

# **REVIEW OF THE USGS STUDY REPORT ON MINING IN MARINDUQUE**

Center for Environmental Concerns – Philippines  
26 Matulungin St., Barangay Central, Quezon City  
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### ***Introduction***

The review of the USGS Study is warranted by the seriousness of mining-related issues in Marinduque that have been repeatedly raised by the affected communities, officials of several municipal level local government units, the church sector, local and national scientific and academic groups, the non-governmental organization (NGO) sector and international support organizations.

Two operational sites of Marcopper Mining Corporation (Marcopper) had sat in Marinduque under top management supplied by the Canada-based Placer Dome for 30 years since 1969 when the company began its operations. Between 1975 and 1991, tailings were piped to the shallow waters of Calancan Bay north of the towns of Boac and Mogpog, creating a causeway of some 7 kilometers of toxic waste that has resulted in more than 2 decades of serious drop in food sources for subsistence and livelihood for the fishing community. Signs of failure were first experienced with the Maguila-guila siltation dam breach in 1993. In 1996, in what has been the worst mining disaster experienced in the country, the Tapian tailings dam in Mogpog burst, flooding 27 villages along Makulapnit and Boac rivers with 1.5 to 3 million cubic meters of toxic silt. More than 30% of these tailings remain today.

The effects of large scale mining which the 1996 Tapian Tunnel bulkhead failure demonstrated have not been properly addressed up to now. In 1997, Placer Dome reported to the public that it had divested its share in Marcopper, thus reducing to a stupendous hide-and-seek game the matter of determining who stands accountable for the clean-up and compensation for damages. Except for the efforts of a PDI subsidiary firm to contain the tailings and undertake post-spill environmental studies, negotiations related to remediation work have increasingly been impaired by widespread public distrust of company initiatives.

The importance of resolving these issues has compelled the Philippine government and the provincial local government unit to attempt to break the impasse in negotiations by initiating a comprehensive study designed to provide an independent or third party assessment, which the USGS undertook. This was resorted to despite the vast amount of research reports, testimonies, investigative missions, fora and documentations on the vicious effects of corporate mining on the lives, livelihood, health and environment of local communities.

On the request of the mining affected communities through the Marinduque Center for Economic Concerns, the Center of Environmental Concerns – Philippines initiated this review of the USGS study report, even without the kind of resources which the USGS Team was afforded. A team of scientists and technical experts was constituted to consider the various aspects of the mining-related issues assessed by the USGS team.

The present review is organized as follows : a background on the USGS study is first provided, followed by a summary presentation of the independent team’s major findings and recommendations. The assessment of the findings and recommendations by CEC’s team of scientists is then presented, organized as to show the inter-relatedness of design structure issues and recommended mitigation and remediation action with the human and ecosystem health issues, according to critical sites from threat source to impact areas.

### ***Background on the USGS Study***

The Report entitled “**Engineering, Health and Environmental Issues Related to Mining on Marinduque**” is the result of an eighteen (18) - month study in three (3) phases in response to the clamor for an independent assessment of concerns surrounding the effects of mining activities in the province. The study was undertaken by the United States Geological Survey (USGS) as Third Party Technical Review Consultant.

The general objective set for the study was “to provide (a) an independent review of known data and (b) a strategy for the long term remediation of affected sites, as well as to provide for long term monitoring and assessment of the health of the human population living in the mining affected areas” (p.1-5). This objective was pursued in three phases described as follows :

- Phase I : Review existing geologic, biologic, health, and safety reports, data sets, etc., and prepare preliminary overview reports
- Phase II : Develop and recommend a mining-related environmental, human health risk and monitoring plan
- Phase III : Prepare the Final Risk Assessment Report

According to the Terms of Reference finalized between the USGS and the provincial government, expected results of Phase I are the health and safety assessments based on a review and evaluation of documents, reports, data sets and information provided by all possible sources on environmental and health issues in the mining affected towns. The review was also set to look into the design, methodologies, protocol, and standards used in the different studies. In addition, data gaps and recommendations for subsequent research were to be identified. Phase II aimed to produce a detailed risk assessment strategy to ascertain the movement of contaminants and interactions with the human population. Based on this, the Team would develop the design for a monitoring plan “in consultation and cooperation with the affected populace” to find out the long-term impact of mine waste on human health. Phase III was set to identify the remediation and monitoring options, and explain the advantages as well as disadvantages of each option. To the extent that there are data issues which would bear on the assessment of the urgency of mitigation, these were to be identified as well.

