

# **GISTM – Defining “Substantial” Conformance: Gold Fields’ Substantial Implementation of the GISTM at the Cerro Corona Mine in Peru and Tarkwa Mine in Ghana**

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## **Abstract**

The Global Industry Standard on Tailings Management (GISTM) provides a framework for the safe and responsible management of tailings, aiming to prevent catastrophic failures and mitigate environmental and social impacts. The GISTM sets out criteria for “meet,” “partially meet,” and “does not meet” conformance with the Standard, but does not provide or define the term “substantial conformance.” This paper presents Gold Fields’ interpretation of the concept of substantial conformance and describes its journey towards achieving it at their Cerro Corona Mine in Peru and Tarkwa Mine in Ghana.

This paper explains why Gold Fields rated many of their assets as “partially conformant” against several GISTM requirements in their Annual Tailings Disclosure Report. It also outlines the measures taken by the company to achieve substantial conformance. The benefits of achieving substantial conformance are highlighted, such as enhanced environmental and social performance and greater stakeholder trust.

Finally, the paper concludes by highlighting the importance of transparent, ongoing collaboration and knowledge sharing between industry, academia, and regulators to improve tailings management practices globally.

## **Introduction**

### **Background on the Global Industry Standard on Tailings Management (GISTM)**

The safe and responsible management of tailings is of paramount importance in the mining industry to

prevent catastrophic failures and mitigate environmental and social impacts. In response to recent incidents and the growing need for a comprehensive standard, the Global Industry Standard on Tailings Management (GISTM) was introduced in 2020. This paper aims to provide an in-depth analysis of Gold Fields' substantial implementation of the GISTM at their Cerro Corona Mine in Peru and Tarkwa Mine in Ghana.

The GISTM serves as a governance and management standard that sets the guidelines for tailings management practices. It is crucial to note that the GISTM does not introduce any novel technical requirements, but instead focuses on providing a comprehensive framework for effective management. However, it brings significant changes in terms of key appointments, roles within the company, reporting, and monitoring requirements.

To fully conform with the GISTM, mining companies must adhere to over 220 deliverables, which are outlined across 15 Principles. These principles cover a wide range of aspects related to tailings management. Notably, the requirements of the GISTM amount to a total of 77, each consisting of multiple requirements that must be met (a total of 219 requirement "parts"). It is important to emphasize that the GISTM is not solely centred around engineering disciplines. Approximately 40% of the requirements pertain to engineering, while 40% focus on governance and management activities, and the remaining 30% pertain to environmental and social disciplines.

This paper will shine a light on Gold Fields' interpretation of the GISTM's concept of substantial conformance, which is not explicitly defined within the standard. Gold Fields has undertaken a comprehensive journey toward achieving substantial conformance, as evidenced by the recently released Annual Tailings Disclosure Reports for the Tarkwa and Cerro Corona mine, where many assets were rated as "partially conformant." By examining the measures taken by Gold Fields to achieve substantial conformance, this paper aims to provide insights into the benefits of enhanced environmental and social performance and the cultivation of greater stakeholder trust.

Furthermore, this research underscores the importance of transparent collaboration and knowledge sharing among industry stakeholders, academia, and regulators. Through such collaborations, the mining industry can continuously improve its tailings management practices globally, ensuring the safety and sustainability of mining operations.

## **Purpose of the paper**

The purpose of this paper is to provide insight into Gold Fields' implementation of the Global Industry Standard on Tailings Management (GISTM) at the Cerro Corona Mine in Peru and Tarkwa Mine in Ghana. By focusing on Gold Fields' experiences, we aim to shed light on the concept of substantial conformance and its practical application.

This paper seeks to explain why Gold Fields rated some of their assets as “partially conformant” against various GISTM requirements in their Annual Tailings Disclosure Report. We will delve into the challenges and limitations faced by Gold Fields during their journey toward achieving substantial conformance, providing valuable insights into the complexities of tailings management implementation.

