

# SUBMARINE TAILINGS DISPOSAL

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## **RECENT HISTORY OF CIVIL SOCIETY ENGAGEMENT WITH THE ISSUE**

**February 2001** – Vancouver meeting between NGOs & mining companies

**April 2001** – Conference in Manado, Indonesia (Manado Declaration)

**2003-2004** – Effort by CSIRO (Australia) and CANMET (Canada) to organize an independent, international, scientific review of STD.

(2004 – Paper by Simon Apte and John Kwong – Deep Sea Placement: Critical Review of Environmental Issues)

I would like to thank the government of Papua New Guinea and the Scottish Association for Marine Science (SAMS) research team for inviting me to speak at this conference today. Before I start, a point of clarification. The term Submarine Tailings Disposal (STD) refers broadly to systems that used submerged pipes to dump mine waste into the sea. The comments I will make today, however, all apply to so-called deep sea disposal systems.

Civil Society Organizations, local communities, government scientists, and the mining industry and its consultants have engaged in a series of exchanges on STD since 2000 that can best be characterized as conflictual, not transparent or inclusive, and ultimately unproductive from the point of view of arriving at shared understandings of what is scientifically “known,” and “unknown,” what is “acceptable” or “unacceptable” about STD from the perspective of environmental and social best practice, and what the work is that needs to be done to arrive at greater shared scientific certainty and a shared set of conditions that should be met before any new STD systems should be considered for approval.

I want to note here that these conditions cannot be only scientific, they must include a frank assessment of governance capacity (having the right regulations in place and the capacity to enforce them) and of social acceptability by affected communities, and Free Prior and Informed Consent by Indigenous Peoples.

Multi-stakeholder engagements on STD can be traced back to a not-particularly fruitful meeting in Vancouver in 2001. I want to read for you a section from the notes that were prepared by NGO participants following this meeting in Vancouver. I do this to highlight the fact that if we are not careful we will find ourselves going “back to the future” in this current effort. *“At the meeting NGOs put forward concerns with mine waste disposal generally. We expressed the fact that, from our organizations’ perspective Deep Sea Tailings Disposal was linked to a series of associated problems including lack of Prior Informed Consent mechanisms, lack of independent verification of environmental performance, lack of meaningful regulatory safeguards, lack of ability to define No-Go areas and scientific uncertainty about ocean ecology (...) The prevalent view expressed by industry reps was that they were interested in discussing DSTP in isolation from these other issues, they were certainly not prepared to open up a broader discussion. Some had the view that they were interested in discussing only the technical and scientific issues related to DSTP in a risk assessment framework to compare it to other tailings disposal options.”* The meeting in Vancouver was not followed up by further meetings on STD by the participants.

Later that year, a conference on STD was organized in Manado, Indonesia by Non-Governmental Organizations and hosted by JATAM of Indonesia. This conference included affected communities, independent scientists and government officials. It reviewed the state of knowledge about STD at the time and the problems that had been reported at existing operations. At the conclusion of the conference the “*Manado Declaration on Submarine Tailings*” was crafted and signed by the participants. The Manado Declaration sums up the findings of the conference and concludes: *“We pledge to work with affected communities to prevent further development of Submarine Tailings Disposal. We strongly urge governments and the international community to ban the practice of STD throughout the world. (...) We believe that dumping mine waste in the ocean is contrary to the principles and hopes of sustainable development.”*

Between 2003 and 2004, Australia’s CSIRO and Canada’s CANMET initiated an attempt to set up an international multi-stakeholder scientific effort to study the scientific gaps and uncertainties associated with STD. There was considerable concern expressed by civil society groups about the process being deployed to choose NGO participants. However, after active engagement by members of interested NGOs this problem seemed to be moving towards resolution. At around that time, however, CANMET pulled the resources that were needed to fund the secretariat and the initiative collapsed. An important background paper was completed, however, by Simon Apte of CSIRO and John Kwong of CANMET, that identified critical information gaps and key areas for further scientific study. I will return to the important findings of this paper later.

One of the lessons that can be learned from this history of multi-stakeholder attempts to grapple with the issue of STD is that process matters! This is a contentious issue. Potentially affected communities are deeply concerned about the possible impacts on their livelihoods and health. There are objective scientific uncertainties that need to be addressed before statements can be made about whether or not STD is “safe” for the marine environment and the species that rely on it, including humans. There has to be a high level of trust in the independent scientific process that seeks to address these information gaps. Trust depends on inclusiveness, transparency and a scientific process that is robust enough to withstand independent review.

