pacific Island Countries and territories wishing to make use of resources on the deep seafloor for economic returns need to adopt a 'precautionary approach. This can simply be interpreted as "in any development where there are threats of serious harm to the marine environment, the lack of full scientific data shall not be used as a reason for postponing that development, said Dr Russell Howorth, director of SOPAC Division of the Secretariat of the Pacific Community (SPC). But, that particular development, he added should use cost-effective measures to prevent environmental degradation. The 'precautionary approach' has been in existence in Rio principle 15 for 20 years but hardly used in the context of bringing the economic benefits of the resources of Pacific islanders to improve their livelihoods, said Dr Howorth while addressing Oceans Day at the Rio +20 conference here in Rio de Janeiro.

Under Principle 15 of the Rio Declaration on Environment and Development (1992), the application of the Precautionary Approach is defined as "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." Dr Howorth also revealed a ground breaking advisory opinion by the International Tribunal of the Law of the Sea Seabed Disputes Chamber which ruled that the precautionary approach is a legal requirement for States sponsoring deep sea mining activities. "The same advisory opinion also gave a significant indication that the 'precautionary approach is on its way to becoming a binding legal principle of international customary law more generally.

Scientific research and exploration of deep sea minerals have been ongoing in the Pacific Islands region in the last 40 years. Since its inception in 1972, the then Pacific Islands Applied Geoscience Commission (SOPAC) was instrumental in the evaluation of seafloor minerals that occur within the Exclusive Economic Zones (EEZ) of Pacific Island Countries and Territories, in collaboration with

developed countries including the USA, Australia, France, Korea, Japan and Germany. These early efforts have led to the discovery of some potential seafloor mineral deposits within the EEZs of Cook Islands, Papua New Guinea, Tonga, Marshall Islands, Fiji and Kiribati, said Dr Howorth. “Beyond the region under national jurisdiction, large areas of the Clarion Clipperton Zone of the Pacific Ocean are undergoing mineral exploration – these activities are overseen by the International Seabed Authority.

The SOPAC director said recent interests in deep seafloor mineral deposits have been revived in a number of Pacific Island Countries where a number of entities have either been granted or applied for commercial exploration licenses. “This new development is largely attributed to sustained increase in global metal demand along with land resources becoming increasingly stretched. “Additionally, new discoveries of high grade precious and base metals on the seafloor in Papua New Guinea and Tonga in recent years coupled with the granting of an offshore mining lease in Papua New Guinea in early 2011 have demonstrated the increasing interest in deep seafloor mineral resources in the Pacific islands region. Also, in 2011 the International Seabed Authority (ISA) granted exploration licenses to Nauru Ocean Resources Inc (NORI – Nauru registered company) and Tonga Offshore Mining Limited (TOML – a Tonga sponsored company) to explore identified areas in the International Seabed Area (commonly known as “the Area”).

“This is indeed a significant milestone for Nauru and Tonga, and they must be congratulated for embarking on this new initiative that resulted in joint venture partnerships with exploration companies to explore ‘the Area’, providing the opportunity for this industry to help these countries meet their development goals. “This was also a significant milestone for the ISA and the international community as it was the first time developing states had been able to participate in the Area and sets an important precedent for other developing states to follow, said Dr Howorth. As the demand for minerals continues to rise, along with the environmental and social costs of land-based mining, seafloor mineral deposits will almost certainly play an increasingly important role in supplying society with an acceptable means of obtaining the metals needed to meet global development objectives.

“The lack of access to metals (for example copper and rare earths) at affordable prices is a serious hindrance to social development and must be overcome if development objectives are to be achieved, and if we are to build affordable clean energy technologies on a global scale required to create a “Green Economy.” Dr Howorth said because of the very high costs of collecting data to help build the knowledge base for Pacific Island Countries through exploration in the deep sea environment, this work must be carried out in partnership with the private sector, which is in a position to manage the financial risks.

“An EU-funded SPC Deep Sea Minerals Project is assisting Pacific Island countries to put in place law and policy to manage responsibly this relationship with private entities. The aim is to ensure the implementation of the Precautionary Approach and other international environmental law standards, and also to provide a stable regulatory environment providing comfort to private entities and their financiers, and to concerned citizens and commentators alike,” said Dr Howorth. The total exclusive economic zone of 22 Pacific Island Countries and Territories is around 30 million square kilometers, four times the land area of Brazil’s 8.5 million square kilometers, which is the fifth largest country in the world.

**Nautilus dispute with Papua New Guinea authorities threatening underwater mining future**  
 MINING.com, Cecilia Jamasmie, June 18, 2012



Canada-based Nautilus Minerals Inc. said Monday that despite several meetings with Papua New Guinea's government representatives in the last two weeks, the company is still battling authorities in regards to its obligation to complete the agreement reached in March last year for its Nautilus Solwara 1 copper project. The company, the first to explore the ocean floor for polymetallic sea-floor massive sulphide deposits, initiated the legal battle on June 1, when it warned that its Solwara 1 copper project could be delayed or cancelled because of the dispute. The country optioned to acquire 30% of the Solwara 1 project, located in its territorial waters in the Bismarck Sea, last year and, as part of the agreement,

Papua New Guinea have to pay its share of development costs for the mine. Not long ago, the future looked promising for Nautilus. In late April, the company announced it had signed China's Tongling Non-ferrous Metals Group as the first customer of its pioneering Papua New Guinean sea-floor mine. The project, in the minerals-rich Manus basin of PNG's Bismarck Sea, is claimed by Nautilus as the world's first commercial sea-floor mine, and is slated to begin production in the fourth quarter of 2013. Nautilus shares fell over 11% in the Toronto Stock Exchange after the announcement, closing at 1.47.

**Cook Islands Explores Creation Of Sovereign Wealth Fund**

*Fund will store revenue from marine mineral projects*

By Rachel Reeves

RAROTONGA, Cook Islands (Cook Islands News, June 14, 2012) – Government is looking to establish a sovereign wealth fund for storing revenue generated from the Cook Islands' mineral assets. Opposition leader Wilkie Rasmussen commended government for proposing the fund, which will encompass revenue generated from exploratory mining licenses and any other associated with mineral assets. He asked finance minister Mark Brown to explain the fund during question-and-answer time yesterday. "There's been a lot of talk about the value of our mineral assets estimated into the billions of dollars' worth," Brown said. "A lot of work has been done in particular through the deputy prime minister's office in putting together the legal frameworks for the commencement of the harvesting or the harnessing of revenues that can be gained from these resources.

"We have passed legislation for the seabed mining program already... It is timely, Madam Speaker, that we also look at establishing a sovereign wealth fund similar to what has been established in other countries who are reaping the benefits of their natural resources," he said, making reference to

the situation of Norway, whose sovereign wealth fund is fed by its North Sea oil program. Brown said that Solomon Islands, Papua New Guinea and East Timor also have sovereign wealth funds, and that the latter has accrued over NZ\$10 billion [US\$] from oil field revenues. "This sovereign wealth fund is to protect for generations to come any wealth that is generated from our resources so we do not repeat the lessons we can learn from other countries who have squandered the wealth from their natural resources, countries such as Nauru."

Brown says an independent consultant has met with government and the opposition to discuss the potential of establishing a sovereign wealth fund, and will submit his report to government "very shortly." "When the report is ready (there will be) a community consultation process to explain to people the purpose of this fund." He estimated the motion to establish the fund will be tabled within the next 12 months. Rasmussen replied that he agreed with the fund in principle, but said government must be sure to include a mechanism that prevents government from having its "hands in these funds."

### **Make or break for Nautilus copper plan**

The National, 12th June, 2012

TORONTO-based Nautilus Minerals, a rising star in the industry, is staggering from a heavy blow. The company is developing the world's first seafloor copper and gold project at its Solwara 1 deposit in the Bismarck Sea, Papua New Guinea. It was expected to begin extracting mineralised material late next year, and had listed on the OTC market in late April to increase access to US capital markets. On June 1, however, the company cautioned that its Solwara project could be delayed or even canceled due to a dispute with the government of PNG over ownership of the undersea mine. Nautilus had signed a deal with PNG in March that would give the government a 30% stake in the project in return for paying its share of development costs, estimated at about US\$24 million. Until the situation is resolved, Nautilus will have to carry all costs itself. The government of PNG has argued that Nautilus has not met some of its obligations, therefore it (government) too is not meeting its obligations. Looking to the sea as a source of base metals should come as no surprise, as the ocean covers more than 70% of the planet and is an obvious source of minerals.

Offshore drilling for crude oil has been going on for over a century, and technological advancements have made it more feasible to drill deep into the sea beds to tap into natural resources. The natural hot springs at the ocean's bottom, around PNG and New Zealand in particular, have concentrated minerals; Nautilus has reported that its copper has a grade of 7%, which is high compared to the average land-based copper grade of 0.6%. Yet Nautilus is currently only one of two mining companies focused on offshore exploration for commercial underwater mining, the other being Nevada-based Neptune Minerals, which has acquired control of the UK's Neptune Minerals and its licensed tenements in New Zealand as well as Japan.

Neptune has also acquired control of Hong Kong's Dorado Ocean Resource, and continues to focus on seafloor volcanogenic massive sulfide (VMS) exploration and extraction. Some industry observers also question whether seabed extraction — which would employ robots to break up the ore and pipe the slurry to a surface barge for transport and processing on land — is worth the risk. A 2011 study published in the journal *Geology* noted that while the sea floor indeed hosts recoverable mineral deposits, they are likely insufficient to meet global demand. Yet Nautilus signed its first commercial deal with China's Tongling Nonferrous Metals Group in April, agreeing to sell about 1.1 million tonnes of copper and other minerals per annum over a three-year period. - Copper Investing News.



## **Pacific Leaders Allegedly Ignoring Opposition To Deep Sea Mining**

*Communities reportedly want more research, consultation*

WELLINGTON, New Zealand (Radio New Zealand International, June 11, 2012) – The Deep Sea Mining campaign says Pacific communities are against seabed mining but their governments are not listening. The campaign says thorough research hasn't been conducted on the impact of the deep sea mine proposed by Canadian-owned Nautilus Minerals in PNG. The Solwara 1 mine planned for the Bismarck Sea is the world's first commercial deep sea mining project. The author of the report 'Out of Our Depth: Mining the Ocean Floor in Papua New Guinea', Dr. Helen Rosenbaum, says the precautionary principle should be applied. "Civil society through the Pacific is increasingly asking for there to be a stay on this form of development until more research is done and communities can be informed and express an opinion. At this point, communities have not given their sanction to this. The governments of the Pacific and the companies who have exploration licenses have no social license at this point to proceed."

*[PIR editor's note: Rosenbaum has been particularly critical of Solwara 1, claiming when researchers have wanted to look at information gathered by Nautilus Minerals, the company has not shared its data, which has lead Rosenbaum to believe the research may not have been conducted.]*

## **Make or Break for Deep Sea Copper Mining**

Wednesday June 6, by Shihoko Goto, Copper Investing News

Expectations are high for mining companies digging deep under the sea bed for copper and other metals, and the ocean is seen by many as the final frontier for commodities investors. Although the price of the red metal has lost its edge in recent months, a steady supply of high-quality copper is expected to become harder to come by, and exploring underwater may prove to be part of the solution. The challenge is how and if such operations can win over public opinion and be conducted in a way that has minimal impact on the environment.

At first blush it may seem like underwater mining has taken a step back. Toronto-based Nautilus Minerals, a rising star in the industry, is staggering from a heavy blow. The company is developing the world's first seafloor copper and gold project at its Solwara 1 deposit in the Bismarck Sea, Papua New Guinea (PNG). It was expected to begin extracting mineralized material late next year, and had listed on the OTC market in late April to increase access to US capital markets. On June 1, however, the company cautioned that its Solwara project could be delayed or even canceled due to a dispute with the government of PNG over ownership of the undersea mine. Nautilus had signed a deal with PNG in March that would give the government a 30 percent stake in the project in return for paying its share of development costs, estimated at about \$24 million. Until the situation is resolved, Nautilus will have to carry all costs itself. The government of PNG has argued that Nautilus has not met some of its obligations, therefore it too is not meeting its obligations.

Of course, looking to the sea as a source of base metals should come as no surprise, as the ocean covers over 70 percent of the planet and is an obvious source of minerals. Offshore drilling for crude oil has been going on for over a century, and technological advancements have made it more feasible to drill deep into the sea beds to tap into natural resources. The natural hot springs at the ocean's bottom, around PNG and New Zealand in particular, have concentrated minerals; Nautilus has reported that its copper has a grade of 7 percent, which is high compared to the average land-based copper grade of 0.6 percent. Yet Nautilus is currently only one of two mining companies focused on offshore exploration for commercial underwater mining, the other being Nevada-based Neptune Minerals, which has acquired control of the UK's Neptune Minerals and its licensed tenements in New Zealand as well as Japan. Neptune has also acquired control of Hong Kong's Dorado

Ocean Resource, and continues to focus on seafloor volcanogenic massive sulfide (VMS) exploration and extraction.

A major problem faced by both companies is opposition from environmental groups. For instance, Wenceslaus Magun, coordinator of the PNG environmental group Mas Kagin Tapani Association, told Radio Australia last month that PNG should step back from its deal with Nautilus, adding that “we could not rely on our government to tell us that seabed mining is good, is safe.” Some industry observers also question whether seabed extraction — which would employ robots to break up the ore and pipe the slurry to a surface barge for transport and processing on land — is worth the risk. A 2011 study published in the journal *Geology* noted that while the sea floor indeed hosts recoverable mineral deposits, they are likely insufficient to meet global demand. Yet Nautilus signed its first commercial deal with China’s Tongling Nonferrous Metals Group in April, agreeing to sell about 1.1 million tonnes of copper and other minerals per annum over a three-year period.

“The quality of this relationship with China’s largest importer of copper concentrates provides further evidence that there is considerable interest in the high-grade massive sulfides being found by the emerging seafloor resource production industry,” stated Nautilus CEO Stephen Rogers. Nautilus will be holding a conference call about its future plans and the latest developments regarding the Solwara project later this week. Major shareholders in Nautilus include Anglo American with 11 percent of shares, and Russia’s Metalloinvest, which has a 21 percent stake in the company.

### **China’s involvement**

While few companies contemplate taking the plunge into deep sea mining, it is clear that public interest in the business is increasingly rapidly. China is invested through the Jiaolong deep sea submersible, which is attempting a record dive of 7,000 meters below sea level. The United Nations’ International Seabed Authority gave Beijing the go ahead to explore for minerals in international waters in 2001. Marine expert Song Xiaojun stated that the Jiaolong will be able to access resource-rich zones that can be as low as 10,000 meters, and commented that “China needs the technology to utilize these resources, because energy is the key to the country’s industrialization.” China is certainly eager to embrace the potential of deep sea mining. In October, the Underwater Mining Institute will be hosting a week-long conference on the challenges of developing marine minerals in an environmentally-sustainable manner at Shanghai’s Tongji University.

“Many private and government-sponsored marine mineral exploration efforts are ongoing in efforts to respond to this increasing demand with new sources minerals. As we anticipate new commercial seabed mining operations in the near term, it is critical to ensure that such activities take place with due consideration for all resources that could be impacted,” the Underwater Mining Institute stated. Clearly, the ocean remains a largely untapped resource for copper and other metals, and that the next scramble for resources may well be heading out to sea. There could be ample opportunities for mining groups both large and small to enter the market, but for now, investors will be closely following the prospects of Nautilus Minerals for clues about the future of the business.

### **Nautilus in hot water**

Post-Courier, June 6, 2012

By PATRICK TALU

NAUTILUS Minerals, the operator of the world’s first undersea mine in the Solwara 1 Project in PNG, said it might have to slow or defer development of its marine-mining project because of a dispute with the State which owns 30 per cent of it. The company advised through Toronto Stock Exchange last week that it was in dispute with the State as to the parties’ obligations to complete the agreement entered into on March 29, 2011. Nautilus further advised shareholders that it had initiat-

ed the dispute resolution process provided for in the agreement, which may lead to a referral of the dispute to an arbitration if it could not be resolved through further discussions amongst senior representatives of the parties over an initial 10-day period. The State exercised its option under the agreement to acquire a 30 percent interest in the Solwara 1 Project through its nominee, Petromin PNG Holdings Limited. However, the State asserts that Nautilus has not met certain obligations on which completion is dependent, and that Nautilus has breached the agreement which Nautilus has refuted. Under the Agreement the State's nominee (Petromin) must pay (among other amounts) its share of costs incurred in the development of the project up to completion to acquire its project interest.

Nautilus said unless and until the dispute was resolved, completion would be delayed or may not occur and Nautilus must continue to carry these costs. This may lead to Nautilus needing to slow or defer the build program for project equipment, which would have consequential impacts on the scheduled commencement of operations and overall project costs. The State signed an agreement and exercised its option to take up a 30% stake in project in the Bismarck Sea. Governor General Sir Michael Ogio signed the agreement at a short ceremony attended by Nautilus Chief Executive Officer Stephen Rogers and Petromin Managing Director Joshua Kalinoe in Port Moresby in March 2011. According to agreement, Nautilus will retain a 70% holding in an unincorporated joint venture to be established with the PNG Government to hold the mining assets of the project. It was agreed that the Government's initial payment to secure its holding will be approximately US\$20-25 million (about K42 million), which represents its share of the exploration and development costs incurred up to the date of grant of the Mining Lease in January 2011.

### **Mineral companies get ready to harvest our seabed**

PNG Mine Watch 2.6.2012

New exploration licenses for experimental seabed mining have been granted in the Pacific, Indian and Atlantic Oceans. Listen to the latest edition of **One Planet** on BBC World Service Radio which features Nautilus's Solwara One experimental seabed mine in Papua New Guinea and puts it in a global context. <http://www.bbc.co.uk/programmes/p00sd38s>

### **Nautilus dispute with Papua New Guinea to delay or even cancel underwater mining dreams**

Mining.com, June 1, 2012, Cecilia Jamasmie

Canada-based Nautilus Minerals Inc. said Friday it is in dispute with Papua New Guinea as to the parties' obligations to complete the agreement reached in March last year for its Solwara 1 copper project. The company, the first to explore the ocean floor for polymetallic seafloor massive sulphide deposits, warned Solwara 1 copper project could be delayed or cancelled because of the dispute with Papua New Guinea over their ownership agreement for the underwater mine. The country optioned to acquire 30% of the Solwara 1 project, located in its territorial waters in the Bismarck Sea, last year and, as part of the agreement, Papua New Guinea have to pay its share of development costs for the mine. "Unless and until the dispute is resolved, completion will be delayed or may not occur and Nautilus must continue to carry these costs," said Nautilus in a release. Not long ago, the future looked promising for Nautilus. In late April, the company announced it had signed China's Tongling Non-ferrous Metals Group as the first customer of its pioneering Papua New Guinean seafloor mine. The project, in the minerals-rich Manus basin of PNG's Bismarck Sea, is claimed by Nautilus as the world's first commercial sea-floor mine, and is slated to begin production in the fourth quarter of 2013. Nautilus shares fell over 12% in the Toronto Stock Exchange after the announcement.

## **Nautilus Dispute With the State of Papua New Guinea**

Toronto, Ontario, Marketwire, June 1, 2012

Nautilus Minerals advises that it is in dispute with the Independent State of Papua New Guinea (the State) as to the parties' obligations to complete the Agreement entered into on 29 March 2011. Nautilus has initiated the dispute resolution process provided for in the Agreement, which may lead to a referral of the dispute to arbitration if it can not be resolved through further discussions amongst senior representatives of the parties over an initial 10 day period. The State exercised its option under the Agreement to acquire a 30% interest in the Solwara 1 Project through its nominee, a subsidiary of Petromin PNG Holdings Limited.

However, the State asserts that Nautilus has not met certain obligations on which completion is dependent, and that Nautilus has breached the Agreement. Nautilus refutes these assertions. As previously disclosed, under the Agreement the State's nominee (Petromin subsidiary) must pay (among other amounts) its share of costs incurred in the development of the Project up to completion to acquire its Project interest. Unless and until the dispute is resolved, completion will be delayed or may not occur and Nautilus must continue to carry these costs. This may lead to Nautilus needing to slow or defer the build program for Project equipment, which would have consequential impacts on the scheduled commencement of operations and overall Project costs.

### **About Nautilus Minerals Inc.**

Nautilus is the first company to explore the ocean floor for polymetallic seafloor massive sulphide deposits and is developing its first project at Solwara 1, in the territorial waters of Papua New Guinea, where it is aiming to produce copper, gold and silver. The company has been granted all necessary environmental and mining permits. Nautilus also holds approximately 600,000 km<sup>2</sup> of highly prospective exploration acreage in the western Pacific; in PNG, the Solomon Islands, Fiji, Vanuatu and Tonga, as well as in international waters in the eastern Pacific. A Canadian registered company, Nautilus is listed on the TSX:NUS and AIM:NUS stock exchanges and OTCQX: NUSMF. Its corporate office is in Brisbane, Australia. Its major shareholders include Metalloinvest, the largest iron ore producer in Europe and the CIS, which has a 21% holding, global mining group Anglo American, which holds an 11% interest and MB Holdings, an Oman based group with interests in mining, oil & gas, which holds a 9.98% interest.

## **Tiefseevorkommen: Deutschland findet riesiges Rohstofffeld**

Manager Magazin, 31.5.2012

*Es ist ein aufsehenerregender Fund: Forscher haben im deutschen Lizenzgebiet des Pazifik ein riesiges Vorkommen an Manganknollen entdeckt. Die gigantische Ablagerung würde den deutschen Bedarf an darin enthaltenen Rohstoffen für 40 Jahre decken - sofern die Knollen abgebaut werden können.*

Hannover - Meeresforscher haben im deutschen Lizenzgebiet des Pazifik ein großes Vorkommen an Manganknollen entdeckt, mit dem Deutschland seinen Bedarf an begehrten Buntmetallen über Jahre decken kann. Das teilte die Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) am Donnerstag nach einer Expedition in den Manganknollengürtel zwischen Hawaii und Mexiko mit. "Das sind etwa 110 Millionen Tonnen, damit wäre in Zukunft mehr als 40 Jahre Manganknollenbergbau in der Tiefsee möglich", sagte BGR-Expeditionsleiter Carsten Rühlemann. Das Metall Mangan ist ein wichtiger Ausgangs- und Veredelungsstoff für die Stahlgewinnung. Die Erkundungslizenz für zwei riesige Gebiete im Pazifik erlaubt Deutschland zunächst die Erfassung der Vorkommen und die Untersuchung möglicher Auswirkungen einer potenziellen Rohstoffgewinnung. Anschließend können sich deutsche und später auch andere Unternehmen um eine Förderlizenz bemühen. Manganknollen beinhalten neben Mangan auch Kobalt, Eisen, Kupfer, Nickel und Zink. Um die besten

Abbauegebiete der Rohstoffe auf dem Meeresgrund zeichnet sich ein Wettlauf der großen Industrienmächte ab. *kst/dpa*

### **Life plentiful at undersea-volcanoes**

Fairfax NZ News, 31.5.2012



Polychaete worm (NIWA); See Stuff.nz for video and gallery of images:  
<http://www.stuff.co.nz/science/7017410/Life-plentiful-at-undersea-volcanoes>

Researchers have returned with more than 5000 samples and footage of never-before-seen undersea volcanoes after a three-week voyage in waters off the Bay of Plenty and northeast along the Kermadec Ridge. The NIWA scientists studied four different undersea habitats - seamounts, hydrothermal vents, continental slope and canyons within a 10,000sqkm area. The work is being done to improve understanding of the vulnerability of deep-sea communities to human activities such as seabed drilling, fishing and mining. Voyage leader Dr Malcolm Clark said the trip confirmed that environments in the different deep sea habitats varied in their characteristics, with communities of fauna differing even from other communities that were nearby. "The implication is that the exploitation of one seamount could have an effect that is not the same as the seamount close by," he said. The specimens collected almost certainly included something new, as typically almost 10 per cent of samples caught in the deep sea were new to science or new to New Zealand.

Canyons which had not been surveyed before had also been sampled extensively, and it was expected many new discoveries would be made once the samples and photographic data were analysed. The seamounts investigated included Tangaroa, about 200km northeast of Whakatane and part of the Kermadec Ridge. It comes to within about 900 metres of the surface of the ocean, starting from a depth below sea level of about 2000 metres. Specimens including barnacles, mussels, and shrimps taken from Tangaroa seamount were specific to sites with hydrothermal venting, proving the seamount was an active volcano, Clark said. Fifty submarine volcanoes stretch along the Kermadec Ridge, which extends almost 1500km to the edge of the New Zealand EEZ, northeast of the Kermadec Islands. The most southerly of the large seamounts along the ridge is about 100km northeast of Whakatane. Clark said the community on Tangaroa seamount was not unique, but differed from those found on some neighbouring seamounts.

Some seamounts had been trawled for orange roughy, and there was also interest in the possibility of mining seamounts in the Kermadec Ridge for a mineral resource called seafloor massive sulphides, which contained high concentrations of copper and zinc, along with gold and silver. Life was plentiful on the seamounts, particularly around the hydrothermal vents, Clark said. The sea-

mounts were hard, rocky places, elevated from the seafloor. The faster currents moving around them brought food particles for animals to eat. In the canyons, which came out from Tauranga and Whakatane, samples had been taken down to around 1500 metres. The canyons could be 200 to 300 metres deeper than the surrounding seafloor and 2km to 3km wide. "They are quite narrow and they channel a lot of water and soft sediment which comes off the land and near-shore coastal areas. They act as almost undersea rivers," Clark said. Little life was seen on the surface of the soft sediment on the seafloor of the canyons, but within the sediment were large numbers and many different types of worms. Samples were collected from the canyon floor using a corer which fired tubes up to 50cm into the seafloor. The tubes were then sealed and returned to the surface. The aim was to have analysis of the samples brought back from the trip, along with those from a survey carried out on the Hikurangi Margin near Cook Strait in 2010, completed within the year.

### **China sets sights on developing technology for deep-sea mining by 2030**

By Tuo Yannan and Wang Qian (China Daily), 29.5.2012

Commercial deep-sea mining by China of polymetallic nodules that contain copper, nickel and cobalt among other key minerals, can begin as early as 2030, according to the former head of the State Oceanic Administration. "With the improvement in deep-sea technology, metal resources under the ocean can be explored and mined within 20 years," said Sun Zhihui. Last year, China was among the first group of countries approved by the International Seabed Authority to look for polymetallic sulphide deposits, a recently discovered mineral source, in the Southwest Indian Ridge, a tectonic plate boundary on the bed of the Indian Ocean, he said, adding the country is applying to explore for cobalt in a new area in the Pacific Ocean. Sun said many countries are developing technologies for commercial mining, but a low-cost method of mining polymetallic nodules has not been found yet. China has explored more than 80,000 square kilometers of the floor of the Pacific and Indian oceans, Sun said.

Xiang Jianhai, researcher at the Institute of Oceanology under the Chinese Academy of Sciences, said: "When we can carry out commercial mining depends on technological development, financial support and the price of key minerals on the market." Xiang added that current exploration, such as that carried out by China's manned deep-sea vessel Jiaolong, will provide the technology and geological information for future mining. He added the extent of the country's deep-sea exploration was catching up with that of advanced countries. Scientists estimate that about 480 million to 13.5 billion tons of polymetallic nodules can be commercially mined, Science and Technology Daily reported. Polymetallic nodules are rock concretions, mostly about the size of a potato, on the seabed containing metals such as cobalt, manganese, iron, nickel and aluminum, which have huge economic potential. Xiang said the deep-sea environment was much more difficult to mine compared with land, because mining equipment has to endure high underwater pressures and marine corrosion.

Feng Xisheng, deputy director of underwater robot research at the Chinese Academy of Sciences, said the Jiaolong has dived to 6,000 meters. According to China Ocean News, the nation will conduct a 7,000-meter test dive later this year. For Jin Jiancai, secretary-general of the China Ocean Mineral Resources Research and Development Association, another obstacle to commercially mining polymetallic nodules is its effect on the deep-sea environment and ecosystem. Nodule regrowth can take millions of years and that would make such mining unsustainable. People have little knowledge of most deep-sea species and environments, making environmental assessment almost impossible, Jin told Science and Technology Daily.

He added that a law on deep-sea environment protection should be established to avoid potential harm during exploration and mining. Improving the legal system relating to deep-sea mining and exploration was the key work of the State Oceanic Administration, Liu Cigui, administration direc-

tor, said at the administration's annual conference in December. An official of the administration, who did not wish to be named, told China Daily that regulation of deep-sea resources exploration and mining is under discussion, with an aim to protect the ocean. The total output value of China's marine-based industries was 3.2 trillion yuan (\$508 billion) in 2009, accounting for 9.5 percent of the country's GDP, according to the administration's website.

### **Call for new PNG government to stop deep sea mining**

Radio Australia, Updated 28 May 2012

There's been a new call for the incoming government in Papua New Guinea to stop the Nautilus Deep Sea mining project going ahead. The National co-ordinator of the environment group, Mas Kagin Tapani Association, Wenceslaus Magun says just about every mining project in PNG so far has been an environmental disaster. He says with weak legislative controls and poor infrastructure and the experimental nature of the Nautilus project, he fears the worst.

### **PNG Environmentalist Urges Solomons To Reject Sea Bed Mining**

*'We need our resources to survive, not money': Magun*

By Daniel Namosuaia

HONIARA, Solomon Islands (Solomon Star, May 24, 2012) – A senior environmentalist from Papua New Guinea (PNG) has called on the Solomon Islands government and people to stop deep sea mining (DSM) in the country. Wancedaus Magun, the national coordinator of Mas Kagin Tapani Association in PNG called on responsible authorities to wake up to save lives than to destroy them. Mr Magun said overseas countries knew the loopholes that our countries have therefore want to utilise it for their benefit. He said if land mining operations have destructive effects to our environment which humans are familiar with, how much more is it for the seabed which no proper scientific discoveries and research has been done about it. "We have seen mining companies come and destroy our environment for these minerals. And when they left, people are suffering. "We are people created by God with dignity and we need our resources to survive, not money," Magun said.

He added that it will come to a time when the country will develop and have the human capacity and infrastructure to venture into such development. "Therefore we don't need foreigners to rip us off and destroy our livelihood." Mr Magun warned that if the ocean resources are destroyed, people's lives too will be destroyed. "Because we pacific island nations depend very much on our sea resources for survival." He further highlighted that there is no baseline study being done for under water mining. He questioned if the country allow DSM, do we have the mitigation capacity and infrastructure to deal with its effects? "Three quarter benefit of these developments will be taken out of this country. "So what is the point of allowing such development to take place when it has devastating effects to our lives forever. "We do not have enough resources and if we destroy then, we are gone."

### **Togolo: Mining sector up for radical change**

The National, 24th May, 2012

By MALUM NALU

NAUTILUS Mineral is embarking on a venture at its Solwara 1 project in the Bismarck Sea that has the capacity to revolutionise the entire mining industry, according to PNG country manager Mel Togolo. He said this was something that had never been done before in a commercial way, and Nautilus was leading the world in the creation of this new frontier. Togolo also explained in detail

at a mining and petroleum workshop for PNG media last Friday how the underwater mining would be done. “The obvious analogy is the oil and gas industry,” he said. “In the early 1900s, all of the world’s oil and gas was produced on-shore. “It was only in the 1940s that the first offshore oil wells were put into production off the coast of Louisiana, and today some 30% of the world’s oil and gas comes from offshore wells. “So in that sense, perhaps the global mining industry is where the oil and gas industry was in the early 1900s, but we have the benefit of their many years of experience to develop this new opportunity for mineral resources.

“Another analogy is in the diamond mining industry, and De Beers has been mining offshore Namibia for diamonds since the 1980s. “Similarly now, there are plans to develop offshore potash deposits in Namibia. “Seventy (70) per cent of the world’s surface is covered by ocean, and it is of course obvious that all of the world’s resources deposits are not restricted to the land. “Therein lies a great opportunity, and the oceans of the world will no doubt host some massive deposits. “We have only scratched the surface.” Togolo said land-based deposits were suffering from declining grades and increasing costs, and the easy discoveries had all been made. “We have to go where the deposits are,” he said. “New frontiers are beckoning and inevitably have to be developed to feed the world’s demands for minerals. “Deep sea resource development is going to happen. “It is just a matter of time, and at Nautilus we are leading the charge, establishing the technologies and methodologies to develop these resources in ways that are responsible and sustainable.”

Togolo said the seafloor production system was comprised of three components:

- g The seafloor production tools. Nautilus would have three of these operating on the seafloor at a depth of 1,600m, controlled by operators on the ship above. They would disaggregate the material and reduce it to a maximum size of 50ml. The material was quite friable and easy to cut, and the process did not require any blasting or explosives;
- g Once the material is cut from the seafloor, it will be collected by a collecting machine, which is essentially a large vacuum cleaner which pumped it as a seawater slurry via a riser and lifter system to the ship on the surface; and
- g The last component is the seafloor production vessel, which will serve as the operational base.

## **Nautilus finds Chinese buyer for minerals**

The National, 22nd May, 2012

By MALUM NALU

NAUTILUS Minerals, which is set to start revolutionary underwater mining at Solwara 1 in the Bismarck Sea between East New Britain and New Ireland provinces in 2013, has already secured a Chinese buyer for its first three years of operation. This was confirmed by Nautilus country manager Mel Togolo at a mining and petroleum workshop for PNG media at the Gateway Hotel in Port Moresby last Friday. He said the indicated resource was one metric tonne at 7.2% copper and 5 grammes/tonne gold while inferred resource was 1.5mt at 8.1% copper and 6.4 g/t gold. The material will be treated by conventional grinding and flotation and will produce a copper concentrate of 25-30% with recoveries of between 85% and 90%. Fifty per cent of the gold will be recovered in the copper concentrate. “We have recently signed a landmark offtake agreement with Tongling Nonferrous Metals Group Co for a period of three years commencing upon the first delivery of product from Solwara 1,” he said.

“So in the first phase there will be no treatment at site, no tailings and minimal shore based infrastructure required. “We currently estimate the operating cost to bring material from the seafloor and get it to shore will be approximately US\$80/tonne, and then on top of that there will be shipping and processing costs. “We have not produced a full feasibility study outlining the project econom-



ics, but our competitors are producing copper at a cost of around US\$1 per pound and we would expect to be very competitive.” Togolo said based on current metal prices, a tonne of Nautilus material currently was worth about US\$1,000. “We expect to produce around 1.3 million tonnes per year, leading to production of 80,000 tonnes of copper and 150,000 ounces of gold a year. “So there will be a healthy margin, giving us a payback of about a year to 18 months. “The capital cost of the seafloor production system will be \$407 million, including a US\$50 million contingency.”

## **Nautilus offers underwater mining**

Post-Courier, May 21, 2012

By PATRICK TALU

THE world’s first underwater exploration and mine undertaken by Canada based Nautilus Minerals (Nautilus) for the Solwara 1 Project in PNG presents huge opportunity for more mineral exploration and underwater mining. Mel Togolo, Country Manager for Nautilus last week during the Australia Papua New Guinea Business Council (APNGBC) forum and trade expo in Brisbane, Australia said “not a lot of mineral exploration has been carried out, and there remains a huge opportunity for discovery. “While there have been 300 such hydrothermal fields discovered to date, some estimates suggest there could be three times that number still to be identified,” Mr Togolo said. Mr Togolo said while updating the delegates on the Solwara 1 Project in the Bismarck Sea between said Nautilus has a 43-101 compliant resource in place. He said Nautilus indicated resource is 1Mt tonnes at 7.2 percent copper and 5.0 g/t gold. Inferred resource is 1.5Mt at 8.1 percent Cu and 6.4 g/t Au.

The material will be treated by conventional grinding and flotation and will produce a Cu concentrate of 25-30 percent with recoveries of between 85-90 percent in which 50 percent of the gold will be recovered in the copper con. Mr Togolo said Nautilus has all of its required permits which the environmental permit was granted in 2009 and while mining lease granted in January 2011 for a deposit that covers 59 sq km.” “Nautilus is a very unique story – we are embarking on a venture that has the capacity to change the industry in a pretty fundamental way. We are about developing mineral resources in the deep sea. “It is something that has never been done before in a commercial way, and Nautilus is leading the world in the creation of this new frontier,” the country manager said. He explained in details that Nautilus intend to develop the project in two phases.

The first phase will see Nautilus put in place the seafloor production system to recover material from the sea floor, bring it to the surface, dewater it and then transport it to shore where we will load it on to bulk carriers and transport it to a concentrator facility offshore for treatment under a tolling arrangement or via a direct ore sales agreement. “We have recently signed a landmark offtake agreement with Tongling Nonferrous Metals Group Co. For a period of three years commencing upon the first delivery of product from Solwara 1. “So in the first phase there will be no treatment at site, no tailings and minimal shore based infrastructure required. “We currently estimate the operating cost to bring material from the seafloor and get it to shore will be approximately \$80 (about K165) per tonne, and then on top of that there will be shipping and processing costs. We have not produced a feasibility full feasibility study outlining the project economics, but our competitors are producing copper at a cost of around \$1 (K2) per pound and we would expect to be very competitive,” he added.

Based on current metal prices, a tonne of our material currently is worth about \$1100 (K2270). Nautilus to produce around 1.3 million tonnes per year, leading to production of 80,000 tonnes of copper and 150,000 ozs of gold a year. So there will be a healthy margin, giving Nautilus a payback of about a year to 18 months. The capital cost of the seafloor production system will be \$407 million (K840 million), including a \$50 million contingency. The government will contribute 30% of that. In phase two of the project, once Nautilus has demonstrated that it can operate commercially,

and it is generating cashflows, the company can then look at potentially constructing its own concentrator facility to enable Nautilus to capture more of the value from the project, but that is a bit of a way down the track. "Deep sea resource development is going to happen. It is just a matter of time, and at Nautilus we are leading the charge, establishing the technologies and methodologies to develop these resources in ways that are responsible and sustainable," he added.

