

Governance and Technical Rapid Response Intervention for the Community Tailing Facility “El Tablón”

Governance and technical recommendations

Authors: Velásquez, C.; Van Zyl, D.; Gallegos, F.; Weiler, P. Report #1, April, 2019.

© 2019 by the University of British Columbia and Canadian International Resources and Development Institute (CIRDI).

The material in this publication is copyrighted. Quoting, copying, and/or reproducing portions or all of this work is permitted provided the following citation is used:

Canada

Program undertaken with the financial support of the Government of Canada provided through Global Affairs Canada.

Programme réalisé avec l'appui financier du gouvernement du Canada agissant par l'entremise d'Affaires mondiales Canada.



Canadian International Resources and Development Institute
Vancouver, British Columbia, Canada

www.cirdi.ca
info@cirdi.ca

Table of Contents

PROBLEMA/OPORTUNIDAD	5
PROCESO	5
RECOMENDACIONES	5
CONSIDERACIONES	6
DOCUMENTOS DE APOYO E INVESTIGACIÓN:	6
1. PROBLEM/OPPORTUNITY.....	8
PROCESS.....	8
RECOMMENDATIONS	8
CONSIDERATIONS	9
SUPPORTING DOCUMENTS AND RESEARCH	10
2. EL TABLÓN 'S OPPORTUNITY	11
KEY HISTORICAL EVENTS	11
CURRENT SYSTEM	11
OPPORTUNITY	11
CIRDI'S RAPID RESPONSE.....	12
METHODOLOGICAL APPROACH	12
3. GOVERNANCE RECOMMENDATIONS	14
KEY STAKEHOLDER ROLES AND RESPONSIBILITIES.....	14
GOVERNANCE OPTIONS SUMMARY	14
<i>OPTION 1 - CURRENT SITUATION (STATUS QUO)</i>	<i>15</i>
<i>OPTION 2 – INTER-GOVERNMENTAL COMMITTEE (PUBLIC OPTION)</i>	<i>15</i>
<i>OPTION 3 – PUBLIC-PRIVATE PARTNERSHIP</i>	<i>16</i>
<i>OPTION 4 – PRIVATE MANAGEMENT</i>	<i>16</i>
GOVERNANCE KEY FINDINGS	17
POTENTIAL LONG-TERM BENEFITS.....	18
4. RECOMMENDATION AND STRATEGIC APPROACH TO CHANGE MANAGEMENT	20
5. CONCLUSIONS.....	23
6. ANNEXES.....	24

List of Acronyms

ARCOM	Agency for Regulation and Control of Mining
CIRDI	Canadian International Resources and Development Institute
CTFET	Community Tailings Facility El Tablón
ENAMI	National Enterprise of Mining
IIGE	Research Institute of Geology and Energetics
MOE	Ministry of Environment
RCET	Relavera Comunitaria El Tablón
SENAGUA	National Authority of Water

PROBLEMA/OPORTUNIDAD

La relavera comunitaria de "El Tablón" (RCET) fue propuesta y diseñada por primera vez para remediar el impacto ecológico de los relaves producidos en el distrito minero de Zaruma-Portovelo (evaluación inicial de aproximadamente 2,500 toneladas de relaves por día, sin embargo si todas las plantas de procesamiento utilizaran la RCET, la cantidad de relaves alcanzaría aproximadamente las 4.000 toneladas/día. Desafortunadamente, la falta de comunicación efectiva, recursos económicos, información, conocimiento y experiencia en el manejo de relaves ha impedido la implementación de un sistema de manejo de relaves adecuado, seguro y ambientalmente responsable.

El Tablón tiene un gran potencial para convertirse en una escuela de manejo de relaves y un ejemplo a seguir en la transformación de la minería artesanal y de pequeña escala; sin embargo, es necesario implementar un modelo efectivo de gobierno y gestión que tome en cuenta el papel y la responsabilidad de los propietarios de las plantas procesadoras en el manejo técnico de relaves.

Proceso

En respuesta a la carta de apoyo enviada por el Viceministro de Minería el 8 de agosto de 2019 (Anexo 6), CIRDI aprobó el "Mecanismo de Respuesta Rápida" para un breve análisis de la situación actual de "El Tablón" en términos de gobernabilidad y operaciones.

Durante los meses de noviembre de 2018 y marzo de 2019 (Anexo 5), CIRDI organizó y facilitó una serie de reuniones interinstitucionales que dieron como resultado la creación de un comité interinstitucional *ad-hoc* integrado por representantes del Estado (Ministerio del Ambiente, Viceministerio de Minería). La función del comité era analizar, recopilar y compartir la información existente sobre la situación la RCET, para dilucidar las necesidades, requisitos y acciones para la gestión adecuada de la relavera comunitaria.

Recomendaciones

Con base en la información recopilada en los últimos cinco meses, y tomando en cuenta las opiniones y recomendaciones discutidas con funcionarios del gobierno ecuatoriano y representantes de las plantas procesadoras, nuestras recomendaciones son las siguientes:

1. Implementar un proceso de gobernanza en el que se cree **una entidad legalmente constituida para la administración de la balsa comunitaria de relaves "El Tablón"**, donde todas las plantas procesadoras del distrito minero sean los principales actores en la formación y administración de la RCET.

Para la creación de la nueva entidad creemos necesario el apoyo y facilitación de las autoridades nacionales en la:

- Negociación y acuerdo entre todos los propietarios de las plantas procesadoras del distrito minero de Zaruma-Portovelo.
- Negociación y acuerdo entre los propietarios de las plantas procesadoras y el gobierno provincial de El Oro sobre un sistema de administración apropiado y personalidad jurídica.
- Transmitir las acciones y requisitos legales con el Ministro de Medio Ambiente y el Viceministro de Minas para el nuevo sistema de gestión implementado para la RCET.
- Procedimientos legales necesarios de acuerdo a los acuerdos establecidos para la creación de la nueva entidad administrativa de la RCET.

Asimismo, teniendo en cuenta la información técnica recopilada y las conversaciones con técnicos ecuatorianos, recomendamos:

2. Modificar la disposición actual de relaves, si es posible, implementando una deposición seca de relaves en la base de la RCET.

Sin embargo, la implementación de cualquier solución técnica para la disposición actual de relaves depende de la existencia de una entidad legalmente constituida para la administración de la RCET.

Consideraciones

Las recomendaciones propuestas en este informe se basan en el análisis y trabajo conjunto entre funcionarios del gobierno ecuatoriano, CIRDI y las plantas procesadoras del distrito minero de Zaruma-Portovelo.

Nuestra propuesta espera resolver algunos de los problemas que hemos encontrado tanto desde el punto de vista técnico como operativo:

Aspectos técnicos:

- Actualización de la calidad geoquímica de los relaves de los diferentes procesos metalúrgicos en diferentes plantas de procesamiento (caracterización).
- La información sobre estudios geológicos y técnicos debe ser difundida para confirmar la estabilidad de la presa en la RCET.
- Se necesitan estudios y modelos geomorfológicos para confirmar el volumen y la vida útil de la RCET.
- Mejorar el funcionamiento del sistema actual de eliminación y tratamiento de relaves.
- Verificar el funcionamiento del sistema de drenaje de la RCET.
- Se debería crear una directriz (OMS) para la gestión de la RCET con la participación de ingenieros de diseño y de obra.
- Aumentar el personal calificado para la gestión y administración de la instalación de relaves de la RCET.

Aspectos de gobernanza y administración:

- Se debe mejorar la comunicación y la coordinación interinstitucional para aumentar el flujo de información entre las oficinas gubernamentales institucionales a nivel nacional, regional y local.
- Las instituciones (públicas y privadas) se beneficiarían de un proceso de aprendizaje que aumente el conocimiento para implementar y manejar los relaves de la MAPE de manera responsable y sostenible.
- Deberían revisarse y crearse reglamentos, instrucciones y procedimientos técnicos adecuados para la gestión de los relaves en el sector minero de Zaruma-Portovelo

Documentos de apoyo e investigación:

Se adjuntan a este informe los siguientes documentos:

- ANEXO 1.- Características Técnicas de la Instalación Comunitaria de Relaves de El Tablón
- ANEXO 2.- Opciones para el depósito de relaves
- ANEXO 3.- Viabilidad para la reutilización y reprocesamiento de relaves
- ANEXO 4.- Estudios adicionales para lidiar con alternativas técnicas para la deposición de relaves

- ANEXO 5.- Lista de reuniones/hitos del proyecto del Mecanismo de Respuesta Rápida
- ANEXO 6.- Carta de apoyo enviada por el Viceministro de Minas

Además, hemos incluido el siguiente documento para su consideración:

- Borrador del Manual de Operación, Mantenimiento y Vigilancia (OMS, por sus siglas en inglés). Este es un documento vivo que tiene que ser complementado con la participación de los ingenieros encargados de la gestión de la RCET.