## ***Scientific reviews of STD NOT commissioned by mining companies***

2001 – Moody, R. *Into the Unknown Regions: the Hazards of STD*

2001 – Mineral Policy Institute. *A Review of Risks Presented by the Ramu Nickel Project to the Ecology of Astrolabe Bay.*

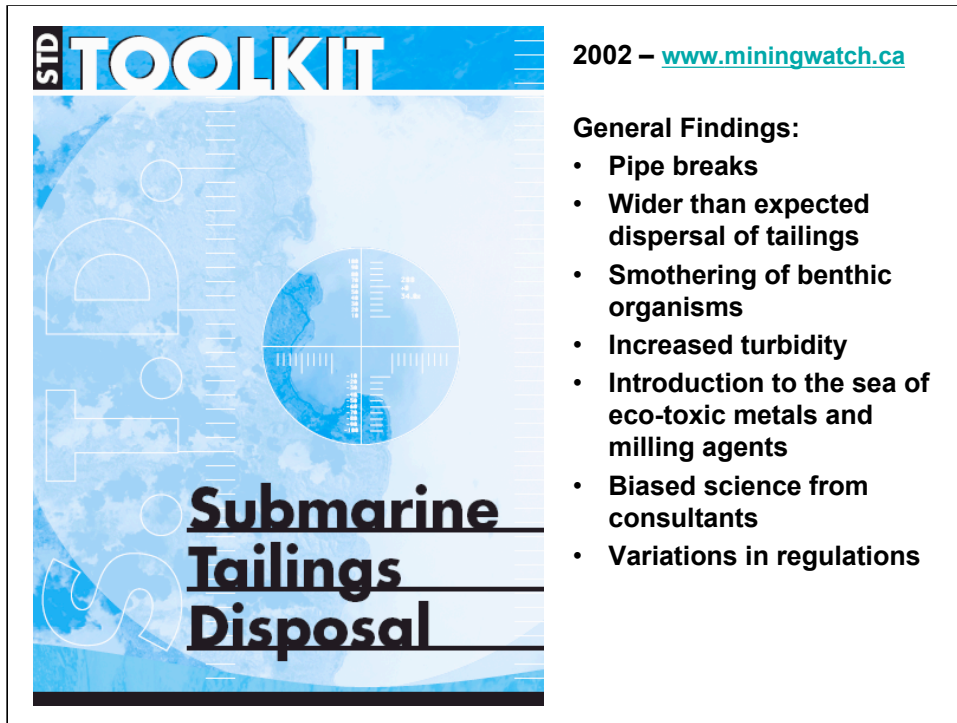
2002 – MiningWatch Canada and Project Underground. *STD TOOLKIT*

2002, 2004 – USGS reports on tailings in the marine environment in Marinduque, Philippines

As a result of the failed multi-stakeholder efforts I have just described, and in the face of seriously biased and flawed “science” on STD being put forward by industry consultants, a number of general and site-specific reviews of STD were produced, or commissioned, by civil society organizations and governments in collaboration with independent scientists.

I will now turn briefly to the general and scientific findings of the STD TOOLKIT as this is the document with which I am most familiar. As I do so, I want to particularly thank Dr. John Luick, who is with us today, for his peer review of the scientific statements in the STD TOOLKIT.

After reviewing the key findings of the 2002 STD TOOLKIT, I will compare these to some of the findings in Apte and Kwong of 2004 and to the SAMS guidelines we will be discussing here tomorrow.



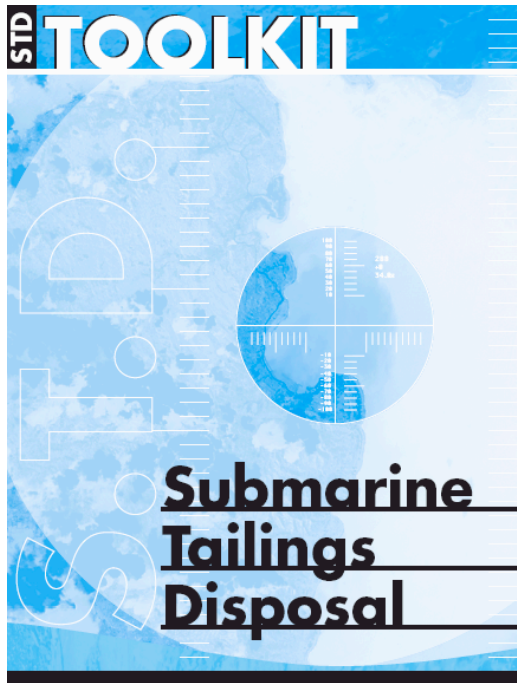
As early as 2001, when I started to review STD operations that were active at the time, it was clear that they shared a number of problems. Most had suffered pipe breaks, all had suffered wider than predicted dispersal of tailings (either through plume shearing or following deposition), all led to increased turbidity, all smothered – largely unknown – benthic organisms, and all introduced eco-toxic metals and milling agents into the sea.