The recommendation for an integrated environmental-geological-biological-health systems approach to the study was itself suggested by the USGS in a preliminary or reconnaissance assessment undertaken in 2000, seemingly on the invitation of the Department of Environment and Natural Resources and the provincial government of Marinduque. In said

study, the health and environmental issues associated with mine wastes were identified while some options for long term remediation were already outlined. The findings were more systematically ascertained by the subsequent commissioned research.

Three scientific teams (one each for engineering, health, and environment) comprised the independent assessment team. A US-based company, The Futures Group International, was responsible for project management and oversight. Funding was provided to the USGS in the amount of P20 million from the Government of the Philippines under the leadership of the Office of President, with facilitative support of Marinduque's Representative to the House of Representatives and the provincial local government unit.

The study commenced in January 2002, while the final report was completed in July 2004. The report was made available to the local community groups and NGOs by October 2004.

### ***Summary of Findings of the USGS Study***

The main findings of the USGS report include the following :

- (1) “potential instabilities in several existing mine structures at the Marcopper site pose the most significant threat to the inhabitants and ecosystems of Marinduque;”
- (2) there are flaws in the design of mine structures, and many are already compromised;
- (3) the design flaws can be mitigated in the short term to reduce the impacts;
- (4) the unchecked erosion and acid rock drainage coming from the Marcopper site have substantial and far-reaching environmental impacts on the Mogpog River, and these exceed the threat from tailings remaining in the Makulapnit and Boac rivers, but the river can “heal” itself in time;
- (5) aquatic life is still being affected by effluents from Marcopper;
- (6) while several heavy metals were at toxic levels, “the direct effects on Marinduquenos of the ongoing ARD contamination and the 1996 tailings spill cannot be determined from the health data;” and
- (7) monitoring as well as detailed engineering studies need to be undertaken to guide long-term plans for remediation.

These findings are described in greater detail, as enumerated below :

From the engineering studies

1. There are instabilities in several mine structures in Marinduque : the four dams which are located at Maguila-guila, Bol River, Upper and Lower Makulapnit.
  - 1.1. Of these, the Maguila-guila impoundment appears to be the most critical, as it is filled to capacity.
  - 1.2. Rapid structural deterioration is indicated in the spillway, decant tower, dam toe, abutments, and downstream dam face.
  - 1.3. Geological weaknesses (faults, fractures, and incompetent rock) are observed in the bedrock of the dam site.

- 1.4. The Tapian east highwall is already compromised, posing a threat to the pit bulkhead.
- 1.5. The structures at Bol River and the Upper and Lower Makulapnit Dams, although they are in less imminent danger of failure, have deteriorating structures due to weathering, sedimentation, and/or vegetative growth
2. Other than the risks from the weak mine structures per se, there are several exposure pathways,:
  - 2.1. There are still extensive deposits of tailings remaining in the Makulapnit and Boac Rivers from the 1996 Marcopper tailings spill, tailings buried in the riverbeds and exposed on the river banks.
  - 2.2. The environmental damage caused by these is far exceeded by the acid rock drainage emanating from the Marcopper site.
  - 2.3. There is acid rock drainage from the Tapian Pit overflow and from the mine waste piles into the Makulapnit, Bol, and Maguila-guila rivers.
  - 2.4. There is continuing erosion of mine wastes into the siltation impoundments on the Makulapnit, Bol and Maguila-guila Rivers.
3. Any failure that can happen in the compromised mine structures will aggravate the already serious flows of mine wastes and the uncontrolled discharge of contaminated and acidic waters into the downstream communities.
  - 3.1. There may be further severe impacts (environmental damage and health problems) on communities downstream along the Mogpog and Makulapnit/Boac River systems that will be similar to those that resulted from the 1993 Maguila-guila siltation dam breach and the 1996 Tapian Tunnel bulkhead failure.
  - 3.2. Fluctuating or rapidly rising water levels may compromise the stability of the Tapian pit east highwall.
  - 3.3. The only drainage for Tapian pit, which is 310 Tunnel, is inadequate for emergency drainage should water levels rise during typhoons.
4. Although the design structure in several sites indicate future failure, they can still be mitigated by corrective engineering work on the basis of data from more detailed studies and systematic monitoring.
  - 4.1. Where most significant threats are present, immediate but detailed further studies are needed (engineering, technical) to ascertain the best remedial action to take.

