MMSD

Mining, Minerals and Sustainable Development

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Mining for the Future

Appendix E: Report of the Workshop on Large Volume Waste

Vancouver, 15–17 July 2001

This report does not necessarily reflect the views of the MMSD project, Assurance Group or Sponsors Group, or those of IIED or WBCSD.

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Workshop Concept

Workshop Format

Prior to the Large Volume Waste Workshop, MMSD set up a Review Committee, made up of a Panel of six and a Forum of twenty-one, to provide guidance on and review documents related to this aspect of the project. The Review Committee were involved in the production of three Working Papers, written by the MMSD research team, on three broad topics: Large Volume Waste, Mine Closure and Abandoned Mines. All the participants of the Workshop were given a set of the Working Papers, as well as a number of case studies on riverine disposal, as background material for the Workshop.

The Workshop was organised to maximise full participation from all those attending with a minimum number of presentations, the majority of the time being used for break-out group sessions and open discussions. The participants were initially divided into six groups and asked to identify the issues and questions that they felt should be addressed during the Workshop. Six brief presentations were then made, loosely based on the Drivers in the Large Volume Waste Working Paper. Break-out groups were then set up to discuss the issues arising from these presentations and to report back to the full Workshop. A further set of break-out groups were then established to discuss the three Working Paper topics.

Following the presentations from the second break-out session the same groups were asked to identify the most significant next two steps MMSD could recommend and the theme or challenge that needs to be addressed. A summary of these points is contained in the table on p. . The Review Committee then remained for an additional half day in order to discuss and summarise the issues and comments arising from the Workshop. During these discussions it was agreed that the outcome of this section of the MMSD project should be a Workshop Report, a summary Report with Conclusions and Recommendations and a final version of the three Working Papers.

This report contains the full transcripts of the presentations and abbreviated transcripts of the discussions and findings of the break-out group sessions. Anyone wishing to see the full transcripts of the break-out group sessions should contact MMSD.

Prior to the Workshop, the MMSD research team established the following objectives, in order to provide guidance to the participants:

Workshop Objectives

This workshop provides a forum for discussions on the wide-ranging issues surrounding large volume waste disposal in mining. It is one of the activities of the Mining, Minerals and Sustainable Development (MMSD) project. The results of the workshop discussions will feed into MMSD's Final Report.

The workshop is being convened to develop recommendations for all aspects of planning, operation and closure of facilities and overall management of large volumes of mine waste,

using a more balanced and participatory decision-making process, in order to maximise the contribution that the minerals sector can make to the transition to a more sustainable society. The workshop will include the following:

- Review of the working papers on Large Volume Wastes, Mine Closure and Abandoned Mines written by the MMSD work group.
- Discussion of all aspects associated with large volume wastes, mine closure and abandoned mines, including technical, political, social and environmental issues.
- Consideration of the drivers used in the decision-making process for all three topics and the role of the different stakeholders in this process.
- Discussion of the obstacles to progress around these issues, and scoping of the array of options for progress.
- Develop recommendations on how the mining industry, as well as related organisations and the regulatory authority, can contribute to sustainable development through its handling of large volume waste, mine closure and abandoned mines.

The outputs of this workshop will be incorporated into the Working Papers, which will contribute towards the MMSD's final report.

The workshop will bring together individuals from mining companies, conservation and development NGOs, research institutions, consultants, international organisations and government from different regions. The workshop will therefore provide an excellent opportunity to share and compare experiences, to identify possible ways forward on issues where views are divergent, and to build on areas of consensus. Much of the material contained in the draft Working Papers has been reviewed and commented on by the Review Committee set up by MMSD for this project. The workshop will provide the opportunity to receive input from a wider audience through the discussion of a series of inter-related topics.

At the start of the Workshop the MMSD research team and Review Committee identified the following anchor question and goal as being central to the discussions:

Workshop Anchor Question

The Question: What can the mining industry/government/civil society do (in any specific area under discussion) to move towards sustainable development:

- Environmental performance
- Social equity
- Economic development
- Transparent governance

The Goal: Ideas for specific next steps towards better understanding and effective implementation to inform discussions and actions.

Summary

Key Issues

The following is a summary of the key issues that were raised during the Workshop. While there were not specific sessions dedicated to all these issues, they became important discussion points throughout the Workshop. They are not presented here in any particular order.

Sustainable Development: There needs to be a definition for sustainable development but before this can be done the audience needs to be identified. In addition, measurable indicators or goals need to be identified for sustainable development. There is some concern that the current industry financial model is in conflict with sustainable development.

Decision-Making: The decision-making process needs to be transparent and coherent with the integration of qualitative values. The question of how to weigh social and environmental costs against economic gain was raised and also how to balance the different perspectives between developing and developed countries. It was also felt that pre-feasibility should be made more comprehensive and decision-making, involving all stakeholders, start at this stage.

Public Engagement: The industry needs to understand how to define and/or identify the 'stakeholders' and how to ensure that the views of all are heard. Local communities need financial and other help in developing the capacity to partake on an equal footing in the decision-making process. All Stakeholders should be involved in decision-making right from the start of any project and continue to be involved all the way through.

Information Availability: There is a need for studies that are accepted by the 'stakeholders' as being independent, credible and balanced. There is also a need for information to be made more easily available generally, on a world-wide basis.

Closure Planning and Management: Some form of financial surety or assurance is essential for all operating mines and closure planning and costing should include a risk assessment. There is a need to identify how long a company is responsible for a site after closure and who takes over that responsibility.

Large Volume Waste: Should some disposal options be generally banned and, if so, by whom? There is a need to discuss the approach to marine tailings disposal. Discussions should always include a 'no mine' option.

Abandoned Mines: There is still a problem of terminology between abandoned and orphaned mines. A method of removing the barriers to action needs to be established as well as a method of paying for their closure/clean-up. Abandoned mines are the largest long-term cause of environmental degradation and they create a legacy of mistrust in the industry. Government and the mining industry have the responsibility to work together in the development of innovative approaches for the remediation of abandoned mines.

Industry Performance: Is it possible to have voluntary collaborative industry efforts to achieve their goals that do not involve regulation? There is concern that there is a quantum leap needed to change corporate culture to understand and embrace sustainable development and it may take some time for the industry to make these adjustments. There is also concern that the smaller companies do not have the resources to adequately incorporate sustainable development and that the industry is characterised by its worst players.

Working Papers: The Working Papers need to cover the holistic impacts of mining activities (including water) as well as have a more global perspective. More case studies are needed to provide a balance both in subject areas and good as well as bad examples. The documents should include an executive summary and a glossary and should clearly articulate a vision for the future of the industry.

MMSD Role: There is concern that any output from MMSD will be seen as a special interest project and not be generally accepted. However, it is still important that the MMSD 'results' should be available to everyone. It is thought that MMSD could help by recommending that a series of international guidelines is produced for the industry. MMSD could also help by serving as a platform for the initial discussion between industry, stakeholder groups and governments, especially on tailings disposal options.

Recommendations

Following the presentations from the second break-out session on Monday afternoon the same groups were asked to identify the most significant next two steps MMSD could recommend and the theme or challenge that needs to be addressed. The following table contains these recommendations.

Group	Most Significant Next Two Steps MMSD Could Recommend	Theme or Challenge that is Key to Address
1	More comprehensive pre-feasibility in order to address sustainable development issues and move the decision-making process up to an earlier phase. Establish world-wide database for monitoring.	More comprehensive pre-feasibility/feasibility to ensure full public engagement
2	Explore project evaluation process. Develop guidelines of waste disposal options.	Develop working definition of sustainable development.
3	Gather information from guidelines for the characterisation of the physical environment, particularly waste. Establish guidelines for public engagement.	Water/water management.
4	Develop guidelines and principles for processes (technical, social, economic, etc.) using tenets of sustainable development. Document should be drafted addressing the state of the industry; where it has come from and where it is going.	Criteria for exit ticket.
5	Funding provided by the proponent to promote capacity building to ensure effective engagement of all stakeholders in the decision-making process. Comprehensive risk assessment where environmental, social, economic and technical issues are given equal weight.	Identify and screen options; not mining should be included as an option. Engagement and verification of stakeholders.
6	Early engagement of interested groups (particularly before significant financial commitments have been made). Internalise total costs associated with environmental issues.	Need for independent funding for research and capacity building.

