

Consultation response

Part 1: Your details

Original language of response: English

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Country of residence: South Africa

Are you willing to let us publish your response publicly on the Global Tailings Review website? Yes

Please select which stakeholder group you are representing: Consultant
(geotechnical)

If 'Other', please specify below:

Are you responding on behalf of an organization? No

Please give the name of the organization:

Your level within the organisation:

Part 2: Your views on each of the Principles and Requirements in the Standard

Topic 1: Knowledge Base

Principle 1

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

No

Which aspects of Principle 1 do your comments relate to?

Comments on the Principle itself, Requirement 1.3, Requirement 1.2, Requirement 1.4, Requirement 1.1

Your comments on Principle 1

The Principle - The Principle is relatively sound, but based upon the listed reqmts, does not seem to be clearly understood or interpreted. What is it really saying (or should be) is that the Hazard and Risk associated with the TSF should be understood and dealt with throughout the life cycle of the TSF. Interpreted in this light, the listed reqmts are somewhat mis-directed. Reqmt 1.1 - this would not prevent failure, perhaps only providing better information on the consequences of failure, which could be used to improve preparedness Reqmt 1.2 - site characterisation rarely change over the life of the dam - focusing on this demonstrates a lack of understanding where the real risk lies and will cause the latter to be overlooked in the tick box pursuit of a red herring Reqmt 1.3 - The significance of an Inundation area is to identify potentially impacted Parties - putting the emphasis on sophisticated determination again mis-directs away from the purpose - Having

identified affected parties to be included in an emergency response plan - the latter is the important issue Reqmt 1.4 - This is part and parcel of identifying Affected Parties

Principle 2

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

No

Which aspects of Principle 2 do your comments relate to?

Comments on the Principle itself, Requirement 2.1, Requirement 2.4, Requirement 2.3, Requirement 2.2, Requirement 2.6, Requirement 2.5

Your comments on Principle 2

The principle is placing "Failure" (prevention) as the primary objective of tailings disposal - this should not be the case, there are many other aspects that should be considered. Reqmt 2.1 - minimizin risk to impacted Parties is not the only goal of tailings disposal Reqmt 2.2 - This is prescriptive and removes autonomy of business control away from the Owner and makes the ITRB omnipotent without any responsibility of accountability - but most significantly, there are not enough "tailings engineers" in the World to fulfil the ITRB concept - to who does the ITRB answer? Reqmt 2.3 - At what point does this engagement commence and under what mandate or jurisdiction? Govts often have regulatory processes in place already, Which take precedence? Talk of potential failure to impacted Parties prior to development would not result in any resolution. The reemit does not seem to recognise that creating above ground TSF's creates a hazard - and there is always a risk that the hazard may manifest. Reqmt 2.4 - this goes to knowing the hazard and managing the concomitant risk throughout the life cycle - the reemit just creates more process that is likely to just be distraction from real understanding Reqmt 2.5 - this is prescriptive to business management and contributes nothing to preventing failures Reqmt 2.6 - this is also prescriptive to business management and contributes nothing to preventing failures

Topic II: Affected Communities

Principle 3

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

No

Which aspects of Principle 3 do your comments relate to?

Comments on the Principle itself

Your comments on Principle 3

This Principle seems to have been drafted for the situation where foreign Mining company's are exploiting and disrupting the traditional way of life of indigenous peoples. It does not warrant a place as a principle in a tailings standard -

Topic III: Design, Construction, Operation and Monitoring of the Tailings

Facility

Principle 4

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

Partially

Which aspects of Principle 4 do your comments relate to?

Comments on the Principle itself, Requirement 4.3, Requirement 4.1, Requirement 4.2

Your comments on Principle 4

Any structure, a TSF or otherwise, should be designed not to fail - irrespective of the consequences of failure - the principle of design on a Consequence base is thus flawed. It is doubtful that anyone has ever developed a TSF with its failure as a foregone conclusion - quite the opposite. The Principle is a contradiction - one is required to assume failure and then design, etc so that the assumption is negated. This is not the best Principle (guide) for stipulating design, etc objectives. Reqmt 4.1 - this reqmt will mis-direct focus away from reducing risk towards ""evading"" risk through a paper exercise. The Conditions are naive and impractical. Reqmt 4.2 - this is just finger pointing and will do nothing to prevent failure of tailings dams Reqmt 4.3 - this just makes the whole idea retro-active which is naive and impractical as well - and again a ITRB becomes the arbiter of business decisions without accountability.