- 4.2. Since the ultimate disposition of the tailings is either not economically viable or unnecessary, sediment erosion and acid rock drainage emanating from the mine site, mine pits and mine dumps must be stabilized through capping, re-contouring, water diversion, reclamation, grading and terracing of embankments and slopes, re-vegetation (the upstream tailings dumps and exposed slopes, and the exposed tailings deposits along the Makulapnit and Boac riverbanks).
- 4.3. For the obsolete dams, the short term recommendations include breaching (mechanical removal of silt), removal of debris and destructive plant growth, repair or replacement of defective structures (such as the decant tower in Maguila-guila), establishment of warning protocols in case of failure.
- 4.4. The most viable long-term solution to problems posed by the dams is their removal after the objectives in the short-term remediation steps are achieved.

From the health assessments :

5. In contrast with reported evidences of ecological and health impacts of the mine operations and the failure of mine structures in the past, there is no sufficient basis to attribute human illnesses and deaths to contamination from mining operations.
  - 5.1. There is no sufficient basis for concluding that ground water supplies along the Boac and Makulapnit rivers is contaminated; it is possible that contaminated waters have not reached the drinking water supplies.
  - 5.2. Interpretation was hampered by the poor state of sourced data : medical reports of diagnosed victims are not population-based, control groups are not available, data sets are incomplete or outdated, access to raw data was not available, details of sample collection and analysis were not available.

From the environmental or ecological assessments :

6. Large-scale copper mining in Marinduque has had significant adverse impacts on the environment in several different parts of the island.
  - 6.1. “Some of these impacts resulted from past permitted practices, such as the disposal of tailings in Calancan Bay. Others resulted from failure of engineered structures (1993 failure of Maguila-guila siltation impoundment, . . . and the Tapian Tunnel bulkhead failure). Still others result from inadequate environmental planning and engineering prior to or during mining, coupled with a lack of engineering upkeep since the cessation of mining (acid rock drainage from mine waste dumps, the Tapian Pit lake, tailings deposits, large scale erosion of mine wastes.

- 6.2. Mogpog and Boac Rivers and their tributaries are contaminated by several heavy metals at levels that are acutely or chronically toxic to aquatic life.
- 6.3. The diversity and abundance of invertebrate species in the Boac and Mogpog watersheds is generally significantly reduced compared to watersheds not receiving acid rock drainage and sediments from the mine site; the reduction in invertebrate species increases with proximity to the mine sources.
- 6.4. While the “metals aluminum, copper, manganese and zinc occurred at toxic levels,” it “is possible that some of the high levels of aluminum were due to natural background sources.”
- 6.5. Mogpog river has been and will continue to be severely affected by mine wastes and acid rock drainage.
- 6.6. Marcopper is the obvious source of many if the adverse environmental impacts, although the CMI mine has potentially produced some similar types of impacts at a smaller scale than those from Marcopper.

### *Assessment of the USGS study*

#### General assessment

##### *1. Main contributions of the study*

In the main, the USGS Study has definitely **consolidated** in a voluminous report of several parts in 3 phases what many institutions and organizations, both local and international, **have separately documented and analyzed**. In this sense, the USGS report is a handy reference material.

Inasmuch as the project intended only to systematize all references and data sources on the mining situation in Marinduque and did not include among the objectives the gathering of new data particularly on health and ecological impacts, the USGS study **confirmed many of the information, observations, and recommendations which previous studies, medical reports, laboratory test results, fact-finding mission assessments and testimonies have repeatedly pointed out** : that (1) there have been negative effects of large-scale mining by Marcopper on the health and livelihood of the human population, as well as on the state of the local environment of Marinduque; (2) there are mine structures, tailings dumps and deposits, along with continuing acid mine drainage, that are affecting and still pose grave threat to lives, livelihood and ecosystems.

The **main contribution of the report**, nonetheless, **is in supplying in greater detail the description of design structure vulnerabilities and the engineering remediation options to stall or reduce further threat from the mine sites, dumps and tailings deposits**. There

are now take-off points for mitigation that can be mutually agreed upon and which, indeed, are urgent.