The following recommendations that are not included in this table were also made as key actions for MMSD:

- Identify organisations or new entity that will continue the MMSD efforts
- Further explore a more radical project evaluation process and expand process beyond large volume waste
- Develop guidelines on:
  - Waste disposal options
  - Decision-making
  - Public engagement
  - Waste management
  - Closure planning
  - Closure implementation
  - Abandoned mines
  - Water management
  - Independent review
- Promote acid drainage research that can inform waste management practices

The following possible definitions for sustainable development were made:

- A sustainable mining industry is one that extracts minerals in a way that allows society and communities to meet their current economic, environmental and social needs in a way that does not compromise the ability of future generations to meet their needs.
- A sustainable mining industry is one where the mining industry is welcomed by societies and communities because its activities meet broad based economic, environmental and social needs.
- A mining industry contributes to sustainable development by being; economically viable, socially acceptable (end land use, no boom/bust), environmentally sound (air, water, land); through a process that involves constructive engagement between communities, industry, government and civil society, transparency and easily accessible information

MMSD's Principles of Engagement

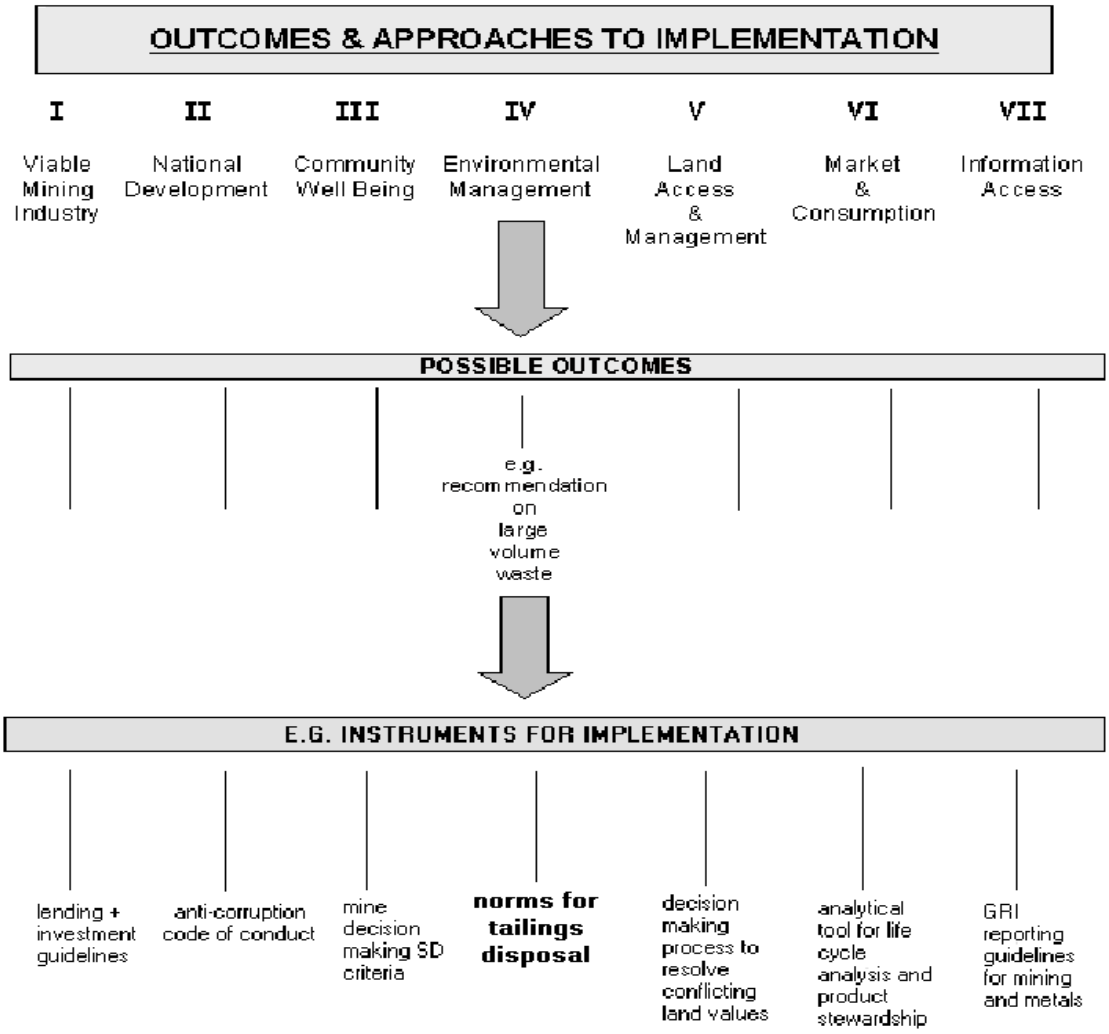
The following Principles of Engagement embody mutually agreed values and principles which are governing the way MMSD approaches engaging stakeholders in its activities.

The Basis of Participation
Those involved in an MMSD activity do so with the assurance that the Project is committed to providing the opportunity for participants to interact, with these expectations:

1. MMSD provides an opportunity for people both to inform each other within the context of a project which seeks to describe the global mineral cycle, and also to offer advice and guidance to the Project.
2. We hope to identify and understand the diversity of perspectives, values and interests that can help build the foundation for positive change. Views have to be freely expressed and the risks of such expression reduced. *This is a forum in which individuals or groups can investigate ideas.*
3. There is a need for a place where views can be exchanged frankly and openly. *MMSD has no authority to impose solutions on anyone.*
4. The Project should strive to identify where it can best help to guide the flow of discussion. *The objective should be to help develop areas of common ground, understand where differences exist, and the underlying reasons for them.*
5. Wherever possible, we should widen the networks of connections and identify ways of addressing challenges, within and beyond the life of the Project.
6. Participating in, or contributing to workshops or other events, commenting on documents produced, suggesting participants for meetings, and other interactions with the Project are not and will not be portrayed as an endorsement of MMSD. These basic understandings on the basis of participation will be included in any meeting reports prepared by MMSD. *It is important that the basis for participation be widely understood.*
7. Notes or minutes prepared by MMSD will report important comments and points of view but will not attribute them to specific participants unless this is requested by the person making the statement. *Exchange of ideas is freer when unknown consequences can be minimised.*
8. The notes from workshops should be reviewed by a representative group of attendees, agreed at the meeting, prior to finalisation. Notes will typically be of a summary nature and will include a list of participants. *There should be an opportunity to discuss the contents of the notes and ensure that everyone is comfortable with them prior to their wider circulation.*
9. There should be an opportunity to discuss this Basis for Participation at the outset of any activity to ensure that participants are comfortable with it and that it is appropriate for the purpose. *It is in no way a constraint on the participants to develop further or additional understandings as are appropriate in the circumstances.*

MMSD recognises an affirmative responsibility to ensure that this Basis for Participation is as widely known as possible within and among the different communities with which the Project is involved.

MMSD Outcomes and Approaches



Presentations

Six presentations were made at the beginning of the Workshop. These presentations were meant to present provocative thoughts that could help to inform and promote discussions in the break-out sessions. The text and diagrams are reproduced here as received from the presenters.

1. Information Bias/Quality – and Public Trust

Dr. Robert Moran, Consultant, Geochemist and Hydrogeologist, US

This presentation focused on the bias that often pervades mining environmental studies, because of the all-too-common financial conflicts of interest for the consultant/investigators. Because 'independent' sources of funding are now rare, most mining-environmental work is funded by the mining industry itself. In fact, most mine environmental efforts intended to obtain regulatory approval are funded by the mining company seeking approval. This

situation, coupled with the fact that much environmental monitoring, especially in developing countries, involves self-policing, leads to a common mistrust of the data and interpretations produced by mining companies and their consultants.

Most consultants to the mining industry derive the majority of their income from mining-related work, and this relationship can 'colour' the questions asked, and the answers received. We are all influenceable, to some extent, by such financial connections.

The presentation mentioned some examples of science that exhibited biased characteristics:

- ARD predictions that were clearly based on poor and incomplete science, and which probably were 'coloured' by the wishes of the mining clients. All of these situations inevitably passed environmental costs from the mining companies on to the general public.
- examples of mining environmental bonding calculations that were recently made for sites in New Mexico, USA. When bond amounts were calculated by the company consultants, the amounts were drastically lower than when 'independent' consultants made the calculations.
- descriptions of environmental impacts due to the decomposition of cyanide and related compounds. When company-employed consultants describe these situations, there are essentially no negative impacts. Non-industry studies often reveal different interpretations.

These sources of financial and psychological bias present the clear need to consult non-industry information when performing mining environmental studies. More pertinent to developing world situations, there is the need to find funding for 'independent' studies of impacts. Where such independent viewpoints are lacking, citizen's groups and NGOs will continue to mistrust company-funded studies and conclusions.

2. *Public Participation*

Susan Joyce, Golder Associates, Sociology and Development, Canada

Public participation and large volume waste management in a mining industry that promotes sustainable development.

Effective community engagement: the mining industry participating in a community's sustainable development.