1. PROBLEM/OPPORTUNITY

The "El Tablón" community tailings facility (CTFET) was designed to mitigate the ecological impact of the tailings produced in the Zaruma-Portovelo mining district. The CTFET was initially designed to manage approximately 2,500 tons of tailings per day, but if all the processing plants in the region use the CTFET, an estimated 4,000 tons/day will be deposited. Unfortunately, the lack of effective communication systems, economic resources, information, knowledge, and experience in tailings management has prevented the implementation of an adequate, safe, and environmentally responsible tailings management system.

El Tablón has the potential of becoming both a school for effective tailings management and an example to follow in the positive transformation of artisanal mining and small-scale mining. To reach this lofty goal, it is necessary to implement an effective governance and management model that takes into account the role and responsibilities of the owners/operators of processing plants in the technical tailings management. This report will briefly outline the technical options and the governance frameworks that the government should consider in determining how to approach the long term management of CTFET.

Process

In response to the letter of support sent by the Vice Minister of Mining on August 8, 2019, (Annex 6) CIRDI approved the "Governance and Technical Rapid Response Intervention for the Community Tailing Facility El Tablón". project that would briefly analyze of the current governance and operational status of "El Tablón".

From November 2018-March 2019 (Annex 5), CIRDI organized and facilitated a series of inter-ministerial meetings that resulted in the creation of an ad hoc inter-ministerial committee made up of representatives of national government ministries (Ministry of Environment, Vice Ministry of Mining). The function of the committee was to collect, share and analyze existing information about the status CTFET to identify the needs, requirements and actions for the responsible management of the community tailings pond.

Recommendations

Based on the information collected in the last five months, and taking into account the opinions and recommendations discussed with officials of the Ecuadorian government and representatives of the processing plants, our recommendations are as follows:

1. The Government of Ecuador should implement a governance process that involves the **creation of a new legal entity that will be given the responsibility of administering the community tailings pond "El Tablón"**, where the owners/operators of the processing plants of the Zaruma-Portovelo mining district serve important operational roles in the formation and administration of CTFET.

In order to create this new entity, we believe the national authorities will require support and facilitation to:

- Negotiate an agreement between all the owners/operators of the processing plants of the Zaruma-Portovelo mining district to take a collective leadership role in the management of CTFET;
- Negotiate an agreement between the owners/operators of the processing plants and the provincial government of El Oro on an appropriate management system and its legal personality;
- Convey the legal actions and requirements with Minister of Environment and Vice Minister of Mines for the new management system implemented for CTEF; and
- Define the appropriate governance compliance management frameworks that the new legal entity that will administer CTFET will follow.

Similarly, taking into account the technical information gathered and conversations with Ecuadorian technicians, we recommend that:

2. The current tailings disposal procedures be modified to a dry tailings deposition at the basin of CTFET.

However, the implementation of any technical solution to the current tailings disposal depends on the existence of a legally constituted entity that can effectively administer CTFET, particularly as it has rapidly expanded from its initial design parameters.

Considerations

The recommendations proposed in this report are based on the analysis and joint work of the Ecuadorian government, CIRDI staff and technical experts, and the owners/operators of the processing plants of the Zaruma-Portovelo mining district.

The analysis and recommendations contained in this report aim to determine alternatives to resolve technical and operational problems that we have encountered, including:

Technical aspects:

- Limited Information on the geochemical contents of the tailings present in CTFET that were generated from different metallurgical processes from the Region's processing plants (characterization);
- Lack of Geological and technical analysis of the stability of the dam in the CTFET;
- Lack of studies and geomorphological models to understand the volume of material stored in and estimate the useful life of CTFET;
- Providing ways to improve the functioning of the current tailings disposal and treatment system;
- Examining the functioning of the drainage system of the CTFET;
- Suggesting a guideline (OMS) for the management of CTFET should be created with the participation of design and site engineers;
- Recommending an increase qualified personnel for the management and administration of the CTFET tailings facility.

Governance and administration aspects:

- Improving inter-ministerial communication and coordination to increase the flow of information within government offices at the national, regional and local levels;
- Increasing knowledge to implement and manage ASM tailings in a responsible and sustainable manner, through a learning process that would benefit public and private institutions; and
- Instituting adequate regulations, technical procedures, compliance measures and instructions for responsible tailings management in the Zaruma-Portovelo mining sector.

Supporting Documents and Research

Attached to this report are the following documents:

- ANNEX 1.- Technical Features of the El Tablón Communal Tailings facility
- ANNEX 2.- Options for Tailings Deposition
- ANNEX 3.- Feasibility for Reuse and Reprocessing of Tailings
- ANNEX 4.- Further Studies to Cope with Technical Alternatives for Tailings Deposition
- ANNEX 5.- List of Meetings/Milestones in the Rapid Response Mechanism Project
- ANNEX 6.- Letter of support sent by the Vice Minister of Mines

Furthermore, we have included the following document for your consideration:

- Preliminary draft of the Operation, Maintenance and Surveillance Manual (OMS). A living document to be complemented with participation of engineers in charge of management the CFTE.

2. EL TABLÓN 'S OPPORTUNITY

Key Historical Events

In 2008, the Government of Ecuador, through the Ministry of Environment, signed an agreement with the Autonomous Provincial Government of El Oro (GPAO) to improve the technical and environmental issues related to tailings produced in the Zaruma-Portovelo mining district. The Provincial government of El Oro recommended the Technical Particular University of Loja to conduct a study on the management of the tailings that were being produced in the gold processing plants of the Zaruma-Portovelo mining district. These actions were done in part to help address the contamination of the transboundary Puyango river basin, which had become a point of concern for the downstream Government of Peru. A space for the final deposition of the tailings of the Region's processing plants was necessary to avoid the tailings being deposited in the Puyango River.

On November 2012, the GPAO signed a contract with the private company APR-Consortium to construction the community tailings facility in the site of El Tablón (CTFET). The National Research Institute of Geology-Mining-Metallurgy (INIGEMM) was then engaged to inspect the construction of the CTFET.

Current System

The owners/operators of processing plants are now required to use CTFET for tailings disposal as a pay per truck fee system. The GPAO charges \$5(US) per truck of tailings. This fee is insufficient to cover the costs related to the safe transportation, operation, maintenance and surveillance of the tailings.

Unfortunately, the GPAO does not have the technical knowledge or resources to implement proper operations, maintenance, and surveillance management of the CTFET. The lack of a clear management plan and insufficient financial resources have resulted in inadequate disposal of tailings. Further, the current governance structure has negatively impacted the opportunity to implement an integrated management system to achieve the facility's main purpose: safe and sustainable tailings disposal.

Opportunity

The operation of the CTFET tailings facility has always been a priority for the Government of Ecuador. At the national level, the Vice-ministry of Mines and the Ministry of Environment are the two governmental institutions that play the most important mandate and role in CTFET, as they license, regulate, control and enforce proper tailings management in the Country. The management of El Tablón has been under consistent review since it was created. This process has led the Vice-ministry of Mines and Ministry of Environment to agree improve their communication for a safe and sustainable tailings transportation, storage, and management to mitigate environmental and health risks associated with ASM tailings.

The responsible management of CTFET is also a priority for the owners/operators of processing plants in the Zaruma-Portovelo mining district to ensure there is certainty regarding an appropriate and long-term solution for their tailings disposal.

GPAO and municipal governments, will benefit from better management of tailings, good mining practices, and credible technical management of CTFET to mitigate the risk of leakage of water from tailings confined in the tailings impoundment, and the potential damage it could cause in surrounding communities.

Responsible mining is a key component of the economic strategy of the Country. Therefore, the short, medium- and long-term management of "El Tablón" is a key priority for the Government of Ecuador. It is important to maintain direct communication with all levels of government, the owners/operators of processing plants and other stakeholders to find a long-term and sustainable solution. It presents an important opportunity to implement an appropriate governance model, and methodologies for unique safe tailing disposal system for the artisanal and small-scale mining sector, in par with the Country's long-term mining strategy, in which includes medium and large-scale mining both play important parts.