## **Cooks Environmentalists Question Impacts Of Seabed Mining**

*NGO hopes government will address concerns before finalizing plans*

WELLINGTON, New Zealand (Radio New Zealand International, May 7, 2012) – The Cook Islands environmental NGO Te Ipukarea Society says questions over the impact and management of seabed mining must be answered before mining goes ahead. The government is finalising plans to implement the Seabed Minerals Act 2009 and is considering a proposal by a Canadian company wanting exploration licenses. A spokesperson for Te Ipukarea Society Teina McKenzie says the organisation has a number of concerns it hopes the government will address before the bill is passed. "Either before or during the finalisation of this bill, a comprehensive cost benefit study should be undertaken, looking at the environmental impacts as well as the social impacts on our community and another is a comprehensive baseline study that will determine some of the biodiversity that exists in our ocean depths." Teina McKenzie says there will be huge economic benefits for the Cook Islands if seabed mining is well managed.

## **Cook Islands: TIS speaks out on experimental seabed mining**

PNG Mine Watch 27.4.2012

In its most recent newsletter Te Ipukarea Society posed a range of questions around experimental seabed mining. The statement is as follows:

"With the passing of the Seabed Minerals Act 2009, the pressure to move ahead with the mining of our deep sea manganese nodules is beginning to mount. With millions of dollars on offer, and a national budget deficit, the temptation to open the door to foreign investment in the mining industry is significant. Even now, the Canadian company Endeavour has a \$15 million proposal on the table for government to consider in the sale of exploration licenses. All this before it is clear what impact seabed mining might have on our environment and society. While the nodules lie on the surface of the seabed and "mining" is likely to be only to a depth of 30cm, there are still several concerns TIS has regarding this industry.

- What will SOPAC be doing to assist the Cook Islands with ensuring ecologically sustainable mining?
- Will there be any serious research to determine the impacts of mining on the ocean ecosystem?
- How long is sediment that is disturbed on the seabed likely to be in suspension (carried in the water)?
- How will the nodules be brought to the ocean surface?
- What will be done with unwanted sediment once it reaches the surface?
- Where will the nodules be processed and what impact will this have there?

These questions are based around concerns over the impact on our fisheries and environment because of the sediment and the chemical components in the waste of nodule processing. We also have concerns about management:

- Will companies be able to on-sell their licenses to another company and benefit from future trading?

- What will be done with revenue to ensure long term benefits from this non-renewable resource?
- Are there plans to add citizens and environmental concerns groups such as ours in the Seabed Minerals Committee for improved community and stakeholder consultation?

We are pleased to know that the draft Model Contract Agreement will be a useful tool for negotiating agreements with mining companies. We already have wealth around us (coral reefs, fisheries, tourist attractions), and we need to be very careful (precautionary principle) that whatever we do does not impact this wealth.”

### **Nautilus signs deal**

Post-Courier, April 26, 2012

PAPUA New Guinea will make history by selling to China its first ever underwater minerals mined from its seafloor of Bismarck Sea after a buyer has agreed to buy. Nautilus Minerals Inc (Nautilus) the operator of the world’s first ever underwater mine in Solwara 1 projet has signed a binding heads of agreement with Tongling Nonferrous Metals Group Co. Ltd (Tongling) for the sale of the product extracted from the Company’s Solwara 1 deposit. Nautilus Minerals Inc, the Canadian based project operator of the Solwara 1 deposit project off New Ireland and New Britain Islands said on Monday that it had agreed to sell about 1.1 million tonnes of material from its Solwara 1 deposit to Chinese copper smelter Tongling. Mel Togolo, Nautilus Country Manager confirmed the news yesterday. Nautilus, which is focused on exploring for mineral deposits on the ocean floor, said the three-year deal with Tongling would commence upon delivery of first product from Solwara 1, which is targeted around the end of 2013.

Nautilus said Tongling would import the product into China and then process it through its facilities in the city of Tongling. After production of a copper concentrate, the product will be smelted in Tongling’s industrial complex. The quality of the copper concentrate produced will determine the purchase price that Tongling will pay. The agreement includes a provision for an early payment of 90 percent of the price upon loading of the export vessel in PNG. Final payment is based on the recovery of copper, gold and silver, with deductions for logistics, smelter treatment and refining charges, along with other processing costs. Nautilus’ Solwara 1 deposit is expected to produce copper, gold and silver. The company’s top shareholders are European iron ore miner Metalloinvest and diversified miner Anglo American PLC, which own 21 percent and 11 percent interests, respectively. “The quality of this relationship with China’s largest importer of copper concentrates provides further evidence that there is considerable interest in the high grade massive sulphides being found by the emerging seafloor resource production industry,” Nautilus chief executive officer Stephen Rogers said.

The company will issue a bank guarantee to Tongling in three stages over nine months, which will not exceed approximately \$US11.5 million, as a security for 50% of Tongling’s concentrator investment costs commencing at the first order of major equipment. Mr Rogers said the Company was looking forward to working with Tongling to realise the full potential of the high grade material extracted from Solwara 1. “We have now closed the value chain on the project, established our first customer for seafloor massive sulphides and look forward to building a long term relationship with Tongling,” he said. Nautilus is currently progressing the build of equipment, including the Seafloor Production Tools and Production Support Vessel (as those terms are used in the Company’s Annual Information Form), for the Solwara 1 Project. The National Government had granted Nautilus mining permit for the site, and the mine is targeting initial production of 1.2 million tonnes per year.

## **SPC ADVISORS, COOKS DISCUSS DEEP SEA MINING ISSUES**

*Secretariat acknowledges proactive legislation in place*

By Eric Parnis

RAROTONGA, Cook Islands (Cook Islands News, April 11, 2012) – The Cook Islands' development of seabed mining legislation is leading the region and the world, according to Deep Sea Minerals Project managers from the Secretariat of the Pacific Community (SPC). Half-way into a series of meetings across 15 Pacific countries and territories, team leader Akuila Tawake and legal adviser Hannah Lilly says there is a need for the majority of Pacific countries to develop legislation and regulations to guide the burgeoning deep sea minerals industry. The pair is currently visiting Rarotonga to conduct a series of meetings with stakeholders associated with deep sea mining and its development in the Cook Islands.

Their tour of the Pacific, which has so far taken them to seven of the 15 nations involved in the project, will be used to present the project's objectives and gather information on how the SPC can help each individual nation. Lilly said that while there were common threads in their meetings thus far – including the need to balance the economic potential of the industry with limiting the environmental impact of any work – each nation and territory was raising individual points with her and Tawake that would need to be developed in the coming years. [*PIR editor's note: The workshop is aimed at promoting awareness of deep sea mining, along with ascertaining community concerns and prioritizing local needs in relation to deep sea exploration and resources. The project is being supported by the European Union and Pacific Islands Forum Secretariat.*]

And while most of the nations needed to introduce draft legislation to regulate the deep sea mining industry, Lilly said the SPC would focus on other points with the Cook Islands, which has already introduced draft regulations on seabed mining and exploration. The pair expects that the SPC will work with the Cook Islands on topics secondary to forming legislation, including capacity-building and advancing the processes surrounding the formation of environmental impact assessments. Lilly and Tawake will hold a public meeting today at the AOG Hall in Takuvaine for anyone interested in deep sea mining. The day will begin at 8:30am and include information on the history of deep sea mining in the Cook Islands, information of the technological advances in the industry and the legal, environmental and economic implications of deep sea mining. But the main purpose of the meeting is to introduce the SPC's Deep Sea Minerals Project to stakeholders and raise awareness of its purposes, progress and direction.

## **SPC PROPOSES REGIONAL DEEP SEA MINING COMMITTEE**

*Body to provide technical, policy advice to decision-makers*

By Samisoni Nabilivalu

SUVA, Fiji (Fiji Times, April 9, 2012) – The Secretariat of the Pacific Community (SPC) recommends the formation of a committee to facilitate decision making in relation to the implementation of in-country deep sea minerals activities. SPC's Applied Geoscience and technology Division (SOPAC) raised the idea at a stakeholders' meeting earlier this year and adds it is able to offer funding for technical and policy advisory assistance to support the NOMC in-country activities. SPC's proposal for the formation of a National Offshore Mining Committee (NOMC) was given to participants at the meeting and listed essential information about the proposed NOMC. SPC believes the NOMC should provide a forum for informed discussions about marine mineral exploration and mining and spearhead and assist the development of national offshore minerals policy, legislation and regulations as other deep sea minerals related activities that are within the scope of the deep sea mining project.

NOMC, SPC adds, should also provide an accessible means for local communities and interest groups to raise concerns and queries, and to learn more about the opportunities and challenges that will be brought about by deep sea minerals exploration and mining. The proposal says the aim of establishing NOMC is to facilitate decision making in relation to the implementation of in country deep sea minerals activities. "The creation of a cross agency, multi-disciplinary and participatory committee like the NOMC should ensure that the Government has its disposal all relevant information for policy and operational decisions and should enhance public knowledge, understanding and awareness. "This should increase the likelihood that policies that policies and decisions related to deep sea minerals will be implemented with public consent and commitment. The NOMC may also serve to encourage trust and avoid conflicts, and to meet legal, policy, and good governance requirements."

### **SOPAC tries to change the spin at Fiji's Deep Sea Minerals and Mining Workshop** PNG Mine Watch 3.4.2012

*After heavy criticism from civil society groups for drafting laws to FACILITATE experimental seabed mining and its cosy relationship with the mining industry, SOPAC has employed expensive media consultants to put out fancy spin like this that is full of lovely sounding rhetoric that hides SOPAC's true intention which is to make the Pacific the testing ground for this new and untried technology that will profit Western mining companies at the expense of Pacific people and their environment:*

The Director of Fiji's Mineral Resources Department, Mr. Malakai Finau told participants in a one day Fiji National Deep Sea Mineral Consultation Workshop held in Suva recently that "with deep sea mineral exploration being granted within the Fiji waters it is important to proceed with caution, to strike a balance between economic development and the protection of the environment." The workshop is part of in-country stakeholder consultation process organized by SOPAC Division of the Secretariat of the Pacific Community (SPC) through the European Union funded Deep Sea Mineral Project in fifteen Pacific ACP States. This consultation allows government officials as well as representatives of the private sector, academic institutions and civil society groups to explore issues relating to deep seabed minerals and mining. Similar meetings have already been held in Kiribati, Nauru, Tonga, Samoa and now Fiji. According to SPC-EU Deep Sea Mineral Project Team Leader, Akuila Tawake, there will be a further ten countries where the consultation workshops will be held in the next five months.

Mr. Finau said the Fiji government is in the process of granting exploration licences to two companies, Korea Ocean Resources and Development Institute (KORDI) of Korea, and Canadian Nautulis Minerals Inc. A third, Australian based Bluewater Metals' application is currently being processed. He said that Fiji's mining law is inadequate and needs to be amended to cover all mining issues including deep sea exploration and mining. With environmental issues and concerns identified in this workshop in anticipation of deep-sea mining interest in the country, the review of the mining law is necessary. Speaking at the workshop, the Director of the SOPAC Division of the SPC, Dr. Russell Howorth, said that he endorsed Mr. Finau's comments and "that with limited knowledge on deep sea ecosystems and environments derived from the ongoing studies in the last four decades, prudent decisions are necessary to ensure environmental impacts of deep sea mineral exploration and exploitation are minimised or avoided. "To this end, the application of the precautionary approach is crucial in ensuring this new industry addresses environmental issues appropriately," he said.

The SPC-EU Deep Sea Minerals Project was designed at the request of the Pacific ACP States, to have a multi-country regional cooperation, encouraging a multi-stakeholder consultative and participatory approach in the governance and management of deep-sea minerals in the region. "While

deep sea minerals may present an alternative economic sector for development for countries in the region, much of the current commercial entity interests are to explore and evaluate the seabed mineral potential. Deep sea mineral exploration can take many years and any decision to mine or not to mine hinges on the results of extensive mineral exploration, environmental studies, and financial capabilities". "We must be careful that we do not create unnecessary fear on the one hand, and false hope on the other, in the minds of the general public" Dr. Howorth concluded.

### **Nautilus solid year**

Post-Courier, March 28, 2012

NAUTILUS Minerals Inc (Nautilus) has ended 2011 in a solid financial position with \$US149.4 million (K309.9 million) in cash and cash equivalents, after a milestone year which saw the company granted the first deep sea "hard rock" Mining Lease for its Solwara 1 project in the Bismarck Sea in PNG. This is according to the Company's 2011 full year financial results and annual information form released yesterday. Also highlighted were several key achievements during the year, with the highlights being: Mining Lease ML154 (the area containing Solwara 1) granted by the PNG government for subsea production in the Bismarck Sea; agreement to form a mining joint venture with the State for the Solwara 1 project; agreement to form a vessel joint venture with Harren and Partner to own and operate a production support vessel; the award of exploration tenements in the Eastern Pacific and Fiji and increased mineral resources at Solwara 1 and a declared maiden inferred resource at nearby Solwara 12.

The company reported a loss of \$US34 million (K70 million), with total expenses of \$US35.0m, including \$US14.2 million (K29 million) in exploration costs, and general and administrative expenses of \$US17.2 million (K35 million). Total assets increased to \$US282.6 million (K586.9 million) with the capitalisation of expenditure for mineral properties following the grant of the mining lease and the increase in assets under construction. Since the year end, the Company has continued to work Petromin PNG Holdings (Petromin), a company wholly owned by the State, to finalise contracts and financing arrangements for Petromin's 30% holding in the Solwara 1 project. The cash and cash equivalents balance was also positively impacted by the receipt of funds from the private placement in Q4 2011. "Nautilus achieved several milestones in 2011 that has positioned the Company well to reach its production target in Q4 2013," said Nautilus Chief Executive Officer Stephen Rogers. 2012 is going to be another productive year as equipment takes shape on the project, the treatment and marketing route is finalised and we continue our exploration work in the Bismarck Sea and other areas to build the production pipeline," he added.

### **Nautilus eyes up to \$100 million for project**

Post-Courier, March 13, 2012

WHILE Nautilus Minerals, operator of Solwara 1 Project in the waters of New Britain and New Ireland provinces, aiming to become the first deep-sea metals producer by the end of next year, still needs to raise \$90-million to \$100-million to fully fund the project, it has about two years to do so, CEO Steve Rogers said on Thursday. According to miningweekly.com on Friday, the Toronto Stock Exchange listed company last year completed a near-\$100 million (K207 million) private placement, with Oman's Mawarid Mining, a unit of oil and gas producer MB Holdings, taking up a 10% stake for \$50.1million (K103 million). "The \$100-million that we raised last year was a big step forward," Rogers told Mining Weekly Online.

Mining Weekly reported that Anglo American subscribed for shares in that deal to keep its ownership of Nautilus at 11%, and Russia's Metalloinvest did the same to maintain its 21% interest. The

funding allowed the firm to recommence the build of its seafloor mining system at the flagship Solwara 1 project in the Bismarck Sea, off the New Britain Island coastline. The government of that country will stump up about \$150 million (K311 million) of the capital costs as a joint venture partner, but Nautilus will still be looking to raise additional financing. “We will need to find probably another \$90 million to \$100 million (K180 to K207 million) to fully fund the project. We have the next two years to raise it, so we’re not in a desperate rush right now,” said Rogers, adding that it had alternatives to selling additional stock. “It’s not a given that we will come back to the equity markets,” he commented.

The statement said Solwara 1 is on track to start producing in the last quarter of 2013, after the global financial crisis delayed it by about two years, and will be the first deep-sea mining operation to come on stream, as mining companies scour the world for near frontiers to dig up. While Nautilus is ahead of a growing pack, China, Russia, Korea and Japan all have permits to scour the seabed for potential high-grade deposits of copper and gold. “There will be a deliberate and significant move into marine-based mining operations,” Rogers said. He compares the shift to what occurred in the oil and gas industry, where negligible production came from offshore sources in the 1950s. Now, over 30% of the world’s oil and nearly 25% of its gas output comes from offshore production. “I can see that same trend here occurring with regards to metals. I don’t anticipate a gold rush, but it will be a slow steady growth,” said Rogers. One of the benefits to building mines on the bottom of the ocean are lower capital costs than comparable operations on land. Where Nautilus is building Solwara 1 for about \$400-million, porphyry mines that produce similar amounts of metals cost in the range of \$1-billion to \$1.2-billion.

### **Seafloor mining companies must invest in protecting the environment**

Radio Australia, 9 March 2012

The region's peak environment organisation says companies wanting to explore or mine the Pacific seafloor should be required to make a significant investment in protecting the underwater environment. Seafloor mining companies must invest in protecting the environment: SP (Credit: ABC)  
The Pacific has become world's hotspot for exploration and looks set to be the first region of the world to embark on commercial exploitation of seabed minerals when the Canadian company, Nautilus, begins mining in Papua New Guinea. The key to good environmental management is having good baseline data ...but the potential seafloor mining sites have been little studied.

**Presenter:** Jemima Garrett

**Speaker:** David Sheppard, Director General of the Pacific Regional Environment Program.

**SHEPPARD:** When you consider the amount of investment that will go into the mining operations the allocation of a percentage of that for a better understanding the marine biodiversity and resources is considered necessary from the viewpoint of SPREP.

**GARRETT:** Many people are concerned about the risks of seafloor mining at the stage what do you see as the main risks?

**SHEPPARD:** Well, I guess it's a new territory. We are not sure but clearly from SPREPs perspective it is important to identify and protect important marine ecosystems. So we know that the deep seabed mining is interested, for example, in three categories of resources, one of which is the cobalt rich crusts, often found on the flanks of submerged islands. Now, these are also the important areas for marine biodiversity so there is a need for great caution in relation to that, as one issue. There is clearly a need for care on the management of tailings that are associated with the deep seabed mining and the issue of spills is less apparent than for oil spills, for example, but still is also an issue. There are quite a few unknowns. The environmental factors are important, they do need to be considered, they do need to be factored in to any decisions relating to deep seabed mining.

GARRETT: These can be very different environments, very deep, sometimes hot and with different chemical composition. What sort of biological riches could be down there?

SHEPPARD: That is the million dollar question. From what we understand the resources are very unique and very important and that really underlines the importance of increased attention to the gathering of information on the resources. The marine biodiversity resources at these depths.

GARRETT: The sites being looked at by seafloor mineral companies are away from public scrutiny. What sort of problems does that pose in finding out the extent of the natural environment down there and in protecting it, if mining goes ahead?

SHEPPARD: Well, I think there should be an obligation on the companies that are involved. The responsibility for deep sea mining is under the jurisdiction of all of the sovereign states. There is a need to ensure that any mining that is undertaken is subject to an appropriate legal, regulatory framework. There is work at the moment, with funding from the European Union, with funding implemented through the Secretariat of the Pacific community, which is looking at these issues in more depth, so to speak, and is developing a regional legal framework for deep seabed mining and exploration.

GARRETT: To what extent is that framework taking into account the environmental issues and what is SPREP doing to make sure that the process will include the collection of adequate data and enforceable environmental protection measures?

SHEPPARD: This is a project which is led through SPC on behalf of member governments. SPREP has been invited to participate. We are participating. We are raising and we will continue to raise issues relating to the need for environmental protection, particularly the protection of important marine habitats, improvement of data on marine biodiversity, particularly on the deep seabed and ensuring that appropriate environmental impact assessment and monitoring protocols are in any operation that takes place.

GARRETT: What sort of independent verification will Pacific governments need to make sure that their environmental standards are met?

SHEPPARD: Well, that is a very good question. When we are talking about sea we are talking about the United Nations Law of the Sea, UNCLOS. There are particular considerations within that that relate to high seas mining that is beyond the exclusive economic zones, so in fact there is an international seabed Authority and it is important that they are involved, that the standards being directed are being applied and they also need to be applied within the exclusive economic zone of each country.

GARRETT: As this affects countries right around the Pacific - on the Pacific Rim as well as in the Pacific Islands - is there a potential to draw on scientific resources and funding bodies from those countries to ensure that this is scrutinised properly?

SHEPPARD: I think they could play a very important role. Obviously, the developed countries around the Rim, including Australia and the United States, have considerably more resources than Pacific Island countries to carry out these types of monitoring, these types of assessments I think their involvement would be very important. For SPREP and these countries are members of SPREP, to the extent possible and relevant we would encourage their involvement in these activities as we move forward.

GARRETT: This sort of seafloor mining could provide enormous revenue to Pacific governments and Pacific governments are quite enthusiastic about the idea. What should they be considering as they move into this new area?

SHEPPARD: I think they need to consider appropriate national legislation. They need to ensure activities are appropriately managed and monitored. They need to ensure environmental factors are built into the operation, that wherever possible costs are included within the overall costs of the mining operation. Also, obviously in this region the leaders have developed a Pacific Islands regional oceans policy, PIROP, so that provides a broad framework for the management of the oceans and Pacific leaders have also initiated an Oceanscape initiative, which has similar objectives, which is allowing sustainable development but not at the cost of the environment, So ensuring that that is



considered. So these are the types of issues that need to be considered. Organisations like SPC and SPREP will provide assistance as much as we can.

GARRETT: NGO groups say the Pacific should not be the world's guinea-pig for seafloor mining. What do you say to that?

SHEPPARD: Well, I think that is a valid concern. The issue of deep seabed mining is largely an unknown. Many groups have suggested that we apply the precautionary principle, that if we are in doubt we be very cautious in how we move forward. I think the reality is, Jemima, is that this will happen in the Pacific. We need to ensure that, if it does, important considerations such as the environmental considerations I've outlined and also social considerations, particularly the need for benefits to come back to countries and local communities are applied.

### **Call for protection in Pacific deep sea mining projects**

Post-Courier, March 9, 2012

The region's peak environment organisation says companies wanting to explore or mine the Pacific seafloor should be required to make a significant investment in protecting the underwater environment. The Pacific has become global hotspot for exploration and looks set to be the first region of the world to embark on commercial exploitation of seabed minerals when the Canadian company, Nautilus, begins mining in Papua New Guinea. But there has been very little scientific work done on the delicate environments at potential mining sites. David Sheppard, Director General of SPREP, the Secretariat of the Pacific Regional Environment Program has told Radio Australia's Pacific Beat important marine ecosystems need to be identified and protected. "We know that the deep seabed mining is interested, for example, in three categories of resources, one of which is the cobalt rich crusts, often found on the flanks of submerged islands," he said.

"Now, these are also the important areas for marine biodiversity, so there is a need for great caution in relation to that. "There is clearly a need for care on the management of tailings that are associated with the deep seabed mining and the issue of spills is less apparent than for oil spills, for example, but still is also an issue. There are quite a few unknowns. The environmental factors are important, they do need to be considered, they do need to be factored in to any decisions relating to deep seabed mining." Mr Sheppard says mining companies should allocate a percentage of their investment to obtain baseline data and meet environmental standards. And he says its important that Pacific countries coordinate their approach because of the potential impact across multiple countries. "When we are talking about sea, we are talking about the United Nations Law of the Sea, UNCLOS," he said.

"There are particular consideration within that that relate to high seas mining that is beyond the exclusive economic zones, so in fact there is an international seabed Authority and it is important that they are involved, that the standards being directed are being applied and they also need to be applied within the exclusive economic zone of each country." Mr Sheppard says SPREP will provide as much assistance as it can to help Pacific countries develop effective seafloor mining laws. "Many groups have suggested that we apply the precautionary principle, that if we are in doubt we be very cautious in how we move forward," he said. "I think the reality is, is that this will happen in the Pacific. We need to ensure that, if it does, important considerations such as the environmental considerations I've outlined and also social considerations, particularly the need for benefits to come back to countries and local communities, are applied." - ABC

## Experimental seabed mining moratorium makes room for science

PNG Mine Watch 9.3.2012

By Liz Trevaskis

The ocean floor could be the next frontier for Australian mining, but seabed mining won't begin for at least another three years in the Northern Territory. Yesterday, the Northern Territory Government announced a moratorium on seabed mining. It's a move that's been welcomed by Aboriginal land councils, but has come as a shock to some in the mining industry. But a CSIRO scientist says its a good window of opportunity to learn more about what lies deep beneath the ocean surface. Earth science and resource engineer Dr Chris Yeats says there's not a lot of seabed mining happening around the world at the moment. And he says the operations that are occurring are generally in shallow waters.

*"In terms of Australia there's only a couple of seabed mining operations, and they're both sand mining operations. "There's also quite a lot of exploration of the deep ocean floor in the South Pacific, they're actually looking primarily for metals, things like copper, zinc, gold, silver." "We know more about the surface of Mars and Venus than we know about the deep ocean floor, broadly speaking it is a great unknown."*

However he concedes when it comes to seabed mining, it's not a question of if, but when.

*"Obviously we want to do this in the most environmentally responsible way possible. "And I guess these are the questions the Northern Territory Government is trying to have answered through their moratorium. "We don't really know enough about the ocean floor to make an informed decision as to whether mining the sea bed in Australia is a good idea."*

## Revealed: the new species threatened by deep-sea mining

Bethany Hubbard, Ecologist, 20th February, 2012



Scaly-foot gastropod (photo: David Shale)

*The lure of deep sea mining in the Pacific and Indian oceans could mean the destruction of species only just discovered on the ocean floor*

Before the late nineteenth century, most people believed the deep sea was a barren wasteland, unable to support life even in its simplest form. After several expeditions by naturalist Charles Wyville Thompson, the world came to realise life not only exists, but prospers in the depths of the ocean.

His three-year voyage on the HMS Challenger produced detailed illustrations of alien-like sea cucumbers, ethereal jellyfish and strange corals all thriving at 3,000 fathoms below. Even after such discoveries, it took decades to fully understand the extent to which such underwater habitats exist. There aren't simply a few deep sea dwellers here and there, but entire ecosystems flourishing without the sunlight and air humans had deemed essential for sustainable life. How can life be so prolific so far from the surface of the ocean? The answer may lie in volcanic activity below the ocean floor, which unearths crucial minerals – creating hydrothermal vents.

These vents are formed when sea water seeps into volcanic rifts within the ocean floor, explains Dr. Jon Copley, from the National Oceanography Centre. The magma below heats the water, which reacts with surrounding rocks to create a mineral-rich fluid that eventually erupts forth from the earth. As the liquid cools, “chimneys” form and create metal-rich deposits. Such deposits contain polymetallic sulphides that are rich with zinc, lead, copper, gold and silver, and polymetallic nodules composed of manganese and iron. The vent fluid also contains the chemicals needed for chemosynthesis, the process upon which deep sea microbes depend - just as plants require photosynthesis, Copley says. Around the towers of black smoke, silvery sea cucumbers and translucent shrimp feed on the chemosynthetic microbes and the circle of life begins. Today, the same minerals that draw life towards the vents are now attracting the attention of powerful global mining companies.

### **The deep sea mining boom**

Exploratory mining is already in progress in the Clarion-Clipperton Zone in the Equatorial North Pacific Ocean. Japan, China, Korea, France, Russia and Germany all have approved sites in the zone, along with the Interoceanmetal Joint Organization, comprised of sponsors from Bulgaria, Cuba, the Czech Republic, Poland, Russia and Slovakia. The next frontier is the Indian Ocean, where Copley just spent several months studying the ecology of deep sea vents on the Southwest Indian Ridge. His team believes they have discovered new species during their expedition, like *Rimicaris* shrimp, *Kiwa* yeti crabs and scaly-foot snails, which likely only inhabit vents within the area.

The SW Indian Ridge is an ultra-slow spreading ridge, meaning there is less volcanic activity in the area. As a result, vents are spread further apart and tend to have longer life spans, sometimes lasting for millennia, whereas vents in the Eastern Pacific experience frequent natural disturbances like lava flows and earthquakes. Mineral deposits are greater in ultra-slow spreading ridges, making them desirable locations for exploration. Copley fears species could be ‘pushed towards extinction’ if mining is eventually permitted in such regions. ‘If you start mining at vents, a key concern is whether you will be disturbing the system more frequently than nature does--and if so, there could be impacts,’ says Copley, who believes sites must be assessed on a case-by-case basis. When vents naturally die, species move to another vent in the area. Destroying vents within a vent field leaves fewer options for homeless creatures. ‘We have a network of island-like colonies of species at deep-sea vents, and what happens if you remove some of the nodes of the network - could it collapse for some species, in some parts of the ocean where vents are further apart?’ Copley says.

### **Nautilus launches exploration programme**

The National, 23rd February 2012

By ELIZABETH VUVU

NAUTILUS Minerals has launched its 2012 exploration programme in the Bismarck Sea in its exploration tenement areas. Its tenements included the first commercial development and recently approved licence, the Solwara 1 and 2 projects, located at 1,600m water depth in the Bismarck Sea between New Ireland and East New Britain provinces. According to a statement from the East New Britain provincial administration, the awareness team visited the province last week from New Ireland and would move on to the other provinces sharing coastlines of the Bismarck Sea as part of

their exploration cruise programme awareness. The Nautilus exploration exercise will begin tomorrow over a period of 90 days aboard mv Duke, a fully-equipped seafarer vessel specially fitted for ocean research and with latest technology on deep sea exploration. According to project geologist of Nautilus awareness team Kessy Wama, the main objective of the exploration exercise was to identify new targets, assess data on existing finds and assess the new methods of exploration.

She said the deep sea exploration methods were mainly multi-beam and seismic surveys with the latter being the first of its kind to be used by Nautilus in mapping out geological structures beneath the sea floor. Wama said these activities were low impact and not harmful to marine wildlife and Nautilus would be operating under both the PNG and Australian standards that would be closely monitored by a marine observer who would be onboard the exploration vessel. She assured that as means of controls and mitigation, all equipment on the vessel were well-tested and designed and manned by very experienced operators. Deputy provincial administrator-coordination and implementation, Clement Irasua, reiterated the need for compliance to ensure that marine resources were protected at all costs while in operation. He appealed to maritime communities of East New Britain and New Ireland to understand this awareness programme and cooperate whenever they sighted the mv Duke out on the open seas.

## **CANADIAN FIRM SEEKS SEA-BED MINING LICENSE IN COOKS**

*Endeavour offers \$46 million for right to explore*

By Rachel Reeves

RAROTONGA, Cook Islands (Cook Islands News, Feb. 22, 2012) - Canadian company Endeavour has offered government NZ\$55 million [US\$46 million] for a licence to explore the Cook Islands seabed to determine its mining potential. Minister of deep-sea mining Tom Marsters confirmed in parliament yesterday that the offer is on the table, as he responded to a question from opposition leader Wilkie Rasmussen about whether rumours Endeavour had offered government NZ\$25 million [US\$21 million] were true. "There is an offer on the table, yes," Marsters said. "But the offer is for NZ\$55 million – NZ\$15 million [US\$13 million] is up-front payment to the government and the other NZ\$40 million [US\$33 million] is an investment on the part of Endeavour to do their own research. "...They have assured us that upon the signing of the agreement, within 30 days they will have NZ\$15 million in our bank account."

Marsters gave a brief history of the government's negotiations with Endeavour. He held up a coloured map of the Cook Islands' exclusive economic zone. "That is the very latest from the scientific world concerning the minerals in our EEZ. If I were to bring you an expanded map of the whole world you would find that nowhere else in the world is (manganese) so concentrated as our EEZ. A lot of work has been done since we took over from the previous government. "...By the end of the month a technical adviser, co-sponsored by the Commonwealth Secretariat and ourselves, will be in place and on the ground here in Rarotonga. "We have not changed anything that the former government has put in place because we felt when we came in that the programme they had set was a good programme." Marsters explained that from the beginning, Endeavour had expressed a keen interest in exploring the Cook Islands seabed.

He said it is too early for him to announce with confidence that Endeavour will be awarded an exploratory licence, but nevertheless he hopes the company will "find a place within the scope of the total programme of our seabed mining". "Until all aspects are in place it would not be advisable for us to jump those hurdles sooner than when it should be happening," Marsters said. Teenui-Mapumai member of parliament Norman George raised concerns about the negotiation process. "Don't be too fussy about investment from the Endeavour mineral people – that could be an opportunity we could lose. Don't waste too much time painfully going through non-existent problems. Get real, get prac-

tical but just make sure that we are not negotiating an agreement which will end up like the Toagate agreement," George said. "Don't forget – opportunities don't remain forever, when there's opportunity there, get going. Get working. Get the right people to advise you and get money in the bank. Cure the deficit so you don't also impose new baby and old age taxes that you have unwisely done in the last year."

## **NAURU FIRST IN PACIFIC WITH SEA MINING LICENSE**

*Sonar exploration, seafloor sampling to begin later this year*

WELLINGTON, New Zealand (Radio New Zealand International, Feb. 13, 2012) – Nauru has become the first Pacific Island country to sponsor deep-sea mining exploration. The international Seabed Authority has granted a Nauru-registered company, Nauru Ocean Resources Incorporation (NORI), a license to scope equatorial waters for nodules of copper, manganese, cobalt and nickel. The company's vice-president, Robert Heydon, says work will begin in the second half of this year.

*[PIR editor's note: NORI has been granted a license to operate within Nauru's Exclusive Economic Zone at depths of 5,000 meters to look for mineral resources. NORI is owned by two Nauru foundations, the Nauru Health and Environment Foundation and the Nauru Education and Training Foundation, which were subject to strict finance and operations history screenings through the International Seabed Authority.]*

"And that exploration will basically just be sort of sonar surveys that determine the bathymetry and topography of the seafloor, as well as sampling. So bringing up samples from the seafloor to determine the grade, which is the percentage of metal in the ore on the seafloor as well as the abundance, so how much of these nodules are down there." Robert Heydon says robotic devices will carry out the work, which will occur at depths of up to five kilometers.

## **SOPAC tries to defend its promotion of experimental seabed mining**

PNG Mine Watch 7.2.2012

*While SOPAC tries to defend its industry driven experimental seabed mining project (see below), it still can't explain how an extractive industry can be sustainable, how, unlike multiple mining projects in PNG seabed mining will benefit ordinary people or why it is rushing ahead while there is no scientific consensus on how to manage the environmental impacts....SOPAC DEFENDS BENEFITS OF PACIFIC SEABED MINING, Says deep sea mining will bring Pacific tangible benefits.*

Akuila Tawake, Deep Sea Minerals Project Team Leader for a European Union (EU) funded project, stressed the importance of such projects in the Pacific region. Mr. Tawake explained that the Deep Sea Minerals Project is administered by the South Pacific Applied Geoscience Commission (SOPAC), a division of SPC, and is developing a regional legislative and regulatory framework for deep-sea mineral mining. "This will help ensure that sustainable resource management will bring tangible benefits to Pacific Island Countries and their people," Mr. Tawake said. Mr. Tawake was responding to a story that appeared on Pac News that questioned the motives of those involved with the project.

*"Since the Project was conceived as a result of a number of Pacific Islands Countries requesting the SOPAC Division for advisory assistance and technical support relating to seabed minerals, it is difficult to understand who is being disenfranchised", Mr Tawake said.*

He said that the Deep Sea Mineral Project is not only being supported by the SPC member countries, but by the Pacific Island Forum Secretariat, as well as the EU. The overall objective of the project, he said, is to expand the economic resource base of Pacific ACP States by developing a viable and sustainable deep-sea marine minerals industry. He said the specific objective is to strengthen the system of governance and capacity of Pacific ACP States in the management of deep-sea minerals.

*"This can only be achieved through the development and implementation of sound and regionally integrated legal frameworks, improved human and technical capacity and effective environmental monitoring systems", Mr Tawake said. [PIR editor's note: Meanwhile the regional civil society group Pacific Network On Globalisation (PANG) has expressed their concern in a Press Release regarding the lack of precautionary approach towards the sustainable development of experimental seabed mining. The group says they "...are angry that SOPAC, with the financial support of the European Union, is assisting Pacific states to push forward the development of a regional legislative and regulatory framework for experimental seabed mining ...without the benefit of adequate scientific debates nor of prior public dialogue and meaningful community participation." On December 1 the group launched a public petition against seabed mining and has since garnered signatures from as far as Nigeria and Guyana, diverse groups in Canada, Asia, Hawaii and the Pacific, Pacific and Australia churches and feminists from across the world.]*

Mr. Tawake said that to date there is only one potential deep-sea mining project in the Pacific region and that is scheduled to become operational in 2013. It is the Solwara 1 project in the Bismarck Sea in Papua New Guinea. The mining company, Nautilus Minerals has been working with the Papua New Guinea government since 1997 to explore seafloor massive sulphide deposits with the option to develop those mineral resources if feasible. Mr. Tawake said that the Papua New Guinea government has taken 14 years to make the decision to allow Nautilus Minerals to develop the mine. The Deep Sea Minerals Project is currently being implemented in the following fifteen island countries: Cook Islands, Federated States of Micronesia, East Timor, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

### **ISA lauds progress at seabed mineral forum**

The National, 2nd February 2012

SECRETARY General of the International Seabed Authority Nii Allotey Odunton said that the ISA had been "honoured and delighted" to hold an international workshop, in collaboration with the SPC/SOPAC division of the Pacific Community and the government of Fiji, on issues relating to the environmental impact assessment of deep seabed mining. Odunton's comments, part of his address to the United Nations General Assembly last month, referred to good progress made at the international workshop in identifying the issues that will need to be addressed in future environmental impact assessments, "including the establishing of a framework so that all stakeholders are aware of what is expected of them". During the workshop in Fiji, an integral part of the four-year, EU-funded deep seabed minerals project, Odunton said that more information about the different species living on the deep seabed was needed.