I also found that, collectively, mining consultant’s reports presented a “science” of STD that was largely unsubstantiated, scientifically or in practice. These reports were uniformly biased in favour of STD, even in relatively shallow waters, such as at Minahasa Raya with questionable evidence of a thermocline. These reports also made broad statements of fact – such as that at depth the ocean is anoxic and the seafloor contains few if any significant biota; a thermocline acts as a cement wall that will not allow upwelling of tailings; tailings leave the pipe in a density current that is like tooth paste and slide to the ocean floor without any contamination of the layers they pass through, etc. These statements were at best unsubstantiated at the time, and have since been shown to be overly generalized and optimistic.

I need to note here that this pseudo-science and lack of objectivity regarding STD on the part of mining industry consultants is still being perpetrated. In a paper published just this year by renowned STD consultant Derek Ellis, formerly of Rescan now retired, he once again minimizes the impacts at Island Copper and fails to reference a key Golder Associates report of 1996 that details those impacts – impacts that were not predicted by the projects consultants, including Rescan.

Ellis also fails to mention that the politically controversial variance that allowed the Kitsault Mine to proceed with STD in Canada in 1981 has been revoked by the Canadian Government and that STD is effectively banned in Canada as a result of provisions in the Metal Mining Effluent Regulations.

On the whole, consultants’ articles and reports prepared for mining companies, which have until recently formed the “science” around STD, are a problematic source of information on STD as they are not peer-reviewed by independent scientists. Additionally, many of these reports, or the raw data they are based on, are not even accessible for public scrutiny for reasons of commercial confidentiality.



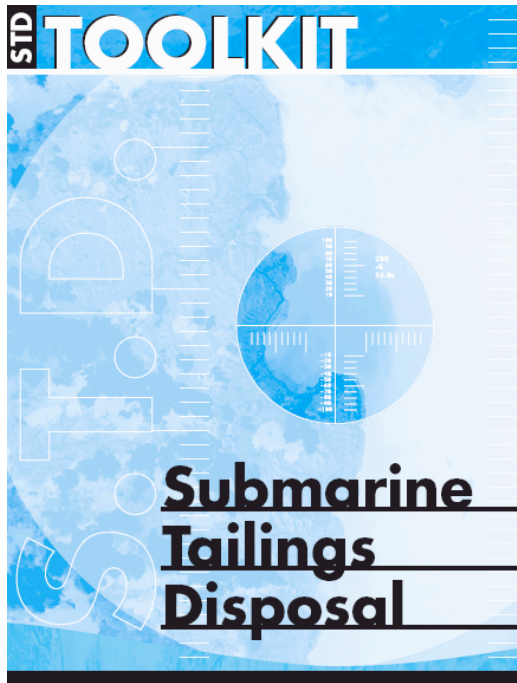
2002 – [www.miningwatch.ca](http://www.miningwatch.ca)

**Scientific and Technological Findings:**

- Lack of data on deep-sea benthic organisms
- Lack of information on re-colonization
- Lack of data on long-term impacts of tailings
- Lack of data on impacts on bioluminescence
- Lack of data on impacts of earthquakes at sea
- Lack of information on effects of plume shearing
- Lack of information on thermoclines, upwelling

As early as 2002, it was clear that there were many scientific uncertainties surrounding existing individual STD projects, for which little data was available, such as at Misima, and more generally there were uncertainties with respect to the oceanic conditions and the impacts of STD in general. (See slide for a list of some key areas where data was lacking.)