## **GISTM implementation**

### **Gold Fields’ journey**

As a member of the International Council on Mining and Metals (ICMM), Gold Fields made a commitment to implementing the Global Industry Standard on Tailings Management across all our tailings facilities. Over the past three years, our Global Tailings Management team has dedicated significant efforts to confirm that our four tailings facilities with the highest consequence classification achieve conformance by August 2023. This Endeavor has been accompanied by an ambitious and challenging timeline, reflecting the high bar set by the Standard.

We take pride in witnessing the transformative improvements that have occurred in tailings management, governance, and monitoring throughout the industry. It is gratifying to see the collective progress and the positive impact we are making as responsible mining practitioners. Throughout this journey, we have highly valued the collaboration with stakeholders and peers, recognizing the immense value of openly sharing our experiences, expertise, and lessons learned.

By engaging in this collaborative approach, we have fostered a culture of continuous improvement, collectively working towards enhancing tailings management practices worldwide. The exchange of knowledge and the synergy created through collaboration have been instrumental in driving meaningful change, ensuring the safety, and minimizing the environmental and social impacts associated with tailings management.

### **Achieving “substantial conformance”**

The commitment made by the International Council on Mining and Metals (ICMM) at the launch of the Global Industry Standard on Tailings Management (GISTM) in August 2020, to achieve full conformance within three years for tailings facilities with “extreme” or “very high” consequence classifications, was an ambitious yet necessary target. This commitment acted as a catalyst, driving immediate and sustained action by companies to work towards and maintain full conformance with the Standard. Gold Fields, among others, has made significant progress in this regard, which we have termed as “substantial conformance.”

However, the reality of progressing implementation while addressing site-specific challenges within the given three-year timeframe has proven to be highly challenging. It is not feasible to progress all 77 requirements simultaneously, as certain requirements must wait until others have been progressed or

completed. For example, developing breach analyses relies on establishing credible failure modes, which, in turn, is necessary to determine consequence classifications.

Various practical technical challenges exist across different jurisdictions. These challenges include limited availability of reliable testing facilities and long lead times for obtaining analytical results. Additionally, there is a relatively small pool of deep expertise in tailings management within the consulting community, which both members and other companies rely on for their expertise.

For Gold Fields, the term “substantial conformance” carries significant importance. It enables a more balanced evaluation of their adherence to the GISTM requirements, distinguishing performance from the term “partially meets.” Some organizations may have adopted the term “Meets with a Plan” as an alternative.

It is crucial to consider the broader context and the journey towards conformance when evaluating performance in tailings management. Assigning a simplistic percentage score to multifaceted aspects, such as human rights due diligence assessments, can oversimplify the evaluation process. Gold Fields recognizes the limitations of a linear approach and emphasizes the demonstration of substantial conformance.

### **Defining “substantial conformance”**

However, it is essential to clarify the concept of substantial conformance. Within Gold Fields’ interpretation, substantial conformance acknowledges the efforts made and progress achieved, even if certain elements are still in the process of being fully executed or updated. For example, a mining operation may have completed a site characterization report within the past 3 to 5 years but chooses to update it based on new findings from a recent study. While a site characterization report technically exists, the question arises as to whether the company should classify itself as “meets” due to its existence or as “partially meets” because it is not fully executed at the time of disclosure. Defining substantial conformance allows for accurate and transparent assessment of performance.

### **Disclosing substantial conformance**

#### *The Gold Fields’ Annual Tailings Disclosure Report*

In line with its commitment to the disclosure requirements of the Global Industry Standard on Tailings Management (GISTM), Gold Fields has undertaken the task of preparing an Annual Tailings Disclosure Report for each of its global operations. These reports provide a comprehensive overview of the mining operations and their Tailings Storage Facilities (TSFs), with a particular focus on those ranked with an Extreme Consequence classification, such as the Cerro Corona and Tarkwa operations, whose reports were disclosed in August 2023.

GISTM – DEFINING “SUBSTANTIAL” CONFORMANCE: GOLD FIELDS’ SUBSTANTIAL IMPLEMENTATION  
OF THE GISTM AT THE CERRO CORONA MINE IN PERU AND TARKWA MINE IN GHANA

The Annual Tailings Disclosure Report consists of three distinct sections. Part 1 offers an overview of the mining operation and its TSFs, providing essential context for the subsequent sections. Part 2 comprises a Plain language summary, which includes all the information required by Principle 15 of the GISTM. This summary aims to present the key details in a clear and accessible manner for a broader audience.