Principle 5

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

No

Which aspects of Principle 5 do your comments relate to?

Comments on the Principle itself, Requirement 5.1

Your comments on Principle 5

The Principle - I am pretty sure that virtually every tailings facility was conceived, designed and implemented with this principle in mind - nobody ever created a TSF with its failure in mind Reqmt 1 - this is just a waste minimisation principle that has long existed and mostly subscribed to within practical limits - just expressed in more obscure terms Deficiency of Tailings dam design has rarely been the cause of failure (Feijao perhaps being an exception - the lack of under drainage being the case in point) - rather failure has been the result of mis-management - Feijao also substantiates this - the incremental approach to design of progressive phases over the life by Mine management without allowing or requiring later designers to address the original design flaw, is a case in point.

Principle 6

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

Partially

Which aspects of Principle 6 do your comments relate to?

Comments on the Principle itself, Requirement 6.3, Requirement 6.4

Your comments on Principle 6:

"Minimize Risk" is a subjective term Reqmt 6.3 - again "minimize" is subjective Reqmt 6.4 - Given the subjective term "minimise", how would differences of "acceptability" be resolved between the Designer and the Reviewer? Who take accountability?

Principle 7

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

Yes

Which aspects of Principle 7 do your comments relate to?

Comments on the Principle itself, Requirement 7.1, Requirement 7.2, Requirement 7.3, Requirement 7.4, Requirement 7.8, Requirement 7.5

Your comments on Principle 7

This is the first Principle that goes to the cause of most tailings dams failures - mismanagement and is the first appearance outside of SANS 10286 of management being a requirement to control risk on TSF's Reqmt 7.1: The reqmts should not be prescriptive to organisations - merely state the requirement to be achieved and leave the how to the owners to decide. Reqmt 7.2: Again, the requirement is to manage to ensure compliance with design - How an Operator achieves this should be their prerogative - many, many Operators are already doing this, and now the proposed standard indicates that they have to change systems to match the latest jargon. Reqmt 7.3: Avoid introducing colloquial jargon as Global std - in many instances responsible engineers produce reports regularly on the status of TSF's - in many parts of the world TSF's are "Operated" - not "Constructed" - the latter term being restricted to pre-deposition capital works Reqmt 7.4: Operating Manuals exist for many Operations - stipulating a blanket annual update is prescriptive and inefficient - if the TSF is being properly managed, the Ops manual will be kept upto date with changes as circumstances require - stipulating a fixed time period elevates procedure above actual need. Requiring the EoR to train personnel is an onerous responsibility for which very few EoR are equipped. Furthermore, this creates conflict of authority - an independent EoR dictating to Mine and/or contractor personnel as to how they should do their job - at best the EoR can/should define required outcomes, not methodology or work practice - the difference between performance specification vs method specifications. Making the EoR responsible for training personnel de facto makes him responsible for performance and as a result accountable for failure. Reqmt 7.5: This is prescribing management systems to organisations - with the effect of elevating procedure above reality, mostly with poor results. Creating another report - the DAR - all this is just creating man-hours for consultant who will still not see the wood for the trees - they don't recognise this at the moment, making it obligatory for the Owner to commission yet another report from the EoR is just distracting and will not prevent TSF's failing Reqmt 7.8: What is the mandate and qualification of the senior technical reviewers of the ESMS? Such a requirement must have a basis in local law - The standard cannot be stipulating something as undefined as this. In general, the reacts do not recognise the existence of well established local practices

Principle 8

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

Yes

Which aspects of Principle 8 do your comments relate to?