"My concern is to prevent species extinction. We want to emphasise the precautionary approach, the work that still needs to be done in collecting baseline data. "It is the mandate of the ISA to protect the marine environment. This means managing deep seabed mineral exploration, and any future mining enterprises, in such a way that the marine environment is sustained as the common heritage of all mankind." Of particular interest for Pacific Island nations are the two licence applications for deep seabed mineral exploration that the ISA has approved in the areas of seabed reserved for de-

veloping states. The successful applications made by Nauru Ocean Resources Inc (NORI) and Tonga Offshore Mining Ltd (TOML), were sponsored by Nauru and Tonga respectively and that by forming partnerships with commercial interests that had access to the financial capital and technology necessary to conduct deep sea exploration, these two countries are following the “only realistic option for most developing States.” – Sea Bed World News

## **SOPAC has no mandate from Pacific island people to push experimental seabed mining**

PNG Mine Watch 30.1.2012

By Effrey Dademo, ACT NOW!

SOPAC, a division of the Pacific Islands Forum Secretariat (SPC), is pushing ahead with a European Union funded project to promote experimental deep-sea mining in the Pacific region without first consulting with communities about whether this form of mining is environmentally, socially or economically appropriate. There is currently no scientific consensus on the consequences of mining seabed hydrothermal vents and a lot of international concern about its implications. There is also no evidence to suggest mining by large foreign corporations really delivers a better quality of life for local people in the Pacific. Yet SOPAC, in alliance with the mining industry and EU, is pushing ahead with developing laws and a regulatory framework for this risky and unproven new industry. The evidence from Papua New Guinea is that large-scale mining does not deliver a better quality of life for local people and causes a multitude of social and environmental problems. PNG has many mining operations but the Gross National Product per capita is much lower than Pacific countries that are not being exploited by mining companies.

According to the World Bank, GNP per capita in PNG is \$1,300 while in Micronesia, Vanuatu and Samoa GNP is more than twice as high, at \$2,700, \$2,760 and \$2,930 respectively. In Fiji and Tonga GNP is almost three times greater than PNG and in Palau GNP is five-times higher than in PNG. Mining might increase government revenues but most of the money is taken away by the foreign mining companies and their highly paid expatriate staff. In contrast incomes from local food production and farming are wholly retained in the communities where the businesses are located and these types of enterprise provide a truly sustainable future. SOPAC says there is misunderstanding and misinformation about its Deep Sea Minerals Project but the truth is it is being driven by the mining industry and the EU, who want to use Pacific resources to increase their own wealth. The mining industry has been working with SOPAC for many years to map the minerals in the Pacific and those relationships mean we can have no faith in the impartiality of SOPAC in providing technical advice to island countries.

Further, before we drive ahead with laws and regulations we need to decide if the Pacific wants to again be the guinea pig for untried and untested technology just as it was for nuclear testing. Why don't we let Canada, the US or the EU do their testing in their own waters rather than ours? Perhaps they are afraid of more environmental disasters like the 2010 seabed oil drilling debacle in the Gulf of Mexico. SOPAC is clearly wrong to say that laws and regulatory frameworks will ensure sustainable resource management and tangible benefits to the Pacific. Again we need to look no further than PNG which has outstanding protections in its Constitution and Environmental laws but has suffered some of the worlds worst mining disasters and a prolonged civil war caused by some the world's largest mining companies. Despite the denials from SOPAC we stand by our statement that the Deep Sea Minerals Project of the SPC (SOPAC) disenfranchises indigenous people and promotes the interest of big mining companies at the expense of local communities.

SOPAC is spending more time talking with Nautilus Minerals in private meetings and exclusive international workshops than it is having a conversation with the Pacific communities that will suffer

the potential impacts of the mining. Nautilus is the Canadian company spearheading much of the seabed exploration in the Pacific and plans to start production at the world's first undersea mine in PNG in 2013. The SOPAC has stated the overall objective of the project is to develop an experimental seabed mining industry in the Pacific but fails to explain how an extractive industry can be "sustainable" nor how it will be different from other mining operations that have failed to improve the livelihood of local communities. While SOPAC may be correct to say that experimental seabed mining could "expand the economic resource base of Pacific countries" this should not be confused with genuine development and improved livelihoods for Pacific people.

We should also not be fooled by fancy statements about "strengthening the system of governance and the capacity of Pacific States" to manage experimental seabed mining. Nothing SOPAC or the SPC can do is going to change the power imbalance between global mining corporations and Pacific Island governments and bureaucrats that make fine sounding laws and policy frameworks meaningless when it comes down to the actual management of individual mine sites. Laws and policies did not protect the people of Ok Tedi or Bougainville and they will not protect the people impacted by experimental seabed mining. Rather than continually dancing to the tune of global corporations, captured governments and their failed economic system of unregulated capitalism, SPC and SOPAC should be looking to support and nurture our own Pacific ways of doing business and caring for our families and the environment.

### **SPC brings in PR consultant to defend mining project**

PNG Mine Watch 19.1.2012

The Secretariat of the Pacific Community (SPC), badly stung by civil society criticism of its experimental deep sea mining project, has brought in an expensive Public Relations consultant to try and massage its image rather than try and address the problems in its initiative. The Deep Sea Minerals Project of the SPC disenfranchises indigenous people and promotes the interests of big mining companies at the expense of local communities, according to its critics. The project is being funded by the European Union and implemented by the Applied Geoscience and Technology Division (SOPAC) of the SPC. It is alleged the SOPAC boss has a close relationship with Nautilus Minerals the Canadian mining company leading the development of experimental seabed mining. We can now expect to see a series of 'placed' news stories in all the Pacific region media which will portray the SOPAC project in a good light, ignore the criticisms and promote the image of experimental seabed mining as somehow good for the environment and good for Pacific people. SOPAC is yet to explain how experimental seabed mining, an extractive industry, can be sustainable, as it claims or why it has given Nautilus Minerals a seat at the table developing the legislation to regulate the industry.

### **KIRIBATI GOVERNMENT EXPLORING SEABED MINING**

*Manganese and cobalt deposits may provide economic boost*

AUCKLAND, New Zealand (The Kiribati Independent, Jan. 19, 2012) – With fisheries as Kiribati's main economic resource for a growing population, there is an imperative to find other income sources. "This is where seabed mineral exploration and mining is important," said Mr. Tearinaki Tanielu, a Geologist, working as the Minerals Officer for the Kiribati Ministry of Fisheries and Marine Resources Development. "As a nation we are working toward adding more prosperity for people to make their lives better, but at the same time with little or no impact on our environment." He said that on a global level, seabed systems are not fully understood, and that there are policy and knowledge gaps that need to be addressed, adding greater complexity to the whole issue, and that it would be necessary for Kiribati to first develop technical and scientific knowledge and the appro-



prate policies so that the country has the capacity to undertake deep seabed mineral exploration and exploitation.

For these reasons, Mr. Tanielu sees the country's on-going association with the SPC/SOPAC (Secretariat of the Pacific Community/South Pacific Applied Geoscience Commission) the Division as a way to tap into forty years of experience in ocean scientific research, as well as be involved in the development of policy frameworks for deep seabed mineral exploration and mining. Frameworks are being developed as a part of the four-year European Union-funded Deep Seabed Minerals Project. "Yes, of course we see the economic potential of deep seabed minerals, but at the same time we have to protect what has been there for millions of years, and that our ancestors have depended on for thousands of years," he said.

*[PIR editor's note: SOPAC has been developing regional laws and regulatory frameworks for deep-sea mineral mining in the Pacific to benefit island economies. The overall goal of the mining initiatives is to expand economic resources bases for island nations through the development of viable, sustainable deep-sea mineral harvest industries. Kiribati is one of 15 island nations that is implementing the Deep Sea Minerals Project.]*

"It is also important to include our cultural knowledge as a complement to scientific knowledge. Local fishermen are aware that any disturbances to the deep seabed may impact upon the environment, and therefore upon their fish supplies and livelihoods." "There is the confirmed existence of manganese nodules and cobalt crusts in our Exclusive Economic Zone (EEZ) in the Line Islands. We plan to have more exploration there, but we want to do this in an environmentally sound way," said Mr. Tanielu. A country's EEZ extends to 200 nautical miles from the shoreline, but when a country is comprised of groups of islands, (an archipelago), the EEZ may be calculated from the outer edges of that group. Mr. Tanielu said that previous studies, undertaken in the 1960s through to the 1990s, provide useful baseline data, although the area studied is small in comparison with Kiribati's EEZ. "But in taking the direction of deep seabed minerals, we still have to be mindful of protecting our ocean because of the great connection the people of Kiribati have; for thousands of years our people have been people of the sea.

Mr. Tanielu said that it was with protection of the environment for future generations in mind, that the Kiribati government created the second-largest marine protected area in the world, in 2006. This was recognized as a World Heritage Site in 2010. "By conserving an area around the Phoenix Islands group, Kiribati has set a standard for the global community," said Mr. Tanielu. Creating the MPA was a significant move that puts the abundant fish stocks out of reach as a commercial resource, and also precludes the possible exploration and exploitation of the mineral resources within the marine protected area (MPA). As the Phoenix Islands are uninhabited, there has been minimal human disturbance in this area, making the MPA a gift to researchers worldwide when they are studying human impacts on environments. Mr. Tanielu said that the MPA is rich in its diversity of corals and fish species. As a protected area, it could become a spawning ground for fish that migrate to other marine areas that have depleted fish populations as a result of being over-exploited. Although the MPA is equal in size to the state of California, it is only a portion of the area making up Kiribati's EEZ. And Mr. Tanielu believes that "it makes sense from a geological point of view to make use of this large EEZ we have been blessed with, but to do so with a minimum amount of disturbance to our environment."

## **SOPAC DEFENDS BENEFITS OF PACIFIC SEABED MINING**

*Says deep sea mining will bring Pacific tangible benefits*

PAPEËTE, Tahiti (Tahitipresse, Dec. 19, 2011) - Akuila Tawake, Deep Sea Minerals Project Team Leader for a European Union (EU) funded project, stressed the importance of such projects in the Pacific region. Mr. Tawake explained that the Deep Sea Minerals Project is administered by the South Pacific Applied Geoscience Commission (SOPAC), a division of SPC, and is developing a regional legislative and regulatory framework for deep-sea mineral mining. "This will help ensure that sustainable resource management will bring tangible benefits to Pacific Island Countries and their people," Mr. Tawake said. Mr. Tawake was responding to a story that appeared on Pac News that questioned the motives of those involved with the project. "Since the Project was conceived as a result of a number of Pacific Islands Countries requesting the SOPAC Division for advisory assistance and technical support relating to seabed minerals, it is difficult to understand who is being disenfranchised", Mr Tawake said.

He said that the Deep Sea Mineral Project is not only being supported by the SPC member countries, but by the Pacific Island Forum Secretariat, as well as the EU. The overall objective of the project, he said, is to expand the economic resource base of Pacific ACP States by developing a viable and sustainable deep-sea marine minerals industry. He said the specific objective is to strengthen the system of governance and capacity of Pacific ACP States in the management of deep-sea minerals. "This can only be achieved through the development and implementation of sound and regionally integrated legal frameworks, improved human and technical capacity and effective environmental monitoring systems", Mr Tawake said.

*[PIR editor's note: Meanwhile the regional civil society group Pacific Network On Globalisation (PANG) has expressed their concern in a Press Release regarding the lack of precautionary approach towards the sustainable development of experimental seabed mining. The group says they "...are angry that SOPAC, with the financial support of the European Union, is assisting Pacific states to push forward the development of a regional legislative and regulatory framework for experimental seabed mining ...without the benefit of adequate scientific debates nor of prior public dialogue and meaningful community participation." On December 1 the group launched a public petition against seabed mining and has since garnered signatures from as far as Nigeria and Guyana, diverse groups in Canada, Asia, Hawaii and the Pacific, Pacific and Australia churches and feminists from across the world.]*

Mr. Tawake said that to date there is only one potential deep-sea mining project in the Pacific region and that is scheduled to become operational in 2013. It is the Solwara 1 project in the Bismarck Sea in Papua New Guinea. The mining company, Nautilus Minerals has been working with the Papua New Guinea government since 1997 to explore seafloor massive sulphide deposits with the option to develop those mineral resources if feasible. Mr. Tawake said that the Papua New Guinea government has taken 14 years to make the decision to allow Nautilus Minerals to develop the mine. The Deep Sea Minerals Project is currently being implemented in the following fifteen island countries: Cook Islands, Federated States of Micronesia, East Timor, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

### **Solwara 1: East New Britain government challenged**

Post-Courier, December 13, .2011

By SIMON KESLEP, Divine Word University

THE East New Britain Sosen Eksen Komiti (ENBSEK) has urged the ENB Provincial Government

to inform the people of its position in relation to the Solwara 1 deep sea mining project and what steps it was taking to protect coastal communities and marine life. The non-government organisation in a press statement outlined that the people were aware of the 20 years mining lease given by the previous government to the Canadian company, Nautilus Minerals Inc but said the project should not go ahead until it can be proven that coastal communities and marine species will not be poisoned. The Solwara1 massive sulphide deposit was located within national jurisdiction, about 30km out of New Ireland and 60km out of Rabaul. ENB SEK program co-ordinator Sharon Nerius said the project was not 100 miles away from the people and therefore closer consideration was required of the marine environment, impacts on people's livelihood and the overall social and economical benefits of local to regional communities in the use of marine resources within the Bismarck Sea.

The statement outlined that the Environmental Impact Study produced by Nautilus and approved by the previous government identified several immediate and direct environmental impacts including destruction of tens of thousands of hydrothermal vent formations and their unique ecosystems beneath the sea floor. Mrs Nerius said the report, titled, *Out of Our Depth*, by Dr Helen Rosenbaum, stated that "Nautilus has prepared a deeply flawed environmental impact statement. For example, the company has insufficiently tested the toxicity of its mining process on vent species, and has not sufficiently considered toxic effects on organisms on the marine food chain." Mrs Nerius said the impacts alone would provide sufficient reason to not approve the project and added that to date; the company has not released its environmental management plan which has raised a lot of fear about what impacts can be expected from deep sea mining. She also said Nautilus had rated the overall ecological impacts as moderate, provided it can develop strategies to manage them. ENBSEK called on National Government and ENB and New Ireland governments to stop further development until a satisfactory environmental management plan was produced.

## **SEABED MINING WON'T BENEFIT PNG PEOPLE: WOMEN'S REP**

*Claims project was 'imposed' on community*

WELLINGTON, New Zealand (Radio New Zealand International, Dec. 5, 2011) – A representative of coastal communities bordering a planned deep sea mining operation in Papua New Guinea says local people stand to gain little from the gold that's extracted. The Papua New Guinea government awarded the Canadian company, Nautilus Minerals, the world's first deep-sea mining lease in January to develop its copper-gold project by searching for mineral deposits in the Bismarck Sea. Jane Kesno, the president of the Namatanai District Council of Women in New Ireland Province, says seas in the area are rich in tuna and many other forms of marine life. She says the project has been imposed on the people by the government. "You know our people are not that educated to the level where they can either oppose or accept or participate in these forms of negotiations taking place. Most of these discussions and negotiations take place in hotels, in towns, in Port Moresby, in places far away from those communities." Jane Kesno says the people of Namatanai will be lobbying their MP, Byron Chan, who is also the mining minister, to have the project delayed while more information is sought. [PIR editor's note: The National reports that company representatives from Nautilus Minerals have said the company will focus on training local people "in deep sea mining and exploration."]

## **IMPACT OF SEABED MINING AS OF YET UNKNOWN**

*Demand for minerals races ahead of research*

WELLINGTON, New Zealand (Radio New Zealand International, Nov. 30, 2011) – The secretary general of the International Seabed Authority says little is known about the consequences of deep

sea mining. A four-day workshop in Fiji this week, organised by the authority and the applied geoscience and technology division of the Secretariat of the Pacific Community, aims to draw up recommendations for environmental impact assessments of seabed mining. The authority governs the parts of the seabed outside of national jurisdictions. Nii Allotey Odunton says with a rise in demand for copper, nickel, manganese and cobalt and an accompanying rise in the regulations around their land-based extraction, seabed mining is becoming increasingly attractive.

"There was one test in the 70s that actually recovered nodules from the seabed. We've had over 40 years of little experiments. There's been no mining in the deep seabed yet. So we don't have any actual data that comes from mining. What we are trying to do is to be as responsible as possible." Nii Allotey Odunton says prospective miners must take out an exploratory licence which requires them to submit baseline data to the authority.

*[PIR editor's note: The Nautilus Minerals' deep sea copper and gold mining project is due to begin in the next two years off the coast of PNG in the Bismarck Sea, the first of its kind. New laws and legislation have been suggested for PNG and the rest of the Pacific regarding the environmental and economic impacts of deep sea mining, which is as of yet a new challenge to Pacific countries.]*

### **Appraisal of Solwara 1 resources upgraded**

The National, 29th November 2011

NAUTILUS Minerals has announced increased resource estimates at its Solwara 1 project in the Bismarck Sea, about 30km north of Rabaul. The company reported the increase last Friday to the stock market as it also declared a maiden inferred resource at the nearby Solwara 12 project which is 25km northwest of Solwara 1. The company planned to start production from the world's first under-water mine by the fourth quarter of 2013. Its under-water and remote-controlled mining equipment were currently being manufactured in England, according to vice-president investment relations and communications Joe Dowling. The key features of the resource update, prepared by independent consultant Golder Associates Pty Ltd in accordance with National Instrument NI 43-101, stated at a copper equivalent cut-off grade of 2.6%, are as follows:

- 1 The company's total indicated resources had increased 18% to 1.03 million tonnes.
- 1 Total inferred resources had risen 36% to 1.8 million tonnes.
- 1 Contained copper in indicated resource at Solwara 1 had increased 25% to approximately 74,000 tonnes.
- 1 Contained copper in Inferred Resource at Solwara 1 had increased 28% to approximately 125,000t.
- 1 Contained gold in indicated resource at Solwara 1 had increased 23% to about 166,000 ounces.
- 1 Contained gold in Inferred Resource at Solwara 1 had increased 5% to about 317,000oz, and
- 1 A maiden inferred resource had been declared at Solwara 12, 25km to the northwest of Solwara 1, of 230,000t, grading 7.3% copper and 3.6 grams per tonne gold.

The increases in contained metal within the resource were the result of additional tonnes and importantly, higher grades, due to successful resource drilling which identified further high-grade ore zones. The increase in tonnes was also partly due to a reduction in the cut-off grade from 4% copper, used in the prior 2008 resource statement, to a copper equivalent cut-off grade of 2.6% in the 2011 resource, following refinements in the project design. Nautilus Minerals president and chief executive Steve Rogers said the notable increase in the company's resource base showed the success of the exploration campaign, extending the life of the Solwara 1 project and delivering an improved knowledge of the Bismarck Sea geology.

“Importantly, the declaration of a maiden resource at Solwara 12 begins the process of building a pipeline of projects for Nautilus in the region, and confirms the prospectivity of the Bismarck Sea, where we have identified another 16 prospects for further evaluation. “Nautilus will attempt to build on this base in the coming year, through on-going exploration activities in PNG and elsewhere in the western Pacific,” Rogers said. “Nautilus will be undertaking important work including the use of multi-beam sonar and seismic exploration tools in the Bismarck Sea over the coming months to assist in identifying targets for drilling, scheduled to be conducted in the second-half of next year. “As part of that programme, we will be testing for additional lenses of high grade material in the vicinity of Solwara 1, while the limits of Solwara 12 have yet to be fully identified,” he said.

### **Dialogue on Solwara 1 project a success**

The National, 29th November 2011

THE state team that participated in the consultation forum on Solwara 1 project in Kavieng last week has hailed the dialogue a success. State team leader and acting managing director of the Mineral Resources Authority (MRA) Kepas Wali said the two-day meeting was fruitful in that it was an interactive session where all stakeholders openly exchanged views and innovative ideas on how benefits should be shared amongst the impacted communities in New Ireland and East New Britain provinces. He said it was encouraging to see that ordinary village people had opportunities to ask questions to which members of the state team responded. Some of the questions asked during the forum concerned the mechanism that would be used to distribute royalties to impacted communities.

Wali said the simple and most effective way was to channel royalties through the provincial and local level government systems. The LLG’s will further distribute to their wards and eventually impacted communities, he said. Wali said the state was proposing to use this mechanism because the normal way of distributing royalties which was through landowner associations had seen little benefits reaching little people in the villages. He said court and other forms of disputes between landowner associations were another reason the state thought that using the provincial and LLG system was a better mechanism.

Other issues raised and discussed included identification of impacted communities and equity. Wali said the meeting progressed smoothly until the end. Wali particularly thanked representatives from the East New Britain provincial government for their “well-organised and planned presentation outlining their ideas” on how benefits should be shared amongst the impact communities. About 300 members of impacted communities from New Ireland province attended the meeting. He assured all stakeholders that their inputs and comments had been noted and would be incorporated into the draft memorandum of agreement (MoA) and would be discussed further in the coming forum next January in Kokopo, East New Britain.

### **Further report raises serious concerns about Nautilus and experimental seabed mining** PNG Mine Watch 28.11.2011

A further report has surfaced that raises serious questions about the propriety of the experimental seabed mining project Solwara 1 and points out that it is not supported by local people and has the potential to be socially, economically, and environmentally destructive. The report, Nautilus Minerals Inc, prepared in 2008, finds that it is abundantly clear that local and regional leadership have inadequate information regarding both the Nautilus company and its explicit technical plans. The report also finds that the awareness of local biological diversity and its documented (and in some cases, expropriated) uses is inadequate to insure any appropriate oversight and management of indige-

nous resources by the Government of Papua New Guinea. Further local people are not aware of the degree to which the proposed operation is likely subject to significant international intellectual property considerations that are neither owned nor overtly documented to have been licensed to the company. The report was prepared by M Cam Financial and Management Advisors and is based on extensive research and consultation in the Rabaul region, Port Moresby and Fiji. The report author, Dr David Martin, concludes:

*There is sufficient opacity so as to preclude entering into full-disclosure binding agreements regarding Nautilus access to land and sea resources to commence operations. The leadership of the Komgi Village has unanimously voiced its opposition to authorizing any use of, or access through, lands under their common control at this time pending the adequate addressing of all concerns regarding guaranteed and absolute preservation of all marine and terrestrial ecosystems.*

On Friday a separate report, “Out of Our Depth”, was published which details the serious environmental and social impacts expected as a result of the unprecedented experimental mining of the ocean floor in PNG. Professor Richard Steiner has also published a devastating analysis of Nautilus Minerals deeply flawed Environmental Impact Statement – “EIS not fit for its purpose”.

### **Nautilus EIS for experimental seabed mining not fit for its purpose**

PNG Mine Watch 26.11.2011

With international attention focused once again on experimental seabed mining, it is timely to look again at Professor Richard Steiner's devastating analysis of Nautilus Mineral's flawed Environmental Impact Statement for its Solwara 1 project

#### ***Professor Richard Steiner***

The Solwara 1 project proposes to commercially exploit gold and copper deposits associated with deep-sea hydrothermal vents at a depth of 1,500 in the Bismarck Sea off Papua New Guinea. As the Project would represent the first large-scale, human-induced, site-specific disturbance to the deep ocean basin anywhere in the world, it must be considered with exceptional deliberation and caution.

Scientists only first discovered these deep-sea hydrothermal vents and their exotic chemosynthetic ecosystems in 1976, and these extraordinary ecosystems remain poorly understood today. Deep-sea hydrothermal vents, found along mid-ocean ridges and back-arc basins (such as the Manus Basin in the Bismarck Sea), support one of the rarest and most unique ecological communities known to science. Organisms derive their energy from sulfide chemicals in hot (350 C), mineralized vent fluids rather than directly or indirectly from photosynthesis as in other biological communities, and/or from endosymbionts in their tissues. Most species discovered at vents are new to science, and the vents support communities with “extremely high biomass” relative to other deep-sea habitats. Some scientists suggest that such deep-sea hydro thermal vents systems may be where life first evolved on Earth.

The proposed Solwara 1 mining project would destroy an extensive patch of productive vent habitat, including tens of thousands of vent chimneys, killing virtually all of the attached organisms. The EIS states that: “The extent of the impacts to vents and other seafloor habitats directly mined will inevitably be *severe* at the site scale,” and that “it may be *many years* before development of chimneys returns to pre-mining conditions (emphasis added).” And mining is expected to alter venting frequency and characteristics on surrounding seafloor areas as well, thus affecting the ecological communities of a much broader scale than just the mined site.

Although the Solwara 1 EIA / EIS makes a significant contribution to deep-sea vent science, it is clear that the EIS does not present sufficient information with which the PNG government can effectively judge the project's expected impacts. Thus the EIS is judged as not fit-to-purpose. Many risk contingencies are poorly analyzed, some are not analyzed at all, and many of the baseline studies necessary to understand potential impacts have yet to be completed. For instance, studies of the taxonomy and genetic relationships of macro-invertebrate species found at Solwara 1, South Su (upstream about 2 km), and Solwara 8 (downstream about 45 km) have not been completed, and thus the degree of genetic variability and endemism of organisms between sites is not yet known. It is likely that several rare and endemic (found only at the site) macro-invertebrate species that are yet to be described by science exist at Solwara 1.

As a result of the 2007 study at the mine site, "at least 20 new species have been added to the species list at active vent sites." This is a high rate of discovery of species new to science, and species encounter rates of the studies predict that there are likely many more species yet to be identified at the site. Such species would likely become extinct due to the mining project, even without having yet been identified or described. This alone constitutes an unacceptable risk. Bioethics dictates that resource development should not knowingly put species at risk of extinction, be they well-known charismatic macro-fauna (tigers, gorillas, whales, etc.), or poorly known deep-sea invertebrates.

While Nautilus conducted extensive studies of the deep-sea *benthic* (bottom dwelling) communities at the site, no systematic study was conducted on the deep-sea *pelagic* (water column) community that would be impacted immediately overlying the seafloor. Further, there was an inadequate assessment of risks associated with sediment and waste rock disposal, toxicity of the dewatering plume to deep-sea organisms, effects of increased light and noise in the deep ocean environment, and potential accidents on seafloor equipment or surface vessels. Regarding impacts to the *near-shore* ecosystem, one of the greatest risks from the project is the potential loss of tow or power of an ore shuttle barge in route to Rabaul (the EIS projects 3-9 barge trips per week, with 6,000 tons of toxic ore onboard each transit), or of one of the 25,000 ton bulk ore freighters (3-6 trips per month from Rabaul), and the barge or freighter then drifting ashore spilling its toxic cargo and fuel onto the coastal reef system. Yet, this risk was not considered at all in the EIS. Much of the EIS is simply too general in nature to determine impacts, and many of the mitigations proposed rely upon Environmental Management Plans and procedures that have yet to be developed by Nautilus, and thus the effectiveness of these cannot be judged at present.

It is likely that the project would result in severe, prolonged, and perhaps region-wide impacts to a globally rare and poorly understood biological community, and it is clear that the EIS does not adequately assess many of these impacts. Further, the benefits to local people or the economy of PNG seem disproportionately low compared to the scale and risk of the project. While the Project could gross almost \$1 billion USD in its 30-month lifetime, it expects to provide only \$41 million in total taxes and royalties to the government, a \$1.5 million development fund, and a few dozen jobs at most to PNG nationals. Given the above concerns, it is respectfully recommended that the government of PNG not approve the project on the basis of this EIS.

### **Report says experimental seabed mining an unacceptable risk**

PNG Mine Watch 25.11.2011

A new report titled "Out of Our Depth" details serious environmental and social impacts expected as a result of unprecedented mining of the ocean floor in PNG. Canadian mining company Nautilus Minerals Inc. (Nautilus) plans to extract gold and copper from the floor of the Bismarck Sea in 2012 at its Solwara 1 project. The project will mine active and inactive hydrothermal vents at 1.46 kilometres under the sea. Thousands of these vents over an 11 hectare area will be destroyed. Possibly

the origins of life on earth, these high-temperature underwater vents host unique species, most of which have not yet been identified or studied. The underwater mine site is located close to coastal communities that rely heavily on sea food for diet and income. The project is raising alarm among these directly affected communities, as well as among PNG citizens who question the environmental process that led to the licensing of the project. Moses Murray, advisor to the “sea bed mining forum” of community organisations from New Ireland Province, East New Britain and Madang, says:

“The PNG Constitution in its preamble provides for sharing of natural resources with future generations. The current trend shown by our political leaders have taken the direction that they are not worried about the future generations anymore. It is “the now” that matters to them. Every mine on land, be they gas, oil, and other natural resources including mining under the ocean is set to be opened. The brain, pen and ink used to draft the preamble of the Constitution was a waste of time.”

Helen Rosenbaum, author of the report, says “Nautilus has prepared a deeply flawed Environmental Impact Statement. For example, the company has insufficiently tested the toxicity of its process on vent species, and has not sufficiently considered toxic effects on organisms in the marine food chain.” Catherine Coumans of MiningWatch Canada, an editor for the report, notes “once again a Canadian company is set to inflict unusual environmental and social harm in Papua New Guinea in a way that would not be permitted in Canada. Canadian mining company Placer Dome dumped mine waste into the sea for many years and Barrick Gold is currently using a major river system as a mine waste dump. It is tragic that Canadian mining companies are profiting from weak governance in Papua New Guinea.” Available: [www.deepseaminingoutofourdepth.org](http://www.deepseaminingoutofourdepth.org)

## **SEABED MINING IN PNG ONLY A YEAR OFF**

Nautilus beings construction of remote machines

PORT MORESBY, Papua New Guinea (The National, Nov. 22, 2011) – The world’s first deep-sea copper/gold project is edging closer to production in the Bismarck Sea off Papua New Guinea, promising to create a new industry to benefit the people of New Ireland, East New Britain and PNG. After several years of careful research, planning and preparation, Nautilus Minerals Inc, the company developing the Solwara 1 project, aims to commence production in the last quarter of 2013. Nautilus had started construction of three sophisticated remote-controlled machines that will be used on the seafloor, at depths of about 1,600m, to mine ultra-high grade deposits of gold and copper at Solwara 1. The mined material will be pumped as slurry to a ship above and then transported to treatment facilities, probably elsewhere in Asia. Solwara 1 had a total resource of about 2.1 million tonnes, which was a modest number compared with many land based mines.

However, the material is high grade, running at an average of about 7% copper, which is more than 10 times richer than typical land based copper mines. The gold grade is also high, averaging about 7g/t, which is more than three times the grade of many land based mines. Besides the high grade of minerals found at Solwara 1, the project was 30km offshore from Rabaul and far away from residential communities. It will create employment and business opportunities for the region, and its impact on the environment will be minimal, and carefully managed. Nautilus aimed to produce around 1.3 million tonnes of ore per year, and the initial size of the area affected by the operations is small, at only 0.11sqkm. The company will not be creating a large pit as typically seen at most land-based mines, which are shifting more than 50 million tonnes of material per year, and often cover more than 10-20sqkm.

The Solwara 1 deposit sit virtually exposed on the seafloor, having been formed by the precipitation of minerals from superheated hydrothermal fluids which gush up from deep within the earth, through cracks and fissures in the seafloor. These types of deposits tend to be relatively small, form-



ing in mounds on the seafloor which can be broken up and collected by the seafloor mining machines without any use of blasting or explosives. Because the material sits close to the surface of the seafloor, there is virtually no waste material created. And as there was no processing of the ore at the mine site, there are no tailings released into the Bismarck Sea. Nautilus had extensive exploration programmes aimed at identifying further deposits in the Bismarck Sea and elsewhere in the Western Pacific, including in Tonga.

The company had already identified many potential deposits and numerous hydrothermal fields, but the full extent of these has not yet been quantified. There are estimated to be potentially thousands of these hydrothermal vent sites on the bottom of the oceans around the world but many of them will be too small to develop. Nautilus had been granted all the necessary permits by the PNG government to begin production at Solwara 1. In March of this year, the government decided to take a 30% stake in the project, ensuring that the people of Papua New Guinea participated in the economic benefits of this landmark project. The government's pioneering decision ushers in a new frontier as countries around the globe look to the ocean for mineral resource development.

Nautilus had relied heavily on proven deepwater technologies in the design of its production system. It comprised three main components: the seafloor production tools, the riser and lifting system and the production support vessel. Using remotely operated seafloor production tools, ore is broken and then gathered by a large robotic machine. The Auxiliary Cutter (AC) was a preparatory machine that deals with rough terrain and creates benches for the other machines to work. The second machine, the Bulk Cutter (BC), has higher cutting capacity to work benches created by the AC. Both machines leave cut material on the seafloor for the Collecting Machine (CM) which will collect the material by drawing it in as seawater slurry and transferring it to the "riser and lifting system" (RALS).

### **Solwara 1: New Ireland people disappointed**

Post-Courier, November 22, 2011

NEW Irelanders who attended the Solwara 1 Project consultation forum last week have expressed disappointment over the non attendance of provincial government leaders. The people of Kavieng, Central New Ireland and Namatanai local level governments have collectively expressed great disappointment over the non attendance by the New Ireland Provincial Government (NIPG) and its administration, in the consultation forum for the Solwara 1 project. The consultation forum started on November 17 and ended on November 18 in Kavieng. It involved the State, the East New Britain Provincial Government (ENBPG) and people of the three Local Level Governments. The president of Central New Ireland Local Level Government Soka Toligai said this consultation process was an important dialogue and he would have wanted to see the NIPG's participation. "It's no good boycotting the process," he said.

Patrick Maris of Kavieng LLG and Andrew Topolot said their leaders have let them down. "Mipla i paol ya bikos ol lida bilong mipela long provinsal gavman i no stap long stiaim mipela," Mr Maris said. (We are confused because our leaders from the provincial government are not here to guide us). The three and many others were reacting to a presentation by the ENBPG leaders outlining their comments on the existing draft Memorandum of Agreement that was drawn up in Kokopo by all parties earlier this year. Their presentation also outlined the proposed breakup of benefits that are expected to flow from the Solwara 1 project.

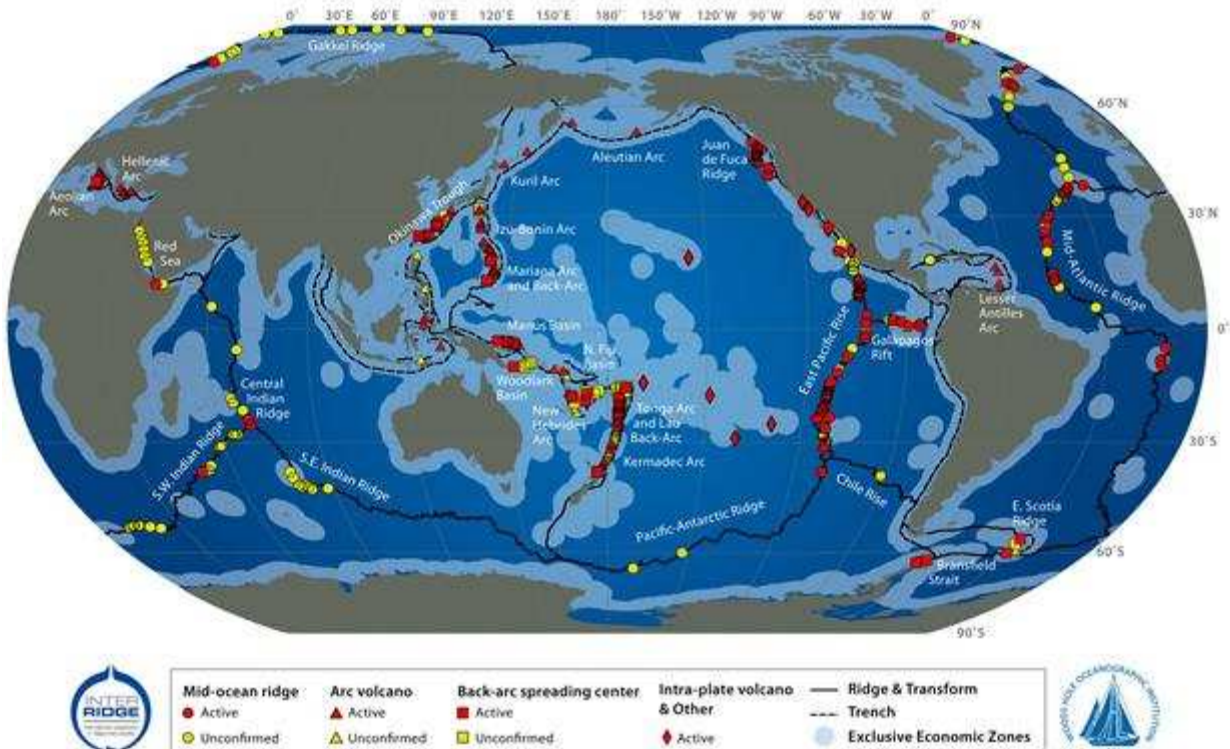
The ENB presentation showed how much royalty would go to each LLG and why they wanted that much of the royalties to go to each of the LLGs. "Mipela i nogat dispela kain ol tingting i kam long provinsal gavman bilog mipela, olsem ol lida bilong ENBPG i wokim, why?" asked Mr Maris. (Our

provincial government leaders don't have the same initiative as the leaders of the ENBPG, why?) Acting Managing Director of Mineral Resources Authority (MRA) Kepas Wali explained to the people that the State officially invited the NIPG to attend this important forum but the NIPG declined to attend. He added that the NIPG has declined to attend a total of three meetings so far.