The most extensive section, Part 3, is a detailed self-assessment report. This section contains a single A4 page dedicated to each of the 219 requirement parts of the GISTM. Each page presents the specific GISTM requirement, its corresponding criteria, a justification for Gold Fields’ self-assessment rating, and a self-assessment rating itself. This report style, spanning approximately 300 pages, offers a comprehensive account of Gold Fields’ approach, methodology, and the work undertaken to achieve substantial conformance.

Initially, the team prepared a simple table using a traffic light system to indicate compliance with each principle. However, considering the “partially meets” status of certain requirements, the team recognized the need to showcase their commitment and the substantial effort involved in reaching conformance. Thus, the decision was made to adopt the detailed self-assessment report format, ensuring transparency and thoroughness in their assessment.

The Annual Tailings Disclosure report was a collaborative effort led by the Global Tailings Management Team, who worked closely with the respective mining sites. To ensure the accuracy and credibility of the report, a third-party consultant was appointed to verify the content. The scope of the verification was to confirm the validity of Gold Fields’ self-assessment, rather than conducting an independent audit. Independent reviews and audits are already conducted by Gold Fields’ engineer of record partner, independent reviewers, independent technical review board, and governance and management systems reviewers.

Prior to the official disclosure deadline, the self-assessment verifiers from the third-party consultant visited the sites and reviewed the content of the Annual Tailings Disclosure report. Their preliminary feedback provided valuable insights and bolstered confidence in Gold Fields’ self-assessment process. As a final step, the third-party verifiers issued a Statement of Assurance, confirming the accuracy and integrity of the report. This Statement of Assurance has been published on Gold Fields’ website, further reinforcing the transparency and accountability of the company’s tailings management practices.

*Why assets were rated as “partially conformant” despite substantial conformance*

The “partially conformant” rating assigned to GISTM requirements in Gold Fields’ Annual Tailings Disclosure Report can be attributed to several factors. Particularly for Tailings Storage Facilities (TSFs) with Extreme Consequence Classifications, the presence of approximately 1,000 project-affected people

downstream necessitates meaningful engagement and a comprehensive approach.

Gold Fields' teams have previously engaged these communities on various topics such as earthquakes, fire, cyanide, and explosions. However, initiating conversations specifically about tailings storage facilities poses unique challenges. It requires a gradual and ongoing process of building trust and understanding, acknowledging that it is a journey rather than a one-time interaction.

To maintain a high standard for themselves, Gold Fields recognized the need to integrate the findings of comprehensive human rights due diligence assessments into their site characterization reports and emergency preparedness and response plans. Although this integration is not a direct requirement of the GISTM, Gold Fields understands that true effectiveness and impactful change can only be achieved by ensuring that this crucial information becomes an integral part of their systems and processes. Simply fulfilling a checklist or storing the information on a shelf without integration and action contradicts Gold Fields' perspective.

By acknowledging the importance of integrating human rights considerations into their operations, Gold Fields aims to go beyond mere compliance. They strive to create tangible and meaningful improvements in their tailings management practices, actively seeking to address the concerns and needs of project-affected communities downstream. This commitment to holistic and inclusive engagement is a key factor in the rating of assets as “partially conformant,” reflecting Gold Fields' dedication to continuously advancing their tailings management approach.

## **Gold Fields' journey towards substantial conformance at the Cerro Corona and Tarkwa mines**

### **Cerro Corona**

The Cerro Corona mine has a single, extreme consequence classification TSF, approximately 156 m in elevation, constructed at an altitude of 3,400 m above sea level. In August 2023, the Gold Fields Cerro Corona tailings stewardship team conducted an assessment of the TSF, determining its conformance level to be 85% in accordance with the requirements outlined in the Global Industry Standard on Tailings Management (GISTM). It is worth noting that all material dam safety requirements have been thoroughly addressed and resolved. However, it is important to delve into the significance of this assessment and what it truly signifies in terms of the facility's compliance and performance.