Figure 1: Mine-Centric Management

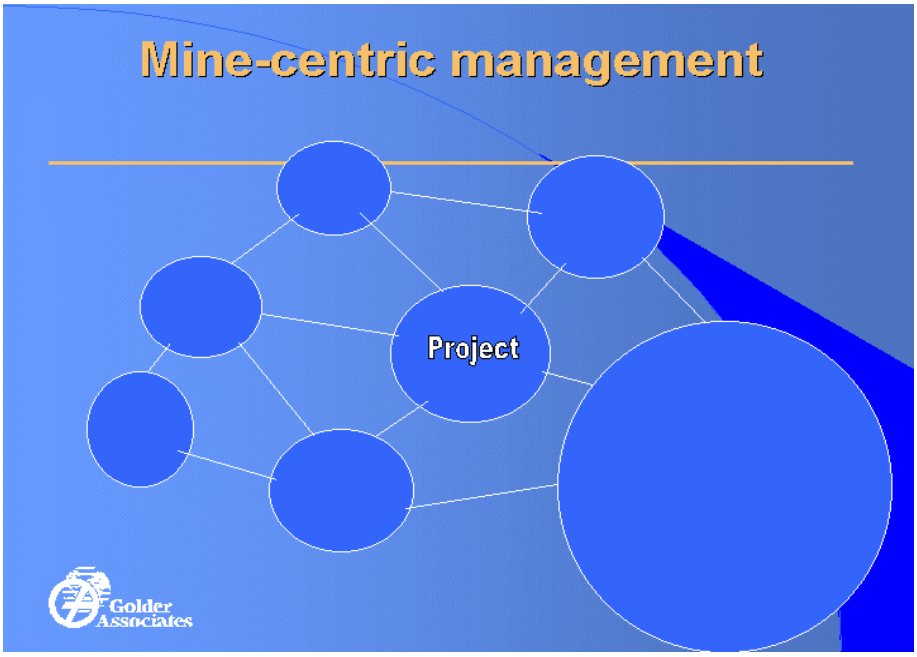


Figure 2: Management for Sustainable Development

My concept of mining and sustainable development: using the extraction of a non-renewable resource (minerals) to develop the capacity (human and social capital) of the relevant community (ies) to achieve the quality of life that they desire into the future.

Criteria for contributing to sustainable development:

- 'Community' representatives integrated into project planning from beginning.

- Project is consistent with community's vision of future which is not mine-dependent.
- Mine's presence is building human, natural and institutional capacity in area.
- Social equity – vulnerable are better off as a result of project.

Why 'Engagement':

- Long term commitment to a process.
- Partnership – respect, decision-making.
- Intimate – have to get to know the 'other'.
- Builds together – requires the involved parties to change, to compromise.
- Flexibility – accommodates change from external forces – markets, accidents, expectations.

Basic Principles of Engagement:

- Transparency = full disclosure.
- Two-way dialogue and responsiveness – no party has all the answers.
- Comprehensive 'coverage'.
- Address power relationships:
  - between company and community
  - within community.

Common Pitfalls in Public Participation:

- Representivity – who are you dealing with? – divide and conquer.
- DC/LDC differences – state capacity, will, resources etc.
- Vulnerable, excluded groups?
- Cultural clashes – mature vis 'emerging' democracies.

Consider Key Cultural Blocks to Successful Consultation:

- Timing
- Education
- Language
- Literacy
- Oral vs written tradition
- Inclusiveness/representivity

Engagement and Large Volume Waste Management:

- Large volume waste or closure decisions should be made within a larger sustainable development analysis.

- Community committees – long term capacity building.
- Future economic alternatives for community considered.
- 'Credibility gap' will determine what public participation need to look like in each case.

Engagement and Participation:

- On-going site and culture specific process.
- Commitment to build trust and credibility.
- Capacity building for effective engagement between the various parties.

3. Capacity of Regulator

Hugh Jones, Golder Associates, Environmental Management, Australia

Apart from the obvious answer of about a bottle of red a night, let's look at it in more practical terms. There are real practical problems to a regulator's capacity.

First and foremost laws are normally enacted in a retrospective way. It's not chance that Moses came down from the mountain with the ten commandments after Kane killed Able, not before and the same applies to almost every other piece of legislation that has been put in place. It is in response to a happening. So I think when you actually ask the regulator what he is able to do the correct answer is 'respond'. Often the regulator has no ability to lead. I think when you start asking governments to do things you need to understand about the way legislation is put in place.

The other difficulty of course is that new legislation has to fit into existing legislation and that's often a very difficult thing to do. This means you often can't achieve your objectives in a very simple way, and need to resort to very convoluted processes. You have to trade off with all the other departments working around you.

There are two arms to government. The administrative arm, which is usually the regulators and the political arm which is the rule maker. The reality of life is that you don't get politicians doing things that the community doesn't want and very often the community wants things without understanding what it really needs. There is a significant difference between 'needs' and 'wants'. The politicians will only go for the wants, they very rarely go for the needs. Statesmen, on the other hand do go for needs.

In many ways the regulator is like a referee or umpire in a sporting contest. The regulator is not a member of either team but has tremendous influence in the way the game is played. The regulator doesn't usually write the rules, they are written by the politicians but the regulator can influence how the politicians write the rules if the regulator has the required 'skills' to do that. Usually the 'skills' are bad examples of things that have happened and they usually get the politicians on side.

A major problem with politicians is they are interested in tomorrow's headlines. When regulators start talking about sustainable development or environmental management they are focused on what's happening 10 and 15 years down the track, so it's a bit of a mismatch

between the two arms within government. When you talk of government please bear in mind it's got these two very different objectives, one tomorrow's newspaper, the other outcome 10 or 15 years down the track.

Regulating authorities are usually under resourced, we've heard that many times. To give you an example, when I was a regulator in Western Australia the WA mining industry had an annual output of about US$6.5 billion. The total commitment of the State to regulating that industry was about US$2 million. I would say that in comparison with many other jurisdictions the regulators of WA were not that badly under resourced. Why is this so? Let us return to our politicians. They make the rules, they dish out the money, and they want 'good' headlines in tomorrow's newspaper. If the 'good' things are less muggings, more kids passing examinations and people having beds in hospitals they will inevitably take priority over some mining company that might shut down in 15 years time. We must also bear in mind the fact that no government has infinite resources.

When bringing about change the regulator must remember that all change is not equal. Whenever new mining legislation happens it's going to affect the operations that have not yet commenced, the operations that are well under way and the operations that are closed and it will affect them in different ways. This particular slide shows the ratio in 1995 of new mines, operating mines and abandoned mines in Western Australia. I think that ratio is similar to the ratio in most countries. This means there will be a small number of new operations where the regulator has maximum degrees of freedom to change things. A significant number of operating mines where the degrees of freedom are much less and a very large number of abandoned mines where you have no degrees of freedom. Regulators must make allowance for this when implementing any new legislation.

New Mining Operations	13
Existing Mining Operations	446
Abandoned Mining Operations	Several thousand

Regulators are human beings. The general public and the regulators often forget this. They have as many biases and so on as any other member of the community and it's a great temptation to impose their biases. You don't get paid much in government, but you've got power! There's an old saying *"when you got 'em by the nuts, their hearts and minds will follow"* and regulators sometimes abuse their power. They impose their personal views and as a society we have to prevent regulators misusing their power.

Trust is a word that has been used in the two previous presentations. I wasn't expecting that as I thought mine would be the first presentation to use it. The equation is:

Trust plus Control is a Constant.

You cannot trust a person and control that person at the same time, try it with your kids, try it with your dog, try it with mining companies. To a regulator it's the same equation, you can't both trust and control at the same time. If you want to be in an effective regulator, you have got to find the correct balance and this balance point will depend on many factors. The state of development of the country you are operating in, the maturity of the companies you

are dealing with, and the relationship between government and the community. In Western Australia we were very fortunate. We were allowed to maximise the use of "trust", in part because most of our mine sites were a very, very long way from our people, (*"what the eye doesn't see, the heart doesn't grieve over")* and in part because the industry was open to education.

You can trust people. With our small number of staff we had to educate the companies, educate them on government organisations and systems and lift their experience. We used to hold around the table meetings where we were all (industry, regulators and NGO's) sat and discussed specific industry issues. you've got to get out there and make such systems work if you are going to benefit from trust. Trust is the cheapest form of regulation but, as a regulator you've got to remember you have to play policeman too.

You cannot shirk away from being a policeman if the community is going to allow you to use trust. Similarly companies need to know that you will take action if they betray your trust. I've carried out some pretty serious and drastic actions in my time as a regulator. I remember shutting down a gold mine once for six weeks. You've got to do that if you're going to be a policeman. It's that kind of action when action is needed that enables the other 445 mines to continue to operate in the trust system.

When I hear people talking about self regulation and self policing I have serious doubts about how it will be applied. I'll believe it the first time that somebody kicks a mining company out of their Chamber of Mines and the first time a professional body kicks out a professional person off out because they have not complied with the organisation's Code of Ethics. That's self regulation and self policing. The regulator has the capacity and the responsibility to police the law, he or she must exercise it. If you don't exercise that you cannot then trust the rest of industry because the industry are seen to be out of control by the public. If the public sees your hang a pelt on the fence from time to time, the public will be reasonably happy in the way you regulate.

