

**Sea dumping of wastes from the mining industry: the case of the Lihir gold mine, Papua
New Guinea**

Submitted by Greenpeace International

SUMMARY

Executive summary: Waste rock dumped at sea from the Lihir gold mine, Papua New Guinea, contains elevated levels of toxic metals in a form likely to be released to the sea and cannot, therefore, be classified as uncontaminated inert geological material. Greenpeace International calls upon Papua New Guinea to cease the dumping operation and upon Australia to report on its involvement in the Lihir mine enterprise. Furthermore, Greenpeace International requests Contracting Parties to bring forward information on other mine-waste dumping operations to the next Scientific Group meeting, and that the issue therefore be included as a substantive agenda item for that meeting.

Action to be taken: Paragraphs 11 to 13

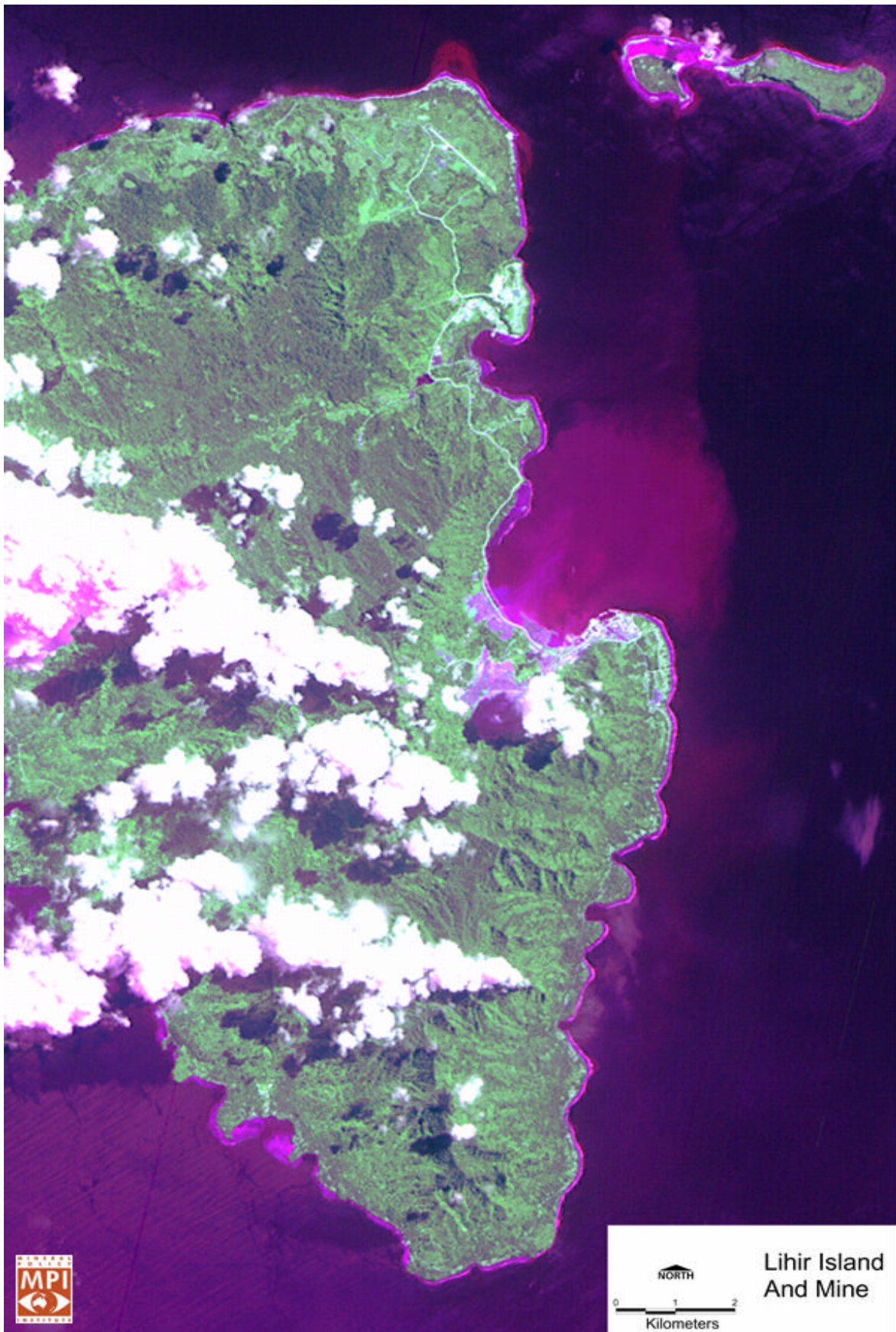
Related documents: None

1. The Lihir gold mine, located on an island north of New Ireland, 700km northeast of Port Moresby (Papua New Guinea), was established in 1997 to exploit one of the world's largest known gold deposits. The mine, owned by a consortium of shareholders (with various Rio Tinto subsidiaries holding the majority of shares) and operated by Lihir Gold Limited, is expected to operate for a total of 36 years, producing an average of 584 000 ounces (16 590 kg) of gold per year, at least in the early phase of production¹.

2. During its lifetime, the mine is expected to yield approximately 89 million tonnes of tailings and 330 million tonnes of rock and other solid waste (including overburden). Tailings are discharged to sea as a slurry via a sub-surface outfall. The overburden, consisting of a mixture of rocks and finer materials, is loaded on to barges and dumped at sea, close to the mine, in an area known as Luise Harbour (Figures 1 and 2).

¹ Lihir Gold Ltd (1997) Facts at a glance, Initial Public Offering of Ordinary Shares, October 1997

Figure 1: Aerial photograph of Lihir Island, showing the Lihir gold mine and the associated sediment plume in Luise Harbour



3. The nature and composition of this solid waste has previously been described in the Environmental Plan prepared for the mine in 1992 by NSR Environmental Consultants Pty Ltd (Australia):-

“Waste rock comprises both barren and mineralised soil and rock. Most of the waste rock is mineralised to some extent but the mineralised portion is neither economically nor technologically recoverable”...”Some of the fine material would form a turbid surface plume, particularly during dumping of soft waste”²