To clarify, it indicates that all critical dam safety requirements have been addressed, confirming the safety and stability of the TSF. Furthermore, it signifies that 87.5% of the 219 individual “parts” of each requirement of the GISTM have been successfully implemented and are in conformance.

GISTM – DEFINING “SUBSTANTIAL” CONFORMANCE: GOLD FIELDS’ SUBSTANTIAL IMPLEMENTATION  
OF THE GISTM AT THE CERRO CORONA MINE IN PERU AND TARKWA MINE IN GHANA

Achieving this level of conformance has been a monumental effort, with the Cerro Corona team completing an impressive total of 161 of 219 criteria projects and deliverables within a timeframe of approximately three years.

### **Tarkwa**

The Tarkwa mine has four operating TSFs, three of which have been assigned an Extreme to Very High Consequence Classification. In August 2023, the Gold Fields Tarkwa tailings stewardship team conducted an assessment of the TSF 1, 2 and 3 at the Tarkwa mine, determining its conformance level to be 79% in accordance with the requirements outlined in the Global Industry Standard on Tailings Management (GISTM). It is worth noting that all material dam safety requirements have been thoroughly addressed and resolved.

To clarify, it indicates that all critical dam safety requirements have been addressed, confirming the safety and stability of the TSF. Furthermore, it signifies that 79 % of the 219 individual “parts” of each requirement of the GISTM have been successfully implemented and are in conformance.

Achieving this level of conformance has been a monumental effort, with the Cerro Corona team completing an impressive total of 238 of 301 criteria projects deliverables within a timeframe of approximately three years.

### **Measures taken by Gold Fields**

The measures taken by Gold Fields encompassed the establishment of robust governance and management mechanisms. This included the creation of a comprehensive Tailings Management Policy, the appointment of key roles responsible for tailings management, and the development of a Tailings Management Framework, Management Standard, Incident Guideline, and RACI (Responsible, Accountable, Consulted, and Informed) matrices.

At the operational level, the Cerro Corona and Tarkwa Tailings Stewardship teams were formed from the outset, working collaboratively with the Global Tailings Management team to address all aspects of the GISTM requirements. To promote technical expertise and adherence to best practices, an Engineer of Record firm was appointed for each operation, to lead technical studies and TSF design components.

Recognizing the importance of independent review and validation, Gold Fields engaged third-party consultants at both operations to conduct comprehensive reviews and audits of various aspects of the TSF management process.

Throughout the journey towards substantial conformance, the Cerro Corona Tailings Stewardship team actively engaged internal stakeholders, including over 450 contractors who are members of the downstream community. Robust, multi-level training was conducted to enhance awareness and understanding of tailings management practices and ensure alignment with the established standards.

Additionally, the team began the process of consulting with local non-governmental organizations (NGOs) and the Defensa Civil to disseminate technical information and foster dialogue with the communities surrounding the mine. This proactive engagement aimed to promote transparency, foster understanding, and address any concerns or questions raised by the community stakeholders.

The Tarkwa Tailings Stewardship team simultaneously commenced their community engagement program, nominating local volunteers to receive dedicated tailings training. The team has worked closely with community Chiefs, internal and external stakeholders to communicate messaging about tailings management.

Gold Fields' commitment to achieving substantial conformance at the Cerro Corona and Tarkwa Mine has involved comprehensive measures spanning governance, technical expertise, independent validation, stakeholder engagement, and community collaboration. Through these efforts, Gold Fields is dedicated to implementing best practices in tailings management and ensuring the safety, environmental responsibility, and positive social impact of its operations.

### **Challenges faced**

During the journey towards achieving substantial conformance, Gold Fields encountered several significant challenges. These challenges encompassed various aspects, including language barriers, extensive learning requirements, cultural transformation, tight timeframes, global coordination, community engagement, and interdisciplinary skill development.

One of the challenges faced was the need to work across two languages, English and Spanish, at the Cerro Corona mine. Operating in bilingual environments necessitated effective communication and translation to ensure clear understanding and collaboration among team members.