Regulation itself can be a moving feast. There's this relationship between trust and control as shown on the slide:

Total Prohibition	Maximum Control
Prescriptive Regulations	High Control
Code of Practice	General Control
Specific Guidelines	General Trust
Generic Guidelines	High Trust
No Regulations or Guidelines	Maximum Trust

If you want to absolutely control something, prohibit it. That's the easiest way to control something. If you want to absolutely trust something don't set any rules. In between there are a series of regulation mechanisms, you can start with generic guidelines. You can increase the control when you make specific guidelines. You can write codes of practice which have a much greater standing in law.

You can write prescriptive regulations, but what you've got to remember as a regulator is that when you prescribe that something happens and the company or the operation follows

that prescription, you wear the consequences for getting that prescription wrong. Regulators have to understand there are many examples around the mining industry where people have explicitly followed the regulator's requirements and it was wrong, because the regulators were human. One of the problems that we have is that under resourced regulators are not able to do the necessary research, which often means regulations are 'borrowed', often with a resulting incorrect prescription.

Now to the four points in the anchor question.

How does all of this apply to environmental performance? The regulator has immense capacity to manage environmental performance through a range of mechanisms.
How does it apply to social equity? That's not so easy for a regulator. Environmental things can generally be measured, they can be managed using a sort of modified engineering approach. I in many ways, it's something we are comfortable to try to manage. Society, on the other hand can't usually be successfully managed by regulators because regulators generally sit in fairly narrow fields. It's something that has to be managed by some other mechanism than traditional regulation.

Economic development can be influenced by regulators and certainly transparency can be very markedly influenced by regulators.

My summary is that regulators are human beings. They have the capacity of other human beings. They are going to make errors. The question is how do we avoid getting regulators to make errors?

4. Financial Surety

John Kilani, Chamber of Mines, South Africa

Topics:

- Financial Surety Instruments
- Financial Provision in South Africa
- Recent Developments
- Mining Industry Response
- Agreed Alternative Arrangement
- Lessons learnt and Discussion Points

Financial Surety Instruments:

- See www.icme.com/icme/finsurety.htm
- Cash surety
- Financial instrument guarantee
- Trust fund
- Corporate financial test

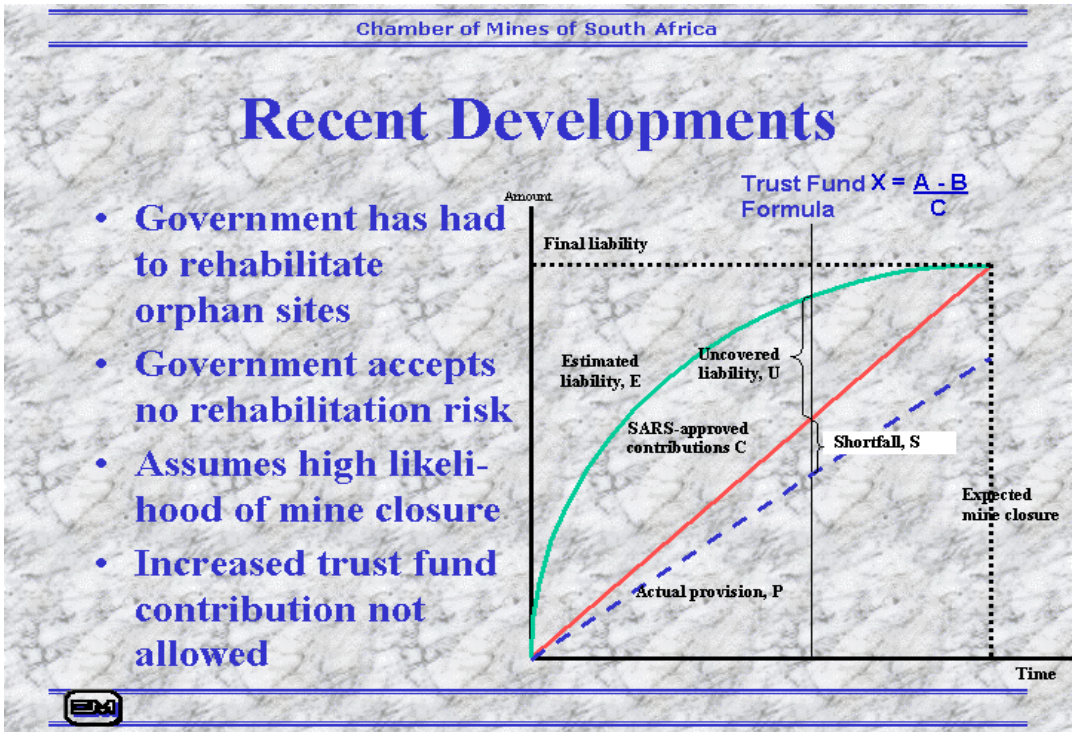
- Pledge of assets
- Parent company guarantee
- Insurance policy

Financial Provision in South Africa:

- Introduced in 1994
- Three mechanisms allowed plus provision for discretion:
  - contributions to dedicated trust funds
  - cash deposit into government account
  - a guarantee by a financial institution
  - any other arrangement approved by government
- Large mines prefer trust funds

Recent Developments:

- Government has had to rehabilitate orphaned sites
- Government accepts no rehabilitation risk
- Assumes high likelihood of mine closure
- Increased trust fund contribution not allowed



Mining Industry Response:

- Government stance is unreasonable
- Transparent, measurable criteria should be developed
- Additional methods of making provision

- 'Status quo' to remain in the interim

Agreed Alternative Arrangement

- Lesser provisions acceptable on the basis of agreed criteria – sets of essential requirements and parameters
- Essential requirements and essential parameters based on the need for an early warning system and risk minimisation
- Essential requirements must be fulfilled before essential parameters could be applied
- Different aspects of the parameters would trigger different level of intervention

Lessons Learnt and Some Key Discussion Points:

- The less trust government has in industry, the less risk it will bear
- Industry is judged by its worst performer
- Rational basis for estimating closure costs is essential
- Liability of clearly defined legal entity
- Transferability of liability to competent third party
- Uncertainties around insurance policies
- The need to ensure security of provisions
- Depreciating value of assets and impacts of inflationary trends
- Ineffectiveness of 'early warning' systems

5. Post-Closure Issues

Dirk van Zyl, Mackay School of Mines, University of Nevada, USA

Post-closure is the extended period that follows implementation of site rehabilitation and reclamation. During this period there may be ongoing monitoring, passive care or active care at a mine site. This presentation provides insight on the activities and decisions that precede the post-closure period. These will determine the post-closure commitments and conditions at a mine site.

From a post-closure sustainable development perspective success can be defined in many ways that could include:

- Economic conditions
  - The mine was profitable for the company and contributed to its financial success.
- Environmental conditions:
  - Regulatory requirements for water quality are satisfied;
  - Vegetation has been established to a set of criteria for density and diversity;
  - Water management control measures are in place that will control erosion and other hydrology concerns; and,
  - Site relinquishment can be successfully implemented or steps are in place to approach that.

- Social conditions:
  - Measures were taken so that a boom-bust cycle was not imposed on the local community; and,
  - The mining company respected cultural traditions and gender issues.

There are many factors that contribute to a successful mine closure, these include:

- The closure planning process is done by a group of multi-disciplinary professionals. There is continuous review, updating and improvement of the closure plan;
- Ongoing consultation with multi-stakeholder groups is done throughout the closure planning process;
- Mine operations are designed and implemented with closure in mind;
- Closure is implemented in a responsible manner; and
- Financial provisions are in place to safeguard the interests of the communities.

These financial provisions for closure include:

- Surety/assurance:
  - Complete and accurate closure cost estimate are performed for the proposed mine closure plans; and,
  - Financial surety instruments are used that will provide assurance that the site will be reclaimed as planned.
- The company has sufficient resources available to effectively implement closure;
- Post-closure financial provisions have been negotiated; and,
- Systems are in place to implement bond release/relinquishment.

In transitioning to sustainable development there are certain past practices, such as poorly planned closure measures at a site, that must be dealt with. The ideal future conditions may include many of the aspects discussed above. At this time a transition is occurring from past practices to the ideal future. Many companies are successful in making this transition, however there are clearly much progress to be made.

A number of opportunities for making this transition include:

- Broader consultation with communities on all aspects of mine closure;
- Better appreciation of changes to land use objectives as a result of mining;
- Improved communication of the performance of closure measures (e.g. covers, water diversions, wetlands, etc.); and,
- Better understanding of the mine life-cycle costs and benefits (including social, environmental resource issues, etc.)

6. *Rhetoric* versus *Action*

Glenn Miller, Environmental Sciences and Health at the University of Nevada, USA

Rhetoric is defined in at least two ways. The first is the use of words to promote a position using exaggerated and aggressive language. The second definition is a more academic definition, that is, a study of how language can be used to effectively convey thoughts. The language used to describe mining is very often burdened with the more aggressive form of rhetoric to defend a position or, just as often, to attack an opponent. Discussions of mining would benefit by reducing the level of this latter rhetoric, but many people working on mining issues commonly use the pejorative words to describe things. The term "orphan mine" may be one description while an alternative description might be an "abandoned, open pit acid mine drainage site". They may refer to the same site, but convey messages that are quite different.