### Canadian study casts doubt on seabed mining prospects

By Randy Boswell, The Vancouver Sun, Postmedia News, November 21, 2011

## Global Distribution of Hydrothermal Vent Fields



Most deep-sea vents are in volcanically active areas marked on the map by red dots. Many are in international waters or in seas belonging to countries that are still developing deep-sea conservation policies. In January, Nautilus Minerals of Toronto won the world's first deep-sea mining lease from the government of Papua New Guinea to mine near vents in the Manus Basin in the Southwest Pacific Ocean. Photograph by: Handout, S. Beaulieu, K. Joyce, and S.A. Soule (WHOI), 2010

With a Vancouver-based company now licensed to open the world's first undersea mine off the coast of Papua New Guinea, a new Canadian-led study of whether ocean-floor extraction of copper, gold and other metals is "worth the risk" concludes that accessible supplies of deep-sea resources are not nearly as plentiful as previously believed. The fresh assessment of offshore mining potential — published in the journal *Geology* and co-authored by University of Ottawa earth scientists Mark Hannington and John Jamieson, along with experts from the U.S. and Germany — notes that the copper-gold project proposed by Canada's Nautilus Minerals on the floor of the Bismarck Sea is "adding urgency to the debate about deep-sea mining" at a time when easy-to-reach metal deposits on land have been in extraordinarily high demand. "The possibility of mining sea floor (deposits) has stirred debate about the sustainable use of this new resource and whether commercial development is worth the risk," the research team states in the *Geology* paper.

And the scientists conclude that although the vast ocean bottom may well hold massive mineral deposits, the most easily identifiable and accessible seams of copper and zinc along the Earth's "neo-volcanic" ridges, for example, are "insufficient to satisfy a growing global demand for these metals." Hannington, the U of O's Goldcorp Chair in Economic Geology and lead author of the study, told Postmedia News on Monday that while undersea metals are very challenging to obtain, the world's nations "may need (them) someday." And he said the work Nautilus is doing in Papua New Guinea is "fantastic, because we've learned so much already about these deposits (from company research) that we as scientists could never have hoped to have learned" given limited university budgets. But Hannington sounded a note of caution about the overall economic prospects for undersea mining.



Areas marked in orange and cream indicate where Nautilus has been exploring the "massive" and mineral rich deposits on the seafloor off Papua New Guinea. Photograph by: Handout, Nautilus Minerals Inc.

"I think the bottom line that the world needs to understand is that the oceans — at least on the neo-volcanic zones where people are presently exploring — are not going to make a major impact on the total availability of metals," he said. Still, "some companies, like Nautilus, will make a few bucks if they can recover the metals at a cost which is less than that associated with mining on land." Key to the financial equation, said Hannington, is the rate at which land-based resources become depleted and the costs of extracting metals from the ocean bottom become truly competitive. "Just in the United States, which is not a major mining centre, there are 90 million tonnes of copper and zinc in the ground that hasn't been developed," he said. "And that's more than all the metal in the deposits that we think exist in the neo-volcanic zones and the ridges" of the oceans. Hannington positions himself on undersea mining "halfway between those who are rushing and those who are not," he said. "The resources in the oceans are likely to become part of a spectrum of resources that we exploit — just like energy, we exploit wind and solar and oil and gas and nuclear.

"I think that certainly ocean mining is going to take place. But it isn't going to replace current metal inventories from land-based mineral deposits." He added that the Geology study is "purely about the geological resource and with potential economic implications. It doesn't consider at all the environmental, social, etc. impacts that may result from this activity." While the government of Papua

New Guinea has given what Nautilus officials call "historic" approval for the undersea project, critics such as Australian senator and Green party leader Bob Brown have raised alarms about the proposed development. "The Australian Greens are calling for scrutiny of what deep seabed mining means for the health of our oceans and our own country's natural marine resources and fisheries into the future,"

Brown said in a June statement about Nautilus's proposed "Solwara 1" mining operation, which would take place about 1,600 metres underwater. Under the Canadian company's plan, robotic mining machines would break up the metal-rich ore on the ocean bottom and send a slurry solution by pipeline to a surface barge for transport and further processing. The technology is largely modelled on offshore oil and gas operations. Hannington declined to weigh in on the debate about the environmental impact of offshore mining. "That's not my domain," he said. "That's a question that society and governmental agencies are going to have to tackle to determine whether those risks are acceptable." [rboswell@postmedia.com](mailto:rboswell@postmedia.com)

### **Seabed mining data crucial**

Post-Courier, November 21, 2011

CAREFUL monitoring before, during and after the impending deep seabed mineral mining off the shores of Papua New Guinea will provide the hard data that will guide responsible deep seabed mining practices in the future. This is the view of Dr Charles (Chuck) Fisher, Professor of Biology, Penn State University USA, who made a presentation at the recent STAR meeting. STAR (the Science, Technology and Resources Network) is an integral part of the SPC/SOPAC Division annual meeting that took place mid-October in Nadi, Fiji. Deep-sea biologist Dr Fisher said that mining activities that were planned with conservation in mind might have little long-term effect on the animal life found at the depths where deep seabed minerals lie.

"On the other hand, poorly planned or regionally intense mining activities could have devastating effects on the fauna, especially on relatively rare species or isolated populations," said Dr Fisher. Dr Fisher had been studying such creatures "almost since they were discovered in the late 1970s," which live where deep-sea minerals have formed. "Within the deep, dark environment of the seabed at depths of around 2000 metres, in waters that can be as acidic as battery acid, a specialised group of creatures has evolved that are not dependant upon sunlight for the manufacture of their food," he said. They survive in large numbers.

### **Stakeholders of Solwara1 meet**

Post-Courier, November 21, 2011

Stakeholders of the Solwara1 project attended a two-day consultation forum in Kavieng, New Ireland Province (NIP). The stakeholders in this project are the State, East New Britain Provincial Government (ENBP), NIP Government and the operator Nautilus Minerals. The NIPG was represented by executives of its local level governments of Central New Ireland, Namatanai and Kavieng. The aim of the forum is to gauge the views of all stakeholders and agree on the various issues including benefits such as royalties, special support grants, employment & training for locals in affected communities and business spin offs. This is the third forum and depending on the progress after this forum, there could be more in the near future.

Acting Managing Director of the Mineral Resources Authority (MRA) Kepas Wali said on behalf of the state that the government and particularly the MRA, was prepared and committed to working with impacted communities and other stakeholders to progress the consultative process and eventu-

ally establish and MOA. He said the MRA's vision is to improve the livelihoods of all Papua New Guineans through the responsible management of the nation's mineral resources. "Consultation processes like this is a direct effort to achieving this vision." Mr Wali explained that consultation forums like these are a normal part of the process of negotiating benefits and related issues before any mining project goes into operation. He said these processes eventually lead to Memorandum of Agreements (MOA) adding that when people get benefits, their livelihoods improve.

### **Nautilus: Project in steady progress**

The National, 15th November 2011

NAUTILUS Minerals Inc continued to make steady progress in the development of its pioneering seafloor copper-gold project, in the September quarter of this year, and remains on track to begin production in the final quarter of 2013. The company completed the quarter with a cash balance of US\$155.1 million, after successfully raising C\$70.5 million in the first tranche of a C\$98.1 million capital raising. The final tranche of C\$27.6 million was received last month. The capital raising involved the issue of approximately 39 million shares at C\$2.52 per share. The funds raised were being used for the construction of a seafloor resource production system, which initially will be deployed at the Solwara 1 project in the Bismarck Sea off New Ireland province – the company's first deepwater copper and gold project. As a result of the successful financing, the board of Nautilus formally sanctioned the Solwara 1 project. "During the quarter, we continued to work with the PNG government and Petromin to finalise contracts and financing arrangements for its 30% holding in the Solwara 1 project," according to Nautilus chief executive Steve Rogers.

Project development gathered pace during the quarter, leading to an increase in investment. Net cash invested for the nine months to the end of September totalled US\$56.6 million, compared with US\$36.4 million at the end of June, with the increase mainly due to purchase of plant and equipment. The loss for the period was US\$11.4 million, reflecting the fact that the company remained in the development phase, and had not yet began revenue-generating operations, the company said. In exploration, Nautilus continued to analyse the results of its Bismarck Sea drilling campaign completed in May, and to update the company's NI43-101 resource through an independent report in preparation by Golder and Associates by year end. The drill programme was expected to lead to a significantly enhanced understanding of Solwara 1 geology.

### **CANADA BANKER SETS UP FOR SEABED MINING IN COOKS**

*Endeavor Financial hopes to gather manganese nodules*

RAROTONGA, Cook Islands (Cook Islands News, Oct. 28, 2011) – Sea-mining hopefuls and Canadian banking group Endeavour Financial have established a Rarotonga-based company to handle all their business in the Cook Islands. The business, which is being handled by Sandy Moreland, met with members of the House of Ariki this month to help build its relationship with the Cook Islands traditional leaders. President of the House of Ariki, Travel Tou Ariki, said the company would again meet with chiefs from Rarotonga and the outer islands soon to better explain their intentions in the country. Tou Ariki said it was every chiefs responsibility to ensure the ocean and seafloor are treated with respect and preserved for future generations.

Endeavour has been lobbying the various Cook Islands governments since 2007 for access to explore the country's ocean beds for possible deep-sea mining. The company has been seeking permission to explore the potential for sea bed mining of so-called manganese nodules, which would produce tonnes of copper, nickel, cobalt and a variety of rare metals. Endeavour Financial adviser Gordon Keep was also in the Cook Islands during those meetings with the House of Ariki. Cook Is-

lands News has approached Keep, Moreland and Endeavour Financial for comment on their movements in the last fortnight, but no response has been forthcoming.

Tou Ariki said the House of Ariki would work to ensure any company conducting deep-sea mining in the Cook Islands would be environmentally friendly and in line with the peoples expectations. He said he appreciated being able to have first-hand contact with Endeavours people. They are trying to let the people know that this is not an easy job and that this is not an overnight job, Tou Ariki said. But it is good to hear it straight from the horses mouth, making sure the House of Ariki is hearing true information.

## **Law on Pacific seabed mining eyed**

The National, 27th October 2011

By SINCLAIRE SOLOMON

LAWYERS are hoping to prepare a new law within three years to protect Pacific marine environments, including those of Papua New Guinea, from possible damage caused by new deep-sea mining projects, Radio Australia reported on Monday. Deep seabed minerals had the potential to be a major economic resource for PNG and other countries across the Pacific but there had been growing concerns about the lack of laws governing the practice. Canadian explorer Nautilus Minerals planned to have the world's first seabed mining project, Solwara1, in waters off PNG's New Ireland and East New Britain provinces, which was expected to begin in 2014. And Tonga and Nauru had sought exploration licences in international waters in the east Pacific through their sponsorship of companies Tonga Offshore Mining Ltd and Nauru Offshore Resources Inc, Radio Australia reported. Nautilus also had sea floor exploration leases in the Solomon Islands, Vanuatu, Fiji and New Zealand.

Radio Australia said that Hannah Lily, a lawyer for the Secretariat of the Pacific Community's Deep Sea Minerals Project, was working with 15 Pacific nations, including PNG, to establish the regional framework before mining begins. Lily told the radio's Pacific Beat that a regional standard would be developed that every country could agree to. "Once we've developed some regional standards that we think we can apply, which will be quite high level, they're going to need to be implemented in quite different ways in each of the countries," she said in an interview. "That's why I am really looking forward to working with the government and legal communities to ensure that what each country ends up with suits their context and it will be quite different for each. "It's about making sure the Pacific region is working together and setting standards that the rest of the world can follow."

Commenting on this yesterday, Nautilus Minerals PNG country manager Mel Togolo said Nautilus Minerals was leading the world in the development of the seafloor resources industry, which had the potential to deliver major economic benefits to countries in the Western Pacific and elsewhere. "As the industry leader, we are very conscious of the need to ensure that we work with governments in the region to develop a regulatory framework that fosters the growth of the industry in a way that is economically, socially and environmentally sustainable," he said. "We have been working with governments in the region, and at a global level through the International Seabed Authority, to develop that framework, and we have been making excellent progress. "We are grateful for the work of people like Hannah Lily and others, who recognise the great potential of the industry to lift the standard of living in the region and create lasting benefits for future generations". The government this year granted the seabed mining licence to Nautilus Minerals for the Solwara1 project, about 50km north of Rabaul, saying that it would take its full 30% stake in the project – about US\$103 million. In what will be the first in the world, Solwara1 was expected to produce around 800,000 tonnes of copper and up to 200,000 ounces of gold a year.

## **NAUTILUS HOPES TO BE MINING PNG OCEAN FLOOR BY 2013**

Company targets sulfide deposits off coast of New Ireland

WELLINGTON, New Zealand (Radio New Zealand International, Oct. 24, 2011) – A lawyer with a division of the Secretariat of the Pacific Community says deep-sea mineral exploration and mining will be hugely beneficial to the Pacific Islands. Hannah Lily, who's with the Secretariat of the Pacific Community's Pacific Geoscience Commission, aims to help member countries develop the legal framework to allow for deep-sea mining. Lily, who will serve as the newly-appointed legal advisor for the Sea Minerals Project, says deep sea mining is expected to get underway in the Pacific within two years with Canadian company, Nautilus Minerals, planning to mine sulfide deposits off the coast of New Ireland in Papua New Guinea.

*[PIR editor's note: Nautilus Minerals plans to raise about US\$100 million to develop the Solwara 1 mining project in the Bismark Sea. However, international critics of the project have commented that the Pacific is a relatively new area for deep sea mining, and the technologies and potential impacts of mining on marine environments are not well-known.]*

"If a state contracts with a mining company or an exploration company to come and work within their territorial waters, to explore the mineral, or eventually to exploit the minerals then those minerals are owned by the state and by its people."

### **Nautilus Minerals to raise US\$100m**

The National, September 2nd 2011

NAUTILUS Minerals is to raise about US\$100 million through a private placement of common shares to fund the development of its first project, Solwara 1, in the Bismarck Sea of PNG, the company announced on Wednesday. As a result of the financing, the board of Nautilus had formally sanctioned the development of Solwara 1, subject to the closing of the private placement in full. The placing would involve the issue of 39 million shares to a number of investors at a price of US\$2.58 per share. Nautilus president and chief executive Steve Rogers said the private placement would provide funds for the construction of the seafloor resource production system, which initially will be deployed at Solwara 1 – the company's first deepwater copper and gold project. The net proceeds of the non-brokered private placement, combined with the US\$112 million in cash reserves held at the end of last June and the contribution from joint venture partner Petromin PNG Holdings Ltd, are expected to be sufficient to fund the development of the offshore component of the mining joint venture, excluding contingency and any working capital requirements.

Investors participating in the placing include Mawarid Mining LLC, a subsidiary of MB Holdings Company LLC, an oil and gas, mineral mining and processing group based in Muscat, Oman. It will make an investment of about US\$50.1 million to purchase 19.4 million shares, equivalent to 9.98% of the expanded share capital of the company. Existing Nautilus strategic shareholders, iron ore producer Metalloinvest and mining group Anglo American, are also participating in the private placement. Metalloinvest had subscribed for approximately 8.2 million shares to maintain its interest in Nautilus at 21%, and Anglo American had subscribed for approximately 4.3 million shares on the basis that its stake will be maintained at 11.1%. Institutional investors had subscribed for the remaining seven million shares to be issued.

Under the terms of the agreements, the private placement will be completed in two tranches, with the final closing taking place on Oct 6, 2011. Rogers said he was pleased to welcome Mawarid Mining, with its strong mining and oil and gas pedigree, as a shareholder of Nautilus and noted the continued support from Metalloinvest and Anglo American. The MB group employs more than

6,500 employees from 51 nationalities in the oil and gas, manufacturing and mining industries. First established in 1982, the group has operations and subsidiaries spread across the globe, including the Middle East, Europe, North Africa, Asia, Asia-Pacific, Australia and New Zealand. It was the first private sector organisation to engage in gold and copper exploration in Oman, where it operated several open pit copper mines and processed ore at its copper concentrate facility in the Al Batinah region.

### **Pacific islands seek protection from deep-sea mining**

Source: SciDev.Net, July 29, 2011

Surging interest in deep-sea metal mining in the Pacific Ocean has prompted island nations to work together to develop the scientific capacity needed to protect their environment. The move follows the discovery of large deposits of rare-earth metals such as scandium on the seabed near Hawaii, Tahiti and other locations in the eastern South Pacific and central North Pacific. The latest discovery was reported by Japanese researchers in *Nature Geoscience* earlier this month (3 July). Canadian mining company Nautilus Minerals is already planning a deep-sea copper and gold mine at the Solwara 1 site near Papua New Guinea from 2013. And last week (19 July), the UN's International Seabed Authority approved applications from China and Russia, and companies sponsored by Nauru and Tonga, to explore deposits around hydrothermal vents in the eastern central Pacific Ocean.

But inadequate international legal safeguards for such mining are causing concern that it could damage the unique biodiversity surrounding deep-sea vents, which spew hot, sulphurous water into the ocean, forming deposits that contain economically important metallic minerals. Member countries of the Secretariat of the Pacific Community (SPC) established a Deep Sea Minerals project in March under its Applied Geoscience and Technology Division (SOPAC) and met last month (6–8 June) to begin developing policy and legislation. The project is funded by a grant of €7.7 million (US\$11.1 million) from the European Union and will be implemented by 2014 in 15 Pacific states. Fiji-based SOPAC provides earth sciences information and services to SPC countries and is funded by member states and donors. The project's leader, Akuila Tawake, said there has been plenty of research into deep-sea minerals over the past 40 years, but much more is needed to understand the likely impacts of mining and to protect the environment. 'The need to carry out the precautionary approach came out [of the meeting] loud and clear,' he told SciDev.Net.

Tawake added that several countries had approached SOPAC for technical advice relating to the exploration and mining of seabed minerals. Under a draft plan, the project will first develop a regional framework and then help countries develop policy and legislation over the next four years. It will also map the information on deep-sea minerals, Tawake said. Michael Lodge, legal counsel for the International Seabed Authority, based in Jamaica, said: 'There are no regulations addressing waste removal in seabed mining since nobody has done it yet, so it's very hard to regulate until we know exactly what technology is going to be used.' He added that standards must be the same for all countries, and that there are many questions to resolve. Community leaders in Papua New Guinea have condemned the Solwara project, claiming that it could have many unknown consequences.

### **PNG SEABED MINING COMPANY CLAIMS 'MINIMAL WASTE'**

*Nautilus Minerals nears active mining*

By Bosorina Robby

PORT MORESBY, Papua New Guinea (The National, July 22, 2011) - The proposed Solwara 1 ocean floor mining by Nautilus Minerals Ltd in the Bismarck Sea has complied with environment and mining laws of Papua New Guinea (PNG), the company's PNG country manager Mel Togolo



says. He also told the PNG Chamber of Mines and Petroleum Environment Seminar on Wednesday that an important aspect of the project was its smaller physical footprint compared with land-based mining. Solwara1 will commercially explore for seafloor massive sulphide (SMS) deposits, which are high grades of copper, gold, zinc and silver, in deep sea mining off the coasts of New Ireland and East New Britain provinces. Togolo said some advantages of deep sea mining, a world first in PNG, was the use of reusable infrastructure and technology like offshore diamond drilling, dredging, onshore mining and pumps systems of oil and gas fields.

“The advantage of being out at sea is that there will be limited social disturbance, and there are no human presence at the depth of 1,600m, which is how far down the mine is located,” he said. Togolo said worker safety would be protected because most of the work would be done by robots and machines programmed to work at such depths, which are too cold and deep for humans, which are all controlled on board a command ship. “We will have minimal waste as what comes out goes back into the sea, and we will have minimal overburden because there is no land for us to get rid off before getting to the ore deposits,” he said. Togolo said during his presentation that Nautilus Minerals had been given government approval in the form of a permit to explore and a permit to operate a mine after satisfying procedures outlined in the Environment Act 2000 and Mining Act 1992. He said these permits were presented in 2009 and 2011 respectively.

Togolo said the project has also applied for and received approval from the relevant communities or those who are closer to the project. He said preliminary awareness programmes included transparent and inclusive stakeholder engagement and workshops involving communities, world-renowned experts, government and non-governmental organisation. Given that production was set to start in 2013, Nautilus Minerals was seeking acceptance or social licence to disaggregate seafloor material, transport the material to a ship and transport to a market. Togolo mentioned that the coastal communities were most concerned about environmental issues such as the protection of the marine environment with emphasis on tuna, reefs, whales, sharks and turtles. In response, Nautilus Minerals said that with the extraction taking place below the level the tuna population, their feeding and breeding grounds would not be affected. However, Togolo said the only impact on surface waters would be the presence of the vessels and supporting vessels and riser pipes which will transport the ore from the seafloor up to the vessel.

### **Nautilus: Pundari pleased with Solwara 1**

The National, July 15th 2011

MINISTER for Mining John Pundari expressed satisfaction over the progress of Nautilus Solwara 1 project especially the technical aspect of the project. During a visit to Nautilus office in Brisbane, Australia last week, Pundari said: “I am particularly pleased to learn of the technology that Nautilus is implementing – the technology that is being adapted from machinery already in use in the oil and gas industry and in offshore diamond mining. That gives me great confidence,” Pundari said. He told Nautilus chief executive officer Steve Roger that the PNG government was fully committed to supporting the project as indicated through its decision to acquire a 30% stake in the first deep sea mining project. “It is my intention to make an announcement on the fulfillment of the government’s commitment in the next few weeks,” he added.

## **Pacific seabed could be resource laden**

Radio Australia News, July 4, 2011



A new study suggests massive deposits of hi-tech minerals might be found in the mud on the floor of the Pacific Ocean. [James Cook University]

A new study suggests massive deposits of hi-tech minerals might be found in the mud on the floor of the Pacific Ocean. The findings could mean challenges to China's monopoly over the so-called rare-earth metals, which are used for electric cars, flat-screen TVs, wind turbines and MP3 players. China has one third of the world's rare-earth reserves while another third are in former Soviet republics, the United States and Australia. Research published in the journal *Nature Geoscience* by Japanese geologists suggests rich deposits of rare-earth minerals in samples taken from the central east and central north of the Pacific. While lab tests showed the deposits could be removed by simply rinsing the mud with diluted acids, it is not known if the technology exists to recover the mud at depths of four to five kilometres below the surface of the ocean.

## **COOK ISLANDS TO ISSUE SEABED MINING LICENSES BY 2013**

*Government searching for technical advisors*

By Eric Parnis

RAROTONGA, Cook Islands (Cook Islands News, June 25, 2011) – The Cook Islands government is aiming to begin issuing deep sea mining exploration licences by 2013, deputy prime minister Tom Marsters said yesterday. Marsters, the Minister for Minerals and Natural Resources, told Cook Islands News he expected the Cook Islands would be in a suitable position to begin offering licences in about 18 months. He said the government was currently searching for experienced technical advisors to help it develop its application process, and that by 2013 it planned to employ a commissioner to supervise determinations. Were looking for this person right now ... in places that already have a strong mining history, Marsters said. These people don't come cheap, but they are worth every cent. It is that point when we start looking at exploratory licences, which is what will lead into mining licences. The seabed mining advisory board established under the previous government will continue to operate with only minor changes.

We have retained the taskforce set up by Minister Robert Wigmore the chairman and everybody else. I might add one or two more, Marsters said. We see the need to maintain momentum by keeping those people on. To change at this stage is counterproductive to the cause. Marsters said the Cook Islands was entering an exciting time for deep sea mining and the government was aiming to make sure it established fair and equal procedures for processing permit applications. He said he expected the relevant technology to be perfected by 2015, with full mining to start in about 10 years. By year 2021 there will be commercial mining, he said. Ten years is within our time, it is certainly within the time of our children and certainly within the time of our grandchildren. It's no longer a dream, no longer pie in the sky. This is real. The Ministry of Minerals and Natural Re-

sources is planning to hold a number of community seminars in the near future. Full details of the public meetings have not yet been finalised, but the ministry expects to be able to announce more within the coming weeks.

## **COMPANY OFFERS \$26 MILLION TO PROSPECT OFF COOKS**

*Canada's Endeavor Financial got no response*

RAROTONGA, Cook Islands (Cook Islands News, June 23, 2011) – Canadian banking group Endeavour Financial has made a fresh, CA\$25 million [US\$26 million] offer to the Cook Islands government for an exploratory licence for manganese nodule mining. But the company appears to have been largely ignored by the government in its latest attempts to obtain a license. Cook Islands News was told by a source close to Endeavour that it had received no official response from the government in the months since it lodged its application. By the time of publication yesterday afternoon, the Ministry of Minerals and Natural Resources had not returned CINews requests for comment on the issue despite being approached multiple times over the previous two days. Endeavour Financial submitted its application to the government in early April, seeking a four-year exploratory licence in the Cook Islands with a proposed start date from today.

In the application, Endeavour estimates it would spend \$25 million of its own money over the next four years setting up a Rarotonga office, conducting environmental studies, collecting samples, testing nodule recovery and conducting feasibility tests. The application included no references to exclusive access to the Cook Islands exclusive economic zone (EEZ) or exclusive access to any minerals discovered during the exploration. Deputy leader for the opposition Wilkie Rasmussen said the government should have considered the Endeavour application and believed the government was holding out on the hope of receiving bigger offers from Asian companies. It seems like they are hanging out to see what money Chinese or Korean companies would bring into the country, he said. Its wishful thinking to wait. Rasmussen criticised the government for treating the possibly lucrative exploration deal as if it was trading the rights on the stock market. I think part of the governments problem is they are approaching it like a brokerage, trying to find the highest bidder. This is also wishful thinking.

## **Deep Sea Mining: Drilling to begin in 2013**

Post-Courier, June 28, 2011

THE Solwara1 seabed mine operation by Nautilus Minerals, located 30 kilometres from the coast of New Ireland and at a depth of 1600 metres is expected to begin by the end of 2013 with the mining of 'high grade' Seafloor Massive Sulphide deposits that contain copper, gold, silver, zinc and lead. While the project is unique as the world's first seabed mine, the lease arrangements are a reflection of the evolving legislative and regulatory process in Papua New Guinea since the 1970s. "This will enable us to avoid past experiences from the OK Tedi and Bougainville Mines," said Lyndah Brown-Kola, Senior Technical Assessment Engineer with the Mineral Resources Authority (MRA). Mrs Brown-Kola was part of a team of government officials who attended the Deep Sea Mineral Project workshop organised in Fiji by SOPAC, a division of the South Pacific Secretariat of the Pacific Community. The team presented to the delegates the legislative and regulatory process in PNG that led to the granting of the seabed mineral mining lease.

Mrs Brown-Kola said that the current legislative and regulatory review process was adequate to ensure that environmental, operational, and financial concerns were addressed. "We operate in conjunction with the Department of Mineral Policy and Geo-Hazards Management, which has responsibility of setting all mining policies. "It is part of the Mining ministerial portfolio," Mrs Brown-

Kola said. She said the Government policy enables the State to acquire up to 30 per cent equity interest in mining projects in PNG. The government has set as a policy, that through its nominated state entity Petromin, it offloads five per cent to landowners as royalty. This provides a clear window of transparency in a project, as well as ensuring that the government shares in the profits, while responsibly participating in the mining operation through Petromin, which is an independent state commercial entity.

Mrs Kola-Brown said that the government had been looking at the Solwara I project since 1997 and it granted Nautilus Minerals the first offshore mineral exploration license in 2008. "We have been working with Nautilus for fourteen years. It was only this year that we granted the company a mining license. This followed two years of deliberations over their application," she said. Mrs Kola-Brown said the two years were spent ensuring environmental concerns were addressed. It was a requirement to issue an Environment Permit as a condition before the mining license was given. "We have been educating PNG communities in the region to make sure they understand all facets of the project. "We have sent our technical overseas to expand their expertise in seabed mining," she said. "We are well aware of the importance of this project and understand that it will be used as a model for others around the world to learn from. I am very proud to be a part of this venture."

## **SAMOA URGED TO DEVELOP SEABED MINING POLICY**

*No pertinent regulations now in place*

APIA, Samoa (Samoa Observer, June 26, 2011) - Samoa needs to put regulatory policy in place and review existing seabed mineral data. That's the reaction from Lameko Talia, Principal Scientific Officer, Geology and Geophysics of the Meteorology Division of Ministry of Natural Resources and Environment (MNRE), after attending a 'high level' Deep Sea Minerals Mining Meeting workshop. Held in Fiji, the meeting identified key issues to be addressed towards the commercialization of deep seabed mining in the Pacific region. The meeting focused on legislative, regulatory, capacity requirements, and the environment, all of which pertain to deep-sea minerals and mining. Mr. Talia is inspired by the workshop, and eager to see a 'Sea Act' formulated that will directly apply to Deep Sea Minerals and Mining. "We need to put policies in place, and we definitely would want to work with SPC/SOPAC Division on this," he says.

Samoa has a principal, overarching The Lands, Surveys and Environment Act, passed in 1989, The Land for Foreign Purposes Act 1992/1993 and National regulations, policies and strategies that cover sand and gravel mining, water, and the conservation of flora and fauna, parks and reserve lands. Apart from the 1989 Act, there is "no provision specifically for the mining of minerals, whether on land or offshore." Mr. Talia says mining in Samoa is confined to coastal sand mining and aggregate quarrying for building roads and other infrastructure. Deep sea mineral mining for commercial purposes "would be a first for Samoa." "Past deep-sea mineral research led to the discovery of deposits of cobalt-rich crust, within Samoa's Extended Economic Zone (EEZ)," says Mr. Talia. "The deposits are medium sized in comparison with those discovered in the EEZ of offshore Cook Islands for example, but there are deposits there." All previous research says the amounts are worthwhile investigating further, and could possibly generate economic incentives for the people of Samoa."

"We have a potential resource, but the existing data needs to be reviewed. If we are economically minded, we need to pinpoint exactly how much ore exists with a thorough exploration using the new 3D bathymetry technology that is now available. This is essential if there is to be any possibility of mining these deposits." Mr. Talia says it is important to look to the examples set by other Pacific Island nations, such as Papua New Guinea and Nauru, and make sure that the funds generated are channeled back to the community, to improve the country's GDP. "This raises issues

of transparency, and as a vital part of any investment in seabed mining, information must be published for public review." In this way there is no possibility of misappropriation, and all parties are kept honest. "It is essential that we enforce contracts, make sure that all safeguards are in place before, during and at the end of a mining operation." For example, we don't want old machinery left on the beaches.

Samoa has a beautiful but fragile environment, and as tourism is a major revenue earner for the country, it is essential to maintain pristine waters and beaches. "We don't want people to stay away because environment has been degraded as a result of mining activities." Mr. Talia says that in order to develop the possibility of off-shore, deep sea mineral mining, it will be necessary to follow up, through the Ministry of Foreign Affairs, Samoa's status in relation to making the country's Maritime Boundaries submissions to the United Nations. "As a geologist from the Ministry of Natural Resources, I found this to be an inspiring workshop," he says. "There is no other Ministry in Samoa to regulate mineral resources, so we are the right people to be taking on this topic." "Perhaps further along, we could develop a specific Minerals Division."

### **Australia: MP Brown calls for scrutiny of deep seabed mining**

Media Release, The Greens, Spokesperson Bob Brown, 10th June 2011

Deep seabed mining threatens our oceans and the marine environment of our neighbours, particularly Papua New Guinea where seabed mining experiments are going unchecked, Australian Greens Leader Bob Brown said today. "The Australian Greens are calling for scrutiny of what deep seabed mining means for the health of our oceans and our own country's natural marine resources and fisheries into the future," Senator Brown said in Hobart after ABC TV's Catalyst program examined deep seabed mining. "On a recent visit to Papua New Guinea, the Chairman of the Bismarck Solomon Seas Indigenous People's Council and Vice-Chairman of the Madang Indigenous People's Forum, John Simoi, raised concerns about the rapid approval of the Solwara I project in the Bismarck Sea and the lack of adequate safeguards," Senator Brown said.

"Our government has given the go ahead for Nautilus to use us as guinea pigs, to experiment," Mr Simoi said. "Nautilus Minerals, based in Singapore, which has the world's first seabed mining operation controlled by robots, in the ocean south of New Ireland, plans to extract minerals that are going to make somebody somewhere very wealthy and dump tailings straight into that marine ecosystem. The threats of that form of process are global," Senator Brown said.

The Senate is scheduled to vote next week on Senator Brown's motion: That the Senate –

- (a) recognises that the Solwara 1 Project in the Bismarck Sea off Papua New Guinea plans to mine copper and gold at a depth of 1 600 metres and is the world's first deep seabed mining project;
- (b) acknowledges that full-scale undersea excavation of mineral deposits globally has potential to remove parts of the sea floor and damage the ocean's health as a result of leakage, spills and damage caused by increased toxicity and sediment from tailings; and
- (c) calls on the Government to establish an inquiry, to report by 1 October 2011, into seabed mining to assess:
  - (i) the level of interest in seabed mining in Australian waters and in waters in the region neighbouring Australia,
  - (ii) the potential impact on the marine environment and resources if this industry develops, and
  - (iii) the need for regulation or a regional agreement to manage and reduce the potential for this industry to impact on marine productivity.

### **ABC TV CATALYST: Deep sea mining**

The Australian TV science magazine show, Catalyst, screened a segment on deep-sea mining Thursday evening (AEST), with a special focus on the Solwara 1 deep-sea mine in Papua New Guinea. Watch the video: <http://www.abc.net.au/catalyst/stories/3240156.htm>

### **Nautilus granted mining lease for Solwara-1**

The National, June 10th 2011

FOR the first time, a major step forward in the development of seabed mining is now in place with the granting of the mining lease to Nautilus Minerals for the development of the Solwara-1 project in the Bismarck Sea between New Ireland and New Britain. The mine operation, located 30km from the coast of New Ireland and at a depth of 1,600m, is expected to begin by the end of 2013 with the mining of “high grade” seafloor massive sulphide deposits that contain copper, gold, silver, zinc and lead. While the project is unique as the world’s first seabed mine, the lease arrangements themselves are a reflection of the evolving legislative and regulatory process in PNG since the 1970s. “This will enable us to avoid past experiences from the Ok Tedi and Bougainville mines,” senior technical assessment engineer with the Mineral Resources Authority Lyndah Brown-Kola said.

Brown-Kola was part of a team of government officials from PNG attending the deep sea mineral project workshop organised in Fiji by SOPAC, a division of the South Pacific Secretariat of the Pacific Community. The team presented to the delegates the legislative and regulatory process in PNG that led to the granting of the seabed mineral mining lease. Brown-Kola said the current legislative and regulatory review process was adequate to ensure that environmental, operational and financial concerns are addressed. “We operate in conjunction with the Department of Mineral Policy and Geo-Hazards Management, which has responsibility of setting all mining policies. It is part of the mining ministerial portfolio.” She said the government had been looking at the Solwara-1 project since 1997 and granted Nautilus the first offshore mineral exploration licence in 2008. “We have been working with Nautilus for 14 years. It was only in this year we granted the company a mining licence.” This followed two years of deliberations over their application. (Note: The Government of PNG granted the world's first deep sea mining lease to Nautilus on the 17 January 2011; R.S.)

### **UNDERSEA MINING ENVIRONMENTAL IMPACTS UNCERTAIN**

*Expert sees fewer threats than land-based mines*

MELBOURNE, Australia (Radio Australia, June 8, 2011) – The International Union for the Conservation of Nature says seabed mining may be less environmentally damaging than land-based mining. But it warns more work is needed to fully understand the impact of under-sea projects. The warning comes as the Pacific prepares to become the first region in the world to mine the ocean floor. Pacific governments meeting in Nadi, Fiji, have been told the environmental footprint of seafloor mining is likely to be much smaller than the footprint of its land-based equivalent. A conservation union marine expert, Jan Steffen, says most seafloor mining will take place in small, defined areas that will not leak much toxic material. Dr Steffen says he does not have particular concerns for the Pacific’s reefs but less is known about the impact on fish stocks. Dr Steffen says Pacific legislation governing seafloor mining should include all the environmental protections given land-based mining. He says more research is needed, along with good environmental impact assessments and more marine protected areas.

## **Glint of underwater gold excites Pacific**

Tamara McLean, AAP South Pacific Correspondent, Sydney Morning Herald, June 9, 2011

The glint of gold under the ocean floor has many poor Pacific nations lining up to grant the world's first deep sea mining licences to dredge the depths of their waters. But protest groups in the region have warned the industry is experimental, economically risky and potentially disastrous for delicate marine eco-systems. A two-day meeting on the future of deep sea mineral mining wrapped up in Fiji this week, leaving representatives from 15 Pacific nations excited at the potential for this lucrative but as yet unexplored industry. Papua New Guinea's government granted the world's first commercial lease for deep sea mining in January to Canadian-based Nautilus Minerals, which will extract gold and copper from the sea floor 50 kilometres off PNG's north coast. At least eight other Pacific nations have also granted exploration licences for the new industry, despite there being few policy and regulation guidelines to manage it.

The Deep Sea Minerals Project, funded by the European Union and administered by the Pacific Islands Applied Geoscience Commission, held the meeting to start mapping out the future of the field. Representatives from tiny nations left the meeting excited at the prospect of big contracts that could help boost their country's debt-heavy balance sheets. East Timor government representative Vincent da Costa Pinto said his nation, independent since 2002, had no exports beyond coffee beans and coconut oil, and no mining activity on land or sea. "To come here and hear the huge untapped potential for gold, copper and manganese in our oceans is exciting," Mr da Costa Pinto told AAP. "We're just a developing nation without a lot of industry so the benefits of projects of this scale that brings in money and economic activity are really huge." The meeting was East Timor's first step towards developing mining laws, he said.