CIRDI's Rapid Response

In response to the letter of support sent by the Vice Minister of Mining on August 8, 2019, CIRDI developed the "Governance and Technical Rapid Response Intervention for the Community Tailing Facility El Tablón" to briefly analyze of the current governance and operational status of "El Tablón". From November 2018-March 2019 (Annex 5), CIRDI organized and facilitated a series of inter-ministerial meetings that resulted in the creation of an ad hoc inter-ministerial committee made up of representatives of national government ministries (Ministry of Environment, Vice Ministry of Mining). The function of the committee was to collect, share and analyze existing information about the status CTFET to identify the needs, requirements and actions for the responsible management of the community tailings pond.

CIRDI met with key government authorities, representatives of processing plants, and the current engineer managing El Tablón. During the process, official representatives of Ministry of Environment and Vice-Ministry of Mines reviewed the information available on the CTFET. Based on these meetings and the analysis of existing reports, we discussed four options for the governance of El Tablón, and two technical options for tailings deposition.

This report summarizes the discussions and analysis on the options that are available to the Government of Ecuador for the technical operation and governance of El Tablón. We include a brief technical assessment of El Tablón describing some potential alternatives and options for better tailing disposal in annex 2.

Methodological Approach

The methodology for the assessment of CTFET is based on two key components: a historical analysis of the facility, beginning with its construction and continuing to the present day; and the discussion of feasible options for the responsible management of the facility.

We conducted a stakeholder analysis to identify who to include in the early decision-making process. This led to the creation of an inter-ministerial committee with the mandate to discuss governance and operational solutions for the management of El Tablón. The Sub-secretary of Artisanal and Small-

Sale Mining, who represented the Viceministry of Mines, was instrumental in coordinating the activities of the ad-hoc committee. Other institutions engaged during the five-month project included: Ministry of Environment, Research Institute of Geology and Energetics (IIGE), National Authority of Water (SENAGUA), Agency for Regulation and Control of Mining (ARCOM), National Enterprise of Mining (ENAMI).

The role of CIRDI in this process was to act as an independent and non-partisan convener, technical expert and liaison between stakeholders to help analyze the current status of CTFET.

Three meetings were held to analyze the status of El Tablón prior to the high-level Roundtable meetings that were held in Quito and Zaruma from March 10-15, 2019. Opinions and recommendations from representatives of different levels of the Ecuadorian government and processing plants owner/operator representatives were compiled during the meetings. This input complemented and informed our analysis for the governance diagnosis and the alternatives for the management of El Tablón tailings facility.

3. GOVERNANCE RECOMMENDATIONS

Key stakeholder roles and responsibilities

Responsible and sustainable tailings management requires the support and coordination of several stakeholders that each have a key responsibility in its operation. Stakeholder collaboration and agreement, particularly the commitment and participation of owners/operators of processing plants, is fundamental for the implementation of any solutions to improve the tailings deposition and treatment in the Portovelo-Zaruma mining district. We believe that it is possible to move towards responsible and sustainable tailings disposal through the implementation of a strategic change management approach, which involves the co-participation of key stakeholders and decision makers. We analyzed the current tailing deposition and explored the feasible options for technical management of the facility, which are described in Annexes 1 and 2. However, we conclude that ensuring an appropriate governance structure must be first be settled upon to implement any of the technical options for the management of tailings.

El Tablón communal tailings facility involves four important stakeholders that must be included in any management strategy: the owners/operators of processing plants (who produce the tailings), GPAO (who constructed the facility and is the current operational manager), the Vice Ministry of Mines (who provides normative and regulatory direction in the mining sector), and the Ministry of Environment (who regulates and controls environmental contamination and pollution).

Table 1. Roles and responsibilities of key stakeholders for El Tablón tailings facility

ENTITY/ ORGANIZATION	ROLE	RESPONSIBILITY
Vice Ministry of Mines	Mineral Normative/Regulatory Mining Administration	Authorizing the activities of Processing plants
Ministry of Environment	Normative/Regulatory Environment	EIA and Environmental management authorization
GPAO	Owner of 250 has in El Tablón Owner of Environmental Licence	Construction and operation of the CTFET
Processing Plant Owners/Operators	Operators/tailings producers	Tailings producers and Final disposal in El Tablón

Governance Options Summary

The construction of the communal tailings facility envisioned with the intention of bringing an environmentally responsible alternative for the tailing disposition of the owners of processing plants. The goal of the Government of Ecuador is to find the most efficient and sustainable way for the management of tailings from all processing plants of the Zaruma-Portovelo mining district. Within

the environmental regulatory context of Ecuador, the producer of any material considered toxic¹ (such as tailings) is responsible for the management and final disposal of the tailings. However, In the current management/pay per truck system, the processing plant owners/operators that produce tailings², transfer responsibility for the management of the tailings to GPAO upon the disposal of the tailings at El Tablón.

The four governance models that follow were analysed and ranked based on a criterion of benefits and challenges in the inter-ministerial meetings that were held as part of this "Governance and Technical Rapid Response Intervention for the Community Tailing Facility El Tablón" . Based on the information provided from different government representatives at the Roundtable meetings, CIRDI has made the following recommendations on what we consider the most appropriate governance options for El Tablón and a road map to achieve a successful management transition.

Option 1 - Current Situation (Status Quo)

The GPAO constructed the tailings facility in 2012-2013 and started its operation in the last quarter of 2014. During the meeting we learned that the operations began without the completion of the construction agreement between GPAO and the APR company. Although the GPAO was given approval to construct the tailings facility and was granted an environmental license by the Ministry of Environment after completing an environmental impact assessment, the Comptroller's Office (Contraloría del Ecuador) does not consider the GPAO as the legal entity for management/administration of the CTFET. This issue has been brought up by the Comptroller's Office and an urgent request has been made to designate an administrator.

The current management system was established during the planning and construction of the facility. GPAO envisioned an investment opportunity from the recovery of minerals remaining in the tailings (including gold residues) in El Tablón. Unfortunately, due to the lack of technical and administrative support, this business opportunity has not materialized or been seriously pursued. The current management system is inefficient and there are potential risks that we recommend be mitigated through improved management and administration of the facility.

One of the major impediments for the effective management of the tailings facility is the lack of human and financial resources and investment in the facility at the provincial and national government levels. The Ministry of Environment has fined the GPAO on several instances due to infractions related to the management of the tailings facility; however, due to a lack of financial resources, remediation and proper tailings management practices have not been feasible. We recommend a change in the current management of the facility as a risk mitigation strategy.

Option 2 – Inter-governmental Committee (public option)

The second option that we analyzed was the creation of an inter-governmental committee for the management of CTFET. The option would entail to transfer the ownership and management of CTFET

¹ For more information refer to the Ministry of Environment Report from the meetings.

² The owners of the processing plants keep the tailings from the miners who rent the plants for processing the ore, a pay per service model of in the ASM sector.

to a committee with the representation of key government institutions at the national and provincial level.

During our discussion, it became clear committee does not have the authority outside their respective mandates, but that it could analyze and recommend certain actions for the management of CTFET. Therefore, for the committee to be a manager of the facility, it will need an executive process to grant the required competencies. For the working group to be responsible of any duties in the tailings facility, such as administrative work, it will need an inter-ministerial agreement which guides the group, their competencies, responsibilities, and financial support for its duties.

Option 3 – Public-Private Partnership

The third option discussed was a public-private option, where a public institution (national or provincial level) and the processing plants in the district create a new entity that will manage the CTFET. One of the benefits of this option is the potential to access financial resources and operational efficiency from the private sector (in this case the processing plants owners/operators) while maintaining the management from a public institution. These complementary capacities could potentially bring more capacity and resources to improve the current system, while providing the necessary safeguards with government oversight and management of the facility with public importance.

One of the main challenges discussed during the meeting, and based on the history of CTFET, is the vulnerability and risk of the politics impacting the management of CTFET. Furthermore, the public resources available for the Government of Ecuador to play even a minor role in the operation of CTFET is limited.

If this governance model is selected for CTFET, a preliminary step would be to define the roles and responsibilities of the public sector based on their competencies (such as regulation and control), and assign appropriate roles for the private sector that best take advantage of their competitive advantages (ability to move quickly, access to financial resources, ability to manage tailings inputs and other aspects of the supply chain, and other economic drivers). One of the benefits of this governance option is the ability to transfer the responsibility for the sustainable and responsible management (and final disposal) of the tailings to the key producers of such tailings (processing plants in the district).