Reducing the level of aggressive rhetoric is difficult, particularly when each interest group (e.g. mining or environmental) sinks to the lowest common denominator for use of language that puts the other side in a dark corner. Engagement in balanced discourse for real solutions can move many of the most controversial issues forward. The issues listed below are admittedly not free of a rhetorical slant but are examples where clear actions can make strong statements:

- ***Quantitative standards***: During planning for permitting and closure of mines, clear and quantitative standards for discharge water quality, groundwater protection and reclamation success are important for environmental protection.
- ***Transparency and inclusiveness***: Public involvement and public scrutiny in controversial projects during planning, operation and closure will increase the public trust in mining.
- ***Riverine tailings disposal***: This method for management of tailings, even in high rainfall areas, is increasingly unacceptable and the mining industry needs to publicly remove this as an option for new mines.
- ***Financial surety***: Financial surety for complete closure of mines is a critical element of permitting any mine. The public is still being left with abandoned mines that ultimately become a public liability.
- ***Closure***: We still do not know how to close mines, and additional research is necessary to prevent and treat acid drainage, and close cyanide heaps and tailings facilities.
- ***Certain areas are appropriate for mining; others are not***: Some areas simply have too great of an environmental and/or social risk for certain types of mining. In other areas, the benefits of mining outweigh the risks. But there should not be a right to mine everywhere.
- ***Engagement***: The environmental community, the mining industry and other interested parties still are very often unable to establish sufficient trust to discuss and negotiate mining conflicts. Better mechanisms for getting to agreement are still lacking.

Break-out Group Sessions

Sunday 15th July am

The Review Committee were divided into six groups and were asked to identify what issues or questions they felt should be addressed/discussed over the next two days? The following is a summary of those comments.

Group A: Chair: Henry Brehaut
Decision-Making Process should include issue identification, indicators, information requirements, site specific value judgement and public role.

Environmental Assessment Process should exhibit credibility with requirements/conduct identified and be site specific.

There is a need for post-mining sustainable use plans.

Group B: *Chair: David Jones*
Definition of Sustainable Development:

- Who is audience for MMSD definition – who will use it?
- In a given setting, who defines sustainable development?

Balance – Developing versus Developed Nation Perspective:

- How do we weigh social/environmental costs against economic gain?
- How do we balance different perspectives between developing and developed countries?
- How does the local population get the resources/empowerment to participate?

Stakeholders:

- How do we define stakeholders (public) for this industry?
- How do mining companies know when 'local' stakeholders have been heard if their views differ from the government's?

Implementation:

- How are MMSD's 'results' going to get out into the real world?
- How do we educate people's thinking towards an MMSD vision?
- Can there be voluntary industry collaborative efforts that do not need government regulators to move forward?
- How fast does the industry have to change?
- How does the industry grapple with its lack of credibility of transparency?
- Industry current financial model is in conflict with sustainable development

Group C: *Chair: Hugh Jones*
Large volume waste:

- Large volume waste or landscape creation?
- Underground placement of mine waste
- Public perception and participation
- Should disposal options be banned (but by whom)?
- The drivers that companies use to select their waste disposal option.
- How do we change corporate culture?

Abandoned mines: dealing with the past

- Abandoned or orphan
- How do we fund the fixing of orphan sites?

Group D: *Chair: John Kilani*
Expectations:

- Clear vision for the future
- Key principles are closure costs, ecological change and social responsibility
- Practical actions (sustainable action plans)
- Implementation strategy

Working Papers:

- More case studies
- Re-structuring of the papers to include executive summary
- Papers need to advance the issues
- The structure and process for reviewing the papers need to be explained

Group E: *Chair: Derek Ellis*

- Who is a stakeholder and what are their relative weights?
- How do we assign/establish global financial criteria for waste management
- How can people distinguish between credible and non-credible documents/information
- What is the role of risk assessment in setting rehabilitation goals?
- Can we develop international codes to set environmental standards?
- How can the MMSD process be expanded to obtain international recognition?
- How can newcomers to mining environment find the authoritative documentation?

Group F: *Chair: Robert Moran*

- How does the MMSD project communicate and engage all the wishes/concerns of all the stakeholders.
- What is the purpose of the document? Clarification of the objectives is needed.
- There is concern that the documents don't focus on sustainable development. There should be clarification on the focus and who the audience is.
- Why is MMSD focussing mostly on marine and riverine disposal ? All issues should be given an equal platform.
- Information bias
- What is MMSD doing about informing stakeholders without the technical knowledge ?
- What is a more constructive role for governments ?

Sunday 15th July pm

Over an extended lunch all the participants of the Workshop were divided into six groups and were asked to identify what issues or questions should be addressed/discussed over the next two days? The following is a summary of those comments:

Group A: Chair: Henry Brehaut

- Abandoned mines: how to remove barriers to action and how to pay
- Large volume waste: big vs. small, life of mine and innovative use (alternatives/end use)
- How to get more NGO involvement
- Articulate goals, objectives, vision
- Balanced decision-making that is a convergent process with the integration of qualitative values
- Participation: integrate from the start
- Limit of acceptance of change
- Validity of plans/implementation
- Third party certification

Group B: *Chair: David Jones*

Risk: How do we accurately communicate the risks in a way that is unbiased and understood?

Stakeholders:

- Need to better define stakeholders ('impacted' vs. 'interested' parties)
- How can workforce become more involved in social and environmental activities of companies?

- How can we adequately assess community concerns/perception as opposed to 'vocal' groups or government concerns?
- Need to include the views of developing countries in MMSD documents

Governance: Can a developing country government that is attracting mines as a government policy also adequately control the impact of the mines?

Implementation of MMSD recommendations:

- Will governments recognise or accept 'voluntary codes' or 'certification' that establish sustainable practices for mining?
- MMSD needs to include examples of good past or present mining practices or how practices will lead to sustainable development (will help to balance the current case studies)
- MMSD needs to include good or effective examples of good mining relationships with communities, local governments, or countries.
- Need to show holistic impacts of mining activities
- How can mines implement 'beyond compliance' practices that enhance production without their practices becoming new regulatory requirements?
- Who is going to take care of abandoned mines?

Perception: How will MMSD address the fear that its output will be rejected by the rest of the world as a special interest project?

Financial: How can financial institutions/funding agencies be involved in the process of sustainable development?

Group C: *Chair: Hugh Jones*

- Discuss the approach to marine tailings disposal
- How de we select 'Regulators'?
- How do NGO's et al get to the government table?
- Industry/community communication mechanisms
- Lessons learned and impacts on future projects
- How do we bridge gap between MMSD and parallel processes (NGO, EC, etc.)?
- Who is the community?
- Could tailings be the start of a debate with NGO's ?
- How do you change corporate culture?
- Voids

Group D: *Chair: John Kilani*
Comments/Issues:

- Language of Working Papers needs clarity (eg: glossary)
- Government is unfairly treated in some areas
- Waste reduction through better utilisation of products
- Stakeholder identification
- Examples of good practices
- Involvement of local grass-root communities in decision-making
- The Working Papers do not set the scene properly – it is necessary to have the global perspective and to show where the industry has come from.
- The need for measurable indicators for sustainable development.
- What is the overall goal for these papers? What are the sustainability goals for Large Volume Waste, Mine Closure and Abandoned Mines?
- Definition of issues and proposals for addressing them
- Implementation strategy to translate proposals into practical actions
- Definition of Large Volume Waste does not capture all mine wastes, e.g. mine water.
- Terms of engagement of stakeholders to be clarified before commencement of impact assessment to avoid political conflicts

Group E: *Chair: Derek Ellis*
Non Anglo-Saxon Global/Regional Balance

- Mine closure and environmental legacies – particularly water.
- Water use by mines and risk of contamination
- Three way interactive dynamics between need for metals, metal prices and environment.
- Respect for the mineral rights of indigenous peoples (and local communities)
- Lifetime planned residue management for sustainable use.
- Small scale mining
- Finances for sustainable development – metal prices do not reflect the full costs.

Group F: *Chair: Robert Moran*
Issues

- Public participation: level playing field; sharing control
- Independent Studies: trust in group doing work
- How to get NGO's to table
- Criteria for sustainable development, process for developing
- Technical issues non-sustainable development
- Issues related to sustainable development

Monday 16th July am

On Monday morning the Workshop participants were divided into six break-out groups, broadly based on their specific areas of interest. Each group was asked to discuss one of the topics from the opening presentations. The following is a summary of the issues discussed, the points raised and, in some cases, recommendations.