Lameko Talia, from Samoa's Ministry for Natural Resources and Environment, was similarly impressed by the industry's potential. "Surveys have been carried out in our waters showing we have both copper and manganese inside our exclusive economic zone," Mr Talia said. "Now it's about getting on, and working how we do this and taking it to our people." Both men acknowledged the need to examine the environmental impacts and accepted that little was understood about scale of the economic rewards. "There are certainly a lot of unknowns," Mr Talia said. Nations are looking to PNG, where the world-first Nautilus project has been signed off and is due to begin in 2013. Lyndah Brown-Kola, a senior technical assessment engineer with the country's Mineral Resources Authority, said PNG was well placed to advise its neighbours on how to regulate and legislate deep sea mining nationally. She acknowledged the government had made mistakes in the past with land-based mining projects but said the deep sea industry promised greater returns "with considerably less negative impact".

Projected earnings of \$US142 million (\$A133.46 million) and mining company grants would provide significant economic gains for the country, she said. "I'm very proud. This is very exciting for us, and for the whole region," Ms Brown-Kola said. Environmental groups are more cautious, however, especially PNG-based Act Now, which fought unsuccessfully to stop the Nautilus project. "As far as we can see, there was little consultation and it was essentially forced on us, even though we have no idea what it will bring, both good and bad," said the organisation's program manager, Efrey Dademo. "We are a guinea pig for the rest of the world to watch." Both the World Wildlife Fund and Greenpeace have warned of the potentially dangerous effects trawling the ocean floor will have on sensitive marine eco-systems.

Duncan Williams, oceans campaigner for Greenpeace Australia Pacific, warned against rushing the process, saying countries needed to ensure that marine reserves and strict regulations were in place before signing off any deals. "There is a lot of room here for mismanagement of resources and environmental degradation," he told AAP from Suva. "Our concern is that these countries will see the

money and jump for quick gains without thinking it through." Maureen Penjueli, co-ordinator of Fiji-based Pacific Network on Globalisation, said she was "deeply concerned" by the economic model being used to promote the industry. "Putting aside the considerable environmental concerns for a moment, economically this may not be smart either," Ms Penjueli said. "For instance, mining the ocean could severely compromise our fisheries industries, so we need to think very, very carefully about what is intrinsically good for our nations. "Do we even want this?"

### **Seabed mining risks in Pacific on Fiji talks agenda**

By Vaudine England, BBC News, Bangkok, 6.6.2011

The prospect of deep sea mining for precious metals - and the damage that could do to marine ecosystems - is worrying environmentalists. The number of firms seeking licences to dig through the Pacific Ocean floor is growing rapidly. A conference on the subject opens in Fiji on Monday. Such seabed mining used to be too costly to be worthwhile. But environmental groups fear advances in technology pose a new risk to the world's oceans. The world's oceans are emergency zones, needing urgent rescue, they say. The damage to sea life is only increasing - from illegal fishing, deep-sea bottom trawling and other destructive techniques - and now there is seabed mining. The listed mining company Nautilus has the first licence to mine the floor of the Bismarck and Solomon oceans around Papua New Guinea. It will be recovering what is called seafloor massive sulphide, for its copper and gold content.

#### **Risk management**

It is just one of several companies hoping for similar access across the Pacific. But such mining can destroy vital, delicate eco-systems, says Steve Smith of Greenpeace International. "Seabed mining is an emerging threat to the world's oceans and Greenpeace is working regionally here in the Pacific as that is where it is emerging right now," he said. "And Greenpeace will have a presence at the meeting in Fiji but we are also working in the United Nations framework to ensure that the world's oceans are protected for the benefit of the world's people and not just for narrow industry interests like seabed mining." Private companies, governments, experts and environmentalists will all be at the Fiji workshop, hosted by the Secretariat of the Pacific Community. The European Union is helping to fund work on finding ways to manage the new industry of seabed mining. But it is likely to take some time to work out who will be the winners in this deadly underwater competition. Mr Smith, Greenpeace International communications manager, and Sarah Duthie, head of the group's Oceans Campaign, were visiting Bangkok as part of a new focus on the Asia-Pacific region. "We are slowly building our work in the Asia region," said Ms Duthie.

### **INVESTMENT EXTRA: Miner sets sail for a fortune under the sea**

By Ian Lyall, Daily Mail 3rd June 2011

Almost a mile below the Pacific Ocean's surface, off the coast of Papua New Guinea, lies evidence of man's ingenuity. In the murky depths, an unmanned vehicle with caterpillar tracks and a vicious array of grinding and cutting equipment throws up plumes of sand as it digs deep into the seabed. What I'm seeing is the future - or at least a very convincing computer-generated simulation of how the multibillion-dollar world of mining is about to change. It also provides an illustration of the lengths to which a motivated band of prospectors will go in their quest for treasures buried under the sea.

In this case it is the gold and copper (and sometimes silver and zinc too) contained in former volcanoes. They are called 'massive sulphide deposits' and are cousins of onshore volcanic anomalies seen mainly in Canada. This under-sea adventure was the brainchild of Julian Malnic, the founder



of Nautilus Minerals, a cutting-edge mining company quoted here on the AIM market as well as across the pond on the Toronto Stock Exchange. The next two years should see the culmination of his efforts, though Malnic is no longer in charge of Nautilus, as work finally begins on the Solwara 1 project. The easy bit was locating this volcanic booty – the Papua New Guinea system was found by marine geologists in 1996. The tough task will be unlocking the mineral wealth of this target in the Pacific's Bismarck Sea.

Nautilus plans to spend \$400million (£245million) between now and the back end of 2013 developing this first underwater open-cast mine at Solwara. It will require a suite of remote-controlled sea-floor production equipment to cut and crush the rock into a thick sludge, which will then be pumped to a production support vessel 1,600 metres above the site. It is a neat process that will see cold water piped back down to the sea floor to minimise the ecological damage, and the dried sludge shipped by barge to shore for processing. The price-tag of the project may seem excessive but is a fraction of the cost of an onshore mine, and analysts predict it could produce annual revenues of \$1billion (£610million) if metal prices remain at their current sky-high levels.

There is a space-age feel to everything the company has done to date. Yet the technology it has deployed – from the \$10million (£6million) remote-controlled vehicles that have been used to explore the ocean bed for gold and copper to the devices deployed to detect the geochemical signatures given off by the precious metals – has been borrowed from the offshore oil industry. In fact, the riser system, a 300mm-wide pipe that will be used in the production phase to get the ore out of the sea, and the state-of-the-art boat it will be shipped aboard are derivatives of the kit used by oil support companies. 'What we realised was the oil and gas industry has been working offshore for 30 to 40 years now. So we asked, "Why can't the mining industry work offshore too?"' says Nautilus chief executive Stephen Rogers.

Nautilus has targeted Solwara because of the unusually high concentrations of base metals. The first project is small by industry standards, both in terms of the size of the resource and the time it will take to exhaust the gold, copper and ancillary metals. However, the beauty of the Nautilus system is that the vessel and equipment are portable, and can be deployed on a new target with a comparatively short turn-around time. Tonga, Fiji and New Zealand 'all look very exciting', Rogers says as he plots the company's next phase of development.

**OUR VERDICT:** Nautilus is unlikely to make a profit anywhere before 2014, according to Numis, the company's broker. However, you are not acquiring the shares for an instant payback – you are buying a stake in the future of mining. The government of Papua New Guinea has done just that, and now owns 30pc of the company. Others who have spotted the opportunity include Canadian mining giant Teck Resources and London Stock Exchange-listed Anglo American, which have 6.8pc and 11pc respectively. All three are there for the long-haul, and that's how this investment should be treated.

### **Seabed mining: NGOs call for structure review**

Post-Courier, June 3, 2011

NON-government organisations in East New Britain Province have called for an establishment of an independent monitoring body to oversee environmental issues that might be caused by seabed mining. The NGOs called on the ENB and New Ireland provincial governments to review their structures to begin regular consultations with respect to establishing a common stand on seabed mining. "NGOs should be included in the consultations," said chairman of the ENB Sosel Eksen Komiti Patrick Waragat. Mr Waragat made the call in a four-day consultation meeting in Kokopo to begin discussions on the MOA of the Solwara 1 project. He warned provincial governments to be

Careful and not to be blinded by money through equity participation and negotiation which were to be generated by the project.

## **GROUP SEEKS MORATORIUM ON SEA BED MINING LICENSES**

Pacific Network on Globalization wants base-line studies

MELBOURNE, Australia (Radio Australia, May 31, 2011) - Pacific rights groups have renewed their call for a moratorium on the granting of deep-sea mining licenses in the Pacific. It comes ahead of a regional meeting in Fiji next week, to map out the future of ocean mineral mining which is a potentially lucrative industry for the Pacific region. *[PIR editor's note: Maureen Penjueli, coordinator of the Fiji-based Pacific Network on Globalization, told Radio New Zealand International that if ecosystems are not mapped, it would be impossible to detect the negative impact of deep sea mining.]*

In January, the Papua New Guinean government granted the world's first commercial lease for deep-sea mining to Canadian-based Nautilus Minerals, which is set to extract gold and copper from the sea bed about 50 kilometers off the PNG coast. About eight other Pacific nations have also granted exploration licenses, but there are few regulation guidelines in place and environmental groups are concerned about the long term impact of mining. Maureen Penjueli, from the Pacific Network on Globalization told Radio Australia's Pacific Beat there is a lot of resistance in PNG because people have seen the problems associated with land based mining and are very wary. "Local communities have been resisting and are opposed to deep sea mining particularly in New Ireland and New Britain," she said. "And so our role really is to facilitate and to try and bring their voice to the regional level."

## **Solwara MOA talks begin**

Post-Courier, May 27, 2011

THE government needs to ensure that the ownership of the Solwara Project straddles New Ireland and East New Britain. Governor of East New Britain, Leo Dion said the Solwara Project was a significant development, but the East New Britain Provincial Government (ENBPG) anticipated that certain issues were addressed and reflected in the Memorandum of Agreement (MOA). Mr Dion made these remarks at a two-day consultation meeting between parties to the Solwara Project that began yesterday in Kokopo. A draft MOA was presented by the State to the parties at the meeting to seek the views and positions of the various parties. The meeting began initial discussions and negotiations on the MOA for the project and discussed royalties, tax credit scheme, business development plan and Special Support Grant and other issues. Mr Dion also highlighted two other important issues; the State's capacity to monitor technical and environmental aspects of the project and that the State needed to seriously consider equity participation of the two Provincial Governments; New Ireland and East New Britain.

The ENBPG team leader Bernard Lukara reaffirmed Governor Dion's position, emphasizing that some of these concerns were about ownership of the area between NIP and ENB where the mineral resources was located, equity participation and effective monitoring of the environment. He urged all stakeholders to seriously address these issues. The parties at the meeting were the state, represented by the Mineral Resources Authority (MRA), Departments of Commerce & Industry, Treasury, National Planning & Monitoring, Provincial and Local Level Government, Mineral Policy & Geohazards Management (DMPGM) and the Office of the State Solicitor. The other parties included the operator of the project Nautilus Minerals Inc, New Ireland (NIPG) and the East New Britain Provincial Governments (ENBPG).

Chairman of Mining, Commerce and Trade for the NIPG Marius Soiat expressed his concerns on environmental issues, saying that the government needed to seriously address the issues before mining could begin. He reiterated that unless the National Government addressed these concerns, the New Ireland Provincial government would not be party to the MOA. Country Manager for Nautilus, Mel Togolo, said the company was keen to ensuring that issues raised by parties were addressed and concluded in a way that was mutually beneficial to all parties involved. State team leader Philip Samar said that the state would take all comments into consideration and address them (issues) appropriately and in the interest of all the parties concerned. He explained that this was the first meeting for the parties to consult on the benefit sharing agreement and that subsequent forums will then be organised to consistently address the provisions under the draft MOA.

### **Nautilus followed strict procedures**

Post-Courier, May 26, 2011

By *HARLYNE JOKU*

NAUTILUS Minerals Niugini Limited followed strict procedures before it obtain an environment and mining license to mine the sea beds of the Bismarck Archipelago, Country Manager of Nautilus Mel Togolo told the Post-Courier yesterday. Mr Togolo said the process for granting of the Environment Permit and Mining Licence took many years of extensive work on their part. "We have carried out, and continue to carry out, awareness campaigns in both East New Britain and New Ireland," he said. He reiterated that people are free to express their views during the permitting process and were encouraged to submit these views to relevant government agencies. "As much as we may like to, it is neither possible nor practical to go to every household and meet each family. The meetings were well advertised through radio and newspaper advertisements. We followed and fulfilled the requirements of the laws of the land and have even gone beyond the formal requirements in terms of consultation.

Mr Togolo made the remarks in response to New Guinea Island NGOs who raised issues at a recent forum about the speed in which the national government has given Nautilus its environment and mining licence and lack of consultation. Mr Togolo pointed out that the claims raised by the NGOs including ENBSEK as reported this week are incorrect and that Nautilus had to go through rigorous scrutiny by relevant agencies before having their permit approved. "It is not easy to get an environmental permit or a mining licence in PNG. There are established processes and procedures and we have followed these strictly. It took us over two years to get the Mining Licence," he told the Post-Courier yesterday. Mr Togolo added that consultations and discussions regarding the project have been thorough. "Provincial and Local Level Governments are encouraged by the National Government to participate in the determination of the distribution of benefits through discussion of the Memorandum of Agreements. This is an established process and has been operating since the 1980s," Mr Togolo said.

### **Nautilus to raise around C\$150 million in offering**

By Liezel Hill, 24th May 2011

TORONTO (miningweekly.com) – TSX- and Aim-listed Nautilus Minerals, the company that plans to mine copper and gold from the seafloor, has launched a market public offering of common shares and plans to raise about C\$150-million. The offering will be conducted through a syndicate of underwriters led by TD Securities and Credit Suisse Securities (Canada), Nautilus said. The company plans to use the proceeds to fund development of its Solwara 1 project, for its equity contribution to a joint-venture on a new offshore mining vessel and for general corporate purposes. The underwriters will also be given an over-allotment option equal to 15% of the shares sold in the offering,

which will be priced in the context of the market, Nautilus said. Nautilus was awarded the world's first deep-sea mining lease by the government of Papua New Guinea earlier this year, and said last month it had signed an strategic partnership agreement with Germany's Harren & Partner, to provide the offshore mining vessel. The company plans to mine high-grade copper and gold ore on the seafloor off the shore of Papua New Guinea. Shares in the firm rose 0,4% on Tuesday, to C\$2,70 apiece by 15:59 in Toronto.

### **Deep sea mining workshop in Fiji**

Post-Courier, May 23, 2011

A project to address legislative, regulatory, capacity requirements and environmental issues pertaining to deep sea mineral mining for countries in the Pacific region will be launched at a three-day workshop from June 6 through June 8 in Nadi, Fiji. The workshop reflects the growing interest in the region with the first commercial mining lease being granted in PNG territorial waters to mine 'high grade' seafloor massive sulphide (SMS) deposits. The deep sea minerals project administered by SOPAC, a division of SPC, and funded by EU is to develop a legislative and regulatory framework for deep-sea mineral mining over a four-year period. This workshop is expected set platform for management of deep seabed minerals. The deep sea minerals project team leader Akuila Tawake informed this paper from Fiji that this will help ensure that sustainable resource management would bring tangible benefits to Pacific island countries and their people.

He said SMS deposits include copper, gold, silver, zinc and lead. "This, in turn has triggered growing interest in mining deep-sea minerals in the Pacific Region. In addition to SMS, the seabed of the region is abundant in manganese nodules and cobalt rich crusts," he said. Mr Tawake said presently, about eight countries in the region have granted and are at various stages of granting exploration licenses but specific policy, legislation and regulations necessary for the control of deep-sea mineral resources are lacking. Countries that are participating in the project are the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, PNG, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu and Vanuatu. "The purpose of the workshop is to help representatives of those countries participating in the Project to better understand issues related to seabed minerals and mining," said Mr Tawake.

He said this workshop would allow stakeholders, including representatives of participating countries, to discuss all aspects of the project and work towards an agreement on a way forward for the next four years. "Mr Tawake said 15 of the world's top technical, policy and environmental experts on issues relating to deep sea minerals will take part in the workshop where they are expected to provide the necessary advice and guidance countries in the region. He said the workshop will be followed by a two-day steering committee meeting of these selected experts on June 9 and 10 on an assessment of regional marine mineral resources. The assessment will be based on past scientific studies and exploration. This meeting is part of the SPC and the Norway based UNEP/GRID Arendal, (the United Nations Environment Program information office) partnership.

### **Exploiting the ocean's riches**

By MICHAEL RICHARDSON, The Japan Times, May 21, 2011

SINGAPORE — In the 1970s, the oil and natural gas industry decided to take a leap into the deep. With many of the biggest and cheapest petroleum deposits on land already discovered, the search for new finds went offshore into ever-deeper waters. The move has transformed the energy business. About one-third of the world's oil and gas now comes from beneath the seabed, although some accidents and spills have caused extensive damage to the environment and been costly to clean up.

Despite the risks and technical challenges, the mining industry is about to do what oil and gas drillers have done. Buoyed by recent high prices of precious and base metals, leading mining and mineral-using economies are on the verge of opening a new frontier of deep-sea metals recovery. Those involved in the hunt include companies from Canada, Australia, the United States, Japan, China, India and South Korea. One of their main targets is the Asia-Pacific rim where volcanic activity and tectonic plate movements create vast mineral and gas deposits on or just below the seabed.

Japan has calculated that in its waters alone, total recoverable metal and energy resources in sea floor deposits amount to at least ¥300 trillion. Multi-metallic sulphide concentrations of gold, silver, copper and zinc in Japan's claimed exclusive economic zone, out as far as 200 nautical miles from the coast, were estimated to be worth ¥80 trillion in late 2008, when most commodity prices were depressed by the financial crisis. Cobalt-rich crusts containing titanium, manganese, nickel and platinum as well as cobalt are valued at ¥100 trillion, while reserves of methanehydrate, icelike gas formations trapped in sediment on the seabed, are put at ¥120 trillion. State-owned China Minmetals, the country's largest metals trader, is intensifying research and development into deep-sea mining. Noting that China relied heavily on costly raw-material imports, Minmetals president, Zhou Zhongshu, said in March that "this will push the country to go for deep-sea mining to explore (for) metals including copper, nickel, silver and gold."

No one has yet attempted full-scale commercial mining to exploit the trove of seabed mineral riches. But earlier this year, the Papua New Guinea government granted the world's first deep-sea mining lease to Nautilus Minerals Inc, a Canadian-based firm backed by several multinational and Russian mining groups. Nautilus is assembling a combination of proven technologies from different industries, among them mining, oil and gas, and dredging, to create what it says will be a cost-efficient system for deep-sea mining. In 2013, it plans to start mining a high-grade copper-gold resource about 1,600 meters below the surface of the Bismarck Sea in Papua New Guinea waters. The company says it will use remotely operated undersea vehicles and machines to cut ore from the sea floor and pump it up to a production support vessel on the surface as seawater slurry. The water will then be removed and the ore shipped to shore for smelting into ingots.

After investing about \$400 million, Nautilus aims to produce ore at an annual rate of more than 1.3 million tons, containing approximately 80,000 tons of copper and up to 200,000 ounces of gold for a number of years before shifting its moveable production system to other nearby deposits it has found. Multi-metallic sulphides are found around seabed hot springs emerging from volcanic vents. Seawater percolates down through the crust and reacts chemically with the rocks at very high temperatures, collecting metals as it does so. When the hot vent water rises and mixes with the cold seawater on the ocean floor, the metals precipitate out to form concentrated deposits. Exploiting these deposits in national waters is already controversial. After returning from a recent visit to Papua New Guinea, Australia's Greens party leader, Sen. Bob Brown, said he would seek a Senate inquiry into the environmental impact of undersea mining. Other critics say that the Asia-Pacific rim is being made a test bed for a potentially damaging new form of mining as technology races ahead of regulation.

Another Canadian-based company, DeepGreen Resources Inc., is seeking financial backing to mine a massive copper-nickel deposit in international waters in the Pacific Ocean between Hawaii and Mexico. The deposit lies 4,500 meters below the surface of the sea. Meanwhile, China and India have filed applications with the United Nations International Seabed Authority (ISA) for high seas mining rights of the Indian Ocean. The ISA has regulatory authority over seabed mineral resources in international waters. Its mandate is to ensure that these resources are exploited in a way that is fair to all countries. However, it has yet to spell out whether and to what extent conservation is part of the common heritage of mankind. (Michael Richardson is a visiting senior research fellow at the Institute of Southeast Asian Studies in Singapore.)

## **Nautilus Minerals Completes Drilling Program**

VANCOUVER, BRITISH COLUMBIA - (Marketwire) -- 05/17/11 -- Nautilus Minerals (TSX: NUS)(AIM: NUS) has completed its 2010/11 seafloor drilling program, with the vessel, REM Etive, having demobilized in Singapore on May 16, 2011. During the drilling program in the Bismarck Sea of Papua New Guinea, Nautilus completed a 99 hole diamond drilling project, for a total of 1475 metres. Drilling was focused within the area of the Mining Lease (ML154) recently granted to Nautilus, which contains the Solwara 1 deposit and the Solwara 5 seafloor massive sulphide (SMS) discovery. A total of 71 holes was drilled in ML154, for 1147 metres. The remainder of the drilling was conducted in Exploration Lease 1374, which hosts Nautilus' Solwara 12 SMS discovery. Nautilus' CEO, Steve Rogers, said the highlight of the campaign had been the identification of mineralization at depth at Solwara 12 and the improved knowledge gained at Solwara 1. "We have commenced data evaluation and analysis and it is expected that results will be reported before the end of this year," he said. Nautilus has commissioned Golder & Associates to generate an updated resource estimate.

## **Nautilus Minerals seabed mining escaping international scrutiny**

From Little Green Palai; PNG Mine Watch 14.5.2011

NAUTILUS Minerals and its Solwara 1 undersea mine is escaping the international seabed authority's (ISA) watchful eyes by mining within Papua New Guinea's exclusive economic zone, says private lawyer Moses Murray. Mr Murray said while Nautilus Minerals boasts world class technologies and sophisticated mining methods, it could not prove that its activities would not cause environmental harm. While world class scientists are still studying seabed mining, this Canadian company has managed to convince the government of Papua New Guinea to allow it to test this source of mineral extraction in its seabed. By mining in Papua New Guinea's territorial waters, the ISA could not scrutinise Nautilus Minerals' activities because it is now within Papua New Guinea's jurisdiction to make sure that this company applies best practice in mining in its sea bed. While the ISA would apply the international law of the sea for mining activities in the open sea, it could not do so here as this mining activity would take place within PNG's waters.

While he called on the government to develop PNG laws to govern the activities of this deep sea mining activity, he emphasised that this should be done slowly and properly. Furthermore, the government department responsible for environment and conservation (DEC) does not have the capacity to do the monitoring of a project this big and complicated. The government would be relying on its mining act which is based on terrestrial mining, and "there is no way this law can be applied for offshore mining," Mr Murray said. He also said that with the absence of concrete scientific data, Papua New Guinea has no other information on this form of mining but to rely on Nautilus Minerals. This, he said, is not helpful for a small country like Papua New Guinea. In the meantime Mr Murray also called on the government to start training up young Papua New Guineans in this field. He said, as a nation we do not have the skills in this field and it places Papua New Guinea in a spot where, the country will depend on Nautilus Minerals.

## **Solwara 1 undersea mine rushed by the government**

By Nickson Kami; PNG Mine Watch 14.5.2011

A community leader signs the Kokopo Statement opposing the Solwara 1 undersea mine. "Why is John Pundari, the Mining Minister questioning Australia's Greens Politician, Senator Bob Brown's actions, in calling for a senate inquiry into the already approved Solwara 1 Project, that will be conducting 'Deep Sea Mining' (DSM) in the Bismarck Sea?" That's from John Simoi, Chairman of the

Bismarck Solomon Seas Indigenous People's Council (BSSIP) and Vice Chairman of the Madang Indigenous People's Forum (MIPF). Mr Simoi says the people, Land Owners asked the Senator to raise their concerns on this issue when they by chance bumped into him in his recent visit, because the project was rushed, and the government didn't care to listen to the people's pleas. Mr Simoi said from researches done by Executives in both the BSSIP and the MIPF groups, there's no indication that the DSM is safe.

"The Department of Environment and Conservation (DEC) doesn't have enough, or don't have any monitoring bodies or systems in place, to monitor what goes on under the sea when the Nautilus Mining Company starts turning the Bismarck Seabed upside down. We've also learnt that this tactic of Mining is the first in the world, and that International Scientists are still studying it, but our government has given the ok for Nautilus to use us as guinea pigs, to experiment the first Sea Bed Mining, and we the Land Owners will not fold our hands and watch this happen!". A Private Lawyer, who's most likely to be the only lawyer in the country who studied Sea Bed Mining, Moses Murray says, our Mining Act is inadequate and or inappropriate to deal with mining of the ocean seabed.

Mr Murray says, if our government is desirous of the mining of our seabed, which it has done by approving Nautilus, then it has to pass a law on seabed mining. The law on seabed mining must not be rushed and it must undergo scrutiny of our people and the International Seabed Organization (ISO). Mr Murray gave Legal Advice to participants in a Public Forum held in Kokopo, East New Britain Province, where Community Representatives, NGOs, MIPF, BSSIP and the East New Britain and New Ireland Provincial and LLG Representatives attended to address the SBM issue. A statement showing that the people of the Bismarck Archipelago are now together and will do whatever it takes, with the Legal Advice of Moses Murray to avoid destruction to the Bismarck Sea, was put together after the forum, and signed by the representatives.

### **Deep sea mining: Pundari: Respect Government decision**

Post-Courier, May 10, 2011

Mining Minister John Pundari yesterday said calls for an enquiry by Australian Greens Senator Bob Brown's on deep sea mining in PNG were targeted towards environmental concerns and not questioning the sovereignty of PNG to permit offshore deep-sea explorations. "I note with interest the comments by the Australian Greens Leader Senator Bob Brown calling for an Australian Senate inquiry into the impact of deep sea mining in PNG. "I assume that the Honorable Senator's concerns are targeted towards the environmental impacts of deep sea mining in general and not questioning the Government of PNG on its decision to grant an offshore mining lease," Mr Pundari said. He said as a sovereign state, the Government has permitted offshore deep sea exploration for the past ten (10) years leading up to the granting of a mining permit early this year.

He said these were permitted activities governed by the independent state of Papua New Guinea's mining, environment, business and other relevant laws. "I call upon Senator Brown to respect the decision of the PNG Government in permitting the Solwara-1 offshore mining project and to refrain from making public comments on a subject matter that is sensitive and which is being discussed by the various stakeholders including the national government, provincial governments and the respective communities. "I detest the fact that an Australian politician sees fit to immerse himself in matters that are far from his own jurisdiction with the intent of undermining the decision of a legitimate Government. "We would appreciate that this matter is raised in discussions at a Government to Government level and not for someone like Senator Brown to be playing politics at a time when he is in PNG launching his sister political party leading up to the 2012 national elections," Mr Pundari said.

The minister said the grant of the Solwara-1 project was legally executed under the existing Mining Act 1992 with a review of the current legislation and policy is being embarked on and will be completed before the end of the year including specific consideration for the offshore seabed mining environment. "I, as Minister responsible for Mining, would be interested in discussing the prospects for any specialist assistance that the Australian Government will be willing to avail to my respective agencies to assist the Government in regulating this new frontier of offshore mining," Mr Pundari said. Senator Brown made the remarks during his recent visit to PNG to participate in a number of political activities related to the launching of the PNG Greens Party in preparations for the 2012 national elections.

### **Nautilus orders undersea slurry pump**

By: Liezel Hill, 6th May 2011

TORONTO (miningweekly.com) – TSX- and Aim-listed Nautilus Minerals has given the green light to an order for a key piece of equipment for its Solwara 1 seafloor mining project, the firm announced on Friday. The company has reinstated a contract with GE Oil & Gas for a subsea slurry lift pump that will pump high-grade slurry from the bottom of the riser to a production support vessel, floating about 1 600 m above. The contract was initially awarded in June 2008, but was suspended later that year because of the global financial crisis.

Nautilus was awarded the world's first deep-sea mining lease by the government of Papua New Guinea earlier this year, and said last month it had signed an strategic partnership agreement with Germany's Harren & Partner, to provide the offshore mining vessel. "We are now taking a number of steps to move the Solwara 1 project forward pending final sanction of the project by the Nautilus board of directors," said CEO Steve Rogers. "By lifting the suspension, we are securing this critical component and ensuring that we meet our project timelines," he said. Nautilus plans to mine high-grade copper and gold ore on the seafloor off the shore of Papua New Guinea.

### **Greens leader vows to probe undersea mining**

The National, May 4, 2011

By PATRICK TALU

THE Australian Greens leader, Bob Brown, said he will push for an Australian senate inquiry into the impact of the world's first undersea mining operated by Nautilus Minerals for its Solwara 1 project in the Bismarck Sea. Brown had just left Port Moresby after attending PNG Greens Party launch in Madang, where he met with Environment Minister Benny Allan and representatives of the PNG Greens party. Brown told Radio Australia upon his return home early this week that he was worried about the environmental impact of the Solwara 1 gold and copper project on PNG's north coast, the world's first deep sea mine. Brown said the project was using new robot technologies to mine the sea floor. "This is something that's going to, if it works there, and Singaporean vessels are currently involved in experimenting with that, extend to oceans elsewhere around the world and of course, the dumping from the process metals there is going to be left on the sea floor as well. "It's a very, very worrying direction for mining to be taking," he said.

The deep sea mining project is set to begin production in 2013 following the official contract signing between the company and the state's nominee, Petromin Holdings, in March to finalise details to start work. The project is said to set the benchmark as the world's first deep sea mining project with capital investment of about US\$387 million, which is almost K1 billion in the 20 years of its lifespan. Nautilus' exploration results have shown that there are high grade mineralised copper deposits 1,600m below sea level and extending to a maximum depth of 52m below the seafloor. The



exploration and drilling results show that the site is expected to produce around 800,000 tonnes of copper and up to 200,000 ounces of gold a year. It is speculated that the project begins a new factor in the mining industry with the start of the first deep sea mining project. Petromin, who owns 30% of the project will be meeting the costs on its own strengths while Nautilus, as the operator will put up 70%.

### **German vessel to act as base for Nautilus**

The National, April 18, 2011

THE world's first seabed miner, Nautilus Minerals, will operate a production support vessel that will serve as the operational base for it to produce high grade copper and gold ore at its first development project, Solwara 1, in the Bismarck Sea. Nautilus has formed a strategic partnership with German shipping company Harren & Partner. This means a joint venture company is to be formed to own and operate the production support vessel in the Bismarck Sea. In a statement last Friday, Nautilus CEO Stephen Rogers said the vessel would be the floating platform for the mobilisation and remote operation of production machinery operating on the seafloor at depths of 1,600m. The seafloor production tools will cut and gather ore which will be pumped in slurry form to the production support vessel, where it will be processed through a dewatering plant before transfer to barges for transport and subsequent treatment. Under the terms of the strategic partnership, Harren will design and build construct the vessel at a cost of approximately €127 million (K460 million), with delivery scheduled for the first half of 2013.

### **Nautilus signs deal for seabed mining ship for Papua New Guinea**

Arnika Thakur, Reuters, 15.4.2011

- Nautilus signs deal with Harren & Partner for a ship
- Says Harren to build ship for 127 million euros
- Harren to own 50.01 pct interest in the ship
- Says ship will be chartered to a mining JV
- Nautilus to hold a 70 pct stake in mining JV
- Shares up as much as 18 pct

Canada's Nautilus Minerals, which mines the sea floor for mineral deposits, signed an agreement with German shipper Harren & Partner for a ship to support operations at its flagship copper mine in Papua New Guinea, the southwestern Pacific Ocean, sending its shares up as much as 18 percent. Nautilus aims to start production at the world's first off-shore copper mine -- the Solwara 1 project -- in the second half of 2013 and getting a contract for a ship was the last big step to get board approval. Harren will build the ship at a cost of about 127 million euros (\$183.34 million) and deliver it in the first half of 2013, Nautilus said in a statement.

Harren will own a 50.01 percent interest in the ship, while Nautilus will hold the rest through a holding company. The Papua New Guinea government, through Petromin PNG Holdings Ltd, holds a 5 percent stake in that holding company. The ship will be chartered to a mining joint venture -- in which Nautilus holds a 70 percent stake, and Petromin the rest -- for eight years at an average daily rate of \$70,000. Nautilus aims to produce about 80,000 tonnes of copper, along with 150,000-200,000 ounces of gold annually from the project. Shares of Nautilus were trading up 6.8 percent at C\$3.15 on Thursday on the Toronto Stock Exchange. They touched a high of C\$3.48 earlier in the session.

## **KOREA BEGINS SEABED MINERAL EXPLORATION IN TONGA**

27 Korean researchers to spend 4 months collecting data

By Tevita Motulalo

AUCKLAND, New Zealand (Taimi o Tonga, April 12, 2011) - Korean research ship RV Araon has embarked on its first exploration expedition for seabed minerals in Tongan waters last Saturday. The vessel berthed in Nuku'alofa held a special ceremony for officials and the Korean expat community in Tonga. The revolutionary icebreaker, built and fitted with the latest technology, and commissioned by the Korean Ocean Research and Development Institute (KORDI) in 2009, sets about not only to determine commercial quantities of valuable minerals of underwater deposits. Another key focus at the moment is to study the impact on the environment and the ecosystem of a wholesale extraction exercise. One of the lead scientists on board the vessel, Kyeong-Yong Lee told Tonga Chronicle although the scan for commercial quantities of underwater deposits is valuable to know, "we are very keen to study specific relationship between the deposits, underwater mineral vents and the ecosystem," an area where there's limited study and data available.

"Because we wouldn't want to exploit an area and cost us more in terms of environmental damages, than the value of minerals extracted," he said. Apart from the specific areas within Tongan waters that KORDI is licensed to explore, they are also doing prospecting exercises in international waters sponsored by the Korean government itself. "The valuable technical information and data collected by KORDI is the essential first step towards discovery of minerals," said Deputy Prime Minister Samiu Kuita Vaipulu, at a special ceremony to welcome the new ship on Friday, in his role as Acting Prime Minister. "The Tonga Government highly values its collaboration with KORDI on mineral prospecting," he said. According to KORDI local officer Mr. Jang Wan Bang, a team of 27 researchers from Korea will spend the next four months collecting data from ocean beds within Tongan waters, in areas where it is up to several thousand meters below the surface.

The expedition is accompanied by an observer from the Ministry of Lands, Survey and Natural Resources. At the completion of the research, the team will submit an evaluation report to the Government of Tonga together with an Environmental Impact Assessment. During the launch ceremony, Korean Ambassador to Tonga Mr. Kwan-il Noh noted that despite the "many challenges and dangers" involved in the Araon's cutting edge work, he is confident that mutual support can boost potential benefits for both Tonga and Korea. "I can say the Korean Government is ready to provide its utmost support and assistance for the development of this project, which will further promote cooperation between our two countries. I hold great hope that this project can bring tangible outcomes which will contribute to the economic development and prosperity of our two countries," he said. Opportunities for further exploration and mineral extraction will depend on the outcomes of the research.

## **COOK ISLANDS DEPUTY TO PROMOTE SEABED MINERALS**

*Deputy Prime Minister London bound*

WELLINGTON, New Zealand (RNZI, April 4, 2011) - The Cook Islands deputy prime minister, Tom Marsters, is traveling to London to promote his country's vast seabed mineral reserves. He says the Cook Islands needs to market itself. Mr. Marsters is accompanied by chairman of the Seabed Minerals committee, Ben Ponia, and both will attend the Commonwealth Natural Resources Forum. The two will also be holding side meetings with Commonwealth Secretariat officials to discuss the contracting of a national mineral resources adviser. The Secretariat is managing the recruitment process of the advisor and it's understood it will partially fund his or her employment.

## **EXPERT: PNG NEEDS LAWS GOVERNING UNDERSEA MINING**

*Current regulations called inadequate*

By Todagia Kelola

PORT MORESBY, Papua New Guinea (PNG Post-Courier, March 31, 2011) - THERE must be a specific legislation governing the recent approval by the Government for the world's first offshore mining project in the country, a senior lawyer has said. Camillus Narokobi who has written a thesis on the Bismarck Archipelago seas while doing his Masters degree on the studies on law of the sea, said PNG doesn't have any legislation governing the mining of our seabed. But PNG is a signatory to the 1982 United Nations Convention on the Law of the sea. And it is obliged under this International law to enact specific legislations in relation to seabed mining and the protection of its marine resources. He argued that the Mining Act and the Environment Act that are being relied on, may not be adequate for these purposes. "Under the International Convention on the Law of the Sea, PNG has to have some enabling laws so that freedom of navigation, freedom of laying submarine cables, pipelines and scientific research, freedom of fishing in the high seas and the right to transit through PNG waters. We are obliged to enact legislations to provide for this" he said.

Another PNG national, a mining expert at the Western Australian School of Mines, Kaul Gena, also supported this call and posed these questions to developer Nautilus Mineral Corporation.

\* What are current ore reserves of Solwara one project and its adjacent areas?

\* What mining methods are they going to use at 1700 metre depth when the ores are hosted by hard dacitic to rhyolitic lava?

\* The ores consist of lead and arsenic bearing minerals, what are the possible mitigation measures that the company will use to avoid environmental contaminations?

### **Lawyer warns government on seabed mining**

Post-Courier, March 30, 2011

By TODAGIA KELOLA

A SENIOR lawyer has warned that the Government must be very careful in its handling of the world's first offshore mining project in the country, the Solwara 1 project. Senior lawyer Moses Murray, who may also be the only Papua New Guinean lawyer that has studied Seabed law, raised this concern saying there is yet to be a proven technological know-how for marine mineral exploration where developing and developed countries are yet to experiment on and PNG might be a guinea pig in this project. He raised these concerns after Prime Minister Sir Michael Somare announced yesterday that Cabinet has made a decision to approve the arrangement for the State to take up 30 per cent equity in the Solwara 1 project. "Let us not be blind by the kind of money to be generated and ask ourselves if we are ready to take control of such an adventure or is owning 30 per cent of the profit good for PNG as a whole. Can we not wait and check this out carefully first.