With respect to the lack of data on the long-term impacts of tailings in the marine environment, this concern relates to the chemical and toxicological impacts of tailings, as well as to the question of whether it is possible to predict where tailings may end up. Golder Associates, in 1996, noted that: *“on the basis of Island Copper Mine, Kitsault Mine and Black Angel Mine, STDs have resulted in dispersal of tailings to a greater extent than predicted. This applies to dispersal in both deep water receiving environments (i.e. bottom of a fjord) and in shallow waters (...) our knowledge of the physics governing solids transport is relatively poor. Many models exist for predicting movement in the marine environment, however, most of these are virtually untested and are indeed based on inappropriate parameterizations.”*



**STD TOOLKIT**

2002 – [www.miningwatch.ca](http://www.miningwatch.ca)

**Scientific and Technological Findings:**

- Lack of information on bio-availability of metals and processing chemicals and effects on the food chain
- Lack of information on metal solubility in seawater
- Lack of information on metal uptake by organisms from undissolved tailings
- Lack of information on metal mobility through vertical migration
- Lack of procedures to deal with failure of the system

See screen.

## ***Ending on a Positive Note...***

- Simon G. Apte and Y.T John Kwong, 2004. *Deep Sea Tailings Placement: Critical Review of Environmental Issues*

Whereas in 2002 most of the issues that were raised in the STD Toolkit were not acknowledged by the industry and its consultants – making the STD Toolkit necessary – both the Apte and Kwong paper of 2004, and now the SAMS Draft General Guidelines (2008) do acknowledge many of the concerns that I and others have raised and the SAMS Draft Guidelines add other important dimensions in addition to the scientific discussion.

**Apte and Kwong (2004)** emphasize the need for “*research to fill critical knowledge gaps in areas of deep ocean science relevant to DSTP.*” They identify knowledge gaps with respect to DSTP in the following areas:

- Sediment transport processes
- Chemical processes
- Biological processes and pelagic impacts
- Benthic impacts
- Biodiversity
- Ecotoxicology
- Engineering and tailings treatment
- Modeling
- Monitoring and assessment

Unfortunately, this paper was commissioned by mining companies and CANMET and CSIRO have apparently not been given permission to release it to the public.

## ***Ending on a Positive Note...***

- The SAMS “Draft General Guidelines” (2008)

**The SAMS Draft Guidelines (2008)** represent progress. Among other things they:

- Emphasize the importance of strong governance – “*state of the art legislation*” and “*competent regulatory authorities with appropriate funding mechanisms to ensure regulatory compliance monitoring both in terms of the discharge quality and its environmental effects.*”
- Emphasize the importance of meaningful public participation - “*establishment of a transparent EIA process*”
- Emphasize the need to seriously consider alternatives to ocean dumping of tailings “*this process should involve all available data on every one of the options being considered.*”
- Recognize that one alternative to disposing of tailings in the ocean would be not to mine at all in a given location - “*no mine*”
- Emphasize the need for a thorough and complete characterization of the marine community to be impacted by this disposal method (presumably this would include a detailed analysis of marine communities in all locations where tailings may end up through plume shearing or other means)
- Emphasize the need for independent assessment of all data gathering methodologies and findings – “*all data obtained from the environmental baseline should be independently assessed by internationally recognized independent scientists and engineers*”
- Emphasize the need for all data (this would presumably mean raw data as well as final reports) to be “*deposited in a database maintained and updated by the competent government authority.*” An important question here would be whether or not the public would have access to this information.

All of these recommendations, and others not repeated here, represent potential improvements on existing scientific and regulatory practices. The devil, as the saying goes, will be in the details. Many of these guidelines are still very broad and are open to a wide range of operational interpretation.

While we remain interested in the further development of these guidelines, we maintain that until those details include an analysis of what is meant by “competent regulatory authorities” and evidence of proven scientific capacity to predict and measure potential physical and ecotoxicological impacts in the marine environment, no more ocean dumping systems should be approved.

## ***Almost!***

- Still lack of understanding that public participation in discussions such as this one is critical and needs to be part of the planning and funding of an event such as this one. There are voices missing today that would have enriched our discussion because of the expense of attending.

SAMS and the Government of Papua New Guinea have to be commended for deciding to open up this meeting to the broader public to discuss the preliminary scientific findings of SAMS' field research. It is very important that the discussions about ocean disposal of mine waste not be confined to the scientific community or to regulators. However, it is clear that there was not much understanding of how strong the public interest, both locally and internationally, would be in this topic, and not enough forethought given to how public participation best could be facilitated. The very high conference fees and the costs of travel to Madang have been prohibitive for both local and international participation by community members and NGOs. While there are clearly limits to the degree to which participation in a meeting such as this can be accommodated. More could have been done to assure some funding was set aside to facilitate participation by community members and NGOs.

Thank you!