Group 1: Information Bias – *Chair: Stewart Cale*
Issues:

- trustworthiness of information
- availability of site specific and general data
- lack of transparency
- inability of communities to interpret the information
- technical capacity of government to deal with the information
- integration of EIA process /information into mine planning/closure
- the impact of the media on public opinion
- lack of sustainability information for institutional investors and others

Recommendations:

- 'strings free' funding for independent evaluations
- direct local involvement in data collection process
- encourage sustainability and transparent reporting for institutional investors
- encourage technical personnel to engage the media
- case studies – include more and varied
- coherent management systems
- increase communications

Group 2: Public Participation – *Chair: Stuart Jones*
Capacity building opportunities:

- Engage specialists in conflict resolution and capacity building
- Employ/engage qualified people and NGOs from local area or region

Recommendations:

- Quantum leap in corporate culture to understand and embrace sustainable development
- Identify positive examples and publicise
- Remove blocks to sustainable development within corporations by assessing performance against 3 legs of sustainable development
- Evaluate models from other industries (e.g. BHP and Shell from petroleum industry)

- Start capacity building as early as possible for the process of public participation.
- Ensure procedures are in place throughout the life of the project for public participation and partnerships
- Embrace the concept of creating sustainable economies and communities beyond closure as early in project cycle as possible.
- Put in place a mechanism for detecting and dealing with unexpected impacts.
- Set up a lesson learning process that feeds into sustainable development
- Support true-cost accounting to get a better balance to the 3 legs of sustainable development.

Next Step: MMSD serve as a platform for initial discussions among industry, stakeholder groups and government to consider a process for developing principles and criteria for decision-making.

Group 3: Capacity of Regulator – *Chair: Graeme Hancock*
Capacities:

- standards
- administrative process
- monitoring/credible presence
- enforcement

Guidelines for mine closure and managing large volume waste:

- regulatory
- voluntary codes of practice
- sustainable development objectives based on best practice; tailings; waste rock; water; land use; livelihoods
- principles; communities; companies
- criteria; financial surety; information requirements
- national or project specific standards
- decision-making; participation

Sources of information:

- ANZMEC Guidelines on Mine Closure
- MAC-tailings
- ICME review
- World Bank guidelines
- US BLM/Reclamation
- USFS- mine EIS
- multinational company guidelines

Capacities needed and how

- develop national regulatory capacity; clear standards; process to implement/administer; clear presence – monitoring; clear enforcement
- how; WB, UNEP and bilateral; ADB, ILO and companies; ICMM (initiative through INGO?); mining techniques and capacity development; training trainers; on-line
- expert support on-going; government access; international pool/roster of independent experts; companies fund – but third party management; who/where house it – UNEP, WB, other? MMSD to investigate

Economic, social and environmental evaluation document

Group 4: Financial Surety/Assurance – *Chair: John Gadsby*
Objective: Ensure adequate funds will be available at any time in the mine life cycle to cover 'closure and post-closure'

Recommendations:

- Terms (funds - good as cash)
- Closure costs - total, current (in-production), end of production
- Estimates: scope (environmental, social), quality (accuracy) and verification
- How to deal with 'marginal projects'
- Financial assurance acceptable to government 'good as cash'
- clear procedures to return properties
- government department working co-operatively
- transfer of post closure management responsibility to competent third party
- government develop/enforce regulations related to mine closure
- international institutions provide guidance/support for government needs to review closure plan
- liability: ownership, declaration (community unaware of liabilities)
- how should devastating failures be handled (operating life and post-closure)

How do we handle financial assurance for small mines?

Group 5: Post Closure – *Chair: Ken Lyell/Ray Krauss*
Cross-cutting issues and actions:
Effective public (social) engagement in the decision-making process and throughout life-cycle of the mine.

- various communities: local, regional and interest groups
- improved trust - all parties must be sincerely engaged
- distribution and delivery system of information

- confidence in and independent scientific verification of information
- industry must make resources available to ensure capacity of interested parties
- peer review

Water:

- water quality and quantity
- long-term recovery of aquifers in arid regions
- identify elements for post-closure management
- establish principles and guidelines for post-closure management;
- regular review and adjustment (adaptive management)
- use evaluations such as risk assessment
- standards for baseline inventories

Post-closure land use:

- who is responsible (custodian after closure) and who pays?
- how do we make it (economically) self-sustainable?
- how do we ensure against unpredictable post-closure events?
- planned land uses may change between operation and closure
- restoration versus reclamation
- make use of mine infrastructure after closure, i.e. power transmission
- creative land use
- community considerations
- develop principles and guidelines for cost calculation
- legacy plan should be considered during feasibility and be reviewed and adapted to periodically (is company liable for mine wastes in perpetuity?)

Uniformity of closure standards and costs in different regions:

- developing countries would like to apply the graduality principle; non-binding guidelines; need more time to maximise opportunities
- North American companies prefer to do business in a less regulated environment
- need for predictability in order for the industry to plan and finance closure
- mining operations should ultimately enhance social and ecological conditions; public expectations evolve with time
- disconnect between local communities and corporate players
- ensure compliance through certification similar to ISO

- checklist of issues which may arise post-closure; closed mine site is not a static organism; it will evolve over time
- technology transfer to mitigate North-South issues
- identify standard language i.e. glossary
- assessment of models for long-term contingency bonds: risk assessment based or pooled funds
- standards for identification of site liability; maintenance and capital
- investigate options for site management on a sliding scale of risk
- no mine should be approved that will require water treatment in perpetuity (?)

Baseline inventories;

- comprehensive with full geochemical/mineralogical characterisation
- data for hydrogeology
- validity of scientific data
- characterisation of measures of uncertainty; use of appropriate predictive models
- representative sampling to monitor ore/waste variability with time
- block-modelling of both ore and waste
- inclusion of traditional land use and traditional knowledge
- monitoring and feedback with adaptation based on feedback
- compliance by junior companies; incentive based programmes

Long-term financial surety

- define surety (?assurance) and long-term (until the next glaciation?)
- design criteria, costs and management must be based on an appropriate time horizons
- uncertainty of long-term performance of dams, waste dumps, etc; how do you deal with unanticipated events and adjust surety?
- assume successful land reclamation
- establish a surety for post-closure/long-term monitoring and maintenance
- water treatment (most expensive post-closure cost)
- what kind of surety and how do you calculate it?
- periodic review and adjustment of financial surety
- standards for joint venture contracts (government and companies)
- can financial assurances prevent abandoned mines
- investigation of issues surrounding transfer of mine ownership
- public should have access to information regarding financial surety

Lack of harmony between various levels of government:

- informed decision-making and decision-making capacity
- institutions involved
- communication between various institutions

Abandoned Mines:

- biggest long-term cause of environmental degradation
- leave behind a legacy of mistrust; makes it more difficult to obtain permitting for new mines
- inventory and mapping of abandoned mines; identify key ecological impacts and technical solutions
- prioritise sites in order of ecological risk and treat one at a time as funding permits
- who should pay? levy on each tonne mined? royalties?
- levies on mining operations for research funding
- establish incentives for re-mining; ends up cleaning the environment
- liability protection for 'good Samaritans'
- standards for abandoned mines should be different from new/operating mines

MMSD Actions
Water:

- appropriate coverage of water management; i.e. scope should reflect actual footprint of mining activity and consider water pathways
- list of issues relevant to water management should be included in the Working Paper

Post-closure land use:

- case study literature search that can be used as a resource by the industry highlighting best case/worst case scenarios and innovative land use

Development of guidelines and principles for effective public engagement:

- checklist of relevant elements
- compile case studies (best case/worst case scenarios)
- establish network of communication
- identify and involve communications specialists
- identify involved institutions and their capacities

Research and compile existing sustainable practices

Establish guidelines for baseline inventories; uniformity of closure standards; long-term financial assurance

Abandoned Mines

- integrate and possibly utilise all available information from other organisations
- provide a guideline to prioritise abandoned mines
- inventory of existing abandoned mines which have been/are being reclaimed/treated
- compile catalogue of available treatment/reclamation technologies

Group 6: Rhetoric vs Action – *Chair: Rebecca Knol*
How do we get action?

- Government processes
- Financial Institutions
- Voluntary Codes of Practice
- Industry pressure
- Company initiative
- Legal enforcement

Mine Closure-Actions

- Identify 'Best Practice' i.e. Australian BHP Booklets
- Mercury taken out of commerce
- Work towards eliminating differences between company sizes
- Assist small companies to improve their practice
- International encouragement for regulatory improvement/education/mechanisms
- Formalise NGO/mining company relationships.
- EIA should look at all mine closure alternatives.
- Quantitative water quality criteria based on pre mining conditions
- Public disclosure of financial assurance
- Encourage NGO's/Governments to establish social development plan programmes/organisation/independent trust to be self sustaining after closure
- Encourage establishment of foundations
- Establishment of 'completion criteria'
- Regularly reviewed environmental programme.