## *2. Limitations*

**Many of the recommended short-term actions are acceptable, and the engineering recommendations were specific and cogently written. However, several critical issues were simply ignored** : who or what agencies shall take on the remediation and monitoring? who is responsible for the clean-up or for significantly removing the threats from the mine structures and wastes? what should be the timetable for doing immediate remediation? what kind of resources will the detailed engineering studies, remediation action, and monitoring require? These were not included in the reports. Hence, the suggested actions redound to a long list of tasks that indicate endless monitoring and detailed further studies.

Undeniably, the recommendations for more detailed studies to aid remediation will require a very tedious process entailing further negotiation and lobbying before they can be actualized. This is almost unfeasible, if the institutional set-up in the mining industry is weighed relative to the seriousness of impending hazards from the compromised structures. More critically, the government does not have the requisite resources or the institutional capability to undertake, much less sustain the suggested systematic monitoring of the mine structure as these fail or become compromised. Hence, the next steps to actual remediation and mitigation remain far-fetched.

Relatedly, the recommendation for long-term remediation is the most unrealistic and unimplementable, viz., the removal of the mine structures inasmuch as mining and its effects, the report also attests to, is very destructive, even for decades

The **TOR** mutually agreed upon by the USGS and the provincial government, with the concurrence of the DENR, **was seriously impaired** in several aspects from the beginning.

First, **they did not include the concerns consistently being raised by affected communities** : to make the company accountable for decades of destruction, and compensate affected households and communities. On the contrary, the intent behind the study was also set in the TOR : break the impasse in order for contending stakeholders to resume their discussion of the mining concerns.

Second, at the level of the Team, **although a health assessment was set out as a specific task, no new additional data gathering was undertaken even if the Team saw the limitations in existing data sets. The ensuing health assessment was therefore flawed, the conclusions reached misleading if not purposely meant to belittle the accountability of the company.** The TOR did not require the Team to obtain additional information. The parties to the TOR are therefore responsible for this serious lapse in the study design if indeed the intent was to provide an independent assessment of the health and environmental concerns among other deliverables. Particularly in relation to health and ecological assessments, the USGS study was a deceptive exercise, given the limited objectives set for

the study itself; worse, it exploited the organizations and institutions, who in the spirit of cooperation, provided data and participated in consultations.

Another limitation of the USGS study is the **weak integration of findings of individual teams**. Despite attempts to present an integrative and systematized analysis, there are sections where the reporting of findings and analysis is not tight. In addition, there are sections with conflicting findings.

For example, the tailings dump in Calanacan Bay is described in one sub-team report as in an intractable situation (p.5). The report “recognized that disposal of tailings into Calanacan and Ulan Bays was a legally permitted practice; however, there is very little information on the distribution, movement and fate of tailings as to suggest detailed remedial options.” And yet, the identified remedial option is to stabilize the nearshore tailings that still remain around the Calanacan causeway, to minimize spread into adjacent coastal areas in order to reduce impacts on increasingly distant reefs, for which the report says that “more monitoring, characterization and engineering studies are needed to evaluate the environmental conditions as basis for developing an appropriate course of action.” In the end, the team claims that no other remedial action appears to be visible, given the volume of tailings deposited in the bay, the enormity of the required characterization effort, and the monitoring and implementation costs association with each action (p. 5). In the same report, “the lack of viable remedial options for the tailings in Calanacan Bay” is finally recognized, adding that “nearshore marine tailings disposal is likely not a workable mining practice due to the unacceptably high environmental degradation costs, and should not be permitted in the future (p. 6).

And yet, the major drawback in this section of the report is the fact that this analysis did not address the fundamental environmental impacts of the tailings on what was once a coral reef environment in and around the bay!

#### Detailed review

### **1. The USGS “study” was very superficial and did not come up with significant primary data that would add and improve on what have already been gathered and already known.**

Other studies and reports have already shown the following :

- The design structures are defective – as proven by several instances of failure in the past.
- Toxic wastes are continuously being discharged through sedimentation at erosion, and are contaminating the soils, water ways, air and are affecting people’s health, livelihood, and various ecosystems.
- Benthic macro invertebrates are disappearing or have disappeared in the Mogpog and Bol rivers. In contrast, as many as 21-25 taxa were recorded for rivers and tributaries that are far from the discharge pathways of mine tailings.
- The situation of algal flora in the Boac River and its tributaries is similar, i.e., these have decreased, while the situation is different in Kan-at.