Option 4 – Private Management

The fourth option analyzed was the creation of a private entity to be responsible to manage the tailings disposal from all processing plants of Zaruma-Portovelo mining district in CTFET. This approach could bring the financial resources of the processing plant owners/operators to bear, while also giving the management an incentive to find efficiencies, where possible.

However, in order for this option to be successful, it will require the buy-in from all the stakeholders in the Zaruma-Portovelo mining district to ensure there are no “free riders”. In depth discussions regarding the appropriate legal form for the management body (such as a corporation, industry association, society or otherwise), how financial and management responsibilities will be divided, about acceptable internal compliance measures, and ensuring appropriate technical capacity to

manage (including training where this is deficient) will be necessary. Once this entity is set up, negotiations regarding the responsibility and liability environmental contamination of existing tailings, and for closure and remediation (and environmental bonds) will need to take place in between the new entity, the Government of Ecuador and GPAO.

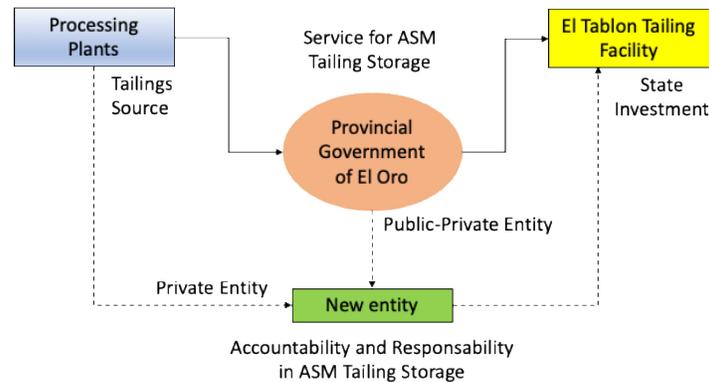


Fig 1. A conceptual model of service of tailings storage and the option to develop a new entity for tailing management.

Given that Options 1 and 2 were found not to be feasible by the stakeholders that were involved in this report, Figure 1 addresses only options 3 and 4. Figure 1 above shows the current model of CTFET with the processing plant owners/operators as waste producers and the current management of the El Tablón tailings storage facility in the hands of GPAO. The alternative is to change the body responsible for management of CTFET to a new entity (broken line) in which owners of processing plants can modify the model creating a private enterprise or a public-private enterprise with the GPAO.

Governance Key Findings

It is important to emphasize the **need to establish a long-term commitment, to take responsibility and build up competency in the management of the CTFET** (including financial planning, risk management studies, emergency preparedness, closing plans among other requirements) for any of the governance models that is selected. This also includes the long-term approach to look for innovative reprocessing methods based on independent and rigorous feasibility studies and new business models (see Annex 3).

Our key finding during our discussions is that it is important to **include the participation of all representatives of the processing plants located in Portovelo-Zaruma mining district when discussing the management of the facility**, as they are the producers of the tailings. The success of any entity that assumes the responsibility of tailings management in the CTFET will depend upon the participation, cooperation and support of all processing plants. The processing plants will need to participate in the discussion for several issues such as transportation, disposal, treatment, management and surveillance. Most importantly, active involvement of these actors creates the conditions for proper management of the chemical and physical contents of the tailings that are deposited to ensure they can be most appropriately managed. The new governance model must achieve the contribution of key governmental stakeholders to find the benefits for the local community.

One of the significant issues to **discuss are the legal requirements, including the ability to transfer the environmental licence from one entity to another, to enable the new management of El Tablón.** According to comments from the Ministry of Environment representatives, to transfer the license, the GPAO would need to close its operations, and the new management entity will be responsible for all deliverables listed in the environmental licence. To close the operation, the GPAO will need to present their final budget, prepare and share due diligence on environmental liabilities, and to transfer their responsibilities and current states of management.

The Ministry of Environment indicated that a further environmental impact analysis is not necessary, but the environmental plan will need to be updated. The new entity will assume the obligations concerning the management of El Tablón tailing facility including those that are under observation of Ministry of Environment.

Potential Long-term Benefits

One of the key benefits for the participation of the processing plants in the management of the CTFET is the ability for the processing plant owners/operators to obtain an extension of the operation permits of processing plants. At the moment many of their legal permits are either on hold (due to non-compliance of legal requirements) or are only issuable for a period of six months to three years. This does not allow the sector to undertake long term planning, nor enable them to access investment opportunities or credits³ for the mining business. If a long term, sustainable and responsible tailings disposal system is implemented, the processing plants would have access to longer operation permits (which reduces risk), and unlocking access to financial resources to achieve long term investment plans which would improve their processing operation practices.

During the conversations about the management of El Tablón, some of the representatives of the processing plants mentioned the proposal to create a unified industrial mining park in close proximity to CTFET. This industrial mining park would become a hub of mineral processing facilities that would require the closing of mineral processing operations in the current sites.

The key concern and draw for the owners/operators of mineral processing facilities is the potential to obtain a longer term permit to operate. The representatives of the majority of processing plants indicated that if there is a long term permit in their operation permits, they will consider investing in improving the tailings transportation, the management of El Tablón, and move to a new area previously studied and planned for mineral processing. Without this certainty, it is likely they will not have access to the resources necessary to improve their operations.

Another key benefit is the opportunity for all involved to learn by doing as a baseline for the organization and development of the small-scale mining sector and preparedness for further mining development in the Country. If the governance model and management of CTFET is successful, the Ecuadorian government could use the experiences of tailings management in the Zaruma-Portovelo mining district to transfer the knowledge and experience to other ASM areas in the Country (as well

³ A representative of the government mentioned that the National Finance Corporation of Ecuador only supports businesses that show plans of operation for at least seven years; therefore, most of the owners of processing plants do not have access to financial credits.

as be an example of good practice that could be replicated internationally). The case of Zaruma-Portovelo is an excellent example to apply the TransMAPE model of training mining stakeholders, while acquiring experience in the governance of the ASGM sector through a participatory management model, which will be described in the next section.

4. RECOMMENDATION AND STRATEGIC APPROACH TO CHANGE MANAGEMENT

Change management employs a structural approach to ensure that the changes will flow smoothly and successfully. The strategic approach to change management proposed in this section intends to modify the current model of service and suggest a model where the processing plants are part of the final disposition of their tailings. Our suggestion hopes to build the capacity of the sector (public and private) in the management of a communal tailings facility. Our recommendation follows national and international guidelines which direct the producers of tailings for its safe management, storage and final disposal.

For the change management process, it is essential to have the collaboration and participation of all stakeholders, including the representatives for processing plants, GPAO, Ministry of Environment and the Vice Ministry of Mines. Within the new model, the key to success is the integration and participation of all stakeholders to make key decisions in the process. In this sense, we propose a short, medium and large term action plan in which many decisions will flow over time.

A flow of actions for change management and governance structure is presented in Figure 2. The proposed actions in the plan suggest achievable actions in the short, medium- and long-term. From the analysis of the current state we conclude that one of the key drivers for a successful transfer of management responsibilities will be the agreement of all owners/operators of the processing plants and GPAO for the creation of one entity that is responsible to manage the CTFET.