Comments on the Principle itself, Requirement 8.4

Your comments on Principle 8

The Principle is sound - the implementation hasn't always been as good as it should be. There seems to be an underlying perception that the failure will come about as a result of a physical attribute - the monitoring systems intended to give early warning of this, but often the failure can be attributable to human failures. Tailings dam failures will be prevented if "the controllable conditions are of a standard, that no matter what the un-controllable event, failure will not occur". Controllable conditions are things such as procurement systems - for example, it is often a reality that a TSF is left in a compromised condition as a result of tardy bureaucratic procurement systems not providing the requisite equipment when the TSF requires them - a management and monitoring system must capture such aspects as well, not just the symptomatic physical responses to such defences - often by then it is too late. Specifically, the Merriespruit TSF failure in SA in 1974 - 17 casualties, was as a result of a failure of the Mine to timeously upgrade the slurry delivery pumping system to allow deposition of tailings where it should have been - because the pump upgrade was not included in the budget - Is it expected that the EoR and ITRB will have say over such matters? If not, their role will not prevent TSF's from failing because they will not get to see the root causes. This Standard has not yet recognised them either, and so is still missing the point and trying to promote more policing, that the industry is incapable of fulfilling, of aspects that historically are not a root cause of tailings dam failures. Every investigation, the last two - San Marco and Feijao making a particular point of it, into TSF failures by independent technical experts only focus on the technical reasons for the actual mechanics of the failure and do not address the underlying root cause. Consequently, engineers are continually looking in the wrong direction and Owners remain oblivious. Reqmt 8.4: The Std seems to be stipulating public disclosure of as a requirement - this is prescriptive without any mandate

Topic IV: Management and Governance

Principle 9

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

No

Which aspects of Principle 9 do your comments relate to?

Comments on the Principle itself, Requirement 9.2, Requirement 9.1

Your comments on Principle 9

The Principle is contradictory to the first one in which every TSF was to be considered as being "Extreme". Furthermore, this is prescriptive, dictating how a company must

conduct its business. The construction of any TSF is "approved" by the Board or Senior Management - the TSF is designed by somebody appointed by the organisation to be suitably qualified to undertake the design - what does "approving" the design mean - do they then take responsibility for the design? Reqmt 9.1: As above Reqmt 9.2: minimise is again subjective - in reality, every time independent development occurs within the potential "inundation zone", which is beyond the control of the Mine, the consequence of failure increases, which means that the Mine must take some measure to counter this increase and even reduce it. All this is very unrealistic.

Principle 10

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

Yes

Which aspects of Principle 10 do your comments relate to?

Requirement 10.3, Requirement 10.4

Your comments on Principle 10:

Reqmt 10.3: This is prescriptive - stipulate the intent and leave the how to the Mine to determine. What is the relationship between the RTFE and the EoR? Surely the EoR should be accountable for the integrity of the TSF - this is prescribing structure to organisations Reqmt 10.4: This is again prescribing management systems to organisations - fulfilling one's job obligations should not have to be incentivised.

Principle 11

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

No

Which aspects of Principle 11 do your comments relate to?

Comments on the Principle itself, Requirement 11.1, Requirement 11.4

Your comments on Principle 11:

There is no global standard on what tailings facilities should be. There is no universal body of education or training that equally equipped practitioners in the field to know what is good or poor. Most practitioners' knowledge and experience is derived from the exposure they have had to a limited number of TSF's in a very colloquial setting with very little appreciation of the wider world of tailings disposal practice - the standards' drafting committee is probably a case in point. So without a common base, - which should be the standard being worked on - establishing a "police force" to regulate this draft will be counter-productive, merely creating opportunity for consultants to sell man-hours ticking boxes and generally failing to see the wood for the trees. Tailings dam failures will continue to occur. Reqmt 11.1: Already experience with so called ITRB's is showing that the process is not fruitful or productive - rather the contrary as those actually responsible are distracted addressing mis-guided conclusions and recommendations The concept of ITRB's needs to be scrutinised - they have no accountability or responsibility - they are merely disruptive. Reqmt 11.4: This is prescriptive - and such requirements are already better covered in existing codes. There are also not enough qualified people in

certain part of the world to fulfil the DSR role. Bringing engineers from elsewhere without colloquial knowledge would just be disruptive. Reqmt 11.5: The limitations of ITRB has already been expressed.

Principle 12

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

Partially

Which aspects of Principle 12 do your comments relate to?

Comments on the Principle itself

Your comments on Principle 12:

The Principle should apply to all roles - not just the EoR - SANS 10286 Code indicates that the Management System should entail the appointment of appropriately qualified and experienced personnel for all roles for which they are being appointed.