4. Furthermore, analyses conducted for the purpose of preparing the Environmental Plan revealed that a substantial proportion of the waste would be “naturally acidic” and would “release filterable metals when mixed with seawater”. Even before operations began at the mine, therefore, environmental assessments had highlighted concerns relating to the dumping of contaminated wastes:-

“Each time a barge load of acid producing hard waste rock or soft waste is dumped a column shaped halo of acidic water and filterable metals is expected to form around the descending solids”.²

5. In order to reaffirm the nature of the waste being dumped at sea as a consequence of the mining operations at Lihir, Greenpeace International collected samples for analysis in November 2001. Two samples were collected, one of the soft clay overlying the gold reserves and one of the coarser rocky material originating from around the gold reserves themselves. Both samples were collected from deposits of material which were about to be loaded on to barges to be dumped at sea. Samples were returned to the Greenpeace Research Laboratories, University of Exeter (UK) for analysis of concentrations of metals and metalloids. A table summarising the results is presented in Appendix 1; details of the analytical methods employed can be provided on request.

6. These analyses confirm the presence of high concentrations of arsenic and copper, and elevated levels of mercury, in both the clay overburden and rock waste originating from the Lihir mine. At 135 and 387 mg/kg respectively, arsenic concentrations in the clay and rock waste are 3-7 times higher than the maximum which might be expected for uncontaminated soils in non-mineral bearing deposits. Copper was present at more than 1g/kg in the clay waste. Both wastes contained mercury at levels 4-5 times higher than the highest concentrations which may be expected for uncontaminated soils (3.3 and 2.6 mg/kg respectively). Clearly these values cannot be assumed to be representative of average concentrations for either material, but nevertheless do confirm the concerns raised by the original Environmental Plan. Appendix 14 of the initial draft plan highlights arsenic and copper as being particularly enriched, as well as cadmium and antimony, and that lead and mercury were enriched in some samples³. Moreover, given the large quantities of such material which are scheduled to be dumped in this manner over the lifetime of the mine (approx. 330 million tonnes), the dumping operation is likely to represent a very substantial source of these contaminants to the marine environment.