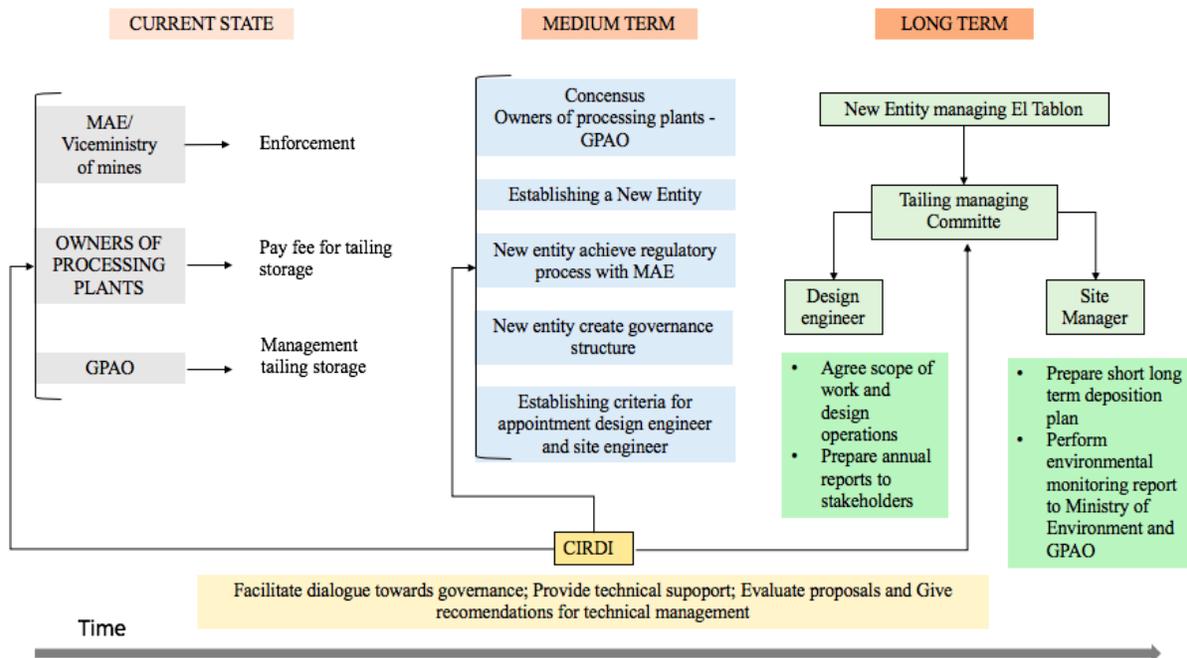


Fig 2. Recommendations over time for change management and to implement governance reforms of the El Tablón tailings facility

We deduced that the decisions made in the medium-term actions will define the further technical activities to implement management changes. Hence, in the medium-term, CIRDI can facilitate the dialogue of industry and government and participate in the meetings to support the decision-making process for the governance, while serving as a resource for technical matters for current and future engineering management. CIRDI can provide support to the creation of the new legal entity and the dialogue with all stakeholders, including the processing plants, GPAO, the Ministry of Environment and Vice-ministry of Mines. Key actions to complete in the medium term are:

- Achieving consensus among all owners of processing plants of Zaruma-Portovelo mining district for the integrated management of the CTFET.
- The two major stakeholders for tailings management: owners/operators of processing plants and GPAO should meet with the objective of agreeing on the creation of a new entity that will be in charge of the management of El Tablón.
- The new entity will create a tailings management committee, which will determine further actions for the pursuance of regulatory approvals with Ministry of Environment, undertake a cost-benefit analysis, and establish a committee for the designation of the design engineer.
- The new entity will determine the tasks and create a terms of reference for a design engineer who is a contractor, consultant or staff member of the new entity.
- The design engineer will review the previous information and to propose a design and implementation plan the new operation plan in El Tablón.
- The selection of a site engineer for the management of tailings disposal and environmental compliance. The site engineer is an employee of the new entity or organization.

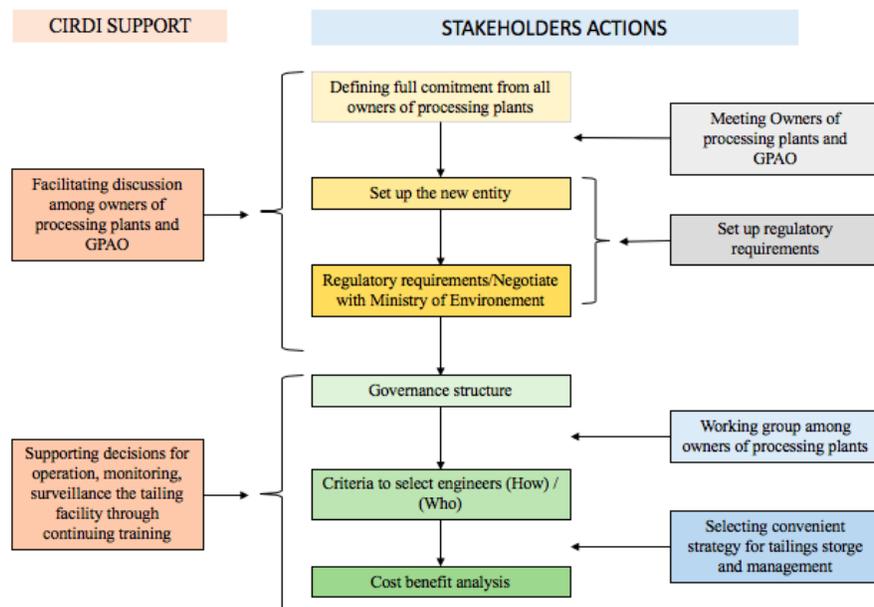


Fig 3. Medium term actions suggested to implement a sound governance system in El Tablón tailings facility.

In this process CIRDI will participate in dialogues providing continued support on innovative strategies for change management of the tailings facility. CIRDI 's goal is to help create a solid foundation for the management of the CTFET, strengthening the implementation capacity of both

the public and private sector. The objective is to create a sustainable management plan that can proceed on its own, build capacity for environmental monitoring and tailings management, including the risk preparedness, recording of information, and documentation. During this process and with the agreements of all stakeholders, CIRDI would continue to provide advice in each of the steps that are required, such as: the cost benefit analysis of different options for tailing transportation, storage and management, the selection of technical managers and the training of processing plants (owners/operators) in proper management and environmental monitoring, and support during site assessment and investigations specified in Annex 4. CIRDI proposes the utilization of the training approaches and educational strategies that were developed and piloted by the TransMAPE project, which have proven to be successful and relevant in the sector to creating sustainable change.

In the long term, the governance model aims to transfer the full accountability and responsibility for tailings management from GPAO to the owners of processing plants (through the new entity). Some of the key actions in the long term are:

- The tailings management committee will maintain the integrity of the tailings dam over the life cycle until closure, so risk management, operation, and closure are effectively managed to minimize environmental and human health impacts.
- The design engineer will be responsible to monitor that all structures are stable and maintain the stewardship of the overall facility.
- The site engineer is responsible for managing safe deposition of tailings, water management and environmental assessment in accordance of the regulations, guidelines, and international standards.
- The design engineer will prepare reports to present to the tailings committee, and the site manager will prepare the short- and long-term tailings deposition plan as well as prepare all environmental monitoring to report to Ministry of Environment and GPAO.

5. CONCLUSIONS

Appropriate management and governance of the El Tablón tailings facility is necessary for the effective implementation of any technical solution. During the "Governance and Technical Rapid Response Intervention for the Community Tailing Facility El Tablón" Rapid Response Mechanism project that was implemented by CIRDI, we identified a strong commitment by the government delegates and the representatives of processing plants to implement a responsible and sustainable governance model for the CTFET. Based on the roundtables and historical analysis of El Tablón, we recommend creating a new entity for the administration of the facility, making sure to transfer the responsibility for tailings disposal to the private sector.

Based on this recommendation, we have described the short, medium- and long-term actions to improve the current governance model in El Tablón tailings facility. The first step toward a decision-making process for the governance of the tailings facility resides on the agreements and commitments of the owners of processing plants and GPAO, with the support of the Government of Ecuador.

- The first outcome should be the agreement between the owners of processing plants and the GPAO toward the creation of a new legal entity to manage the tailings facility.
- The second outcome should be the arrangements of legal and regulatory actions with both Ministry of Mines and Ministry of Environment according the new governance structure.
- The third outcome should be securing qualified personnel for the design, management and implementation of safety tailings storage protocols, including an accurate analysis of the capacity of El Tablón and the production of tailings from all processing plants.

We also recommend that any further discussions and analysis of technical management options for the El Tablón tailings facility should include the opinions of current personnel managing the facility and as well as those involved in the construction and in design of the CTFET.

6. ANNEXES

ANNEX 1.- Technical Features of the El Tablón Communal Tailings facility

On February 28, 2019, a field visit was completed by the inter-ministerial committee for operational improvement of the El Tablón communal tailings facility in the study area. The group met to review the information gathered by the Geology and Energetic Research Institute (IIGE) on the current status of El Tablón. IIGE looked at technical information related to geology, topography, and the environment. IIGE created several topography maps presenting current features that show the main characteristic of El Tablón, including the shape of the embankment and the historical tailings deposition. Furthermore, IIGE presented a water quality assessment report that was done in the tailing facility and in El Salado creek.