- Livelihood sources have been destroyed (stunted plant growth, decreased fish catch/fish kills).
- Local people have suffered blood disorders associated with anemia.
- They also suffer from cancer-associated symptoms.

**2. It must be acknowledged that there are short-term recommendations that are indeed warranted.**

- The 20m Bulkhead thickness was safe based on the available design criteria of concrete compressive strength of 13.1 MPa (1901Psi). (This view is subject to the accuracy of assumptions used because there is no information on manner it was constructed.)
- Installation of emergency spillway to prevent Tapian Pit from overtopping.
- The installation of weirs at the 190 tunnel and new access tunnel to monitor the rate of discharge.
- Improvement of access road at Maguila-guila Dam for deployment of personnel and equipment for clearing-out debris obstructing the spillway, and to repair/replace the decant tower if necessary.
- Installation of weirs at the outlet portal of the diversion tunnel of the Bol River Dam and clearing-out of obstructions to the spillway.
- Installation of weirs and clearing-out of obstructions at the Lower-Upper Makulapnit Dam.
- Installation of screen at the tunnel inlet and removal of corroder piping at the Tapian 310 drainage tunnel.

**3. There is no evidence that the team exerted efforts to approach the problem from a broad historical and social perspective, but used instead a manifestly corporate-friendly approach.**

Although the TOR required the study team to generate a systematized description and analysis of the mining situation from available reports, the team relied mainly on a review of documents made available to them which, when found insufficient, were no longer validated or enriched through other methods, such as field techniques and consultations which were nevertheless cited as TOR-covered research activities.

The approach gave undue importance to information from obviously vested-interest laden sources, drew invalid conclusions from flawed assumptions and incomplete data, selectively extracted corporate-friendly information out of context from published reports (inexplicably missing out very relevant contrary information) while implicitly dishing them out as scientific facts, and inappropriately applied technical-scientific parameters that only puts undue burden on the victims of the mining disaster and further delays remediation and compensation measures.

The USGS report made much prominence of the summary conclusions of the Bentley and Dempsey report, the CPHA report and the UNEP report, which, taken together, tended to

trivialize and cast doubt on the fact that the mining operations of Marcopper had caused immense environmental damage and adverse health effects on the people of Marinduque. For example, the USGS team, right in the first page of its health assessment report, quoted the following from the UNEP 1996 report:

- “The ENVIRONMENTALLY AVAILABLE concentrations of trace metals that were detected in both the river water and mine tailings were not found to be sufficiently high to represent an immediate toxicological threat to either aquatic BIOTA or human health.”
- “There is no evidence that ACUTE poisoning has occurred in the exposed population due to the mine tailings or that there is an immediate threat to human health as a result of the spillage”.
- “The drinking water that is used by local communities living adjacent to the affected areas is not obtained from the river system, but from upland sources. Chemical analysis of the drinking water indicated that it meets acceptable standards.”

Furthermore, the “first primary conclusion” of the Bentley and Dempsey report was given prominence by the USGS report:

“Metal intake by people living along Boac is not significantly different to metal intake by the people living in CONTROL regions (i.e., the residual tailing does not add significantly to the intake of contaminant metals by the population in the Boac region); and The total metal intakes in the Boac population are either less than or approximate the health guidance values for each metal (**i.e. intake of contaminant metals does not pose a health risk to the Boac population**).”

Thus, right at the beginning of its report, the USGS team had already declared that the mine tailings do not pose any health risk to the people in Marinduque, implicitly absolving the mining company from liability. In their report, the USGS team put into doubt the source of lead poisoning (although the team appears unconvinced that there is in fact lead poisoning among the Marinduque residents), suggesting that the paint in the schools and lead from vehicle exhaust might be the sources of lead poisoning rather than the mine tailings. This shows either utter ignorance of local conditions or a deliberate attempt to absolve the mining company from accountability.

