

Buyat Bay is polluted and a risk to the community: Highlights of the official joint investigation of Buyat Bay

Compiled by WALHI-Friends of the Earth Indonesia, Indonesian Mining Advocacy Network (JATAM), and
Indonesian Center for Environmental Law (ICEL)
based on Joint Investigation Technical Team report, 9 November 2004

Top Ten Key Findings:

- 1. Buyat Bay seabed is polluted with arsenic and mercury.**
- 2. Arsenic and mercury found in Buyat Bay is not natural.**
- 3. Newmont dumping breached toxic waste law.**
- 4. Arsenic and mercury in fish poses unacceptable risk for Buyat Bay community.**
- 5. Mercury is accumulating in seabed creatures of Buyat and Ratatotok Bays.**
- 6. Biodiversity in Buyat Bay hit by arsenic pollution.**
- 7. No protective thermocline despite Newmont claims.**
- 8. Buyat Bay human health hazard requires fish intake reduction and possibly relocation of residents.**
- 9. Buyat Bay human health hazard requires arsenic poisoning investigation and up to 30 years monitoring by Newmont.**
- 10. Legal action should be taken over breaches of environmental law and ocean dumping of mine waste should not be permitted in future.**

The study by the Buyat Bay Joint Investigation Team is by far the most comprehensive and thorough study ever done on the case. It covers physical, chemical, and biological aspects as well as findings in relation to the environmental quality of the bay and its potential impacts on marine life and human beings. This is unlike previous studies which have only gone as far as looking into water conditions but not properly examined the seabed, resident organisms, etc. The results represent the actual condition of the bay and people living around it as well as the source of pollution. Several of the Joint Study conclusions show that mine waste (tailings) dumped by Newmont in Buyat Bay poses risks to local people. Those points are:

1. Buyat Bay is polluted with arsenic and mercury according to ASEAN Marine guidelines:

Arsenic pollution in the Buyat Bay seabed (sediment) is as high as 666 mg/kg. Buyat Bay is polluted according to the ASEAN Marine Water Quality Criteria for arsenic which ranges from 50 mg/kg and higher for polluted marine sediment. [Walhi notes that Buyat Bay is also polluted according to US, Canadian, Australian and NZ guidelines which share an ecological Probable Effects Level of 42 mg/kg arsenic in marine sediment].

Mercury pollution in the Buyat Bay seabed (sediment) averages over 1000 µg/kg. Buyat Bay is therefore polluted according to the ASEAN Marine Water Quality Criteria for mercury which ranges from 400 µg/kg and higher. [Walhi notes that Buyat Bay is also polluted with mercury according to US, Canadian, Australian and NZ guidelines which share an ecological Probable Effects Level of 696 µg/kg mercury in marine sediment].

2. Arsenic and mercury in Buyat Bay is not natural:

The Technical Team results show that levels of total arsenic and mercury on the seabed of Buyat Bay are extremely high compared with natural control sites (i.e. sites not affected by mine waste dumping) and also compared to levels recorded in Buyat Bay before Newmont's mine began. Arsenic levels in Buyat Bay sediment are around 100 times higher than control sites. High levels of arsenic and mercury on the seafloor in the tailings dumping location in Buyat Bay have been previously mentioned in the Indonesian Environment Ministry Study (2003), also in a study by WALHI and Evan Edinger (2004), as well as Newmont's monitoring. From a comparison with pre-mine conditions and control sites it is clear that Newmont's mine waste dumping is the source of arsenic and mercury pollution in Buyat Bay.

3. Newmont dumping breached toxic waste law:

In legal terms, Newmont's dumping of mine waste into the ocean has breached the Government Regulation on Dangerous and Toxic Waste Management No. 19 year 1994, and Government Regulations No. 19 year 1999 and No. 85 year 1999.

4. Arsenic and mercury in fish poses unacceptable risk for Buyat Bay fishing community:

The Technical Team calculated the Acceptable Daily Intake (ADI) of arsenic in Buyat Bay fish and concluded that Buyat Bay community members' consumption of fish from the Bay exposes them to an unacceptably dangerous level of inorganic arsenic. The Technical Team also calculated the Tolerable Daily Intake (TDI) of mercury for Buyat Bay community members and concluded that consuming fish from Buyat Bay is risky for adults and exceeds the tolerable level for children. Due to the fact that both arsenic and mercury can be found in fish, then the Buyat Bay community are at risk of being contaminated by mercury and arsenic at the same time.