Due to a lack of technical information, a discussion was focused on the construction of the embankment, and specifically on the perception that the main embankment was constructed on a weak surface of the foundation base and consequently could affect the stability of the dam.

Among the technical features, IIGE revealed that there was a lack of information about the design of the embankment and stability of the dyke and the drainage system. It was also emphasized that there was a lack of soil geo-mechanical classification and insufficient geotechnical investigations, resulting in several uncertainties about the construction and operational function of El Tablón. Beginning in 2015, when the owners of processing plants were authorized to transport their tailings to El Tablón, the instrumentation for controlling the tailings facility was not installed, the roads to reach the basin area were not finished, and surface water diversion channels around the impoundment area of the tailings facility were not constructed.

The tailing facility remains under the supervision and management of GPAO, and tailings deposition started during the last quarter of 2014. At the beginning, the tailings were dumped on the top of the upstream slope of the main embankment (see Figure 1A). Later on, the tailings were placed at the southwestern edge of the tailings facility creating several platforms. The deficient trafficability in the facility means that it is necessary to create those platforms which at the moment are approximately 20 metres over the filling limit that was previously planned for the tailings facility. According to the managing engineer, the management of El Tablón has consistently lacked the economic resources that are required for the proper management.

While there is no an accessible inventory of the tailings that have been deposited in El Tablón, it is estimated that the facility receives approximately 1,200 tons/day from processing plants throughout the Zaruma-Portovelo mining district. It is estimated that about 90% of processing plants of the mining district are discharging their tailings in El Tablón. Only the largest processing plants of the mining district (total of seven) which have their own tailings facility and do not use the El Tablón tailing facility. However, the national authorities anticipated that all processing plants of Zaruma-Portovelo will eventually have to transport the tailings to El Tablón. The inclusion of these processing plants would increase the future volume of tailings deposits to 4,000 tonnes/day. Through satellite images provided by IIGE, it is feasible to distinguish the tailing deposition during the time of work from 2016-2019 (Figure 1A).

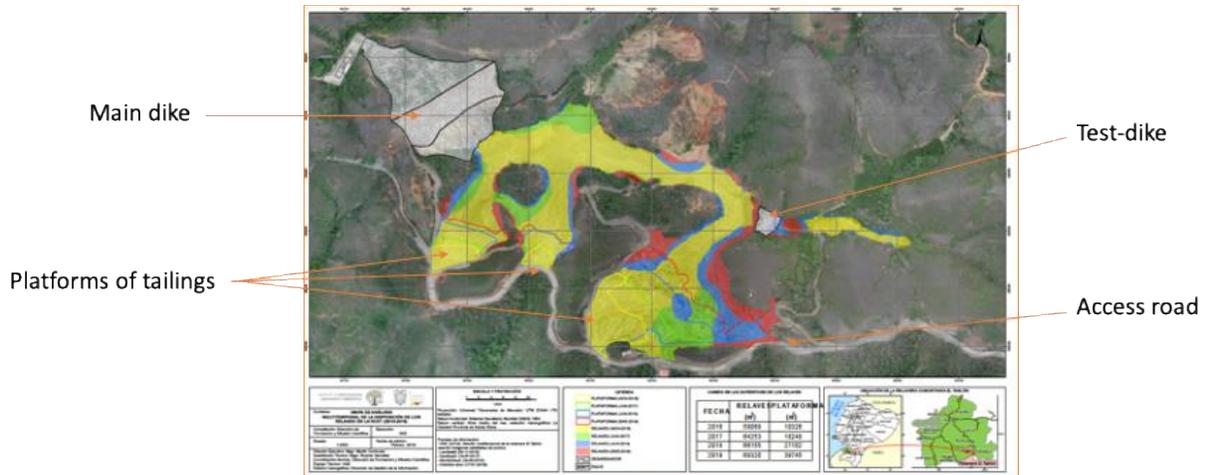


Figure 1A. Recent topography of El Tablón tailing facility. The figure shows the temporal tailings deposition in yellow (2016); green (2017); blue (2018); and red (2019). The figure shows the three main platforms of tailings main embankment and test dam, and the main road for access to the facility. Source IIGE Report 2019

Based on the current tailings deposition, the current manager of El Tablón tailings facility indicates that the drainage system is in good condition. Seepage water is conducted through underdrains and pipes below the main structure (see Figures 2A-3A).

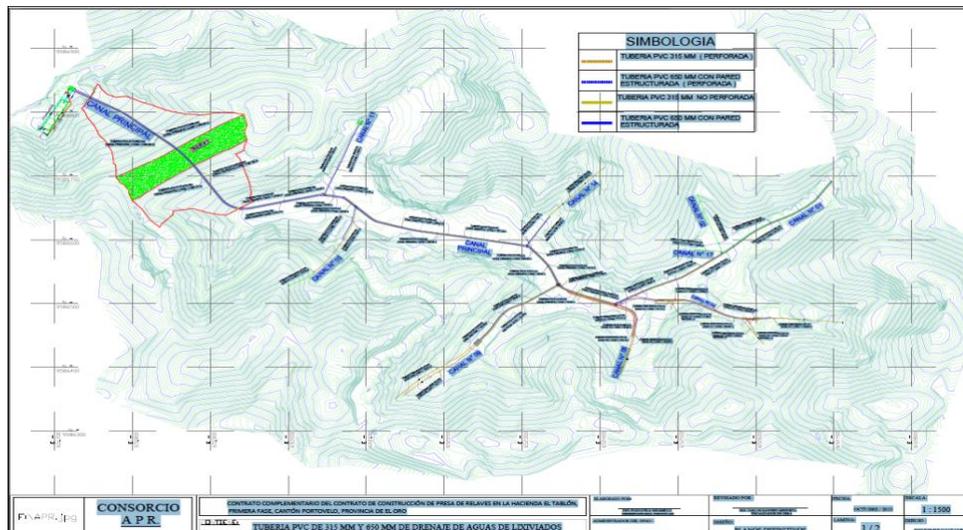


Figure 2A The drainage system consisting of a central structure wall with 315-mm and 615-mm diameter perforated PVC-P 1.0 MPA pipes, along the impoundment structure, and interconnected with seven lateral pipelines. (Source: APR consortium with help of MC engineer).

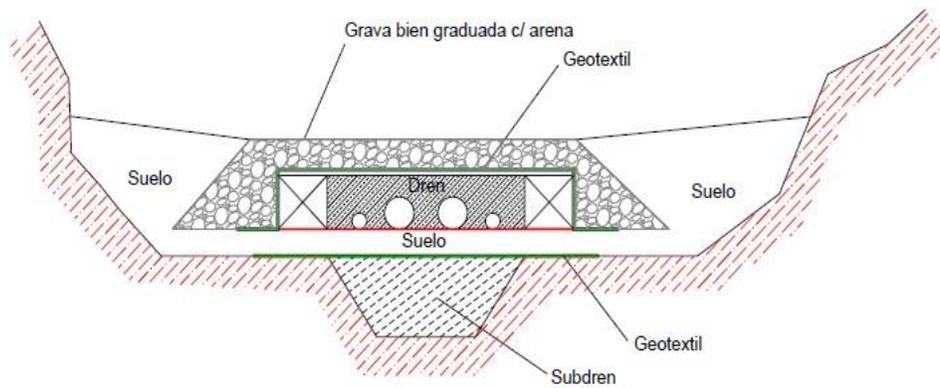


Figure 3A. The foundation drainage system showing sub-drains to collect rain water and drains for seepage. The entire drainage system is covered with a gabion structure and geotextile. A geotextile separates the sub-drain and drains.

The central part of the dike contains a sloping chimney drainage system to intercept seeping water (Figure 4A).