Principle 13

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

Partially

Which aspects of Principle 13 do your comments relate to?

Yes

Your comments on Principle 13:

The Principle is prescriptive, suggesting how an organisation must be. Such a principle can only be effective by culture, not by decree - so the std is saying that all Mining organisations must be culturally similar - a little unrealistic

Principle 14

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

No

Which aspects of Principle 14 do your comments relate to?

Comments on the Principle itself

Your comments on Principle 14:

There is a mis-perception herein that somehow employees and the public are more aware of issues on the TSFs than those responsible for the TSF. This is naive.

Topic V: Emergency Response and Long-Term Recovery

Principle 15

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

Partially

Which aspects of Principle 15 do your comments relate to?

Comments on the Principle itself

Your comments on Principle 15:

National Codes and Regulations cover Emergency Preparedness Plans - it is the upkeep and implantation of such plans that is the challenge.

Principle 16

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

No

Which aspects of Principle 16 do your comments relate to?

Your comments on Principle 16:

Topic VI: Public Disclosure and Access to Information

Principle 17

In your view, will compliance with this Principle and its Requirements contribute to the prevention of catastrophic failure of tailings facilities?

No

Which aspects of Principle 17 do your comments relate to?

Comments on the Principle itself, Requirement 17.3

Your comments on Principle 17:

National Regulation generally require some sort of Public Participation Process prior to getting approval. Maintenance of the Emergency Preparedness Plan maintains contact with Affected Parties Reqmt 17.3: This is prescriptive and could be disruptive to company business - and seems to be self-promoting - "credible global initiatives..."?

Part 3: Your views on the Standard

Your view as to whether the content of the Standard meets your expectations

Your view as to whether the content of the Standard meets your expectations (closed question):

1: Falls well below my expectations

Please summarize why you chose this option:

It is not a Global Std, but rather the perspective of a certain sector. It has overlooked existing practices. It is misguidedly prescriptive, but misses the root cause of TSF failures. It has no clear mandate, but is rather coercive. It cannot be universally applied and will be disruptive, prejudicial and disadvantageous to many Operators. Finally, it will not prevent tailings dam failures

Your view on whether the Standard will create a step change for the industry in the safety and security of tailings facilities

Your view on whether the Standard will create a step change for the industry in the safety and security of tailings facilities (closed question):

1: Will not improve the safety and security of tailings facilities

Please summarize why you chose this option:

The response of Mining company's to this "std" will be to tick boxes from the top and not actually make behavioural changes to their management of tailings facilities

Does the content of the Standard address all aspects of tailings facility management adequately?

Does the content of the Standard address all aspects of tailings facility management adequately (closed question)?

No

Please explain why and/or what is missing:

There are better examples of management systems in practice already - SANS 10286 being one. What has been presented in the draft is too prescriptive from a certain perspective and is not adequately objective and principle driven - it seems that certain practices from some parts of the world have been massaged into the draft and presented as "good or best practice" - they are hardly applicable, with all the jargon and prescription, globally.

Part 4: Suggestions for topics to be included in the accompanying Recommendations Report

On which topics would you expect to have further clarification or guidance in this document?

The third bullet seems to indicate that there is some intention of "management", implying some authority. What authority? Where does the mandate come from? How does this impact of national sovereignty? What will the impact be of the economy of many countries and the well-being of its citizens due to the conditions imposed by this Std? This standard is premature - there is a lot of geotechnical research still to be done on understanding tailings behaviour and then on determining a suite of "regionally appropriate or suitable" practices to underpin a technical global body of knowledge. As for management standards, new ones don't have to be created, many exist already - the drive should be to influence Mines to recognise the risk tailings pose and to manage these accordingly. As it stands, the draft std does not fulfil any of this - it is only being given attention by Mines for fear of repercussions from the investment and insurance sectors.

Other information

Non-fitting response text (text submitted which did was not in response to one of the questions above)

COMMENT ON DRAFT GLOBAL TAILINGS STANDARD

It is commendable that the initiative of a Global Tailings Standard has been taken, but there seems to be a lack of understanding as to why such an initiative was required in the first place. At face value, it is a response to too many tailings dams failing, and as a last straw, a knee-jerk response to Feijiao. What does not seem to be recognized is why this has been so.