² NSR (1992) Lihir Project Final Environmental Plan, Volume B: Main Report, NSR Environmental Consultants Pty Ltd, Hawthorn, Australia, April 1992

³ NSR (1989) Lihir Project Draft Environmental Plan, Volume C: Appendices (Part II:11-17), Appendix 14: Geochemical Characteristics of the Leinitz and Minifie Deposit Materials, November 1989



Figure 2: a) aerial photograph of Luise Harbour, showing the Lihir gold mine and b) barge engaged in the dumping of waste rock from the mining operations.

7. The materials being dumped at sea, arising as they do from a mining operation, clearly represent wastes from industry. The elevated levels of the toxic metals copper and mercury, and metalloid arsenic, combined with the acidic nature of the wastes (again highlighted in the Environmental Plan), confirm that the material cannot be classified as “uncontaminated inert geological materials the chemical constituents of which are unlikely to be released into the marine environment”. These materials are, therefore, clearly industrial wastes, the dumping of which is prohibited under Article IV of the London Convention (1972), to which Papua New Guinea is party.

8. According to information received by Greenpeace International, political risk insurance for the Lihir mine was provided by the Australian export credit agency EFIC from the start of operations until the policy was surrendered by the operator in late 2000. The reasons for the surrender are not known. Other information indicates that the provision of such insurance was previously refused by the United States export credit agency OPIC (Overseas Private Investment Corporation) on the basis that “*it could not be assured that it could support the project based upon initial concerns about US environmental policy regarding ocean discharge of wastes*”⁴. OPIC did not proceed with a more detailed evaluation.

9. Greenpeace International understands that the underwriting of the Lihir mine operations by EFIC was contingent upon the fulfilment of a number of conditions relating to environmental performance and monitoring, though the extent to which these conditions were met is not clear.

10. Environmental impacts of the Lihir mine are likely to arise from both the tailings discharged by pipeline and the wastes dumped by barge. Whereas the tailings discharge falls under the competence of other fora, the dumping at sea of the solid wastes is an issue of direct relevance to the London Convention.

11. In recognition of the origin and contaminated nature of the clay and rock wastes, and the prohibition of the dumping of industrial waste at sea under the London Convention (1972), Greenpeace International calls upon Papua New Guinea to cease the dumping of these materials and to develop contained and controlled land-based alternatives, for the Lihir mine and for other such mines within its territory.

12. Greenpeace International further requests to Australia to bring forward details of support (financial or otherwise) provided to the Lihir mine, during its construction and operation, by the Australian export credit agency EFIC, including details of conditions imposed and information showing the degree to which those conditions were met. Australia is also requested to inform the meeting of any other support provided by the Australian government or agencies to mining operations in Papua New Guinea.

13. Finally, Greenpeace International calls upon all other Contracting Parties to bring forward to the next meeting of the Scientific Group any information concerning similar dumping operations for mine wastes, and/or on land-based alternatives employed to avoid recourse to dumping at sea, to allow substantive discussion of this important and, to date, largely overlooked issue.

⁴ OPIC (1997) Overseas Private Investment Corporation Environmental Summary of Lihir Gold Project (Papua New Guinea), Washington D.C., August 1997

Annex 1: Concentrations (mg/kg) of various metals and metalloids in samples of clay and rock waste arising from the Lihir gold mine, prior to loading for dumping at sea.

	MI01062 – waste clay from overburden above gold reserves	MI01063 - waste rock adjacent to gold reserves
Antimony	<90	<90
Arsenic	135	387
Barium	61	129
Cadmium	<1	<1
Chromium	23	36
Cobalt	47	76
Copper	1057	220
Gold	<35	<35
Lead	15	59
Manganese	860	262
Mercury	3.3	2.6
Nickel	78	38
Selenium	<200	<200
Vanadium	282	141
Zinc	167	128

Samples were collected in November 2001 and returned immediately to the Greenpeace Research Laboratories, University of Exeter (UK) for analysis. Elemental concentrations were determined by Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES), following hot acid digestion and using appropriate certified reference materials. Concentrations are reported as mg/kg (parts per million, ppm) of the original solid material.

Acknowledgement: Greenpeace International is indebted to the Mineral Policy Institute, Sydney (Australia) for provision of the official documents and photographs respectively referred to and included in this submission.