**4. The information being communicated by the USGS report is completely contrary to established facts and what is generally known about copper mines and mine tailings. The USGS team apparently ignored worldwide scientific and empirical data showing that mine tailings result in adverse health and environmental effects to the immediately surrounding communities due mainly to heavy metal contamination.**

The mining of copper has historically produced the largest volume of uncontrolled and dangerous wastes in the mining industry. It does so still today. For example the Clark Fork Complex is the biggest "Superfund" (Environmental Protection Agency clean-up) site in the USA, and one of the largest dumping grounds for metallic wastes in the world. A 1998 study

of Peru's biggest copper operation (SPC - Southern Peru Copper) revealed that tailings containing iron, aluminum, copper, manganese, zinc, lead, arsenic, chrome and cadmium had been deposited in the Locumba river. Several other cases, receiving global publicity, have focused on the hazards of copper wastes disposal - notably from the Rio Tinto-owned Bougainville mine (officially closed in 1989), the Grasberg gold-copper mine in Papua (formerly West Papua/Irian Jaya) and the Ok Tedi mine run by BHP of Australia in the highlands of Papua New Guinea. In Vermont, USA, drainage from abandoned copper mines is negatively affecting the environment. The USGS, in fact, has cooperated with a local citizens group, the Elizabeth Mine Study Group, to evaluate acid mine drainage around the Elizabeth mine near South Strafford.. Similar, but smaller, mines were also in operation north of South Strafford near West Fairlee and Corinth. Waters draining the Elizabeth mine workings and waste piles are acidic and laden with toxic heavy metals. Copper mining in Butte and Anaconda, Montana, starting in 1860's, poisoned the air, the land, and the water. Over 100 years later, contaminants are still found as far as 300 miles down the Clark Fork River, whose headwaters are in that area. The presence of the contaminants has been known for many decades.

A review of a USEPA document published in February 1997 regarding CERCLA 106 actions taken at various mining sites in the US should leave no doubt as to the health and environmental risks associated with mining operations similar to the Marcopper operations in Marinduque. Section 106 of the US Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) provides for abatement action by a State, local government, or the President, when there exists an "imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a hazardous substance." In addition, Section 106 contains severe penalties for noncompliance, forcing potentially responsible parties to clean up a site, or pay as much as \$25,000 a day. These orders are EPA's means of enforcement, which achieve cleanup at sites posing significant threat to human health and the environment where negotiations over Superfund cleanups have failed. CERCLA 106 authority has been invoked in response to hazards posed by a substantial number of abandoned mining and mineral processing sites in the US.

There are many other examples of adverse health and environmental effects associated with heavy metals released by copper mining operations. It is therefore inexcusable that the USGS report is practically saying that the mine tailings from Marcopper do not pose a health risk to the population.

**5. The USGS team gave little importance to, or even disparaged, the results of prior studies done by Filipino experts on the Marinduque incident, showing heavy metal contamination of both environmental and biological media, and showing clinically discernible adverse effects, especially among children in Marinduque.**

The USGS team, in fact, misrepresented the findings of the UNEP investigative mission in 1996 since they omitted the other relevant conclusions in the UNEP report. For example, among its conclusions, the UNEP report stated the following:

- The Makulapnit and Boac River system has been so significantly degraded as to be considered an environmental disaster;
- The aquatic life, productivity and beneficial use of the rivers for domestic and agricultural purposes are totally lost as a result of the physical process of sedimentation;
- The coastal bottom communities adjacent to the mouth of the Boac River are also significantly degraded as a direct result of smothering by the mine tailings;
- There is an increased health and safety risk due to immersion and flooding as a result of the very large volume and physical properties of the mine tailings, should they be mobilized during the wet season;

The UNEP investigative mission, in the first place, was not a health assessment team. It was an environmental team and there were no medical experts with them competent enough to adequately assess the health impacts of the mine tailings. Nevertheless, its findings do not necessarily contradict the empirical observations by people who experienced directly the adverse effects of the mine tailings and the results of the studies done by Filipino expert teams corroborating the empirical experiences of the people in the affected communities

Curiously, the USGS team did not make any mention of a previous USGS study done from October 14-19, 2000, (USGS Open file report 01-441) which showed that water samples from the mine tailing causeway in Calancan Bay, Marinduque contained high levels of heavy metals, including lead, and that the water samples were toxic to the embryological development of sea urchin, a biological indicator of the potential toxicity of mine tailing wastes. In its summary and conclusion the report stated:

“High toxicity was observed and elevated levels of metals were measured in the pore waters collected at the two stations nearest to the Calancan tailings causeway, although those sites were in the predominately upcurrent direction.”