Monday 16th July pm

On Monday afternoon the Workshop participants were again divided into six break-out groups based on areas of interest. The 'post closure' group from the morning session asked

to be given more time to continue their discussions. The other groups were asked to discuss the Working Paper topics. Because of the interest in Large Volume Waste three separate groups discussed this topic.

Group 1: Post Closure (Gp 5 from am cont.) – *Chair: Clive Bell*

Recommendations for MMSD
Short term: The importance of water in mine environmental management is underrated in the Working Papers. Need to revise each report to address this issue.

Long-term: develop guidelines for characterisation of the physical environment and principles for 'community' engagement

Possible themes

- 'Mining as if people mattered'
- 'If promises were kept – mining with integrity'
- 'Mining with integrity'

Group 2: Mine Closure – *Chair: Chris Swindells*
MMSD needs to: Establish guiding principles/guidelines for processes for the inclusion of stakeholders and their issues into all aspects of the mine life cycle from exploration and development to operations and closure.

MMSD documents should be: A statement of where we come from and where we are today (incorporating case studies) and clearly articulate a vision where we wish to be as an industry in future.

The MMSD vision should be articulated as: A statement of clear principles and processes which express where we wish to go from here for adoption by industry as voluntary codes of practice and regulators as the basis for policy and regulators as the basis for policy and regulation as an initial step in what is acknowledged as a process of continuous improvement in mineral project social, economic and environmental outcomes.

A key issue or challenge: Establishment of criteria for the walk-away (final closure) decision or the transfer of responsibility from the developer to another responsible third party.

Group 3: Abandoned Mines – *Chair: David Jones*
Why Address Abandoned Mines?

- Mining industry is characterised by its worst actors
- The worst problems in the mining industry are often abandoned mines with no connections to ongoing or new operations
- A sustainable mining future will include addressing some abandoned mines to establish a positive image and allow new development

Nexus between Sustainable Future and Abandoned Mines: MMSD should explore in the Abandoned Mine Working Paper how a mining company with a new project may benefit from helping clean up an abandoned mine problem:

- case studies of good examples
- identify impediments to working on abandoned mines and ways to eliminate them (Good Samaritan)

Government Leadership:

- Government must show leadership in addressing abandoned mines by evaluating models and mechanisms to pay for remediation
- MMSD Working Paper should identify references for models and mechanisms for government funded cleanups

Inventory:

- The Working Paper summarises many inventories and references priority setting mechanisms
- A sustainable mining programme should provide a list of the important elements (guidance) on how to prepare an inventory and prioritise abandoned mine problems

Group 4: Large Volume Waste 1 – *Chair: Stuart Jones*
Findings: Decision-making process needs to be efficacious and transparent and legitimate

Recommendations to MMSD:

- A discussion among industry, stakeholder groups and government agencies (on an individual basis) on options for tailings disposal.
- And consider a process for developing decision-making options for tailings disposal
- This would be based on the MMSD large volume waste Working Paper (as revised) and other documents

Recommended process for Consideration of Options:

- Proponent commits to working with stakeholders to seek agreement to a process to jointly assess different options.
- Proponent commits to fund capacity building and independent advice to the stakeholders
- Engagement of stakeholders
- Jointly define options
- Assess the engineering design, mitigation measures, residual environmental and social impacts and risks of each option at equal level of detail.
- Jointly decide on preferred option.

- If agreements cannot be reached: project stops, proponent withdraws or Government decides to proceed with original or new proponent
- Preferred option to EIA
- Code or guideline?
- Recommend development of a decision tree approach to: The engagement of stakeholders(?); identification of options, their preliminary screening and the selection of a short list of options for detailed assessment
- Industry, governments and representatives of civil society should participate.

Comments on Working Paper:

- availability of information
- target audience - too technical, lacks clarity
- Too little focus on land storage; too much focus on riverine tailings disposal
- Need inventory (Mt/d)
- Add summary of on-land storage failures
- No bibliography on marine disposal (there is an enormous amount of information)
- Need physical stability assessment; chemical reactivity characterisation; treatment of liquid effluents

Group 5: Large Volume Waste 2 – *Chair: Robert Moran*

- Exploration/Pre-feasibility (fatal flaw)
- Approval – better, shorter regulatory approval
- Full sustainable development: economic, social, environmental
- Decision-making system, public consultation throughout.
- Appropriate/transparent tech/env/social/waste (tailings, rock, overburden, other wastes)
- Site selection disposal options

How to get these decisions earlier with fully integrated sustainable development. Pre-feasibility/feasibility phase is a tool to achieve early and full engagement. Needs efficiency and legitimacy

No-Go option

World Wide Database on mine performance (sustainable development)

- *Verified (independent)*
- *Social, economic (community, company), environment (impacts, disposal methods, benefits)*
- *Monitoring systems established and performance assessed*
- *Information/data feed into new projects (lessons learned)*

Group 6: Large Volume Waste 3 – *Chair: Stewart Cale*
Marine Disposal; use with extreme caution; use precautionary principle; more research required

Riverine Disposal; new schemes unacceptable; commitment required from mining companies; mitigate current impacts

Land Disposal; creative and innovative; in-pit disposal where possible; backfilling underground voids; clarity of presentation

Landscape; reclamation and after-use

Reclamation; concurrent with mining activity

Capacity of the environment; cumulative impact and current loading; limitation on disturbance

Waste minimisation; mining methods; underground or open-pit; commitment required from mining companies

Long-term Evaluation; too many decisions based on short-term financial considerations; science and economics based on risk assessment

Environmental Regulations - no 'side deals'

Water Management; satisfactory end quality to receiving environment; alternative view – no degradation; total ionic loading; minimise consumptive use; sustainability of resources; transparent monitoring system

Heap Leach; long-term liabilities and monitoring

Annex I: Workshop Programme

Saturday 14th July

11.00-18.00 General Discussions - LVW Review Committee Panel and MMSD Work Group

Sunday 15th July

10.00-12.30 General Discussions - LVW Review Committee and MMSD Work Group Break-out Groups – Expectations of the Workshop and General Comments

12.30 Meet and Greet (Registration)

13.00 Lunch

13.30 Break-out Groups – What Issues or Questions should be addressed/discussed over the next two days?

14.30 Opening Remarks and Introduction – Jay Hair, Chair MMSD Assurance Group

15.30 Presentation – Information Bias – Dr. Robert Moran, Consultant, Geochemist and Hydrogeologist, USA

15.45 Presentation – Public Participation – Susan Joyce, Golder Associates, Sociology and Development, Canada

16.00 Break

16.30 Presentation – Capacity of Regulator – Hugh Jones, Golder Associates, Environmental Management, Australia

16.45 Presentation –Financial Surety –John Kilani, Chamber of Mines, South Africa

17.00 Presentation – Post-Closure Issues – Dirk van Zyl, Mackay School of Mines, University of Nevada, USA

17.15 Presentation - Rhetoric vs. Action – Glenn Miller, Environmental Sciences and Health at the University of Nevada, USA

17.30 Discussion

18.00 Set-up Break-Out Groups – Meredith Sassoon, Chair of Review Committee

19.30 Reception and Dinner to be held in the Delta Pacific hotel

Monday 16th July

08.30 Introduction to the Day

09.00 Break-Out Groups

12.30 Lunch

14.30 Reconvene with discussion from Break-Out Groups

16.00 Break

16.30 Break-Out Groups

19.00 Evening Dinner and Boat Cruise

Tuesday 17th July

08.30 Break-Out Group Presentations (6 presentations of 20 minutes)

10.30 Break

11.00 Discussion on recommendations
12.00 Full workshop closes

12.30 Lunch for LVW Review Committee and MMSD Work Group

14.00 Discussion on outcomes and recommendations - LVW Review Committee and MMSD Work Group

16.00 Break

16.30 Draw up draft recommendations - LVW Review Committee and MMSD Work Group

Wednesday 18th July

09.00 – 13.00 General Discussions & Working Papers – LVW Review Committee Panel & MMSD Work Group

Annex II: List of Participants

Surname	First Name	Organisation	Country
Allen	Nick	BHP Billiton	Australia
Balvin	Doris	Labor Lima	Peru
Bell	Clive	ACMER	Australia
Brehaut	Henry	World Alliance for Community Health	Canada
Cabalda	Michael	Mining, Environment & Safety Division	Philippines
Cale	Stewart	Knight Piesold	UK
Campusano	Raul	COCHILCO	Chile
Cederstav	Anna	AIDA	US
Chambers	David	Centre for Science and Public Participation	US
Curry	Robert	Watershed Institute, CSU Monterey Bay	US
Danielson	Luke	MMSD	UK
Davies	Michael	AMEC	Canada
Dhar	Bharat	AIU	India
Digby	Caroline	MMSD	UK
Ellis	Derek	University of Victoria	Canada
Ferguson	Keith	INAP / Placer Dome	Canada
Ferris	Glenda	Consultant	Canada
Fleury	Anne-Marie	MMSD	UK
Gadsby	John	Consultant	Canada
Gallinger	Ross	BHP Billiton Base Metals	Chile
Greene	George	Stratos Inc.	Canada
Hair	Jay	MMSD Assurance Group	USA
Hancock	Graeme	Department of Mining	PNG
Hodge	Tony	Anthony Hodge Consultants	Canada
Jones	David B.	US EPA	USA
Jones	Hugh	Golder	Australia
Jones	Stuart	NSR	Australia
Joyce	Susan	Golder	Canada
Kilani	John	Chamber of Mines	South Africa
Knol	Rebecca	Geita Gold Mine	Tanzania
Krauss	Ray	Consultant	USA
Kuit	Walter	Cominco	Canada
Kyeyune	Silvia	MMSD	UK
Lighthall	Peter	AMEC	Canada
Lyell	Ken	AngloAmerican	South Africa
Maest	Ann	Stratus Consulting Inc.	USA