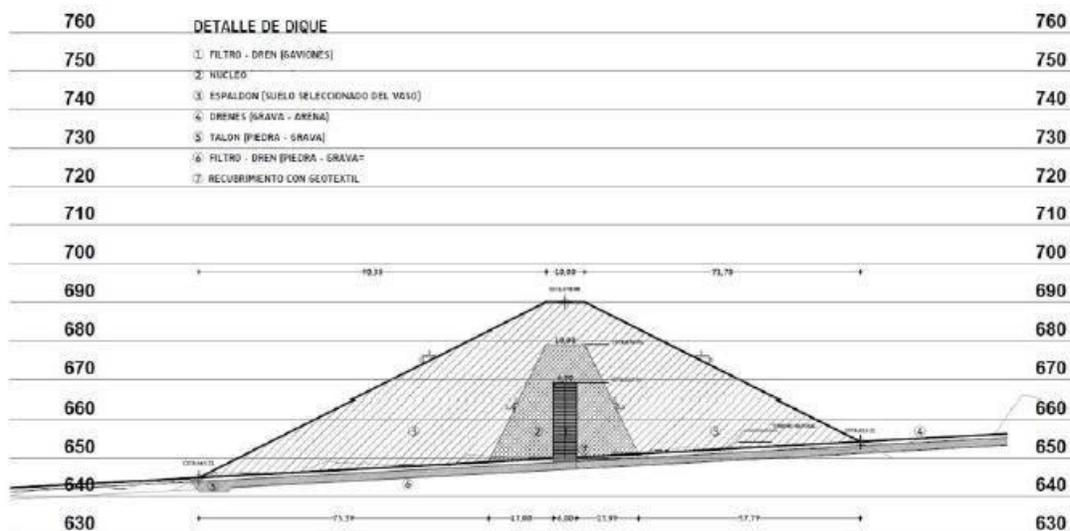


Figure 4A. Main dike structure - constructed of borrow-material up to 45 meters height with tailings deposited upstream. Constructed embankment would support a total amount of 5,500,000 m³ of tailings at 30% humidity in an area of 21.6 hectares. (Source: IIGE 2014 from Auditing report).

The engineer who represented the INIGEMM (currently IIGE) during the construction of El Tablón showed a photographic record demonstrating the details about the construction of the embankment. From this engineer's technical expertise, he was able to demonstrate that the embankment was constructed on the basis of technical procedures based on results of geophysical and soil analysis done by Technical Particular University of Loja (UTPL), and INIGEMM, but also indicated that the contractors tested the soil during the construction of the embankment. He highlighted that the compacted material was tested during construction, and from observations during construction, he emphasized that the embankment was constructed on the bed rock in the place previously determined by a geophysical analysis.

According to the manager of El Tablón, the tailings disposal is functional during all seasons (dry and wet). The manager concludes that there are two characteristic conditions for the seepage water flow, one in the winter and another one in the summer. In the winter period when there is heavy rain from January to April, the manager estimates a flow of 40L/minute, and in the summer time the flow rate decreases drastically to 2L/minute. Water is received in the water collection pond and when the water level reaches the maximum level the liquid is pumped back to the basin of the tailing facility. Due the chemical characteristics of the tailings, the solutions contain cyanide, heavy metals such as arsenic (As), cadmium (Cd), chromium (Cr), lead (Pb), copper (Co), zinc (Zn), Manganese (Mn) Cobalt (Co), and residual sulphide minerals not recovered in the processing plants. Certain amounts of mercury (Hg) can also be present in the tailings due the amalgamation process used by some processing plants. The water is not treated but when a high volume of water is collected, the solution is returned to the impoundment area. A recent water quality analysis done by IIGE revealed high pH in all samples from the El Salado Creek reducing the risk of acid mine drainage.

Discussion with the inter-ministerial working group assisted CIRDÍ's expert, especially with respect to the construction of the dyke, and the information gathered for the construction determines that the dam and its drainage system was well constructed. At present, an investigation is necessary to confirm the stability and the efficient functioning of the drainage system. An effective and safe disposal of ASM tailings in the communal tailings facility of El Tablón is possible by implementing certain requisite actions for a change of management that are identified earlier in this report.

ANNEX 2.- Options for Tailings Deposition

The technical alternatives for the deposition of tailings in El Tablón must consider the design, construction, the current features of management and actual deposition state of the facility. From this analysis, two alternatives can be anticipated for initial consideration: continue with the platforms construction in a simple way of management or change management to create accessibility to deposit the tailings in the basin. However, after changes to the governance system has been effected, the design engineer selected will develop design proposals for consideration.

OPTION 1. Do Nothing and Continue with the Current Approach

Currently, the management of the tailings facility is achieved without technical assistance for its operation, maintenance and surveillance. Lack of access to the main impoundment area complicate the deposition of tailings. Due to the presence of wet tailings, transport inside the area is impossible. It was identified that the lack of trafficability in the tailings facility is currently one of the biggest challenges for the facility's management, especially during the winter because of high humidity in the soil and tailings.

Because of lack of trafficability, the trucks carrying tailings can only reach the higher part of the facility, close to the administration house, and discharge the material on the top of the area by making several platforms. The highest platform is almost 30 meters higher than the maximum level of the main embankment. The biggest problem of this deposition is that the platforms are out of the valley and at a higher elevation than the main dike aggravating the risk for the workers, trucks and all structures of the tailings facility. The manager of El Tablón indicates that there is an intention is to push down the tailings, but it is challenging due to the higher elevation of the platforms. The existing platforms formed in the tailings facility increase the risk of failure if the situation persists under the current conditions. An alternative to consider for the future deposition of tailings in El Tablón is to move away from the use of platforms.

OPTION 2. Tailings deposition in the basin

Depositing the tailings in the basin is the alternative for El Tablón because it helps to control the deposition in the impoundment area and allows for the optimization of its management. To achieve this option, creating accessibility to the basin of the tailing facility is mandatory. We suggest two options for tailing deposition in the basin: slurry tailings or dry tailings.

OPTION 2A. Deposition of slurry tailings

This option involves installing a pipeline to distribute lower density tailings around the whole confinement area of the tailings facility. Water management is very important in this option. Although the current manager of El Tablón is of the opinion that the drainage system is working in acceptable manner, it is important to assess the effectiveness of this system. El Tablón does not have any water treatment system as currently constituted. Therefore, the management of surface water, including the water containing in the particles voids of the sand-tailings and controlling the distribution of the rain water, will be fundamental for the deposition of slurry tailings.

Due to the absence of a monitoring system in El Tablón, the quality of the water quality leached from tailings is unknown. However, it is assumed that the characterization of water quality will be related to chemical reactions that took place during the processing operations in the processing plants, and thus it will depend of the type of processing. In the future, the water quality resulting from the tailing deposition will be related with the geochemistry of the tailings and the reactivity of chemicals in the deposition site.

The degree to which slurry tailings would function efficiently relates to how its management would be adapted to the current management conditions according the embankment construction and water management. Experts recognize that the presence of water intensifies the risk of dam failure; therefore, water management is a priority issue working with this approach. Likewise, slurry tailings need a pipeline to transport the tailings from the surrounding area to different parts of the tailings facility to release the slurry in a uniform way. Therefore, it is important to consider the actual topography and the locations of platforms formed in one of the edges of the tailings facility to implement a water management system.

Another consideration instead of slurry tailings is placing a filter to make a cake of tailings for tailings disposal in El Tablón. The filtered tailings could be stocked in cakes unlike slurries, which must be pumped to the disposal area. In this case the cakes can be transported by truck or conveyor. Once the tailings are transported to El Tablón, a bulldozer could push the tailings and compact the material inside the embankment. Cake production tailings would allow the facility to maximize the storage capacity.

In both cases, slurry tailings and cake production need a good water management plan in both summer and winter seasons.

OPTION 2B. Deposition of Dry Tailings

This option considers elevating the test dam previously constructed by the contractor and the construction of a new embankment parallel to the main embankment in the tailings facility. The embankments can be developed with borrow-material or with the tailings. The first embankment can be built elevating the test dam which is five metres in height and situated upstream of the tailings facility, and another embankment could be built at the middle of the impoundment area. The tailings with at least 12% humidity can be transported by truck passing through the embankments and discharging the material to both sides.

To dry the tailings, it will be necessary to have a thickener or filter pressure either in the processing plant or in the El Tablón tailings facility, therefore this option considers the utilization of filter tailings equipment to produce a high-density thickened tailings solution to the problem associated with water. This material will compact very well to be deposited in the impoundment area. Ideally, with the filter tailings, it will be possible to go over the maximum elevation level of the dam, making stable mountains facilitating partial or total reclamation. Importantly, this alternative allows to the facility to maximize its life cycle, and considering that all processing plants of Zaruma-Portovelo including the largest will use the El Tablón for tailings disposal there will be a considerable increment of tailings to be deposited in El Tablón, making this option the most appropriate.