Inherent in the draft document are the assumptions that;

- The geotechnical fraternity (as the custodians of TSF design) fully understand the behavior of tailings dams
- Geotechnical design is sufficient to create a safe tailings deposit, and
- The Mining industry does not follow the geotechnical design so needs to be policed more closely

These assumptions are flawed, so no matter how well the standard may be drafted, it will not be effective, creating more angst than solace. And tailings facilities will consequently continue to fail to the bewilderment of many as has been the case over the past 20 years since National Codes emerged.

The point being missed by the geotechnical fraternity and the Mining industry is that the manifestation of risk arises during the development of the tailings facility mostly over its operating life, which is generally in the control of the Mine.

The design engineers, having never really participated in the development management and operation and thus having poor understanding thereof, rarely inform the Mine of what it should be doing during the development phase to realize the intent of the design (if it was ever defined) and thus control the risk.

The Mines, for their part, having not been informed adequately, and having never been schooled in the practice of tailings disposal –which institution in the World provides tailings disposal practice as an academic or vocational subject? –are left to indirectly control a risk of which they are generally unaware and for which they are ill-equipped.

Clearly something needs to be done to improve matters, although it should also be recognized that the fatalities caused by tailings dams in the broader scheme of things, is not significant. It has not all been disaster. On the whole, the risk is being, perhaps not always by design or deliberate management, controlled.

The draft Standard has been rushed to “print”, focusing on symptoms and not causes. Fiddling with the draft, which the public comment process does, cannot make it better, only more complex and convoluted and in the end, less effective.

The causes for less than optimal tailings disposal practice first needs to be understood. Thereafter there is potential to draft an effective global standard that is outcome based rather than quasi-prescriptive.

CAUSES

Understanding the geotechnical behavior of tailings The assumption that the presence of saturated material automatically leads to liquefaction does not

correlate with hundreds, if not thousands, of tailings facilities that have existed in such a state for many decades. Reality shows that the undrained analysis is not necessarily a good or accurate model or simulation of tailings dam behavior. The geotechnical fraternity and academia need to first develop models that more accurately reflect actual tailings dam behavior before advocating techniques as a required standard.

Requirement 1: Properly understand the behavior of tailings deposits with appropriate supporting analytical techniques

Understanding where and when the risk needs to be controlled

Tailings disposal/facility design needs to start at or during the identification or proving of and the conceptualization of the exploitation plan for the ore-body and extend through to a post-mining landform or use. The concept of an Engineer of Record is a step in the right direction, but the question needs to be asked and addressed as to whether the World has enough (if any, at this point) qualified Engineers that can comprehend the full extent of a design as defined above. Historically tailings facility design is seen as the domain of the geotechnical engineer educated to look at the geotechnical behavior of the deposit, with little understanding or comprehension of how the deposit actually develops on a 24/7 basis and all the other ancillary aspects that contribute to the overall solution.

Requirement 2: Educate and train "Tailings Engineers" to understand the full spectrum of tailings disposal

Develop skills and capacity to manage the risk

The awareness has probably been created as to the significance of tailings disposal. It is, after mining and mineral processing, the third pillar of mineral exploitation, commonly called Mining. However, while mining and mineral processing are widely taught academic and vocational subjects, with graduates filling positions of responsibility in organizational structures, nothing exists for the 3rd tailings pillar. The current situation is a consequence. During the development of tailing's deposits, challenges arise. These are mostly dealt with in the most expedient manner by the Mine, sometimes inadvertently deviating from the design. Understanding is a more assured method of obviating such eventualities than prescribing change management systems.

Requirement 3: Educate, train and capacitate resources to manage the risk of tailings disposal

Attachment 1 reference (if applicable)

ref:0000000924:Q83

Attachment 2 reference (if applicable)

9th December 2019

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Prepared by



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In a full-time tailings career spanning 3 decades, I have been directly responsible for and involved with close to 300 tailings dams, in more than 20 countries on 5 continents, was principle author of the SANS 10286 Code, introducing the concept of tailings management to SA, author of numerous papers and primary educator and trainer to the SA Mining industry in the tailings field for nearly 15 years.