Surname	First Name	Organisation	Country
Martin	Todd	AMEC	Canada
McCommon	Carolyn	Rio Tinto Technical Services	UK
McDonough	John	Barrick Gold Corporation (Mining)	Canada
McPhie	Michael	Knight Piesold	Canada
McShane	Frank	MMSD	UK
Miller	Glenn	University of Nevada	USA
Miller	Jim	Freeport McMoran	USA
Moran	Robert	Consultant	USA
Okuao	Edward	East Asian Pastoral Institute, Manila University	Philippines
Paez	Carlos	Ministry of Mines & Energy	Ecuador
Pelletier	Clem	Rescan	Canada
Phillips	John	GHD Pty Ltd	Australia
Robertson	Andrew	Robertson GeoScience	Canada
Robertson	Jim	Placer Dome	Canada
Salinas	Javier	Geología Ambiental y Medio Ambiente	Bolivia
Sassoon	Meredith	Mining Environment Management Consultant	UK
Scoble	Malcolm	University of British Columbia	Canada
Sigurdson	Glenn	The CSE Group	Canada
Siregar	Lasmaydha	BHP Billiton	Australia
Siwik	Rick	Noranda Inc	Canada
Stalker	Peter	Writer	UK
Swindells	Chris	Golder	Australia
Tremblay	Gilles	NRC MEND	Canada
Van Zyl	Dirk	Mackay School of Mines, Uni of Nevada & Reno	USA
Veiga	Marcello	University of British Columbia	Canada
Wicks	Clive	WWF, UK	UK
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Annex III: Summary of Discussions from Sunday 15th July Break-Out Groups

1. Information Bias

- Need for independent studies – trust
- Need for basic data rather than predictive models
- How to build information networks
- EIA information and evaluation of costs and benefits in fragile ecosystems
- Availability of information
- Buy-in – all segments – all levels
- Validity of plans vs implementation
- Communication of risks
- How to distinguish between credible and non-credible information sources
- How to build information networks (making authoritative documentation available)
- Public perception

2. Public Participation

- Financial information not usually available to the public
- Need training for the public
- Need respect for community interests
- Should have public participation in monitoring and compliance
- Need effective methods to ensure effective public participation – beyond EIA process
- Terms of engagement need to be clear
- Need method for transfer of knowledge
- Right to consultation and information
- How to get more NGO involvement
- Integrate from the start
- Definition of stakeholders/community
- Involvement of workers in social environmental issues
- Adequate assessment of community concerns/perception (as opposed to 'vocal' groups)
- How do NGOs etc get to the government table
- Industry/community communication mechanisms
- Could tailings be the start of the debate with NGOs

- Involvement of local grass-root communities in decision-making
- Need respect for mineral rights of indigenous peoples/local communities
- Need level playing field
- Need to share control
- Identifying stakeholders – determining their relative weight
- How does one know when 'local' stakeholders have been heard, particularly if their views differ from the governments
- When we refer to public, who do we mean
- How do local populations get the resources and empowerment to participate

3. Capacity of Regulator

- Need policies and technical tools for controlling compliance
- How to raise the awareness of sustainable development principles in government
- Need to establish minimal standards for mining industry
- Credibility of industry codes of conduct
- How do we get 'whole' industry to sign up to guidelines
- Third party certification
- Can developing country governments be policy-makers trying to attract mines as well as the regulators
- Will governments accept 'voluntary codes' to establish sustainable development for mining
- Can mines implement 'beyond compliance' practices than do not become regulatory requirement
- How do we select regulators
- Need for international agreements for environmental management – country equality
- Can we develop international codes to set environmental standards
- What is a more constructive role for government

4. Financial surety

- What is the best framework for financial provision
- Who should monitor/manage the monies
- Should there be a regular review process

5. Post-closure Issues

- How long is 'long term'

- Limitations of current technology for post-closure environmental control
- Flooded mine voids
- How do you set rehabilitation goals, what is the role of risk assessments
- Post mining sustainable use plans

6. Rhetoric vs. Action

- Can industry present a more positive image to the public – can MMSD help
- How do you change corporate culture
- When will the mining industry become respectable
- How does the industry grapple with its lack of credibility and transparency
- How fast does the industry need to change

Others
Decision-Making

- Balanced decision-making – coherent process – integration of qualitative values
- The decision making process needs to include; issue identification, indicators, meeting information requirements, site specific value judgements, a public role

Sustainable Development

- How can international financial institution be involved in sustainable development for mining
- Need mechanisms to make sustainable development part of project development cycle
- Why is worker health and safety not included in sustainable development equation
- How can financial institutions be involved in process of SD
- Need to have measurable indicators for SD
- What are the sustainability goals for LVW, MC and AM
- Lifetime planned residue management for sustainable use
- Financing for sustainable development – metal prices do not reflect full costs
- Criteria/process for developing SD
- Clear vision for the future needs to be addressed by practical action plan (sustainable development plans) and implementation strategy
- Current industry financial model is in conflict with SD
- Definition of SD, what are we working towards, who is audience for MMSD definition, who will use it
- In a given setting, who defines SD

MMSD

- How can MMSD link to other work being done in same area
- Need substantive engagement from community groups and NGOs in MMSD process
- What happens to MMSD when current work is complete
- How will MMSD address possibility that output will be rejected by rest of world
- How to bridge gap between MMSD and parallel processes
- How can MMSD process be expanded to obtain international recognition
- How are MMSD results going to get into the real world
- How do we evaluate people's thinking towards an MMSD vision
- How does MMSD communicate and engage all the wished and concerns of all the stakeholders
- What is MMSD doing about informing stakeholder without the technical knowledge

Working Papers

- Need to look at holistic impacts of mining projects
- Articulate goals/objectives/vision
- Need to look at pollution prevention
- Need to look at new technologies to reduce wastes
- Include views of developing countries more in MMSD documents
- Case studies should include good or effective examples – good practice
- Need to show holistic impacts of mining activities
- WPs – government unfairly treated in some areas
- WPs do not present global perspective
- WPs need to show where industry has come from and where we are going
- Application of lessons learnt from impacts on future projects
- Language of documents needs clarity – glossary
- What are the overall goals of the WPs
- Need more case studies
- Why is MMSD focussing on marine and riverine disposal – all issues should b e given an equal platform
- What is the purpose of the working papers, clarify the objectives
- Concern that the documents don't focus on sustainable development – clarify focus and audience
- Re-structuring of papers to include Executive Summary

- Structure and process for reviewing papers made clear
- Drivers that companies use to select their LVW option

Odds

- Tackling pollution from cyanide and mercury
- Need definition of issues critical to mining and suggestions for next steps in addressing these issues
- How to make mining industry internalise full costs
- Limit of acceptable change
- Need definition of issues and proposals for addressing them
- Need implementation strategy to translate proposals into practical actions
- Dynamics between needs for metals/price for metals and the environment
- Include small scale mining
- How do we balance different perspectives between developing and developed nations
- How do we weigh mining/social/environmental costs against economic gain
- The EA process needs to be; credible, meet requirements, and be site specific

Large Volume Waste

- What process would allow a discussion on the potential use of marine tailings disposal
- Need new approach to LVW – landscape creation – new designer material
- Need to consider mine water as part of LVW
- River and Ocean disposal of waste not acceptable – except for gravel mining
- Land disposal in a town no better
- Big vs small
- Life of mine
- Innovative use – alternatives/end use
- Discuss the approach to marine tailings disposal
- Voids
- Waste reduction through better utilisation of products
- Definition of LVW does not capture all mine wastes – mine water
- How do you establish global financial criteria for waste management
- Underground placement of LVW
- LVW or landscape creation
- Should disposal options be banned, by whom

Mine Closure

- Need to look at mine closure and environmental legacies – particularly water
- Abandoned Mines
- Who is going to take care of abandoned mines
- Long term legacy issues
- Remove barriers to action
- How to pay
- Who is going to take care of AMs
- Dealing with the past
- How to fund Abandoned Mines