It is unlikely that the USGS 2003 team was unaware of this very relevant USGS Open File report 01-441 because in their Phase one report, they made mention of a prior USGS preliminary mission report, USGS Open File report 00-397. The fact that they completely ignored this 01-441 report adds to the suspicion that this USGS team is not “independent” after all and that the “study” was designed to whitewash the Marinduque mining disaster and to absolve the mining company from liabilities.

#### **6. The USGS 2003 team made unwarranted judgements on the studies done and the clinical decisions made by the Filipino experts from the DOH/NPCIS team.**

While constructive criticisms of the scientific aspects of the studies are welcomed, the USGS team did not exert any effort to clarify with the UP-NPCIS team the questions they had and the practical constraints under which the studies were done. The USGS team also did not have the appropriate qualifications and competence to pass judgement on the clinical decisions of the team of medical toxicologists from the UP-NPCIS. It must be noted that the USGS team had only one medical doctor in their team who is reportedly a pediatrician but not a medical toxicologist. In contrast, the UP-NPCIS team had at least 6 medical

toxicologists involved directly in the health assessments and management of the Marinduque incidents and who have had extensive experience in actually managing poisoning cases, including two internationally recognized pediatrician-toxicologists who are often invited as consultants by international bodies, including WHO. Furthermore, the USGS team did not have the benefit of actually seeing and examining the patients treated by the UP-NPCIS team and even admitted that they did not see the raw data of the studies they were reviewing and therefore, were basing their observations and conclusions merely on theoretical grounds, tenuous assumptions and grossly inadequate information.

Worse, the USGS Team has ignored the detailed recommendations of the UP-NPCIS Team for systematic health monitoring repeatedly submitted to government agencies since 1999. (See Appendix).

### ***Concluding Remarks***

The basic questions relating to the Marinduque mining disaster have not been made clearer by the USGS “study”. In fact, it even obscured whatever information already exists. The decision of the Marinduque provincial government and the National government to call in US based experts as so-called “independent” study team reflects the persistence of colonial mentality among key Philippine government officials at the highest levels. It also reflects the lack of respect and confidence on the capacity of local Filipino experts to provide sound and “independent” expert advice on the appropriate government response to situations such as the Marinduque mining disaster.

It is lamentable that the Philippine government did not give due importance to the DOH/UP-NPCIS team as much as it did to the USGS team. Early on, the DOH/UP-NPCIS team was requesting funds to undertake the appropriate studies and health management measures to respond to the Marinduque mining disaster and to determine the extent of harm that the mine tailings had inflicted on the Marinduque residents but they had always been forced to work on extremely limited funds. Yet, the provincial government of Marinduque and the Office of the President could easily provide P20 million for a US team to make judgements on what Filipino experts are more than capable of doing. In fact, it does not take much study to know that the Marcopper mining operations had resulted in a monumental health and environmental disaster.

Historically, open pit mining had always been associated with such health and environmental disasters and there are many examples in other areas of the Philippines (e.g., Maricalum in Negros and Lepanto in Benguet) and throughout the world, including the US (Mining disasters have occurred in several states in the US, for example, in California and Colorado). It is also known that contamination of the surrounding environmental media by toxic heavy metals are almost always a consequence of open pit mining operations such as what has happened in Marinduque and elsewhere.

Even without so-called “independent” studies, it should be a matter of common sense that adverse effects from one or more toxic heavy metals are bound to occur in people residing in

areas where there are mine tailings nearby. A careful analysis of events and confounding factors related to the mining disaster in Marinduque would easily reveal the truth to a sensible, honest and truly independent person devoid of vested interests. There is, in fact, sufficient evidence, scientific and empirical, to declare that people have been adversely affected by the mining operations of Marcopper and that the company and the government should be made accountable for the damages that have been incurred. It is absurd that the USGS team is looking for other sources of lead other than the mine tailings to explain the lead poisonings that had been observed and documented in Marinduque residents, especially among children.

By and large, the exercise undertaken by the USGS Team has been costly, deceptive and defective social engineering initiative that denigrates the decade old struggle of the Marinduquenos.