"Is there a country or mining company in the world that has successfully mined the ocean sea bed? Or is PNG a guinea pig in this exercise that has inflated our minds with big bucks and generate employment. What about the negative effects that would be borne on the sea life which in turn will affect the people closer to the sea bed mining?" he asked. Mr Murray said the international situation on marine mineral exploration at present is unstable, and because of the importance of detailed knowledge of the processes regarding the ocean floor exploration, it requires generous funding. Even national oceanographic efforts at present can be best described as stagnating and somewhat confusing, because very few results are known. Environmental, pollution, and resource studies are needed everywhere, especially following the introduction of an Exclusive Economic Zone around the coastal States.

He explained that because PNG's knowledge about the oceans and their influence on the earth environmental state as a whole is limited, stimulation and international co-operation are necessary in all sectors of oceanography, including the marine minerals. "It is most important that we increase our efforts on sea-floor inspection," he said. He also posed these questions. Do we have trained manpower in this kind of sophisticated mining as opposed to onshore exploration and mining? Do we have our own trained scientists to properly assess and evaluate environmental damage and pollution of our sea waters or are we to use what other scientists tell us as truth? Do we have our own trained exploration geologist who can understand mineral deposit models, interpreting geophysical and geochemical results, and properly treating large number of data from exploration surveys or are we again to depend largely on explanations given by outsiders who are part of the company conducting the mining?

### **Deal on Solwara 1 inked**

The National, March 30, 2011

By BOSORINA ROBBY

THE Solwara1 deep-sea mining project of Nautilus Minerals Inc is set to begin production in 2013 following the official contract signing between the company and the state nominee, Petromin Holdings yesterday. The deal will finalise project details to pave way for it to start. The project is said to set the benchmark as the world's first deep-sea mining venture with capital investment of about US\$387 million, which is almost K1 billion in the 20 years of its lifespan. Operating in the Bismarck Sea near New Ireland, Nautilus' exploration results had shown that there were high-grade mineralised copper deposits 1,600m below sea level and extending to a maximum depth of 52m below the seafloor.

The exploration and drilling results showed that the site was expected to produce around 800,000 tonnes of copper and up to 200,000 ounces of gold a year. It is speculated that the project begins a new factor in the mining industry with the start of the first deep-sea mining project. Nautilus chief executive officer Stephen Rogers said yesterday the signing signified a milestone for both parties as they moved into finalising the details to start production. Petromin chief executive Joshua Kalinoe said this was also a significant opportunity for Petromin in terms of exposing staff to the opportunities to advance in all fields that the new technology that would be used in the project. He said Petromin, which owns 30%, would be meeting the costs on its own strengths while Nautilus as the operator would put up 70%.

### **Prime Minister confirms state's stake in seafloor mine**

The National, March 29, 2011

CABINET has approved the arrangement for the state to take up equity in the Solwara1 project that it hopes will be the first in the world to lead to mining of the seafloor. The project, by Canadian developer Nautilus Minerals, involves mining for gold and copper found in high concentrations in massive sulphide deposits over a 59km<sup>2</sup> section of the Bismarck Sea, at depths of about 1,600m, 50km north of Rabaul. Prime Minister Sir Michael Somare's announcement yesterday of the cabinet approval followed an earlier announcement last month by Mining Minister John Pundari that the government would take its full 30% stake in the venture – more than US\$100 million. Sir Michael said in a statement that Solwara1 was among the priority projects to create jobs, increase revenue earnings and boost foreign exchange. "The project will be mining very rich seafloor massive sulphide (SMS) deposits and will generate over US\$140 million directly into the economy.

“The approval of the arrangement has preserved the right of the state to acquire up to 30% equity in the whole value chain of the project,” he said. “Being the first offshore mining project to be granted to mine massive sulphide systems on the sea floor, the government had ensured that the people of Papua New Guinea benefit through the state’s participation in the whole value chain of this milestone mining project.” He said the state’s right for equal participation would be exercised through its nominee Petromin PNG Holdings Ltd. This was consistent with current policy and law that Petromin was the state nominee for designated mining and petroleum projects. Sir Michael also said Solwara1 was a first of its kind, involving an equity position by the government.

“This is the first time that the government has taken an equity position in a medium scale mining project that will be developed under a mining lease,” he said. “This now sets a policy precedent that the state will take equity participation in future mineral projects that are to be developed both under special mining lease and mining lease, for both onshore and offshore mining developments.” Nautilus Minerals capital investment in the project would be about US\$387 million over the lifetime of the mine. Early this year, the government granted a 20-year mine lease for the project as well as set certain conditions in the mining lease to guide and control development. “I must commend Pundari, for successfully securing the project development as well as ensuring the state’s equity participation in this project,” Sir Michael said.

## **AUSSIE EMISSARY: SEABED MINING A BOON FOR PACIFIC**

Parliamentary Secretary Marles briefs Tongan officials

By Tevita Motulalo

AUCKLAND, New Zealand (Taimi o Tonga, March 23, 2011) - Australia’s Parliamentary Secretary of Pacific Islands Affairs, Richard Marles thinks the benefits of seabed minerals should be maximized for the benefit of the Pacific country they are taken from. Marles was in Tonga last week to reaffirm Australia’s support as a Pacific partner and a friend of Tonga, wrapping up a region-wide tour to all the small states in the Pacific. "We see ourselves as very close friends and we want to be the best of friends that we can be to Tonga," he said to Tonga Chronicle in a doorstep media conference just before departing Nuku‘alofa. "The Gillard Labour government regards the Pacific as absolutely crucial to Australia’s Foreign Policy. Whatever else happens around the world our neighborhood will always be our neighborhood. And for that reason the Pacific is our collective neighborhood," he said.

But the issue of seabed minerals had been a key point in discussions with the Tongan Cabinet, amidst the exchange regarding the ‘partners in development’ program for Tonga. In Tonga, Australian companies are involved in the prospecting for underwater commercial mining and Marles thinks there are two key issues to be looked at. "One is that I don’t think this is about to happen tomorrow. This is a long-term prospect, but as a long-term prospect I think it does offer a significant source of hope and opportunity for the people," he said. "Secondly, I think what matters [most] as this important issue is discussed is that countries think about ways...such that the return from it is maximized for countries in whose resources they reside and that there is a long-term benefit for the countries involved." "And that may ultimately involve," according to Marles, "with the underwater treasures in each respective exclusion economic zone, being a benefit for the next generation rather than this one but that the important preparatory work being done now for that." He continued, "I think in the short term we’re not about to see people make a whole lot of money overnight, and I actually think that [does] not occur so that the returns are maximized."

Surveillance of Pacific security and EEZs is done by the ‘Quadrilateral Group’- Australia, New Zealand, the United States and France. None of the smaller Pacific states are involved in that forum, and neither does a rising Pacific presence like China. "Whilst in a sense those quadrilateral talks are

focusing on having those four countries present, the kind of programs that are coming out are involving all of the countries of the Pacific," he said. It is clear that the Pacific Patrol Boat program, with three patrol vessels donated by Australia "work in very closely with the network of surveillance which is being built with the assets of the US Coast Guard, the Australian Navy, the New Zealand Navy, and the French Navy." He made no comment on China. Marles met Prime Minister Tu'ivakano first thing Friday morning after arriving Thursday night, being the first high-level delegation from Australia to do so since last year's election and the formation of the new government.

"Look, we've had a fantastic day here in Tonga and it's been a real privilege," he says. Later on he visited Nuku'alofa Government Primary School, for which Australia has funded new curriculum materials for students and teachers, and then a short ceremony giving out identification badges for Tonga Police members also funded by Australia. Other than Australia's overseas development assistance in Tonga, there were also discussions on the Seasonal Worker's program in Australia. "Which has had a very strong uptake from people in Tonga. And we're very pleased about that. That's a program that we're keen to see expanding [and] to get an understanding from the government here about how we may improve it." On further financial assistance, Marles said Tonga "faces obviously a number of financial challenges going forward."

He said the Australian government is "very keen and appreciative" of a "Public Expenditure Review Process, which is been undertaken by the Government of Tonga in the context of our aid program with Tonga." "And I understand that will continue and that is very good news for us," he said. It was also an opportunity for him to clarify the layers in Australian foreign aid structure. "We've got a very structured way in which all of these issues can be processed," he said, hinting a more "structured way in which each of the requests can be met." "I think it's been a very important step forward having the partnership for development," said Marles, but not one to be seen as to give "handouts".

### **Pacific should not be used as a testing ground for deep-sea mining**

PNG Mining Watch 2.3.2011

Two campaign organizations, based in Fiji and Papua New Guinea, have joined forces to denounce plans for the Pacific to be used as the testing ground for deep-sea mining. ACT NOW! and the Pacific Network on Globalization say the Pacific region has already suffered the negative social and environmental impacts of industrial mining on land and should not take further risks with the marine environment. "Rather than allowing ourselves to be the testing ground for multinational companies and foreign governments, Pacific countries should focus on new approaches to our own development that are consistent with our lifestyle, history and social and political realities", says Efrey Dademo, Program Manager with ACT NOW!

Nautilus Minerals has already been granted a license by the PNG government to develop the world's first deep-sea mine and the European Union has announced plans to help 15 Pacific island countries to develop laws and policies to facilitate such operations across the region. Maureen Penjueli, coordinator for PANG, says Pacific island countries do not have the resources, capacity or experience to effectively manage and monitor large resource projects and government should focus on supporting their own people rather than large corporate interests. "We have had an alternative development model forced upon on us by outsiders but it is clear that model is not working for us and, indeed, is failing in the West as well. We, as Pacific people, need to find our own voice and return to a focus on our own strengths and knowledge base." "Deep-sea mining is likely to be another catastrophic failure for the region and we don't need it."

## **Petromin government representative to Solwara I**

The National, March 2, 2011

By MALUM NALU

PETROMIN PNG Holdings Ltd has been nominated to exercise the state back-in right in the Solwara-1 mining project, Mining Minister John Pundari announced on Monday. Pundari said after consulting Prime Minister Sir Michael Somare, who is also minister responsible for Petromin, he had exercised his powers under the Mining Act to nominate Petromin, once the state entered the project through the options agreement, which was being negotiated with project developer Nautilus Minerals Ltd. He said based on his advice, Sir Michael had confirmed the nomination under the Petromin Act, conditional on the state entering the project. "Petromin will now negotiate commercial terms with Nautilus to fund its equity in the project," Pundari said.

"I have taken the initiative to nominate Petromin as the state's nominee to acquire the state's interest in all upcoming major mining projects that are rapidly advancing into the production stage," Pundari said. "These exciting projects include the three upcoming mines: Frieda in East/West Sepik (copper/gold), Yandera in Madang (copper/molybdenum) and Wafi-Golpu (copper/gold) in the Morobe." "PNG must gain significantly from these projects once these mines begin production. Pundari said the benefits to the state can be greatly maximised if the state participated in these projects as a shareholder, and through Petromin, state and landowners would also benefit. "Under the mineral policy, landowners in project areas are entitled to 5% equity in the project to come from the state's share of equity," he said. "The cost of the equity would be negotiated on a case-by-case basis."

## **CRITICS SEE PNG AS GUINEA PIG IN DEEP-SEA MINING**

*Untried technology, unknown environmental impacts*

By Karon Snowdon

MELBOURNE, Australia (Radio Australia, March 1, 2011) - Papua New Guinea's (PNG) government is being criticized for approving the world's first deep-sea mine. Nautilus Minerals, of Canada, was awarded a license in January to extract gold and copper from the floor of the Bismarck Sea, about 50 kilometers north of Rabaul. [*PIR editor's note: The resource reportedly has 2.2 million tons of ore, including an indicated resource of 870,000 tons at grades of 6.8 percent copper and 4.8 g/t gold.*]

The project's environmental impact statement has been approved by the PNG government and work is set to start within two years. But critics are accusing Nautilus of wanting to use the Pacific as a testing ground for untried technology, with unknown environmental consequences. With demand and prices rising sharply, mining for gold, copper and other minerals from the deep sea-floor is now economically viable. The Solwara One gold and copper project off PNG's north coast is the first attempt of its kind. Fifteen other Pacific Island nations are being offered help from the European Union to develop laws to facilitate similar projects. That has worried groups in PNG and across the Pacific, like the Pacific Network on Globalization - a regional non-government grouping concerned with economic justice. Maureen Penjueli, the network's coordinator, says the region is being to test an untried technology. "We are pretty much guinea pigs in this particular process," she told Radio Australia's Pacific Beat. "So I think that's why we need to err on the side of caution and really go through this thoroughly, rather than rush through based on the economic arguments alone."

Concerns have been raised over the potential impacts of mining on fishing, and on largely unknown plants and animals that live around mineralized areas that exist near volcanic vents in the sea bed. For Solwara One, Nautilus will employ technology used by the offshore oil and gas industries to

mine up to two kilometers below the surface. For a 20-year license, the company made a security payment of US\$18,000 and will pay royalties of 2 percent of its net returns once production begins. Nautilus executive Stephen Rogers told Radio Australia in January: "As this industry emerges, it is going to present a significant contribution to the PNG economy. "Over and above that we've carried out exploration in the territorial waters of Tonga and we have large tracts of land right across the western Pacific in countries like Fiji, New Zealand, Vanuatu and Solomon Islands." The company commissioned environmental assessments from several universities and Australia's peak scientific body, CSIRO, with findings published in a 275-page study.

## **REGIONAL ORGANIZATION TO GUIDE SEABED MINING**

*Geoscience Commission to draw up legislation*

MELBOURNE, Australia (Radio Australia, Feb. 24, 2011) – The Pacific Geoscience Commission is to help the Forum Island nations to become global leaders in sea-bed mining. [*PIR editor's note: The Pacific Islands Applied Geoscience Commission (SOPAC) is an inter-governmental regional organization based in Suva, Fiji that promotes sustainable development in the countries it serves. Member countries include Australia, Cook Islands, Federated States of Micronesia, Fiji, Guam, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. American Samoa, French Polynesia and New Caledonia are associate members.*]

A new four year project announced by the Commission will help the 15 Forum Island countries address everything from seabed mining legislation and environmental controls to on-the-job training. The Pacific is expected to be the first region in the world to begin commercial seabed mining. Project leader Akuila Tawake says the dangers of starting mining without proper legislation are huge, particularly for the environment and fish resources. Mr Tawake says the project will help countries draw up legislation to manage mining and provide training for Pacific citizens.

### **Nautilus' 2nd project site**

The National, February 16, 2011

THE Canadian mining company Nautilus Minerals has identified a second potential development project in the Bismarck Sea in Papua New Guinea. Nautilus chief executive Steve Rogers said the success of the initial drilling at Solwara 12 means the company had taken a big step forward towards building a portfolio of projects in the Bismarck Sea, adding to its existing Solwara 1 deposit. A statement from the company said a deepwater exploration drilling campaign carried out at the Solwara 12 prospect discovered intersections of mineralisation at all five drill sites. The company said it will conduct further drilling at Solwara 12 to establish a resource. The government awarded Nautilus the world's first deep-sea mining lease last month to develop its copper-gold project by searching for mineral deposits in the seabed of the Bismarck Sea.

### **Independent scientific review slams Nautilus's environmental plan**

PNG Mine Watch 7.2.2011

An independent scientific review of the environmental impact statement (EIS) for the proposed Nautilus Minerals Solwara 1 seabed mining project in Papua New Guinea concludes the statement is completely inadequate and that the mining will result in severe and prolonged environmental impacts. The review, which can be downloaded below, was completed by Professor Richard Steiner, a



member of the IUCN Commission on Environmental, Economic and Social Policy. Nautilus's Solwara 1 mine will dig gold and copper deposits from deep-sea hydrothermal vents which, says Prof Steiner "support one of the rarest and most unique ecological communities known to science". Prof Steiner says the mining activity will "destroy an extensive patch of productive vent habitat, including tens of thousands of vent chimneys, killing virtually all of the attached organisms". Although the EIS accepts "the extent of the impacts to vents and other seafloor habitats directly mined will inevitably be *severe* at the site scale," and "it may be many years before development of chimneys returns to pre-mining condition", Prof Steiner says the analysis is still seriously inadequate.

*The EIS does not present sufficient information with which the PNG government can effectively judge the project's expected impacts. The EIS is judged as not fit-to-purpose. Many risk contingencies are poorly analyzed, some are not analyzed at all, and many of the baseline studies necessary to understand potential impacts have yet to be completed. The report concludes that "it is likely that the project would result in severe, prolonged, and perhaps region-wide impacts to a globally rare and poorly understood biological community, and it is clear that the EIS does not adequately assess many of these impacts. Further, the benefits to local people or the economy of PNG seem disproportionately low compared to the scale and risk of the project".*

The PNG government granted Nautilus a license for the Solwara 1 mine on January 14.

Read the Executive Summary from Prof Steiner's: below or download his full report:

[ramumine.files.wordpress.com/2011/02/full-report.pdf](http://ramumine.files.wordpress.com/2011/02/full-report.pdf)

## **EXECUTIVE SUMMARY**

The Solwara 1 project proposes to commercially exploit gold and copper deposits associated with deep-sea hydrothermal vents at a depth of 1,500 in the Bismarck Sea off Papua New Guinea. As the Project would represent the first large-scale, human-induced, site-specific disturbance to the deep ocean basin anywhere in the world, it must be considered with exceptional deliberation and caution. Scientists only first discovered these deep-sea hydrothermal vents and their exotic chemo-synthetic ecosystems in 1976, and these extraordinary ecosystems remain poorly understood today. Deep-sea hydrothermal vents, found along mid-ocean ridges and back-arc basins (such as the Manus Basin in the Bismarck Sea), support one of the rarest and most unique ecological communities known to science. Organisms derive their energy from sulfide chemicals in hot (350 C), mineralized vent fluids rather than directly or indirectly from photosynthesis as in other biological communities, and/or from endosymbionts in their tissues. Most species discovered at vents are new to science, and the vents support communities with "extremely high biomass" relative to other deep-sea habitats. Some scientists suggest that such deep-sea hydrothermal vents systems may be where life first evolved on Earth.

The proposed Solwara 1 mining project would destroy an extensive patch of productive vent habitat, including tens of thousands of vent chimneys, killing virtually all of the attached organisms. The EIS states that: "The extent of the impacts to vents and other seafloor habitats directly mined will inevitably be *severe* at the site scale," and that "it may be *many years* before development of chimneys returns to pre-mining conditions (emphasis added)." And mining is expected to alter venting frequency and characteristics on surrounding seafloor areas as well, thus affecting the ecological communities of a much broader scale than just the mined site. Although the Solwara 1 EIA / EIS makes a significant contribution to deep-sea vent science, it is clear that the EIS does not present sufficient information with which the PNG government can effectively judge the project's expected impacts. Thus the EIS is judged as not fit-to-purpose. Many risk contingencies are poorly analyzed, some are not analyzed at all, and many of the baseline studies necessary to understand potential impacts have yet to be completed.

For instance, studies of the taxonomy and genetic relationships of macro-invertebrate species found at Solwara 1, South Su (upstream about 2 km), and Solwara 8 (downstream about 45 km) have not been completed, and thus the degree of genetic variability and endemism of organisms between sites is not yet known. It is likely that several rare and endemic (found only at the site) macroinvertebrate species that are yet to be described by science exist at Solwara 1. As a result of the 2007 study at the mine site, “at least 20 new species have been added to the species list at active vent sites.” This is a high rate of discovery of species new to science, and species encounter rates of the studies predict that there are likely many more species yet to be identified at the site. Such species would likely become extinct due to the mining project, even without having yet been identified or described. This alone constitutes an unacceptable risk. Bioethics dictates that resource development should not knowingly put species at risk of extinction, be they well-known charismatic macro-fauna (tigers, gorillas, whales, etc.), or poorly known deep-sea invertebrates.

While Nautilus conducted extensive studies of the deep-sea *benthic* (bottom dwelling) communities at the site, no systematic study was conducted on the deep-sea *pelagic* (water column) community that would be impacted immediately overlying the seafloor. Further, there was an inadequate assessment of risks associated with sediment and waste rock disposal, toxicity of the dewatering plume to deep-sea organisms, effects of increased light and noise in the deep ocean environment, and potential accidents on seafloor equipment or surface vessels. Regarding impacts to the *nearshore* ecosystem, one of the greatest risks from the project is the potential loss of tow or power of an ore shuttle barge in route to Rabaul (the EIS projects 3-9 barge trips per week, with 6,000 tons of toxic ore onboard each transit), or of one of the 25,000 ton bulk ore freighters (3-6 trips per month from Rabaul), and the barge or freighter then drifting ashore spilling its toxic cargo and fuel onto the coastal reef system. Yet, this risk was not considered at all in the EIS. Much of the EIS is simply too general in nature to determine impacts, and many of the mitigations proposed rely upon Environmental Management Plans and procedures that have yet to be developed by Nautilus, and thus the effectiveness of these cannot be judged at present.

It is likely that the project would result in severe, prolonged, and perhaps region-wide impacts to a globally rare and poorly understood biological community, and it is clear that the EIS does not adequately assess many of these impacts. Further, the benefits to local people or the economy of PNG seem disproportionately low compared to the scale and risk of the project. While the Project could gross almost \$1 billion USD in its 30-month lifetime, it expects to provide only \$41 million in total taxes and royalties to the government, a \$1.5 million development fund, and a few dozen jobs at most to PNG nationals. Given the above concerns, *it is respectfully recommended that the government of PNG not approve the project on the basis of this EIS.*

### **Revealed: how deep-sea mining could destroy the 'cradle of life on earth'**

Ramu Nickel Mine Watch 4.2.2011

*In November Mine Watch reported on scientists fears about the impacts of deep-sea mining off the coast of Papua New Guinea. Below is the full article from The Ecologist on which that report was based.*

*By Tom Levitt*

As Papua New Guinea gives go-ahead to a Canadian mining company to dredge its coastal seabed for minerals, critics say environmental assessments have been inadequate, local objections ignored and new species of life could be extinct before they have even been discovered. Deep-sea hydrothermal vents systems may be where life first evolved on earth. It was perhaps only a matter of time before mining the deep seas took off. Following in the footsteps of deep-sea fishing and drilling for

oil it has been lurking in the minds of exploration companies like Nautilus Minerals, which is behind a major project in Papua New Guinea (PNG). The idea of digging up the seabed one mile beneath the ocean surface to extract mineral-rich deposits such as copper and zinc first emerged in the 1960s. An initial flurry of interest in the 1970s was put off by low metal prices and UN regulations (1) that exist on exploiting resources in international waters. But with rising demand from China and India for rare earth metals like copper, and deep-sea surveys having now found concentrations of minerals four to five times those on land, it has returned but this time in the 'unregulated' territorial waters of PNG, conveniently close to the Asian markets. Ecologists say the PNG government is allowing Nautilus to go ahead with the first ever commercial deep-sea mining project without properly considering the environmental impacts or local opposition. Nautilus investors include the mining giant Anglo-American which is ignoring indigenous opposition to a gold and copper mine in Alaska.(2)

### **'Cradle of life on earth'**

As well as being metal-rich, the volcanogenic hydrothermal deposits which Nautilus plans to mine are home to a unique ecosystem that is still largely unknown to scientists since being discovered in the late 1970s. Initially, the deep sea was thought to be full of soft sediment and little else but the discovery of hydrothermal vents on the seabed, which produce the deposits, revealed a completely novel ecosystem, unreliant on photosynthesis. 'It's the cradle of life on earth,' explains Dr Rod Fujita from the Environmental Defense Fund and author of studies looking into deep-sea mining, 'and the only one that does not depend on sunlight. There are species there that are found nowhere else on earth. It's not like any land habitats we are used to; in fact you have to have your perspective altered to appreciate this deep-sea world,' he says. 'The mining process in PNG will take the top 20-30m off the seabed at a depth of 1,500m and lift it up to the surface before transferring it by barge to processing sites on land. 'You will destroy fauna just by lifting the land,' says deep-sea ecologist Professor Paul Tyler, from the National Oceanography Centre at Southampton University. 'It is possible you might mine at a distance [from the hydrothermal vents] but by mining close by you will affect the flow and the vents might switch off and then all the animals die – you lose a huge biomass.'

### **'Flimsy' environmental report**

Nautilus has attempted to fend off these criticisms by publishing an environment assessment, coproduced by a respected deep-sea biologist Dr Cindy Van Dover. In it they admit the impact to vents and seafloor habitats will 'inevitably be severe at the site scale' and that they will take 'many years' to recover. However, other ecologists say the assessment is 'flimsy' and fails to give a full account of the potential damage mining will cause. Professor Richard Steiner, from the University of Alaska cites the incompleteness of classification of species found at the sites and an inadequate assessment of the risks associated with sediment and waste rock disposal. He also cites the effects of increased light and noise in the deep ocean environment and the toxicity of the dewatering plume [the process of removing water from the mined deposits] to deep-sea organisms, which will not be able to differentiate between food and junk sediment. Of particular concern are the hundreds of thousands of tonnes of waste that will be produced by the mining process, which Steiner compares to that of a 'giant underwater tractor' and which will be pumped onto deeper sea beds nearby. Dr Fujita said the physics of water as well as weather and currents made it difficult to predict or contain any spill and that deep-sea mining had the capacity to produce pollution that could travel across into international waters.

### **Exploitation or financial gain?**

'I don't think the project would be allowed to proceed anywhere else in the world based on such a poor analysis of risks,' says Steiner. The USA is known to have similar deposits off the coast of Washington as has Canada but mining is not thought to be imminent. Dr Fujita suggests Nautilus is just the latest overseas mining giant to take advantage of lax regulations in the country. 'In PNG

they have a poor record of mining on land resulting in lots of poor conditions and that bad record and lack of oversight is now moving from land to sea,' he says. Only this week the PNG government was accused by Greenpeace of allowing rampant logging and failing to respect the rights of indigenous groups who depend on the forests. Nautilus has reportedly suggested the country would benefit by more than \$200 million from the mining but Steiner says the benefits to local people or the economy of PNG were likely to be disproportionately low compared to the scale and risk of the project. 'While the project could gross almost \$1 billion USD in its 30-month lifetime, it expects to provide only \$41 million in total taxes and royalties to the government, a \$1.5 million development fund and a few dozen jobs at most to PNG nationals,' he said.

Prof Steiner is also acting as a science advisor to Mas Kagin, a group formed in 2008 to give a voice to coastal indigenous people in PNG oppose any commercial mining. The group says it depends on the coastal waters for their 'livelihood, culture and way of life' and has a right to oppose the seabed mining. In a campaign video community groups from two provinces expressed their fears. 'When we first heard that Nautilus was going to mine the seabed using technology that had never been used anywhere else it felt as though we were becoming a science lab...and our very lives part of an experiment to test this new technology,' it says. Nautilus conducted workshops with local villages to explain its proposals but rejected calls to set up a permanent citizens advisory council. The company also declined to respond to concerns raised in this article but has previously said it took great pride in 'leading the mining industry into the deep ocean'.

### **Opening the floodgates**

It has estimated several billions tons of copper could be extracted from seafloor sites around the world. Dr Tyler acknowledges that the deep-sea has 'not even had its surface scratched with what it might contribute to the economy' but fears PNG's decision to approve Nautilus mining plans will 'open the floodgates' before proper assessments have been made of the impact. China is known to be seeking to mine similar deposits in the South-West Indian Ocean. 'Deep-sea fishing is a good example. We can ring alarm bells but there is no regulation of it. If I had my way the whole area of deep-sea would become a protected area and people who want to exploit it would have to apply to a body who can ensure that they were doing a proper environmental analysis before they were allowed to exploit it. At the moment there is no requirement at all and we end up looking at the damage done,' he says.

Steiner agrees and says there is too much wrong with the PNG project: 'the way this first deep-sea mine proceeds will set the tone for all others, and this is a very, very bad start'. He argues investment in reusing copper and gold made more sense than continuing to pay mining companies to take bigger risks in an effort to dig up more. 'The global economy simply does not need the gold or copper that would be recovered at these deep-sea hydrothermal vents. We know how to recycle and re-use much of the copper already up out of the ground, run through the economy, and discarded in waste dumps. It is a unidirectional waste of resources, energy and money. And we know better.'

#### Footnotes

1. <http://www.isa.org.jm/en/home>
2. [http://www.theecologist.org/News/news\\_round\\_up/465497/alaskan\\_fishermen\\_to\\_fight\\_mining\\_giant\\_at\\_its\\_own\\_agm.html](http://www.theecologist.org/News/news_round_up/465497/alaskan_fishermen_to_fight_mining_giant_at_its_own_agm.html)

### **New Ireland: Soiat warn Nautilus**

Post-Courier, February 3, 2011

By JOSHUA ARLO

NEW Ireland Provincial Government (NIPG) cabinet chairman Marius Soiat has issued a warning

to deep sea mining company Nautilus Minerals that it will meet resistance from the landowners and the provincial government. He has warned investors in the deep sea mining Solwara 1 Project in New Ireland waters of the Bismarck Sea that the project was doomed. A furious Mr Soiat said he was disgusted to learn in the media that the National Government had gone ahead to grant the deep sea mining lease to Nautilus Minerals to take on the first deep sea mining project in the country. He described this as a "sweetheart deal" between the company and the National government to "exploit" the people despite the landowners and provincial government steadfastly opposing the grant of a lease. He warned the company that getting the support of the National Government does not mean it can bulldoze the project through no matter what the landowners and provincial government think. "We will make it tough every inch of the way," he said, adding that gone are the days of foreign capitalists stealing resources off the people of NIP while promising "liklik toea". He said the National Government runs off and makes agreements that lead to huge incomes for the people in Waigani, but they never keep their promises to the landowners.

## **Bergbau am Ozeangrund**

### **Gericht nimmt Tiefsee-Glücksritter in die Pflicht**

Von Christoph Seidler Spiegel online, 2.2.2011

**Die Tiefsee steht im Blickpunkt internationaler Rohstoffsucher. Was aber passiert, wenn ein Förderprojekt am Ozeanboden aus dem Ruder läuft? Der Internationale Seegerichtshof hat nun Regeln gegen Umweltschäden auf den Weg gebracht. Doch Öko-Aktivisten gehen sie nicht weit genug.**

Es sind zwei ungleiche Partner, die sich da zusammengetan haben. Gemeinsam mit dem kanadischen Bergbaukonzern Nautilus Minerals will der Inselstaat Nauru wertvolle Metallknollen aus der Tiefsee fördern. Die liegen in Teilen des Pazifiks auf dem Meeresboden und enthalten große Mengen Mangan, Kobalt, Kupfer, Nickel und Eisen. Ein durchaus attraktives Ziel für die Rohstoffjäger also. Als Entwicklungsland genießt Nauru Privilegien. Reiche Staaten wie Deutschland haben das Meeresgebiet, in dem der Inselstaat und Nautilus gemeinsam fördern wollen, bereits wissenschaftlich erkundet. Sie mussten die Daten allerdings kostenlos abgeben. Das macht Staaten wie Nauru oder auch Tonga zum idealen Partner für Konzerne wie Nautilus. Die Glücksritter müssen so kaum etwas für eigene Forschung zahlen.

Nautilus verfügt laut seinem letzten Quartalsbericht über eine Kriegskasse von rund 180 Millionen Dollar. Naurus gesamte Wirtschaftsleistung nimmt sich mit etwa 40 Millionen Dollar dagegen läppisch aus. Doch was würde passieren, wenn es bei dem geplanten Tiefsee-Abenteuer etwas schief läuft? Wenn giftige Metalle freigesetzt würden und weiträumig Fische stürben? Müsste dann der Konzern zahlen? Oder der ärmliche Inselstaat? Oder würden die Kosten geteilt? Mit diesen Fragen hat sich der Internationale Seegerichtshof in Hamburg nun beschäftigt. In einem Gutachten stellt die Kammer für Meeresbodenstreitigkeiten klar, dass sich Unternehmen nicht von ihrer Verantwortung freikaufen können. Nautilus darf also nicht mit einer cleveren Vertragsgestaltung die Risiken auf die Mini-Republik abschieben, die gerade halb so groß ist wie der Berliner Stadtbezirk Mitte.

"Es kann nicht sein, dass mariner Bergbau durchgeführt wird und sich niemand für die Umweltfolgen verantwortlich fühlt", sagt Volker Steinbach von der Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) im Gespräch mit SPIEGEL ONLINE. Das Gutachten der Hamburger Seerichter sehe er deswegen positiv. Die Behörde in Hannover kümmert sich um die Erkundung zweier Lförmiger Gebiete im Nordostpazifik. In der sogenannten Clarion-Clipperton-Zone sind in 4000 bis 6000 Metern Wassertiefe große Mengen Metallknollen zu finden. Drei Mal waren deutsche Forscher schon vor Ort, zuletzt im Frühjahr 2010. Einstweilen hat die BGR eine Explorationslizenz für

insgesamt 75.000 Quadratkilometer bei der Internationalen Meeresbodenbehörde in Jamaika gekauft. Wenn deutsche Bergbauunternehmen eines Tages dort fördern wollen, müssen sie aber noch einmal zahlen. Der Grund: Das Meeresgebiet zwischen Hawaii und Mexikos Westküste gehört zum Gemeinsamen Erbe der Menschheit.

### **Keine "Billigflaggen für Tiefseebergbau"**

Das Gutachten des Seegerichtshofs fordert nun, dass die Staaten strenge Regeln für den Unterwasserbergbau in ihren Lizenzgebieten erlassen müssen. Bei Verstößen dagegen soll dann das betreffende Bergbauunternehmen zur Kasse gebeten werden - in unbegrenzter Höhe. Wenn die Staaten sich aber nicht genügend um die Einhaltung der Gesetze gekümmert haben, können auch sie in die Pflicht genommen werden. Dasselbe gilt, wenn die Regelungen nach internationalen Maßstäben zu lax sind. Er hoffe, dass künftig in vielen nationalen Gesetzgebungen die hohen Standards übernommen werden, sagt Rüdiger Wolfrum, einer der elf zuständigen Hamburger Richter. In Deutschland gibt es dafür seit 1995 das Meeresbodenbergbaugesetz, außerdem noch die Meeresbodenbergbauverordnung. Die Ausbeutung der Bodenschätze am Ozeangrund sei mit hohen Umweltrisiken verbunden, warnt Wolfrum.

Umweltschützer sehen das Gutachten genau deswegen mit gemischten Gefühlen. Einerseits scheint die Gefahr gebannt, dass selbst grundlegende Standards unterschritten werden. Für Entwicklungsländer sollen nämlich dieselben Sorgfaltspflichten gelten wie für reiche Staaten. Damit sei die Gefahr von "Billigflaggen für Tiefseebergbau" gebannt, sagt Christian Neumann von der Umweltschutzorganisation WWF im Gespräch mit SPIEGEL ONLINE. Und doch bleibe ein entscheidendes Problem: "Die Haftungsfrage bleibt am Ende ungeklärt." Denn wenn das Bergbauunternehmen im Schadensfall finanziell überfordert sei, dann könnten Umweltschäden am Ende unbezahlt bleiben. "Es sollte ein Fonds eingerichtet werden, der von der Industrie und den teilnehmenden Ländern gefüllt wird", fordert Neumann. Wie groß so ein Fonds sein müsse, ließe sich derzeit aber noch nicht sagen.

Bei Greenpeace begrüßt man das Gutachten, kritisiert aber generell den angestrebten Tiefseebergbau als verfrüht. Die Tiefsee sei eine der am wenigsten erforschten Regionen der Erde, sagt Mitarbeiter Jörg Feddern. Erst müsse man die Ökosysteme der Tiefsee erforschen, dann könne man über ihre wirtschaftliche Ausbeutung nachdenken - und nicht umgekehrt. Das wird in der Praxis wohl auch so laufen. Denn einstweilen gibt es niemanden mit einer Förderlizenz für den Meeresboden mitten im Pazifik. Mehrere Staaten mit Forschungsgenehmigungen - darunter China, Russland, Japan und Frankreich - müssen sich aber bald darüber klar werden, ob sie in den Bergbau im Ozean einsteigen wollen. "Ich würde erwarten, dass in den nächsten fünf bis sieben Jahren fundamentale Entscheidungen fällig sind", sagt Michael Wiedicke-Hombach von der BGR. In Deutschland werden die Dinge allerdings wohl länger dauern. In diesem Jahr soll der Technologiekonzern Aker Wirth erst einmal ein Konzept für ein Abbaugerät vorstellen. Wie eine riesiges Zwitterwesen aus Gartenhäcksler und Staubsauger könnte es sich am Meeresboden entlang fressen. Irgendwann. Vielleicht. Denn die Erforschungsphase im deutschen Lizenzgebiet läuft einstweilen bis 2021 - und ein großer Partner aus der Industrie fehlt bis heute.

### **Papua New Guinea approves world's first seabed mining project**

From Radio Australia

The Papua New Guinea government has given the green light for the what is hoped to be world's first sea floor mining venture. It has granted a 20-year mining lease to Canadian company, Nautilus Minerals, to mine gold and copper in a 59 square kilometre section of the Bismarck Sea. The Solwarra one site, as it is known, is off the coast of New Ireland province and about 50 kilometres north of Rabaul.

*Presenter: Jemima Garrett*

*Speaker: Stephen Rogers, CEO of Canadian company, Nautilus Minerals*

GARRETT: The grant of the mining lease was the last regulatory hurdle Nautilus Minerals had to clear. Nautilus CEO Stephen Rogers says it is an historic decision.