The idea to work over the test-dam was previously recommended and discussed with the Director of Artisanal and Small-Scale Mining as a pilot program, with the conclusion that raising the test-dam is convenient because of its minimal intervention, the easier accessibility it would provide, the existence of a drainage system, and presence of vegetation in the surrounding area (which reduces the risk of land-slides). In addition, the approved EIA considers the construction of a second dam could take place in the future. Therefore, this does not change the projected construction allowing the possibility to continue without having to undergo a new EIA to implement changes. It is likely that it is feasible to fill the projected embankments at approximately 685 metres in height, which is 10 meters below the maximum level of the main dam.

An interim alternative is to mix slurry tailings and dry tailings deposition. Working in phases by starting the deposition of tailings by truck during the next five years, and later changing this method to a slurry system. This can be done by differentiating the type of tailings produced in processing plants. An advantage of the cake or dry tailings is the opportunity for land reclamation and that its rehabilitation will be easier.

ANNEX 3.- Feasibility for Reuse and Reprocessing of Tailings

The representatives of Ministry of Environment emphasize that their interest not only resides on the final deposition, but also in the reuse and reprocessing of tailings to generate limited or zero waste. The Ministry of Environment gives tax deduction incentives for cleaner production technology call a "green point" which is an important point to emphasize for the case of El Tablón. Although the waste is considered hazardous, it can also become an economic resource for further mineral extraction.

Any option to reuse or reprocess the tailings in El Tablón will be based on the classification of tailings, testing, analysis, alternatives for reuse and reprocessing. Several studies have to be done over time and the results will inform the opportunities to re-process or reuse the final tailings. The possibilities and opportunities to reprocess the tailings and to get effective returns will also depend on several aspects such as concentration of the target element, price and market, but more importantly any chance to reuse the tailings would fit the current model of work in ASM.

To understand this issue, it is important to highlight the historical issues of ASM processing plants. About 30 years ago the ASM miners discharged rich gold tailings with concentrations about 30 g/ton, but with better equipment, the miners and owners of processing plants are recovering more gold including by processing the tailings, resulting in a strong reduction of gold concentration in tailings. It is important also to recognize their current recovery of silver and production of copper concentrates. About 90% of the processing plants use cyanidation at present, and almost 60% incorporate flotation techniques in operations concentrating gold, copper and zinc. This means that the final concentration of gold in tailings could be around 0.5 g/ton. The low gold grade in many ores also has an implication on the final concentration of gold in tailings. Therefore, the reprocessing of tailings and its value is driven by the practical applications of the owners of processing plants and their innovative approach over time. With this scenario, it is evident that the tailings management including re-processing and sub-products development is on the hands of owners of processing plants.

If there is a way to do a business with the tailings either for its reprocessing or reuse to achieve zero-waste, it will be through incentives to the owners of processing plants. The main stakeholders for tailings management in the Zaruma-Portovelo mining district therefore are the owners of processing plants who will need to work collaboratively, joining one group and ensuring the best practices in mining, ore processing and tailings management.

ANNEX 4.- Further Studies to Cope with Technical Alternatives for Tailings Deposition

For technical management, such as producing slurry tailings or dry tailings will imply the need to develop complementary studies.

Based on the technical analysis and taking into consideration the options presented earlier in this report, we determine the following studies are necessary:

A technical investigation in the tailings facility, which will involve:

- Performing geophysical investigation in 10 lines along the main embankment;
- Drilling to complement the geotechnical model of the dam;
- Analyzing rock and soil including for the purposes of new embankments; and
- Taking approximately 40 tailings samples for SPT analysis.

An assessment of the drainage system and phreatic level. It is important to know if the amount of flow of water through the drainage represents the amount of existing water in the area of tailing deposition.

- This test will involve performing drainage tests on the drainage system, and positioning the assessment in different parts of the tailings facility.

To investigate the environmental impacts and the leaching process, some investigations need to be carried on, including:

- Taking samples in three creeks around the tailings facility to analyze anions and cations (45 samples in three creeks);
- Taking tailing samples from inside the tailings facility for elemental analysis in ICP (10 solid samples inside of the impoundment area over the main drainage system); and
- Analyzing the neutralizing capacity of tailings.

In agreement with all owners of processing plants, update geochemical information of tailings in all processing plants including quantity of tailings produced and assessing the quality in both solid and liquid phase.

- This study will do an assessment of tailings produced in processing plants, analyzing the quantity and its quality in solid and liquid-solution.

ANNEX 5.- List of Meetings/Milestones in the Rapid Response Mechanism Project

Activities in Ecuador	Participants	Date
Meeting	Government representatives	November 8, 2018
Meeting	Government representatives	November 14, 2018
Workshop (Governance and Technical Support)	Government representatives	November 26,27, 2018
Field visit	Government representatives	December 4, 2018
Meeting	Government representatives	February 11, 2019
Meeting (Governance)	Government representatives	February 25, 2019
Meeting (Technical)	Government representatives	February 27, 2019
Meetings	Government representatives	March 11, 2019
Workshop	Academia (AIME)	March 14, 2019
Technical Meeting	Government representatives	March 15, 2019
Final Meeting	Government representatives & Industry	March 15, 2019

ANNEX 6. – Letter of Support from the Vice Ministry of Mines

MINISTERIO DE MINERÍA



Oficio Nro. MM-VM-2018-0146-OF

Quito, D.M., 08 de agosto de 2018

Asunto: Solicitud de fondos del Mecanismo de Respuesta Rápida para una "Intervención Técnica y de Gobernabilidad de Respuesta Rápida para la Relavera Comunitaria "El Tablón" (Ecuador)

Elaine Pura
CIRDI
En su Despacho

Estimada señora Pura,

La presente carta expone las conversaciones que se han mantenido entre representantes del Ministerio de Ambiente de Ecuador (Dr. Jorge Oviedo), el Viceministerio de Minas (Dr. Enrique Gallegos-Anda) con los funcionarios del Canadian International Resources and Development Institute ("CIRDI" en sus siglas en inglés) los señores Mike Ellerbeck y Francisco Gallegos, sobre la posibilidad de colaborar en áreas de apoyo técnico y de gobernabilidad para el desarrollo de la Relavera Comunitaria "El Tablón", situada en la provincia de El Oro (República del Ecuador)".

De lo anterior hemos recibido el grato mensaje de que CIRDI podría apoyar al Ministerio de Ambiente y Viceministerio de Minas en varias áreas de su experiencia. Por ello, el propósito de esta atenta comunicación a usted, es la de solicitar formalmente la asistencia de CIRDI, a través del Mecanismo de Respuesta Rápida, en las siguientes áreas:

1. -Fortalecimiento de la Gestión Integrada de Recursos, por medio de la asistencia geotécnica para evaluar el actual estado estructural de la Relavera Comunitaria "El Tablón".
2. - Mejora de la Capacidad y Gobernabilidad del Sector Público, a través del desarrollo de un Plan de Manejo para la Relavera Comunitaria, tanto a nivel intergubernamental como nacional, provincial y municipal (en adelante para futuras comunicaciones "Niveles de Gobierno").
3. - Involucrar a las Comunidades y Compartir los Beneficios, mediante el fortalecimiento de las relaciones entre los líderes de los diferentes Niveles de Gobierno, así como los responsables de la toma de decisiones que se centran en el aprendizaje de la industria, dentro del país, y en proporcionar oportunidades para el intercambio global de conocimientos.

Estas tres áreas han sido identificadas por su potencial, con el objeto de beneficiar la vida y bienestar de las personas que viven en el área de influencia del Proyecto, en aras de que éstos alcancen el bienestar que necesitan y el aumento de su nivel de vida. Además,



Oficio Nro. MM-VM-2018-0146-OF

Quito, D.M., 08 de agosto de 2018

creemos que los fondos de la Respuesta Rápida pueden conducir en el futuro a una mayor colaboración entre nuestros Ministerios y su Institución.

Por lo expuesto, estamos listos para trabajar junto con su equipo y crear actividades detalladas de entrega de proyectos que se ajusten a sus prioridades y a las muestras.

Gracias por su continuo apoyo, esperando profundizar y fortalecer nuestra colaboración interinstitucional.

Con sentimientos de consideración y estima, me suscribo.

Atentamente,

Documento firmado electrónicamente

Abg. Henry Troya Figueroa
VICEMINISTRO DE MINERÍA - MM

Copia:

Señor Abogado
Enrique Gallegos Anda Cobo
Subsecretario de Minería Artesanal y Pequeña Minería - MM

Señora Internacionalista
María Verónica Giler Alarcón
Analista de Asuntos Internacionales

ra