### **SCIENTIFIC PANEL**

Dr. Giovanni Tapang, Physicist  
Dr. Romeo Quijano, Pharmacologist  
Dr. Rowena Boquiren, Social Scientist  
Dr. Aloysius Baes, Geo-chemist  
Dr. Lyn Panganiban, Toxicologist  
Ma Theresa Concepcion, Geologist  
Engr. Bebing Clemente, Metallurgical Engineer  
Engr. Joji Calonzo , Civil Engineer

RECOMMENDATIONS OF THE UP-NATIONAL POISON CONTROL &  
 INFORMATION SERVICE REGARDING THE MINING-RELATED ACTIVITIES AS  
 BASED ON THE HEALTH ASSESSMENT OF COMMUNITIES AFFECTED BY THE  
 MINE SPILLAGE IN BOAC AND THOSE ALONG CALANCAN BAY  
 IN STA. CRUZ, MARINDUQUE  
 (February, August 1977; 1999)

COMMON	BOAC	MOGPOG	CALANCAN	
Establish a long-term health programme/ medical surveillance system for the communities affected by the mining activities				
Continuing health assessment and surveillance among the affected communities				
1. Conduct a comprehensive health and environmental study on the long term impact/risk assessment of mining activities/mine waste tailings discharged in the area				1.1 Conduct a monitoring of marine/aquatic organisms in Calanacan Bay area specifically for methyl mercury, lead, copper, arsenic and cadmium  Include monitoring of drinking water and sediment for metal content and sulfide level
	Set up a guarantee fund for health services/ programmes for the community			
	Management and detoxification of persons with elevated heavy metal exposures and other existing health ailments			2. Appropriate medical management of subjects with abnormal findings

	Equip local health personnel with training and facilities to respond to health problems prevailing in the area			Establish a multi-agency task force to set up a comprehensive rehabilitation plan/monitoring program for the community including legislation at the national level
				Set up a guarantee trust fund for the health care needs of the community

February 1977 (Boac, Marinduque), August 1977 (Sta. Cruz, Marinduque), July 1999: Proposed Integrated Plan of Action for the Affected Communities of Mine Waste Tailings in Marinduque

## I. Health Monitoring

### A. Health Assessment/Management

1. To be conducted by Region 4/UP-NPCIS/DOH CO (OH Div.) in the following areas:
  - Calancan Bay – along coastlines: 1999
  - Mogpog – preliminary health survey: 1999
  - Boac – follow up
2. Continuing detoxification/management of other health needs (PTB/anemia, etc.) of affected children and community members – PGH/Marinduque Provincial Hospital: 1999-2001

### B. Manpower Development

1. Training of Clinical Toxicologist
2. Training in Toxicology Administration and Management
3. Training in Analytical Toxicology Laboratory Procedures and Techniques

### C. Long Term Management

1. Detoxification will be undertaken at the Marinduque Provincial Hospital
2. Manpower Development
3. Laboratory upgrading for metal and biologic monitoring
4. Drugs and medicines:
  - Antidotes
  - Anti-TB
  - Anti-anemic

## II. Environmental Monitoring of Affected Areas

1. Identification of “high risk” and “low risk” areas by:  
Air, water, soil and metal monitoring (lead, copper and cadmium)

## 2. Remediation Measures

2.1 Relocation of families of detoxified children to “low risk” areas

2.2 Environmental remediation of affected coastlines

2.2.1 Conduct research activity by the Bureau of Forestry/Bureau of Soils and Water Management on plants/trees that can absorb the Heavy metals (e.g. planting of mangroves)

2.2.2 Continuing research on marine, estuarine fishes and other products which are “safe” and “unsafe” and the areas affected

2.2.3 Creation of a Task Force or Committee to issue guidelines on fish and other marine products as to food safety as well as recommended amount that may be “safely” eaten by community members

2.2.4 Monitoring of water tables for drinking – especially heavy metals and arsenic

2.2.5 Monitoring of animals in affected communities regarding metals, cyanide levels

### **III. Administrative/Legal Management and Assistance:**

1. Propose new law for compensation/relief of victims of mining operations

2. Creation of a Task Force with representatives from the local government, NGO, DOH, DA, DENR, DOJ, DSWD

3. Relief and Compensation Program for affected persons, communities

3.1 Financial assistance

3.2 Medical

3.3 Livelihood

3.4 Housing

\*\*\* Patterned after the ‘MINAMATA RELIEF AND COMPENSATION LAW’