ROGERS: As this industry emerges it is going to present a significant contribution to the PNG economy.

GARRETT: Earlier this month you had more drilling results from Solwarra One. Just how much gold and copper is there and how much do you plan to produce once mining gets underway?

ROGERS: At the moment we have an indicated and inferred resource. Combined it totals around 2 and a quarter million tonnes, approximately, of ore. When we go into production we would be producing at approximately 1.3 million tonnes per annum and that should generate something of the order of 80,000 tonnes of copper per year and approximately 150,000 to 200,000 ounces of gold, each year as we go forward.

GARRETT: That will make Nautilus a significant player - producing about half as much copper as the giant Ok Tedi mine and the same gold as an average small operator. The grant of the mining lease was delayed while the PNG government considered if it will exercise its option to take a stake in the project of anything up to 30 per cent. Now the lease has been granted it has just 30 days to make a decision and find the finance. I asked Stephen Rogers what it would cost PNG to take its full option.

ROGERS: Any capital that we have to put into the project, going forward .. the government would have to put up its 30% share. Initially, it has an outlay of approx US\$20-25 million which represents the investment costs to date on the exploration, the environmental work and the development work, that has been carried out so far on the project.

GARRETT: What is your understanding of what sort of stake the PNG government is considering?

ROGERS: I wouldn't like to second guess the government but I am of the opinion that they will certainly participate.

GARRETT: As the project is offshore you don't have to deal with landowners. Does that mean PNG and its citizens will not get as much income from deep sea mining as it does from mining on land?

ROGERS: Not at all. The same opportunities exist for people to participate in this project by providing services to the company, and in terms of the royalties going back into the country, they are

exactly the same as any land-based mine. So while we are not impacting people and having to move them from their homes, the general benefit back into the country is very similar.

GARRETT: How soon do you hope to be able begin commercial mining?

ROGERS: Once we sanction the project - which means our board has to approve it - then we'll be about 30 months before we go into production. We have one more milestone to put in place after this particular one: we are intending to close out an arrangement with a strategic partner which will bring in the additional capital that we need to take the project through to commissioning and into production. We hope to do that in the near future and once that milestone is achieved then our board would approve the commencement of the building of the equipment. We are well advanced in the engineering aspects of all of this equipment and we are now very close to the stage where we will start to assemble all the different components necessary to start offshore production.

GARRETT: Stephen Rogers CEO of Nautilus Minerals. Mr Rogers is bullish about the future of seafloor mining and he believes the Pacific will lead world.

ROGERS: We've had considerable success in the Bismarck Sea, with 19 different systems discovered to date. Over and above that, we've carried out exploration in the territorial waters of Tonga, and we have large tracts of land right across the Western Pacific in countries like Fiji, New Zealand, Vanuatu and the Solomon Islands.

GARRETT:: So what potential do you see in the longer term for this industry in the Pacific?

ROGERS: We have a view in the company that the seafloor industry has the ability to provide the world's copper supply. We don't have hard evidence of that at this point in time. But based on what

we do know about the location of these seafloor massive sulphides around the world and the intensity or diversity of systems that we have seen in this one area of the Western Pacific, we apply that across the world - the experts tell us that there could be many thousands of systems with the ability to provide the world's copper demand. (Ramu Nickel Mine Watch 30.1.2011)

## **CANADA BANK SEEKS UNDERSEA EXPLORATION IN COOKS**

*New application for possible mining venture*

WELLINGTON, New Zealand (RNZI, Jan. 26, 2011) - Canada's Endeavour Financial Corporation is again lobbying the Cook Islands Government for a deep sea mineral exploration license. Endeavour, a merchant bank which focuses on the mining sector, wants to investigate whether the nodules of manganese and other minerals can feasibly be extracted. The company first approached the Cooks government in 2008 but the then administration refused to enter into any agreements as seabed mining legislation hadn't been put in place. The most recent proposal submitted by Endeavour has been given to the new economic development taskforce for comment. The taskforce is expected to advise the minister of mining and natural resources, Tom Marsters, on whether to accept or decline the Endeavour proposal.

## **PNG eyes full stake in sea floor mining**

The National, January 25, 2011

THE government will take its full 30% stake in the venture – worth more than US\$100 million – that it hopes will be the first in the world to lead to mining of the sea floor, Mining Minister John Pundari said last Friday. Confirming the government's recent granting of a mining licence to Canadian company, Nautilus Minerals, for a 59km<sup>2</sup> section of the Bismarck Sea, at depths of about 1,600m, Pundari said the state had negotiated to purchase the full equity participation. The Solwaral site, as it is known, is off the coast of New Ireland and about 50km north of Rabaul. He told Radio Australia the state's 30% share would cost about US\$103 million and would be bought over a three-four year period. "We are looking at investing about US\$27 million in the first year. "We will also be acquiring an interest in the new technology. "Our patent interest will be about 30% again and we are looking at purchasing 5% in the first year and the balance in the subsequent years."

Nautilus also has sea floor exploration leases in the Solomon Islands, Vanuatu, Fiji and New Zealand. It hopes to begin its commercial gold and copper operation in PNG by 2014. Pundari also told the radio network that PNG would take a stake in the patents for Nautilus's new mining technology. "We will also be acquiring an interest in the new technology. "Our patent interest will be about 30% again and we are looking at purchasing 5% in the first year and the balance in the subsequent years. Asked where the government would get the finance from for its stake in the Nautilus project, Pundari said the government was looking at nominating Petromin to carry the states interests. He added that Petromin had access to the necessary finance and would be able to sign an agreement with Nautilus within the next 30 days. The mining planned at the Solwarra 1 site in the Bismarck Sea will be no small operation. The gold and copper is found in high concentrations in massive sulphide deposits on the sea floor in 1,600m of water. Each year, 1.3 million tonnes of ore will be cut from the seafloor and pumped to the surface in seawater slurry. There, it will be dewatered before being moved onshore for processing. Nautilus says it is well-advanced with the technology needed to mine the seafloor.



*Letter to the editor***No to seabed mining**

Post-Courier, January 24, 2011

Why is our government rushing in dishing out exploration and mining licenses at an alarming rate? Is it that we don't have other options in export earnings to subsidise economic gains and improve social indicators as government, mining companies and Mineral Resources Authority (MRA) asserting? Is mining sustainable and would improve the basic living conditions of the indigenous citizens of PNG like agriculture, fisheries, tourism etc are providing now? Deep sea mining is the first of its kind in the world brought on by our leaders for testing hence the coastal people of New Ireland (NIP) and East New Britain (ENB) will be used as guinea pigs to test new technologies. Our government through MRA dished out exploration licenses to Nautilus all over PNG waters.

Nearly 75 per cent of our seas are under exploration license areas of Nautilus but the Post-Courier page 3 Wednesday January 19 revealed project 1 is now granted mining lease. Nautilus have 11 solwara project sites and imagine how all Solwara projects will affect our sea and people depending on it for 20-50 years and beyond. MRA and Department of Mining is foolish in brain and or self-centred by the lust for money than the protection and love for the land, sea and environment as God directed human kind to treasure and be managers over them. ENB and NIP please stand up and voice your concern like Madang people against Ramu Nickel! You can get your sea back and enjoy the beauty and providence of the sea through God than being lured by typical empty promises of the international mining corporations! Duwigon Iyampon, POM

*Editorial***Seabed mining, a risky investment**

Post-Courier, January 19, 2011

So the government of Papua New Guinea has gone ahead and granted a deep sea mining lease to Nautilus Minerals to develop its copper-gold project in the Manus Basin. We are told that the 20 year lease covers an area of about 60 square kilometers around the Solwara 1 project. The stretch of sea in the Manus Basin is very deep but, again, we are led to believe that Nautilus, using state-of-art- technology, has been exploring the sea floor for mineral deposits. And from the studies, the project aims to produce about 80,000 tonnes of copper, along with 150,000 to 200,000 ounces of gold annually from the project. We are told that the project is estimated to cost about K1.04 billion and the PNG government has retained an option to take up to a 30 percent stake in the project as a joint venture partner. This option, we understand, is exercisable within one month. Should the government decide to exercise this option; it will contribute funds to the project in proportion to its interest, including its share of the costs incurred to date.

It is quite interesting to read that the government is interested in taking up equity in the seabed mining project. The idea might be noble, given that we all like to make some money in any resource project that takes off in this country, however deep sea mining is something new. It is a new frontier as there are not many projects like this around the world that we can learn from. The Minister for Mining, John Pundari and his department must come clear and tell us if we, as a country, understand what we are entering into. The people of this country have a right to know before the Government squanders tax payer's money on, what we firmly believe, is an ill informed decision. It is public knowledge that exploration activity has been pursued in the Manus basin by Nautilus and its joint ventures partners for some years. From this work, the assay values of surface samples

collected through remotely operated vehicle and dredging looks promising. This is confirmed by independent expert opinions we have sought. The same experts tell us that similar conclusions are also drawn for samples collected through shallow exploratory drill holes but the most important question is whether it has sufficient reserves or resources to develop a seabed mining.

We are informed that from submersible observation of submarine hydrothermal deposits around the Pacific Rim and East Pacific Rise, it is recognised that the distribution of the sulfide chimneys or sulfide mound are irregular and it is quite impossible to do block modeling to quantify the resources. Furthermore the super high grade does not quantify a resource to make it economical viable, we are told. When we go back a few years ago, drilling of the Pacmanus site in Manus Basin by Ocean Drilling Program (ODP) failed to discover massive sulphide deposits below the chimney structures. This is found to be true in similar observations that are made at other sites around the world. What Papua New Guinea needs to know is whether there are sufficient resources in the Solwara 1 project for the government to be talking about taking equity in the project?

This is a question that needs to be addressed by the geological informed staff of the Minerals Resources Authority (MRA) and the Department of Mining. The other question we have that needs to be answered as well is the high lead and arsenic content in the sulfide chimneys in the Manus Basin. Did MRA did a due diligence check on the environmental implication for such heavy and toxic elements? We urged the Government not to be deceptive when it comes to dealing with resources on the ocean floor. We are talking about hard rock and it is not manganese nodules or submarine placer deposits like those of the West African coast where it can be easily mined by dredging.

### **Deep sea mining lease granted**

Post-Courier, January 19, 2011

*By MOHAMMAD BASHIR*

Rousing times are ahead in the mining and petroleum industry when the PNG Government created history by granting the first world deep sea mining lease to Nautilus Minerals Inc (TSX & AIM: NUS) of Canada for the development of its Solwara 1 project in the Bismarck Sea. Besides the multi-billion dollar PNG LNG project, the deep sea mining is a new frontier which has attracted interest from even the United States which sent a team of experts to PNG late last year to learn PNG's approval regime for such venture. The US is only familiar with deep sea and offshore development of gas and oil projects only like many other countries. Nautilus CEO Stephen Rogers said the granting of the mining lease on the Solwara 1 project was an important step for his company and PNG. "This historic decision to grant a lease over a deep sea deposit is a major step forward for this new frontier, and it reflects the fact that the Solwara 1 project is being recognised as an exciting, commercially valuable undertaking," he said.

The lease covers an area of about 59km<sup>2</sup> surrounding Solwara 1, 50km north of Rabaul where Nautilus intends to mine high-grade copper and gold deposits on the seafloor, at depths of about 1600 metres. The mining lease has been granted for an initial 20 year term and the PNG Government has retained an option to take up to a 30 per cent stake in the Solwara 1 project as a joint venture partner. The option is exercisable within one month and if exercised, the Government will contribute funds to the project in proportion to its interest, including its share of the exploration and development costs incurred to date. Nautilus will now press ahead to conclude its strategic partnering discussions and continue the development of the Solwara 1 deposit, which has a stated resource of 2.2 million tonnes of ore, including an indicated resource of 870,000 tonnes at grades of 6.8 per cent copper and 4.8 g/t gold.

When it commences production, which is expected about two and a half years after full project sanction, Nautilus plans to produce ore at an annual rate of more than 1.3 million tonnes, containing about 80,000 tonnes of copper and 150,000 to 200,000 ounces of gold. Ongoing deep-sea drilling is also expected to lead to expansion of the resource base before the start of production. CEO Rogers further said: “We are grateful to the PNG government for its support and welcome its participation in the project. We look forward to working closely with the Government on Solwara 1, which will generate significant investment for the economies of New Ireland, East New Britain and PNG. “The successful development of Solwara 1 will pave the way for the expansion of operations to other sea-floor deposits in the future, creating an exciting growth industry further benefiting PNG,” he said.

### **Government takes interest in seabed mining**

Post-Courier, January 13, 2011

By MOHAMMAD BASHIR

The National Government has already made a decision to consider taking equity into the Solwara 1 seabed mining project spearheaded by Nautilus Minerals. The size of the equity is being worked on by Nautilus and will be announced after the project is signed off when the Minister for Mining has approved the appropriate licences under its prerogative. Mineral Resources Authority (MRA) acting managing director Philip Samar disclosed this at the launch of MRA’s online shop in partnership with ANZ bank yesterday in Konedobu. “That’s where we are heading. It is the minister’s prerogative to grant the appropriate licence and we will take it from there,” Mr Samar said when put to him by the Post-Courier. He also said that the United States government also sent a number of experts on a fact finding mission to the country last December to learn the approval regime of PNG in seabed mining.

The United States are only into oil and gas projects under seabed or offshore projects and are not familiar with mining of minerals such as the proposed Solwara 1 project. “This is super high grade stuff and it is only found on the surface unlike mining on land which requires digging miles deep such as Porgera where you have to dig down to 50 meters or more,” Mr Samar said. The most expensive product on sale online by MRA after yesterday’s launch is PNG’s geophysical survey data which was compiled under a European Union project. Instead of potential miners spending millions of kina to undertake their own survey and obtain these data, they can now simply pay US\$5,000 online and obtain it from MRA. Other geophysical maps and even application form for licences can be obtained online on the MRA’s homepage and paid in any currency which will be converted through the ANZ eGate system. ANZ’s relationship manager Kingly Anakapu said the product is an indication of how business has grown and moved into high technology in PNG.

### **Nautilus hits rich deep-sea copper area**

The National, January 11, 2011

By PATRICK TALU

NAUTILUS Mineral’s Solowara 1 deep-sea mining project in the waters of Bismarck Sea in New Ireland has discovered high grade mineralised copper deposits, prompting the company to increase exploration spending to at least US\$20 million. The Bismarck Sea operation is the world’s first deep-sea mining enterprise. In a statement last week, Nautilus said recent ocean floor drilling at its Solwara 1 project in New Ireland revealed a number of intercepts of copper mineralisation exceeding 20%, and confirmed extensions of mineralisation at the deposit. The company said the results from 10 holes drilled during the second half of last month showed the presence of high grade copper at all sites. The results are based on hand-held X-ray fluorescence (XRF) analyses.

The programme had involved a total of 23 holes drilled at 17 locations, about 1,600m below sealevel and extending to a maximum depth of 52m below the seafloor. Nautilus' chief executive Steve Rogers said: "The results again showed the richness of the Solwara 1 deposit. "It is increasingly clear that the mineralisation is more extensive than initially identified. "In addition, the copper grades we are finding in these seafloor deposits are significantly higher than the grades that are typical in land-based projects," Roger said. Rogers said Nautilus continued to refine drilling techniques, lifting core recoveries and productivity.

### **Nautilus' seafloor copper prospects**

The National, December 22, 2010

DEEPWATER seafloor drilling trials conducted at Nautilus Mineral Inc's Solwara 1 project in Papua New Guinea have confirmed the extension of high grade copper mineralisation beyond the project's previously identified massive sulphide system. Nautilus chief executive officer Steve Rogers said the company was encouraged by the initial results from the trials. "A number of milestones have been achieved. "The drilling supports our view that the Solwara 1 resource is likely to extend beyond the previously identified limits and remains open at depth. "The focus now is to optimise core recovery and drilling system, to improve results so that we can enhance Nautilus' knowledge of the resource and other Bismarck sea discoveries," Rogers said.

### **Deep sea mining faces storm**

The National, December 8, 2010

The deep-sea mining to be developed by Canada's Nautilus Minerals off the coast of New Ireland and East New Britain is now faced with stiff opposition. The recently incorporated land group West-coast Central Seabed Mining Landowners Association (WCCSMLA) has the backing of the Namatanai joint district and budget priority committee (JDBPC) with a funding of K50,000 towards meeting legal cost. A further K20,000 will come from the Central LLG. Chairman of JDBPC and Namatanai Member of Parliament Byron Chan who supported the landowners' plight said the financing of such legal battle was crucial so that the government could be made aware of the reality that any mining agreement must involve landowners. He argued that currently the mining agreement did not accommodate the landowners' issues and wanted to see it resolved by putting in place proper laws to safeguard the landowners. Chan said at present, there were no mining laws that deal with the sea in PNG and wanted the landowners to pursue the court's interpretation on this.

Recently, the landowner executives of WCCSMLA met with Chan and the media and raised their concerns and announced the legal challenge. "We will make an application to the Supreme Court in Kokopo for an interpretation of the Mining Act," WCCSMLA technical adviser Roboam Paka said. He said the current memorandum of agreement had three signatories, which was the state, the developer and the two provincial governments of East New Britain and New Ireland. Similarly, a total of K100,000 had been approved by the Namatanai JDBPC for the Simberi landowners to take the company Allied Gold to court for environment pollution, royalty differences and review of mining lease. Chan also called on Lihir and Nimamar local level government to be prepared for the Lihir infrastructure development grants and to review current mining benefits as the agreement to increase the output gold next year had been approved.

## **Nautilus expects to unveil project partner soon**

Mining Weekly, By: Matthew Hill, 2nd December 2010

TORONTO (miningweekly.com) - TSX- and AIM-listed Nautilus Minerals, which hopes to mine the seafloor up to 1 600 m below the surface off the Papua New Guinea coast, will announce its partner this month, CEO Steve Rogers said on Thursday. The company had been in talks with prospective partners in its flagship Solwara 1 licence since 2009, and has now narrowed the list down to two companies. "We are in the stages of finalising agreements with those parties," Rogers told *Mining Weekly Online*. "I am targeting to have that closed by year end – if not, then by early next year." Talks were progressing with both parties simultaneously as "security" should the negotiations fall through with either one. Nautilus said previously that potential partners had been "right to the wedding chapel" before pulling out.

The Toronto-based company, which aimed to become the first deep-sea miner, also needed to receive a mining licence before it could start production. Rogers said this process was "heading in the right direction", and the company should have the Solwara 1 licence by the end of the month, or early next year. It might have happened sooner had there not been a change of mining ministers in Papua New Guinea mid-year. "We had to go through re-education process," said Rogers. Saloman Partners analyst Raymond Goldie said the market was not particularly concerned about the mining licence. But he added that previous forecasts by Nautilus that it would have a partnership concluded earlier this year, which it failed to do "disappointed the market".

Rogers would not name the companies Nautilus was courting, but said "we are looking at both mining groups and service type partners". Canada's Teck Resources and Anglo American are both shareholders in the company. Would they be keen on increasing their stakes in Nautilus? "That's something I can't really comment on, but certainly their level of interest is not waning," Rogers said. TD Securities analyst Craig Miller said in an August note: "It is our belief that the company is likely looking to joint venture all its tenements within the Bismarck Sea, with Nautilus as the operator."

### **PIONEERING**

While other companies, including diamond miner De Beers, have mined the sea floor in shallow waters off the coast of Namibia and South Africa, Nautilus would be the first to tap deep-sea minerals. The seafloor deposits Nautilus wants to mine were formed after extremely hot water carrying metals from deep in the earth mixed with cold seawater at the bottom of the ocean, depositing metal-rich minerals. The company aims to use existing offshore oil technologies to cut ore from the seafloor and pump it to the surface as seawater slurry. Once the ore is dewatered, it will be shipped to shore for processing. "We want to show the world that yes this can be done," Rogers affirmed. "Success in seafloor production will bring significant interest. It has the potential to change the face of mining," he said.

Goldie said if Nautilus was successful, it would "change the world a little" by opening up new sources of supply. "Would it mean the long term shortage of copper supply goes away? Definitely not," he added. Nautilus has said it could produce about 80 000 t/y of copper at Solwara 1, as well as 150 000 oz/y to 200 000 oz/y of gold. This could shift once the company has completed a design review over the next four weeks. Goldie rated Nautilus as a buy, with a one-year target price of C\$5,10. In the August note, Miller gave the company a C\$2,25 year target price. Nautilus was trading at C\$2,05 a share on Thursday, giving it a market capitalisation of C\$319-million.

## Villagers give notice on deep-sea mining

National, November 29, 2010

By ISAAC NICHOLAS

WEST coast central New Ireland landowners will ask the Supreme Court to stop any deep-sea mining in the area until the current mining laws governing sacred fishing grounds are properly interpreted. Nautilus Minerals had obtained national government approval to begin deep sea mining off the coast of New Ireland and East New Britain. Namatanai MP Byron Chan and the provincial government have joined forces with the West-coast Central Seabed Mining Landowners Association to fight for benefits from the mining operations. Landowner representatives including chairman Benson ToMarum, secretary Eugene Pasmets and technical adviser Roboam Paka and Chan held a joint media conference in Port Moresby last Friday to announce the legal challenge. "We will make an application to the Supreme Court in Kokopo for an interpretation of the Mining Act," Paka said. He said the current memorandum of agreement has three signatories, which is the state, the developer and the two provincial governments of East New Britain and New Ireland. "We have engaged lawyers to go to court to seek interpretation whether we can claim ownership of the sea."

Paka said villagers, who used the ocean area to be mined for food, had not been consulted, simply because the Mining Act was not clear on the sea aspect. "We want the seaowners to be part of the MoA and pre-project financing be enjoyed by the locals." Paka said the rights of landowners to fish and visit their sacred sites out at sea must be protected. "The state has resolved that we are not owners of the sea. "The state seems to think that ownership ends at the waterfront," he said. Paka said the people had a long association with the sea around the St George Channel through fishing and sacred shark-calling activities. "Our cultures are linked to the sea and we want that to be addressed in the MoA." Chan said four main issues were equity, mining facilities and operations, seaowners being part of the MoA and pre-project financing. "We are taking the matter to court for legitimacy of the current Mining Act to ensure the rights of our people are protected," he added.

Post-Courier, November 11, 2010

## Deepsea mining delay

By NOEL PASCOE

THE world's first deepsea mining venture is waiting anxiously on a decision by the Government on taking a stake in the potentially lucrative project.

The committee of economic portfolio ministers is to decide on whether the Government will push for a share in the Nautilus Minerals Niugini Ltd deal.

The Nautilus executives were dealt a shock late last month when, suited up formally to receive their exploration licence, they were told of a new clause in the proposed licence: equity for the State in the venture.

The licence issue was put off pending a decision of the economic ministers committee.

Canadian-owned Nautilus proposes to conduct mining for precious metals in deep waters 30 to 180 kilometres off the west coast of Namanatanai, New Ireland.

They have been planning on a start to mining in the first quarter of 2013.

An exploration vessel, the Rem Etive, is expected to arrive in Rabaul by the end of this week after a delay awaiting work permits for foreign crew, the company's country manager, Mel Togolo, said yesterday.

Mr Togolo said there had been "very positive talks" with the Government.

## Nautilus licence deferred

National, October 27, 2010

By PATRICK TALU

THE signing and granting of a licence to Nautilus Mineral for the Solwara 1 underwater mining

project has been deferred. Minister for Mining John Pundari yesterday attributed the deferral to conflicting advice given to him by the Mineral Resources Authority (MRA). He said it was not due to a court injunction taken out against the state and MRA by the New Ireland provincial government as reported in *The National*. "In light of the new deep sea mining method to be employed by Nautilus and the risk profile associated with the Solwara 1 project, I must ensure the state is not exposed to any unnecessary risks while preserving any benefits that the state may stand to lose in the development of the project," Pundari said. "With that in mind, it is my intention to use my powers under the Mining Act 1992 to grant the Solwara 1 mining licence with conditions for compliance by the company in the best interest of the state. "I was provided with two separate documents containing a number of conditions by MRA. "One document had 11 conditions while other had 12," the minister said.

The 12th condition was related to the preservation of state equity in the project. "In fact, these conditions reflect the position of the state as advocated by the minister for treasury and finance through the deliberation of the state team when assessing the development proposal of the project. "The condition give the state the right to exercise its option to take up 30% participating interest in the Solwara 1 project up to a period of at least 12 months from the time Nautilus advises that it has successfully completed the trial of the mining equipment," he said. Pundari said for some reason, MRA had recommended the document with 11 conditions for approval, leaving out the bit outlining the state's interest in the project. MRA and Nautilus had argued that the 12th condition would limit the developer's ability to raise capital to finance the project. "I am not convinced by this assertion by MRA and Nautilus," Pundari said. "I have directed the state team to reassess this condition and confirm the assertion made by Nautilus and advise me accordingly. "In the meantime, my position has not changed and I am determined to sign off the Solwara 1 project mining lease with the 12th condition attached," the minister said.

### **Papua New Guinea gives green light to deep-sea mineral mine**

*Plans for a new mine for ore that contains copper, zinc and gold have caused alarm among scientists and indigenous people*

Christine Ottery, guardian.co.uk, Thursday 21 October 2010

The green-lighting of the world's first deep-sea mineral mine in Papua New Guinea waters has caused alarm among scientists and indigenous people who fear it will damage local marine life. Papua New Guinea's prime minister, Michael Somare, today licensed the new mine for ore that contains copper, zinc and gold, to be run by Canadian company Nautilus Minerals. Sited in the Manus Basin within Papua New Guinea's territorial waters, it will be near hydrothermal vents 1,600 metres below the surface. Driven by rising copper prices around the world, Nautilus' Solwara 1 project will excavate 1.2 to 1.8m tonnes of high-grade sulphide ore a year. Scientists are concerned about the scale of the mining. Paul Tyler from the University of Southampton and chair of the Census of Marine Life said: "Hydrothermal vents have a very distinctive fauna that is only found on hydrothermal vents so mining close to the vents could wipe out the vents or cause a large amount of damage in the surrounding area."

Nautilus says it has carried out extensive environmental research and impact assessments, and has conservation mitigation strategies in place such as moving organisms for later recolonisation. But Tyler said: "When you mine near a hydrothermal vent you change the flow of fluids through the sea floor. You might switch the vent off or create another one elsewhere – that might affect the distributions of animals around the vent." Deep-sea organism populations do not have resilience to disruptions and have slow growth because of limits in food supply and the cold water. "These organisms catch, store and break down carbon that is removed from the atmosphere by shallow water organisms," said Elliott Norse, president of Marine Conservation Biology Institute in Washington DC.

"The deep sea also harbours organisms that could be important to humans as anti-cancer medicines – but that we might not even know about yet."

The indigenous communities of Papua New Guinea are also against the mining operation, and have petitioned the government to prevent it. However, one expert said the risks had to be put into the context of damage caused by other types of mining, such as excavating a mountaintop. Linwood Pendleton, the director of Ocean and Coastal Policy at Duke University, said: "Hydrothermal vents are naturally combustible habitats, they blow up, they become colonised, then the vents die and the ecosystems around them die, so if mining were done at a small scale and low frequency then it may fit very well into this chaotic system of destruction. Mining a mountaintop, once it is gone, it's gone." It is unlikely that concerns will stop the mining project going ahead as no one from the international community can interfere in Papua New Guinea's territorial waters of the Bismark Sea. Comment was not available from Nautilus Minerals.

- **22 October update:** The expected announcement of the go-ahead for Solwara 1 to the national media of Papua New Guinea did not occur yesterday. No official reason was given for the deferral of the licensing.

## **NAURU BACKS APPLICATION FOR DEEP SEA MINING**

*Company estimates \$4 billion investment*

WELLINGTON, New Zealand (Radio New Zealand International, Oct. 11, 2010) – A Nauru based company seeking an application to explore for deep sea minerals says it could bring enormous benefits in revenue, employment and capacity building. The Nauru incorporated company, Nauru Ocean Resources has made the application to the International Seabed Authority to explore an area in the north-east Pacific Ocean reserved for developing states. The Nauru government says it is the first developing state to sponsor such an application. The government says the agreement requires no monetary commitment from the country, and will not deplete its resources as the minerals are in international waters.

Nauru Ocean Resources chairman David Heydon says as well bringing in royalties and taxes, there could be other spinoffs. "We also need to employ Nauruans and help build capacity there of their skills in the marine environment and engineering and technical environment. So look it's an amazing endeavour." Robert Heydon says the venture may require about four billion US dollars in capital which could be drawn from capital markets, and existing mining companies in a partnership arrangement.

## **China's expansion in PNG continues apace**

**PNG EXPOSED**

NAUTILUS MINERALS has confirmed Chinese interests are planning to take a controlling stake in the Solwara 1 undersea mine as China's expansion into PNG continues. Solwara will be the world's first undersea mining operation and will produce both copper and gold. The Chinese are also likely to fund the Yandera copper and gold mine in Madang Province. Like the Ramu nickel mine, Yandera will use marine dumping to dispose of mine waste. China is also looking to expand its manufacturing capacity in PNG on its own terms. The PNG government is currently negotiating a loan from the Chinese government for China to build the Pacific Marine Industrial Zone which will be the first Special Economic Zone in PNG. Within the zone Chinese companies will be able to operate tax free and avoid local wage restrictions and health and safety laws. This will provide an opportunity for the Chinese to process the gold produced from the Solwara and Yandera mines.



China's interests extend to other resource sectors. Zhoushan Zhenyang Deep-Sea Fishing, a subsidiary of Zhejiang Hailisheng, is building a \$20 million tuna processing factory in Lae. Other Chinese companies hold licences to fish in PNG waters. China is the biggest consumer of unprocessed logs from PNG's rainforests, importing around 80% of PNG's annual log production. Australia's Lowy Institute has pointed out that large-scale resource projects in PNG do not alleviate poverty as most jobs are taken by foreigners, profits sent off-shore and government revenues not spent on regional development. (from PNG Attitude October 2010, p. 7)

### *Letter to the editor*

#### **Please stop deep sea mining!**

Post-Courier, October 1, 2010

I would like to ask this Government to stop touching, digging and using all our resources. We are a very small country and we are blessed with a lot of resources. The good Lord has blessed us (PNG) richly, yet we are very poor in terms of development and the way of life. I can say that we are very rich in terms of resources compared to other countries in the world but after 35 years we haven't developed like Singapore after 40 years Independence. Something is terribly wrong in the way the affairs of the country are being managed. There is a lot of mining activity going on in a lot of provinces in PNG, apart from logging, fishing, tea coffee, cocoa and copra. But this hasn't brought development to our country which is being managed by selfish leaders and only benefit themselves and their families. I ask the present government to stop digging all our resources, think about the future. Do you have a backup plan if we use all our resources? We must not misuse them or used them up. I go against the deep sea mining and I ask all NGI regions, especially East and West New Britain, New Ireland, Manus and other leaders to join forces and stop Nautilus, stop deep sea mining. It's our life, our sea, our land and most of all our future. Nautilus please listen. Stop the exploration in our sea. Leave our sea alone. Yours faithfully, Maris Tana, NIP

#### **COOK ISLANDS TASK FORCE TO GUIDE UNDERSEA MINING**

*Huge deposits of cobalt near Cook isles*

By Helen Greig

RAROTONGA, Cook Islands (Cook Islands News, Aug. 31, 2010) – In the Cook Islands, a Seabed Minerals Policy Taskforce has been set up by government to provide advice on the national seabed minerals policy and guidelines on the set up of the Seabed Minerals Authority.

*[PIR editor's note: According the site-Secretariat of the Pacific Community, Cook Islands nodules have among the highest cobalt content in the Pacific worth 10 to 30 times more than copper or nickel. It is estimated that the 32 million tonnes of cobalt resource is enough to sustain the current world demand for 520 years. According to SPC, the mining tailings could be harmful to the marine ecosystem if not disposed of properly.]*

The taskforce, headed by Marine Resources Secretary Ben Ponia, was appointed about two months ago with the approval of cabinet under minister of natural minerals resources Robert Wigmore. It is responsible for developing the national policy for the seabed minerals industry and will provide legal, policy and technical advice to government in the development and management of the resource. The taskforce vice chair is Foreign Affairs and Immigration Secretary Jim Gosselin, and members are National Environment Service Director Vaitoti Tupa, Office of the PM Policy Director Liz Koteka-Wright, Public Service Commissioner Navy Epati, Solicitor General Tingika Elikana,

acting Financial Secretary Kevin Carr, and private sector representatives Nadine Newnham and Tim Arnold. Ponia said the taskforce will review the draft of the seabed mineral policy and look at how it will be brought into effect.

The taskforce was set up about two months ago and has had ‘one quick inception meeting’ which included the Commonwealth Secretariat legal advisor Johsua O’Brien. Ponia says the taskforce serves as an interim arrangement before a Seabed Authority is appointed. Local lawyer Tim Arnold said he had agreed to be on the taskforce to help look at the legal issues involved. "This is an entirely new frontier from legal point of view. Obviously there’s a policy – clearly the policy needs to have a legislative underpinning. And there’s a huge piece of legislation (Seabed Minerals Act 2009) that’s been passed by parliament but unless that’s understood, and unless people engage with it in terms of everything that flows from that in terms of regulations, in terms of identifying suitable people to man the office – then there will be nobody at the wheel when people come asking for exploration licenses."

Arnold says he’s personally skeptical that the whole thing is going to result in anything in the short to medium term. "The technology to exploit these minerals in a cost effective way is probably at least a decade away. I believe that one of the things the taskforce can and should be doing is letting the public of the Cook Islands know that we’re not here because there’s huge amounts of money to be made next year – we’re here because we’re dealing with something that belongs to all Cook Islanders and its part of people’s heritage over the next 50 to 150 years. It’s an opportunity to be involved in setting something up in a responsible manner," he said. Newnham says part of the policy will address how future revenues from the exploration and mining of the manganese nodules will be managed. *Cook Islands News*: <http://www.cinews.co.ck/index.htm>

### *Letter to the editor*

#### **Forget the proposed deep sea mining**

Post-Courier, August 23, 2010

The proposed deep sea mining deal by Nautilus must not continue at all. The Minister of Mining, Mr Pundari should not be like a blind man going ahead into signing agreements with Nautilus. “Harim, Pundari, we at the coast depend mainly on the sea for the source of protein like fish, shells etc. For a Highlander like you to just sign agreements or deals without concern of our country’s coastal population is really foolish. You would be enjoying yourself in your luxurious hometown while we at the coast will suffer the consequences of deep sea mining. You are not even from the coast and you don’t even know how important the sea is to us. Not only that, our future generations will suffer mostly because of some greedy leaders’ rubbish deal. What else do we need, we have gold mines, cocoa, copra, coffee etc, and now the huge multi-billion-dollar LNG project on the way and yet some one new like Pundari is still looking for more resources. Minister, just forget deep sea mining because we New Irelanders won’t allow that to proceed. In addition to that, our ocean is not an experimental laboratory for you and Nautilus. Concerned Karanas.

#### **UNDERSEA MINING CALLED THREAT TO PNG MARINE LIFE**

*Madang activist warns of reef damage, unknown risks*

By Poreni Umau

PORT MORESBY, Papua New Guinea (PNG Post-Courier, Aug. 19, 2010) – Papua New Guinea’s coral reefs are in danger of being destroyed if the deep sea mining by Nautilus goes ahead, a NGO leader says. This concern was raised by the chairman of the Bismarck Solomon Sea Indigenous

Peoples Council (BSSIP) John Simoi. Mr. Simoi, from Bagbag Island, off the coast of Rai Coast in Madang Province and a conservation campaigner against ocean floor mining and dumping of mine wastes into oceans, said the Bismarck Sea, known as the "Cradle of Marine Biodiversity" would be affected greatly if the proposed deep sea mining by Nautilus goes ahead between New Ireland and East New Britain provinces.

He said there had never been ocean floor mining in the world before and the Bismarck Sea should not be used as an experimental site, where the consequences were not yet known to the world. He said this was also the spawning and breeding ground for the Morgado Square tuna of which a fifth is owned by PNG. He said all these could be wiped out if the mining goes ahead. Simoi said PNG would be in breach of protecting its coral reefs under the Coral Triangle Initiative signed in Bali in 2007 with five other member countries including Malaysia, Philippines, Indonesia, East Timor and Solomon Islands. He said that these six countries in the world own more than half of the world's coral species and PNG owns half of the world's sea grass and a third of the world's mangroves. He said that the Bismarck Sea is very special in the world and is in the Pacific "Ring of Fire".

Simoi said here, at 1,000 to 3,000 feet below sea level where the tectonic plates meet, there are cracks called thermo vents that blow out black smoke that contains zinc, gold and silver that are crystallized when they get cold and remain exposed on the ocean floor. He said this had attracted companies like Nautilus to conduct deep sea mining where over 500 species of organisms rely on heat from the thermo vents to survive and where 80 percent of them are new to science. He said the Bismarck Sea is not like any other place in the world and every effort should be made to protect the marine life from being destroyed.

### **Authority: We did nothing wrong**

National August 16, 2010

THE Mineral Resource Authority (MRA) has denied it had given wrong advice to the new minister for mining to grant mining licence to the developer of the Solwara-1 offshore mining project, Nautilus Minerals Niugini Ltd. This was in response to recent media statements in both newspapers by Rabaul MP Dr Allan Marat, who had claimed MRA had not held sufficient consultation with relevant stakeholders on the Solwara-1 project. "We strongly refute his private assertions which unfortunately were printed for public consumption," MRA managing director Kepas Wali said.