Calculations were based on the International Center for Environmental and Industrial Toxicology's ADI and TDI methodology. This involved analysing fish samples from Buyat Bay and observations of Buyat Bay people's actual fish consumption level of 0.45 kg/day. However if a more conservative value is used for fish consumption, based not on a fishing village population, but the general population's estimated consumption of 50 kg/capita/year, then the level of mercury in fish consumption for children and adults will be within the safe level. [Note: TDI and ADI describe the same concept, but TDI is designed for contaminants such as mercury, while ADI is for contaminants such as arsenic].

5. Mercury is accumulating in seabed creatures of Buyat Bay

Creatures living on the seabed (benthos) in Buyat Bay are accumulating mercury from sediment contaminated with Newmont's mine waste. Levels of mercury in these creatures average 1889 µg/kg which is approximately ten times higher than creatures collected from uncontaminated control points.

6. Biodiversity in Buyat Bay hit by arsenic pollution:

The Diversity Index for seabed creatures (benthos) and phytoplankton at the tailings dumping location in Buyat Bay shows there is heavy pollution due to arsenic. These benthos and plankton are a crucial part of the human food chain.

Explanation: The calculation of diversity index for sea life - plankton and benthos (seabed creatures such as crabs, mussels, worms etc) – was used to acquire a description of the health condition of Buyat Bay. From the diversity index for phytoplankton organisms in the tailings dumping point in Buyat Bay, it can be concluded that the Buyat Bay ecosystem is disturbed. The

Joint Team results match the findings in the 2002 WALHI study and the 2004 study by the Indonesian Marine and Fisheries Department. Meanwhile, the plankton and benthos diversity index in Ratatotok Bay is within the criteria of light to medium pollution.

There is a consistent connection between the poor diversity index for benthos and the high level of arsenic found in Buyat Bay seabed, as well as between the high diversity index for benthos and the low arsenic pollution level found in Ratatotok Bay. The same pattern was found between the plankton diversity index and the arsenic levels in the sediment of both bays.

7. No protective thermocline despite Newmont claims:

Contrary to claims in Newmont's pre-mine Environmental Impact Assessment, the Joint Team there is no thermocline ocean layer. This is an important finding because in Newmont's Environmental Impact Assessment (1994), it was stated a thermocline layer at 50 – 70 meters depth would function as a barrier to keep tailings from mixing and spreading in Buyat Bay. The conclusion that there is no protective thermocline is in accordance with previous studies – an Independent team study (1999), Tailings Feasibility Study (2000), P20 LIPI (2000), and the Indonesian Environment Ministry Study (2003).

Selected Recommendations of the Technical Team:

8. Buyat Bay human health hazard requires fish intake reduction and possibly relocation of residents:

From the calculation of Acceptable and Tolerable Daily Intake (ADI and TDI) of heavy metals, the human health Hazard Index (HI) was discovered to be higher than a value of 1.0. This means Buyat Bay is a risk to human health. Therefore, it is recommended that the consumption of fish from Buyat Bay be reduced, and the possibility be considered of relocating the inhabitants of Buyat Bay to a different location.

9. Buyat Bay human health hazard requires arsenic poisoning investigation and up to 30 years monitoring

The Technical Team noted that the hazard index data shows an arsenic hazard in Buyat Bay, and further noted that initial observations in the field suggest locals who have fallen ill display symptoms which may match the literature for bodily arsenic accumulation. The Team therefore recommended that follow-up research be conducted by the Health Ministry to look into arsenic poisoning in the residents of Buyat complaining of symptoms such as skin disease, lumps, breathing difficulties and dizziness. It is recommended that samples of urine and nail clippings be taken for further analysis.

Since parts of Buyat Bay are categorized as contaminated, and looking also at the biodiversity indexes as well fish data, the study found that the disposal of Newmont's mine waste, which has not occurred beneath a thermocline, has had an impact on sealife in Buyat Bay. The Technical Team thus recommended that Newmont and the government monitor the situation over the next 30 years or until Buyat Bay recovers naturally.

10. Legal action should be taken over breaches of environmental law and ocean dumping of mine waste should not be permitted in future.

Legal action should be taken over breaches of environmental law by Newmont and unlicensed miners, and in the light of the Buyat Bay experience, ocean dumping of mine waste should not be permitted in future.