Wali said Nautilus was granted an Environment Permit last December after wide consultation with the affected communities by the developer, Department for Environment and Conservation and MRA. Wali said Marat stated the government had dictatorially used the same amended Environment Act 2000 to apply for the Mining Licence for Solwara-1. "With due respect to the member, the eventual granting of the mining licence will be done under the Mining Act 1992. "Due statutory processes and procedures were followed to arrive at the decision to recommend to the mining minister for grant of the mining licence. "That recommendation is now before the minister for his acceptance and execution," Wali said.

He said apart from a consultative development forum at Kokopo in April, both the government and developer held various consultative meetings with more than 10,000 people from communities within Westcoast Namatanai, Rabaul, Kokopo and Gazelle. "We are, therefore, confident that no manner of unprofessional conduct or ill advice have gone to the new minister for mining on this subject matter," Wali said, adding that MRA acknowledged the efforts of Marat who, in his former capacity as justice minister, provided legal advice to the state team on offshore compensation and benefits such as royalties.

## **Awareness lacking on seabed mining: NGO**

Post-Courier, August 12, 2010

By MAUREEN SANTANA

An NGO in East New Britain advocating under the voice of the Island Communities New Britain Heritage and Environment Watch visited NBC Radio East New Britain talk show program yesterday. It was to inform the people in the province and also in New Ireland of the lack of awareness and proper consultation on the seabed mining proposed to start with the issuing of a licence by Mining Minister John Pundari. The group, lead by Markus Waninara and other members of the watch, said from awareness carried out by the group, most people had signed a petition against the Solwara 1 project that will be mined by Nautilus Mineral Incorp.

He said from the outcome of the forums, awareness and road shows indicated that the people were not in favour of the project due to the following reasons: "The project is the first and there is nowhere in the world that we can refer to and attain information of such projects thus signalling a threat as the sea is seen as our social security for the people in the two provinces." He said other setbacks were there was no proper information for the landowners and awareness done by Nautilus was at short notice. The petitions collected represented people from NIP, Pomio, Duke of York, Matupit, Lassul, North Coast Road, Karavia, Raluana to Vunamami and Kokopo town.

### *Letter to the editor*

## **New Ireland and East New Britain stand like Madang**

Post-Courier, August 9, 2010

The Mining Minister John Pundari without full consent rushed to approve a mining licence for Nautilus to go into deep sea mining. Deep sea mining is the first of its kind in the world brought on by our leaders for testing hence the coastal people of New Ireland and East New Britain are being used as guinea pigs to test new technologies. Mining giants from developed countries who have a share or interests in Nautilus are trying to get this trial project into operation purposely to weigh out the environmental and socio-economic implications to the indigenous communities and PNG against the production and profits expected to wholly benefit them.

The Government is continuously dishing out exploration licences to Nautilus all over PNG waters. Nearly 75% of our seas are under exploration licence areas of Nautilus. Nautilus have identified 11 solwara project sites which the first, approved by Mr Pundari, will start production after sorting out a few technicalities within a few weeks or months. All the islands and coastal communities near and around the Nautilus Solwara 1 project are against this project. This project will not bring similar job employment as mining on land. The communities' subsistence life and marine environment will be affected. Mr Pundari is not a coastal or islander to rush approval of the Nautilus mining licence after a week of appointment. I hope he knows what the sea and marine life means to coastal communities. PNG

## **Mining minister to give licence to Nautilus**

Post-Courier, August 5, 2010

By ERIC TAPAKAU

PAPUA New Guinea will become the first country in the world to go into deep sea mining when offshore miner Nautilus Minerals Inc. is awarded a mining licence today. Mining Minister John Pundari announced on Tuesday that he would sign and award the licence today. The licence is a

permit from the Government to allow Nautilus to start mining as soon as all related issues and matters are completed. The ML is a sign that the Government agrees for Nautilus to complete all preparations to start mining. He said during the handover takeover ceremony between himself and former Deputy Prime Minister and former Minister for Mining, Lands and Physical Planning Sir Puka Temu that the Solwara -1 project meant a lot for Papua New Guinea as it would underpin the country's position as the leader in undersea mining in the world.

“Should this be a successful project, we will be the leaders (in deep sea mining),” Mr Pundari said. He said the project being the first of its kind would be a big challenge for the country and the operator Nautilus Minerals but as a team “we will make this project a huge success”. Sir Puka advised Mr Pundari that environment issues were the biggest challenges in the mining sector but through dialogue with the landowners, these challenges would be overcome. He also said that PNG was a pioneer in deep sea mining and Nautilus would be using some of the advanced technology in the world to extract high valued minerals from the sea bed. Nautilus is the first company to commercially explore the ocean floor for polymetallic seafloor massive sulphide deposits and is currently developing its first project.

The company's main focus is the Solwara-1 project, located in territorial waters and 1600 metres below the surface off the waters of Bismarck Sea just off East New Britain and New Ireland provinces. Nautilus is listed on the TSX and AIM stock exchanges, and has among its largest shareholders two of the world's leading international resource companies Anglo American (11.1 per cent), Teck Resources (6.8 per cent) and Metalloinvest, one of the largest and fastest growing mining and metallurgical holding companies in Russia, beneficially owns 21.0 per cent of its shares through Gazmetall Holding (Cyprus) Limited.

## **Hindernisse für Metalle aus der Tiefsee**

heise online, 25.06.2010

Während die Öl-Industrie darüber nachdenkt, wie man die Offshore-Förderung sicherer machen kann, arbeiten Wissenschaftler und Unternehmen mit Hochdruck daran, auch seltene Metalle aus der Tiefsee zu fördern. Doch die Ausbeutung der Tiefsee erweist sich als schwieriger als zunächst gedacht, berichtet *Technology Review* in seiner aktuellen Ausgabe. Seit 2002 haben sich die weltweiten Ausgaben für die Tiefsee-Exploration auf mehr als 13 Milliarden Euro versechsfacht. Im Unterschied zu den 1970er-Jahren, als man schon einmal die industrielle Erschließung der Tiefsee testete, scheint es nun ernst zu sein. Gold, Kobalt, Kupfer, Molybdän, Neodym oder Indium – all das ist in der Tiefsee reichlich vorhanden und für die moderne Elektronik unverzichtbar. "Anders als in den Siebzigern ist eine Metallknappheit eine realistische Aussicht", sagt Johannes Post vom Meerestechnikunternehmen Hydromod Service GmbH aus Hannover, Co-Autor einer neuen Studie für das Bundeswirtschaftsministerium zur Erschließung der Meeresressourcen.

Allein in der "Clarion-Clipperton-Zone", einem Gebiet 4000 Kilometer westlich von Mexiko, das Deutschland von der Internationalen Meeresbodenbehörde lizenziert hat und das etwas größer als Bayern ist, lagert in Knollen auf dem Meeresboden 50-mal so viel Kobalt wie weltweit pro Jahr verbraucht wird. Hauptbestandteile der Knollen sind Mangan und Eisen, sie enthalten jedoch auch in geringeren Mengen Kupfer, Nickel, Aluminium und Titan. Auf den ersten Blick scheint es recht einfach, diese Knollen vom Meeresboden zu ernten. Der Transport zum Mutterschiff könnte in einem sogenannten Airlift erfolgen, wie er bereits bei der Offshore-Förderung von Diamanten vor der Westküste Afrikas eingesetzt wird. In ein bis zu 60 Zentimeter breites Gestängerrohr wird ein Stück über dem Meeresboden Druckluft aus einer Versorgungsleitung eingepumpt, sodass Luftblasen in

der Röhre aufsteigen. Dadurch verringert sich das Gewicht des Wasservolumens im Rohr – ein Unterdruck entsteht, der Sand und Gestein am offenen Rohrende einsaugt und bis an die Meeresoberfläche befördert.

Ganz problemlos ist das Verfahren jedoch nicht. Denn mit den Manganknollen wird auch jede Menge Sediment vom Meeresboden angesaugt. Es mit an Land zu transportieren wäre wenig wirtschaftlich, es über Bord zu werfen ökologisch hochproblematisch: In den obersten 1000 Metern Meeresschicht würden die feinen Körner der Meeressedimente das Plankton schädigen, das den Anfang mariner Nahrungsketten bildet. Auch am Grund würden die Kettenraupen von Erntemaschinen Sediment aufwirbeln, das die Filter vieler sogenannter Strudler – dazu gehören Krebse, Würmer und Muscheln – verstopft. Doch auch am Meeresboden selbst würden Sedimentwolken zu einem Problem: "Im Knollengürtel im Pazifik herrscht eine starke Bodenströmung. Das antarktische Bodenwasser fließt dort nach Norden, schon seit Zehntausenden von Jahren", sagt Peter Herzig, Direktor des IFM-Geomar. Diese Strömung würde die Sedimente in kurzer Zeit im gesamten Nordpazifik verteilen.

Auch die kommerzielle Ausbeutung so genannter "schwarzer Raucher" hat sich als schwierig erwiesen: In Papua-Neuguinea hatte die kanadische Firma Nautilus Minerals von der Regierung bereits eine Lizenz bekommen, um das so genannte Solvara-Feld abzubauen, dessen Erze mit einem hohen Goldanteil locken. Nautilus plant, ein Abbaugerät auf Stelzen zu verwenden. Der Abbau selbst sollte mit rotierenden Fräsköpfen erfolgen. Eigentlich wollte Nautilus schon in diesem Jahr loslegen. Doch die Finanzkrise und Bedenken von Umweltorganisationen machten dem kanadischen Projekt einen Strich durch die Rechnung. Nautilus stornierte vorläufig die Bestellung des Fördergeräts bei SMD und ließ ein Umweltgutachten anfertigen. Denn an den aktiven Schloten hat man komplexe Lebensgemeinschaften entdeckt, deren Bedeutung für die marinen Ökosysteme, aber auch für die Biodiversität der Meere nicht unterschätzt werden darf. "Nautilus hat daraufhin zuge5 sagt, nur die erkalteten, inaktiven Schlote abzubauen", weiß Ozeanograf Johannes Post von Hydromod. Nun will das Unternehmen 2012 starten. (*Niels Boeing*) <http://www.heise.de/newsticker/>

### **Deep sea tailings report ready**

National, June 8, 2010

THE Scottish Association of Marine Science will be submitting an evaluation of its findings on deep sea mine tailings placement to the National Government, says one of its leading scientists. Dr Tracy Shimmield, associate director of business development and theme leader of industrial impacts on oceans, indicated from Argyll, Scotland, last Friday that the organisation was about to complete its report of the Basamuk Bay in Rai Coast, Madang. The project would evaluate existing deep-sea tailings placement practice in order "to establish a consensual, clear, environmentally defensible, enforceable policy on the disposal of deep sea tailings in PNG". The study at Basamuk Bay was prompted by the disposal of Ramu Nico mine tailings. The study, independent of an environmental assessment, which has been accepted by the Government, had been taken up as a research project funded by the European Union through its 8th Development Fund.

The researching organisation, the Scottish Association of Marine Science, is one of the oldest oceanographic organisations in the world, founded in 1884 by Sir John Murray. Its main objectives were to critically assess all existing information on past Misima and present Lihir mine operations using deep sea tailings placement (DSTP) and provide guidelines for future DSTP marine environment monitoring in the context of international best practice. It believes that PNG and the world will benefit immensely from the findings of the research, which is also a Mining Sector Support Programme (MSSP – an EU initiative).

## **Deep Sea Tailings Deposit to go ahead, despite public outcry**

National, May 11, 2010

MINISTER for Environment and Conservation Benny Allan was at Bongu village in the Astrolobe local level government in Rai Coast to receive a petition against the current controversial deep sea tailings deposit (DSTD). He declared boldly before the crowd that the DSTD was not going to harm them. “The government will ensure that the DSTD will not harm your village life. “The examples we see happening to Misima and Lihir has not affected them since we have not heard any noise from them,” he said yesterday. “The government, before issuing the environmental permit, after many reviews and adjustments being made, see that the only option available to us is the deep sea tailings. That is the only option available.” When called upon to speak, Allan did not elaborate how the DSTD would work, the negative impacts or why the government was sending in department officers to do a “rushed awareness exercise”. Allan only said that it was important for development to take place and, as such, the locals needed to be more “open-minded” to receive the negative impacts of changes that came with any development.

Deputy Prime Minister and Minister for Mining Sir Puka Temu, who supported his counterpart, said that the DSTD matter was before the courts and therefore could not elaborate further. “Nickel project lo Madang em bai kamap,” Sir Puka said. (The nickel project in Madang will go ahead). “The developer is investing K1.4 billion. They are the largest developer. The government receives 60% of its income from mining. “The government’s position is based on independent reviews and assessments in previous years which have resulted in the environmental permit being awarded already to MCC (Chinese Metallurgical Construction Company).” Sir Puka said although they were happy to receive the petition from the locals with a response to be forthcoming after 21 days, laws of the country had to be followed. Although he did not specify what laws, he alluded that contractual agreements already in place had to be seen to be effected. Bongu front man pushing for the DSTD to be stopped, George Ireng, announced before the two ministers, Madang Governor Sir Arnold Amet and Rai Coast MP James Gau that if the current court decision, which will be made today at 1.30pm, is in their favour, then “there will be no tailings deposit”.

### *Letter to the editor*

## **Deep sea mining will only destroy marine life**

Post-Courier, April 29, 2010

Deep-sea mining and tailings dumping will impact on deep-sea animal communities. In light of the ongoing court battle to halt RamuNico from constructing the tailings pipeline; I'd like to point out deep-water communities that may potentially be impacted in the process. I must stress that the process of harvesting natural wealth so often comes with greater sacrifices in that destruction of wild-life habitats and the consequent annihilation of lives of their inhabitants are unavoidable. Having said that, it must be made known that commonsense and intelligence should prevail over greed and money. Many would think deep and cold dark waters are uninhabitable; they are dark watery deserts and lifeless. However, science has shown that these landscapes are and have been home to many different kinds of marine creatures of the kind that boggles the mind.

Deep-water habitats include volcanic vents and or black smokers and deep-sea coral reefs. Deep-sea coral reefs like shallow water tropical reefs are large accumulations of stony corals forming a complex skeletal framework. Deep-sea coral reefs occur in waters between 200 metres and 1500 metres deep often on continental slopes, submarine plateaus, ridges and seamounts. Deep-water coral reefs host communities of associated animals that may be distinct from surrounding deep seas and which may have species diversity and potentially be endemic. Scientist have discovered that these reefs

host the early stages of many deep-sea animals including juvenile and adult fish of commercial values such as redfish. Modern fishing vessels trawling for fish is a known threat to these deep-sea coral communities, however deep-sea construction for tailings pipeline and mining are potential threats to them as well.

The RamuNico tailings pipeline may run through deep-water coral reefs and accumulated tailings hence may be exposed to deep-water currents and up-wellings due to in-situ conditions. If this is possible, dumped tailings can be transported ashore, and dumped on surrounding coastlines: on shallow water reefs and beaches. This would have devastating effects on shallow water coral reefs and all living things that depend on the coral reefs. Upisa Wana, Gerehu

### **More awareness on deep sea tailing needed**

Post-Courier, April 28, 2010

By ROSALYN EVARA

MADANG Governor Sir Arnold Amet is insisting there not only be greater awareness especially on the impact of the Deep Sea Tailing Placement but also that these exercises involve all relevant community leaders. Speaking to reporters at a press conference in Madang yesterday Sir Arnold said these were the views that he had impressed strongly on senior officers from Ramu NiCo (MCC) Limited, and state agencies including Mineral Resources Authority (MRA), Mineral Resources Development Authority (MRDC) and the Department of Environment and Conservation during a meeting he had convened with them yesterday morning. Sir Arnold said the team arrived from Port Moresby on Monday afternoon and were enroute to the mine impact communities to carry out their awareness.

He said he had requested an urgent meeting with them to discuss the continued responsibilities of the company, state agencies and respective governments in relation to the whole project and especially the DSTP which the National Court has placed an injunction over. He said he had advised that before the state and company representatives take to the communities that they ensure that the messages they intend on relaying are presented in the most simple and appropriate forms and content to the leaders on the ground. He said it was vital for this group of people to first understand the issues and basis on which the government had issued the environmental permits so that they too could then advise the people whom they live with daily accordingly.

### **SCIENTISTS CONCERNED ABOUT PNG SEABED MINING**

*Proposed 'Solwara' project called threat to marinelife*

By Yehiura Hriehwazi

PORT MORESBY, Papua New Guinea (The National, April 16, 2010) - Proposed seabed mining at PNG's Solwara 1 project and elsewhere in the Pacific is on a collision course with some leading scientists and oceanographers studying the ocean floor. Nautilus Minerals is pioneering the technology to extract precious minerals from ocean floors in what has been described as the "world's first" approach and the PNG Government gave the green-light to its environmental impact study (EIS) last September. "The recent approval of the Solwara 1 project environmental permit is an exciting and significant milestone for the company and represents the culmination of over three years of effort on the part of our Environmental team," the company announced on its website. The environmental team is led by the environment manager for Nautilus, Dr Samantha Smith.

[PIR editor's note: "Solwara" is Melanesian pidgin for "salt water"].



However, a conservation biologist Prof Rick Steiner, formerly of the University of Alaska, who was called in to examine the company's original environmental impact assessment study has expressed concern about the impact of the project. Interviewed by BBC news yesterday, Prof Steiner is concerned about the dumping of thousands of tons of rock on the seabed and the danger of spillages of toxic residue and destruction to vent chimneys and unknown species of marine life. Volcanic vents spew out hot water and precious metals like copper, gold, silver and zinc. "(At) The site that they mine, they're going to destroy all these vent chimneys where the sulfide fluids come out." He added that it could cause the extinction of species that were not even known to science yet. "I think that, from an ethical stand point, is unacceptable," he said. Nautilus CEO Steven Rogers said he accepted that the mined area would be damaged, but said he was convinced it could recover. He believes deep-sea mining will be less damaging to the environment than mining on land. He said: "I think there's a much greater moral question.... here we have an opportunity to provide those metals with a much, much lower impact on the environment."

### **Government to give go ahead to Nautilus**

Post-Courier, April 8, 2010

By *GRACE TIDEN*

THE National Government after reviewing and evaluating all documents submitted by Nautilus Minerals is prepared to permit the undersea mining Solwara 1 project to go ahead. Deputy Prime Minister and Minister for Mining, Lands and Physical Planning Sir Puka Temu announced this yesterday during the opening of the Solwara 1 Project Consultation Forum in Kokopo. He said he was prepared to grant the development licence once the State was satisfied that all relevant and necessary steps had been taken. Sir Puka said that the Government was comfortable, confident and convinced that the undersea mining project was a goer. "I am pleased to announce as Minister for Mining that the Solwara 1 project will be the first project to be permitted under the recently established Mineral Resources Authority," he said.

The Deputy PM said the Somare/Temu Government had a duty to this country and its people to have this project approved as a matter of national importance and global interest. Sir Puka said The Solwara 1 project was unique project and a new concept and the commencement of the project would prove significant for the country and the global community as it signified the start of a new industry and a move away from the traditional land based mining to deep sea bed mining. He said it was a new frontier and PNG was proud to be at the forefront of this historical development. He said the Government's "take" from the project would help to boost the nation's foreign exchange and revenues given that Misima Mine was now closed and Ok Tedi Mine will close by 2013.

### **Nautilus must explain first: Dion**

National, April 8, 2010

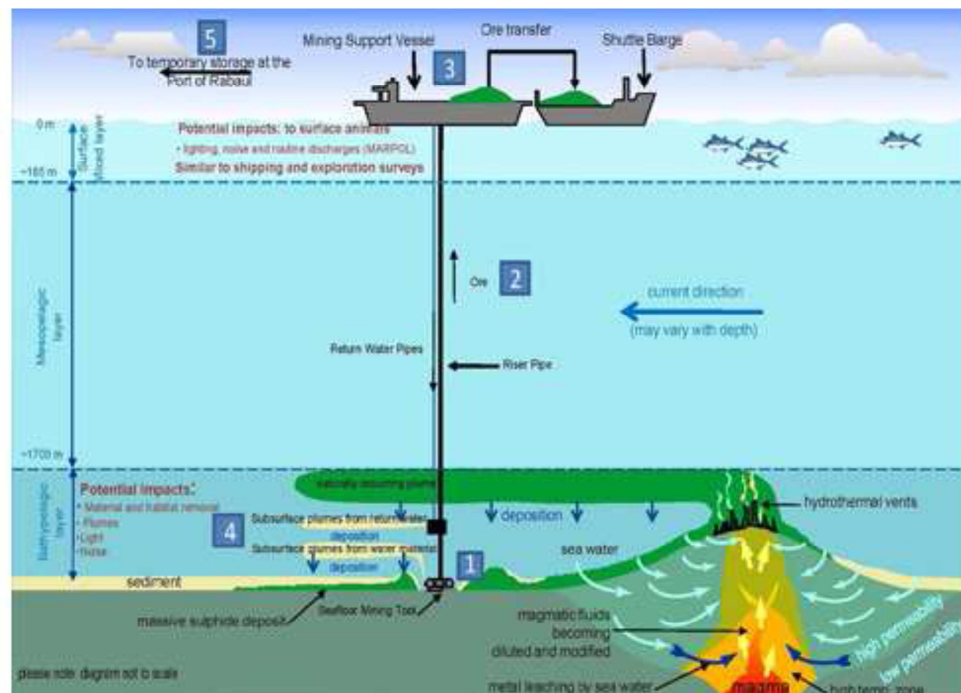
By *ELIZABETH VUVU*

EAST New Britain Governor Leo Dion says the impacts of the proposed seabed mining by Nautilus Minerals must be thoroughly explained to the provincial government so that the people are well informed. "Experience has shown that major development projects today failed to deliver due to lack of consultation, monitoring and implementation. "The people are also ill-informed. "All stakeholders must be mindful that the coastal people depends on marine resources to sustain their livelihood," he told the Government, Nautilus Minerals company officials, Mineral Resources Authority executives and Department of Mineral Policy and Geohazard Management at the opening of the two-day Solwara 1 project consultative forum in the Vunapo conference centre in Kokopo yesterday.

He acknowledged the Somare-Temu Government for addressing the issues and that the consultative meeting demonstrated the Government's commitment to improve the long-term interest of the people. Mr Dion said: "Stakeholders need to be mindful of the people's perception. I am glad this consultation forum is addressing the outstanding issues. "Technically, the environment will be protected and machines will be used to explore the seabed. But experience from other provinces need to be considered seriously." He said the provincial executive council had approved the work of Nautilus Minerals in providing assurance to the public to be open and frank in finding out more information about the proposed seabed mining. A series of community awareness and consultation meetings, focusing on districts and local level governments had also been held.

## Sea is the final frontier for mining

National, March 2010



Source: KESSIE TADAP

SEA bed mining will be the next frontier in the mining industry for the future, according to Nautilus Minerals. This was the message to PNG Ports Corporation managers and senior executives last week by Stephen McLay of Nautilus Minerals when giving an update of the company's activities and its sea floor mineral explorations with mining potential in PNG. Mr McLay, who is a project manager for Nautilus Minerals, said that, although mining started on land, the trend would turn seaward. As there will be fewer discoveries in the mining frontiers on the land, the next frontier in the mining industry will be the sea.

Nautilus Minerals has been conducting mining exploration in what is called Solwara One in the Bismarck Sea between northern Rabaul and New Ireland and also in the Woodlark area. There are also other undersea mining potential sites in the Pacific including Tonga and the coastline of Fiji in which the company has interests. These potential undersea mining areas were found within the active volcanic Pacific Ring of Fire where there are literally thousands of ore deposits found across the sea-floor due to volcanic activities along the crusts.

Minerals that have been found to be contained in ore deposits under the sea include zinc, gold and silver, to name a few. Mr McLay said that due to these large deposits under the sea, there was

“enormous potential” for undersea mining in PNG. He said many undersea explorations had already been carried out and the company aimed to actually put minerals on the world market. “Our current focus is the Solwara One in PNG in the Bismark Sea”, Mr McLay said. “We have got our environment permit issued last month but what we are doing now is community consultations with the stakeholders before work kicks starts in early 2010.”

### **Nautilus finds high-grade copper, zinc at Solwara**

National, January 21, 2010

CANADA’s Nautilus Minerals Inc has discovered high-grade copper and zinc during its deep-sea exploration at Salwara in Western Bismarck Sea last year. Copper grades up to 32.4% and zinc grades up to 52.6% were reported from grab samples collected from these discoveries using a hand held x-ray fluorescence (XRF) metre. Final assays on samples collected from Solwara 12 and 13, had also been received, and indicated gold up to 39.7 gram per tonne (g/t) and silver up to 682 g/t. Additionally, the company has made a further high-grade discovery at Solwara 11 (11i) in the Western Bismarck Sea. Nautilus, the first company to commercially explore the ocean floor for polymetallic seafloor massive sulphide deposits and developing its first project – Solwara 1, said in a statement the discovered areas were identified using enhanced target generation techniques and technology developed by Nautilus’ exploration team over the last two years.

Stephen Rogers, Nautilus’ chief executive officer, said: “Further success in the Bismarck Sea, PNG, combined with good assay results clearly highlights this region as a significant SMS domain. “Our work is now focused on the evaluation and ranking of the new systems in preparation for an intensive drilling campaign in 2010.” The exploration vessel mv Fugro Solstice was successfully demobilised in Singapore last Tuesday after completing a 132-day programme of water geochemistry studies, geophysics, remotely-operated vehicle (ROV) mapping and ROV sampling.

### **Nautilus receives Solwara project ecology permit**

National, January 8, 2010

NAUTILUS Minerals Inc. has announced that the final environmental permit for the development of the Solwara 1 project in New Ireland province was received on Dec 29. This was from the Department of Environment and Conservation (DEC) for a term of 25 years, expiring in 2035. The environmental permit in principle was issued in September last year. Nautilus chief executive officer Steve Rogers said in a statement: “The environmental permit is the culmination of many years of work by Nautilus and the DEC and paves the way for processing of the company’s mining lease application. “The project team is working with the Government of PNG to complete the final stages of this process”. In the regional joint venture, he said Nautilus was continuing advanced discussions with several parties in connection with a regional joint venture covering some of Nautilus’ tenements in the territorial waters of PNG. Nautilus is the first company to commercially explore the ocean floor for gold and copper seafloor massive sulphide deposits and is currently developing its first project. The company’s main focus is the Solwara 1 project, which is located in the territorial waters of PNG in the western Pacific Ocean.

### **PNG OKS SEABED MINING**

Nautilus Minerals gets 25-year permit

By Jemima Garrett

MELBOURNE, Australia (Radio Australia, Jan. 6, 2010) - The Papua New Guinea government has

issued an environmental permit, allowing for the world's first commercial seafloor mining project to begin. The PNG government has granted a 25-year environmental permit to Nautilus Minerals to mine gold and copper at its Solwara One site, 1.7 kilometers below the Bismark Sea. Nautilus CEO Steve Rogers says the decision is a significant milestone. He says it took three years of research in conjunction with 14 of the world's leading marine institutions to put together the environmental impact statement. "All of the scientific bodies have been independent from the company. These bodies have been free to publish the findings from their scientific research with no control or monitoring from ourselves," he said. Mr Rogers says Nautilus hopes to begin mining in 2012.

## **COOKS PARLIAMENT TO CONSIDER SEA MINING RULES**

*Environmental, cultural impacts among concerns*

By Helen Grieg

RAROTONGA, Cook Islands (Cook Islands News, Oct. 31, 2009) – Parliament's final sitting of the year is set to be held on November 23-27. The main item on the agenda is the passing of the Seabed Minerals Bill which sets out the laws and regulations covering the exploration and mining of the country's manganese nodule resource. Leader of the house John Tangi says the sitting date outlined on the parliament calendar still needs to be confirmed by prime minister Jim Marurai and subsequently the Queen's Representative Sir Frederick Goodwin. Parliament last sat in August and adjourned sine die after just three hours. At that time the Seabed Minerals Bill, first tabled in March, was to be reintroduced following a parliamentary select committee review, however chairman of the committee Terepai Maoate Jnr said more time would be needed to complete their work before the bill could come back to the house. The committee was set up on March 19 and reported back in April asking that it be allowed more than the two weeks allocated for the review. It was then asked to report back to parliament by June 30.

Since then the committee continued to take submissions from the public and visited Aitutaki to inform the island about the bill. The committee had wanted to have similar meetings in the other outer islands as well as with communities in NZ and Australia, but that did not eventuate. The committee reported in June that issues of concern to the public centre around such factors as the environment, cultural impacts, legal capacity protection methods, operation management, reliable financial systems, and disbursement of benefits. Its report stated that the Commonwealth Secretariat representatives who helped draft the bill cautioned against fast-tracking it through parliament in view of the global downturn in demands, diminishing interest from potential investors in deep sea mining and the continued search for appropriate technologies. Also in August, minister Kete Ioane was due to table the Constitution Amendment (No 28) Bill and it is likely this will be on next month's sitting agenda. Tangi says there will be other minor bills for parliament to consider and debate, and so he expects the house will sit for the full five days allocated on the calendar.

Cook Islands News: <http://www.cinews.co.ck/index.htm>

## **Nautilus in firm financial status**

National, November 9, 2009

NAUTILUS Minerals Inc is in a strong financial position with US\$217.6 million (K581 million) in cash and cash equivalents held on deposit with major banks as of Sept 30, the company reported last week. Other highlights for the quarter ending September included:

- 1) Exploration success within two weeks of exploration cruise;
- 2) Nautilus granted environmental permit "approval in principle" for Solwara 1 prospect in New Ireland province; and
- 3) Port capacity at Rabaul secured.

Working with appropriate Government departments and agencies, the next steps for Nautilus was to negotiate the development agreement required for the grant of the mining lease (ML) and prepare the draft project environmental management plan (EMP). The company said in a statement that its cash balance at the end of the third quarter was in line with management's expectations and reflected a reduction in creditors during the quarter. Nautilus continued to conserve cash until the Solwara 1 project equipment build restart. This was accomplished through cost-reduction programmes and maintaining its cash in currencies that reflected the company's current and expected cash outflows, to take advantage of natural hedges. "Nautilus continued to make progress on advancing the Solwara 1 project and building a resource pipeline for the future in the Bismarck Sea," Stephen Rogers, Nautilus' chief executive officer, said. "The Solwara 1 project represented positive step changes in the environmental and social aspects of copper extraction. "With the high copper grades of seafloor massive sulphide (SMS) systems and minimal overburden, very little waste will be produced," Mr Rogers said.

### **TAKE A HARD LOOK AT UNDERSEA MINING IN COOKS**

RAROTONGA, Cook Islands, The Cook Islands Herald *Editorial* (Dec. 2, 2009)

While our politicians congratulate themselves on getting the Seabed Minerals Bill enacted in order to pave the way to the riches beneath the sea, we hear that government is considering using borrowed money to set up the Seabed Minerals Authority. Before counting our chickens before they hatch (in terms of the mining companies that are supposedly going to flock to the Cook Islands) perhaps our leaders need to step back and take an impartial look at the realities of the situation. Right now, our country is only at the start of the journey into uncharted waters and our politicians need to be realistic about their expectations and also of the due diligence necessary of companies that will approach the Cook Islands.

Firstly, the manganese nodules are lying at great depth (estimates are 5,000 [meters] beneath the sea); and there is no proven, cost effective method for recovering the minerals from such depths, making seabed mining an unknown quantity. The only company with any credibility to approach the Cook Islands re the minerals is Endeavour Mining Capital a publicly listed, Canadian company whose reps visited Rarotonga in November 2007. During that visit, the Endeavour reps held a public meeting in Kent Hall and told the audience they wanted to create a 'project specific' company for public listing on the Canadian Stock Exchange to raise the 'necessary equity and debt finance' through investors buying shares.

Endeavour said they would invest NZ\$32 million [US\$23 million] of their own venture capital to begin the project. What they are seeking from government is an exclusive mining rights 'to explore the feasibility of the project' and said 'sea-floor mining is in a similar position to off-shore oil and gas drilling in the 1960s'. At the meeting, the company admitted 'seafloor mining was new and lacked international consensus on environmental standards'. At the meeting, the Endeavour reps claimed the time was right to try again as the metallurgical recovery processes had improved but needed further test work carried out. The Endeavour reps claimed economic benefits would flow from employment opportunities of NZ\$34 million, project royalties of NZ\$8 million [US\$5.6 million] annually, NZ\$80 million [US\$57 million] in business taxes annually, and up to NZ\$6 million in income taxes on wages.

The proposal was not the first time that the question of seafloor mining of manganese nodules had been raised in the Cook Islands. Politicians obviously believe there will be benefits from the millions brought in from prospecting permits; exploration permits; retention leases; and mining licensing rights plus royalties and so on. If this is true, then why is the government even considering using borrowed funds for such a purpose? In the beginning, all we need is a minimal staff of the

Commissioner with free secretarial support available from the Office of the DPM (at no extra charge). The Commissioner could perhaps operate from an office in MFEM or the DPM, all in the interests of keeping overheads down to a minimum. The Advisory Board is also necessary as a safeguard but as they will only be called upon when needed, they don't need a permanent home.

What are the safeguards to our Environment? At the meeting, this writer raised the matter of safeguards and guarantees to ensure there will be no adverse effect on our marine environment through dredging and mining activities on the seafloor. Mining activities are certain to have an adverse effect on our tuna fishing industry and our country's declaration of our waters being a whale sanctuary. The fear is our country may suffer from an environmental disaster similar to PNG, with the Ok-Tedi goldmine environment disaster caused by the mining activities of BHP-Billiton, one of the largest mining companies in the world. Ok-Tedi was a gold and copper mining operation in partnership with the PNG government who were paid handsomely, but during the mining activities, arsenic, a toxic byproduct of mining gold, gushed down the Fly River. The toxic waste poisoned the rivers and environment downstream of the mine in Ok-Tedi and killed all the fish in the river and all the resources on the banks of the river.

The lives of 50,000 PNG people were ruined with no more water for drinking or bathing or agriculture because of the toxic waste. Legal action was taken against BHP-Billiton in a class action by the downstream landowners who sued the company for NZ\$4 billion. The aftermath of the disaster was a huge amount of bad publicity for BHP in their home country of Australia and the company eventually offered an out of court settlement of NZ\$23.6 million US to the 50,000 villagers (NZ\$472 per person) on condition that the company was to be granted immunity from further legal action for mining related issues. Environmentalists condemned the pitiful sum per person affected. BHP has now pulled out of the PNG operation but the effects of the disaster will take another 300 years to remediate. Are our politicians paying attention? Not likely, and it is a concern that our politicians are so in favour of mining, they lack the impartiality and ability to sort out the genuine approaches from the charlatans that are bound to approach the Cook Islands over the coming years.

*The Cook Islands Herald: <http://www.ciherald.co.ck/Times.htm>*

### **Bass in PNG treatment plant deal with Nautilus**

Papua New Guinea National, October 10, 2009

BASS Metals has struck a deal that could result in its Hellyer treatment plant in Tasmania's north-west processing base and precious metals mineralisation spewed from volcanic vents on to the seabed offshore from Papua New Guinea, Melbourne's The Age newspaper reported on its online edition on Monday. Bass said its non-binding toll treatment deal with Toronto-listed Nautilus Minerals aimed for Hellyer to process up to one million tonnes a year of mineralisation – scraped from the seabed by Nautilus – for five years. A Nautilus subsidiary would pay Bass A\$1 million (K2.5 million) for the first two years, A\$750,000 (K1.89 million) in the third year and two payments of A\$250,000 (K632,000) in years four and five. Bass said work by Nautilus had delineated a seabed “mineral resource” at its Solwara 1 project that contained ““high-grade copper and gold along with silver and zinc””.

### **Nautilus focus on training**

Papua New Guinea Post-Courier, August 20, 2009

By Rosalyn Evara

NAUTILUS Minerals is committed to the long term training of Papua New Guineans, say company officials. Nautilus' environment manager Dr Samantha Smith said the company had a training

program in place and it intended on getting as many Papua New Guineans as possible versed with the concept of seabed mining. Dr Smith said at present many of the Papua New Guineans working for the company were graduates. However, she said they were sending them to Brisbane on a regular basis for training purposes. She said with Nautilus set to start its 2009 PNG and Solomon Islands exploration program, a total of nine Papua New Guineans would also be involved in this exercise. “Some of these people were involved in the exploration activities that Nautilus conducted in Tonga. They will also be going over to the Solomon Islands for that leg of the exercise as well.

“The campaign will also provide on the job training for these people,” she said. Dr Smith said among the nine is a young Papua New Guinean named William Saleu who had won a 7 scholarship offered by the company to a leading university in the United States of America. She said Mr Saleu during his stint there had not only learned but helped in the development of some of the techniques in this field of mining. The paper understands that some of the Papua New Guineans including Mr Saleu, will be boarding the exploration vessel, MV Fugro Solstice, in Madang. Another group in Rabaul will also board when the vessel calls into port to refuel. Dr Smith said the crew have been rostered for shift work, working seven days a week and up to 12 hours a day.

## **TONGA’S SEABED A WEALTH OF VALUABLE MINERALS**

*Nautilus Minerals hopes to develop undersea resources*

MELBOURNE, Australia (Radio Australia, June 16, 2009) – High concentrations of gold, silver, copper and zinc have been found in seafloor mineral deposits in Tonga. The results were announced on Toronto Stock Exchange by Nautilus Minerals. Nautilus minerals has exploration licences in a number of Pacific countries and hopes to become the first company in the world to commercially mine seafloor minerals. The results from the first phase of Nautilus's 2009 exploration program in Tonga show 34 grams per tonne of gold and 185 grams per tonne of silver. Nautilus CEO Steve Rogers say the results are consistent with those from its exploration areas in Papua New Guinea. Late last year Nautilus was forced to delay its plans for mining in PNG. Mr. Rogers says after a period of consolidation the company now looking for a mining vessel and plans to begin production in PNG by the end of 2011.