Learning the requirements of the Global Industry Standard on Tailings Management (GISTM) inside out proved to be a demanding task. The comprehensive understanding of the standard was crucial to implementing the necessary measures for conformance.

In addition to completing individual projects, Gold Fields had to create a new culture and way of working within the organization. This involved not only meeting specific project goals but also fostering a broader shift in mindset and work practices to align with the principles and requirements of the GISTM.

The timeframe for establishing the new culture, governance and management framework, and closing out all 219 requirement parts was particularly challenging. The process required efficient planning, coordination, and implementation of multiple initiatives within a limited timeframe.

Conducting meetings across multiple time zones added another layer of complexity to the process. Coordinating schedules and ensuring effective participation from team members in different regions demanded careful organization and adaptability.



As the Cerro Corona and Tarkwa TSF’s have an Extreme Consequence Classification, educating more than 1,000 people on the risks associated with tailings management at both operations presented a considerable challenge. This task required the development and implementation of robust training programs to enhance awareness and understanding of tailings-related risks among employees and contractors.

Establishing strategies to connect and engage with communities without causing unnecessary alarm was a crucial challenge. Balancing effective communication and community involvement while addressing concerns and building trust required careful planning and sensitivity.

It was not feasible to progress all 77 requirements of the GISTM simultaneously, as certain requirements could not commence until others had been progressed or completed. For example, developing breach analyses relies on establishing credible failure modes, which, in turn, is necessary to determine consequence classifications.

Various practical technical challenges exist across different jurisdictions. These challenges include limited availability of reliable testing facilities and long lead times for obtaining analytical results.

Furthermore, the journey towards substantial conformance required engineers to develop interdisciplinary skills. For example, understanding and conducting human rights due diligence assessments, as well as recognizing the importance of collaboration with social practitioners and environmental professionals, expanded the skillset beyond traditional engineering disciplines.

Overcoming these challenges demanded resilience, adaptability, and a collaborative approach. Gold Fields tackled these obstacles head-on, implementing strategies and initiatives to ensure the successful progression towards substantial conformance and the enhancement of their tailings management practices.

### **Benefits of achieving substantial conformance**

Substantial conformance to the Global Industry Standard on Tailings Management (GISTM) brings forth numerous benefits for Gold Fields and their tailings management practices. These benefits encompass the integration of interdisciplinary teams, enhanced design and engineering approaches, the integration of human rights, social and environmental considerations, fostering a culture of sharing and openness, assurance of facility integrity, technological advancements, global collaboration, and valuable learning experiences from independent technical reviewers.

One significant benefit is the integration of interdisciplinary and international teams. Substantial conformance encourages collaboration and breaks down silos, ensuring that tailings design and engineering no longer operate in isolation. The involvement of diverse expertise from various disciplines allows for a more comprehensive and holistic approach to tailings management, incorporating considerations beyond traditional engineering aspects.

By achieving substantial conformance, Gold Fields successfully embeds human rights, social, and environmental considerations into the design and operation of their facilities. This integration ensures that ethical and sustainable practices are upheld, fostering a positive impact on local communities and the environment.

The Annual General Meetings (AGMs) play a pivotal role in creating a culture of sharing and openness within Gold Fields. These gatherings provide a platform for knowledge exchange, facilitating easier collaboration and fostering a sense of collective responsibility towards tailings management. The AGMs serve as opportunities to learn from each other's experiences, thereby promoting continuous improvement and best practices, conducting an AGM in two languages was an enjoyable and engaging experience.

Substantial conformance offers reassurance that the facility is built on sound engineering principles and is designed to meet the highest standards of safety and environmental performance. This assurance not only instills confidence within Gold Fields but also among stakeholders and the wider community.

Technological advancements in the field of TSF monitoring became an integral part of substantial conformance. The adoption of innovative monitoring technologies enhanced the efficiency and effectiveness of monitoring practices, enabling real-time data analysis and proactive risk management. This integration of technology further strengthens Gold Fields' commitment to continuous improvement and informed decision-making.

Achieving substantial conformance opens up opportunities for Gold Fields to work globally, collaborating with international teams and leading professionals in the field of tailings management. This global engagement facilitates the exchange of ideas, sharing of best practices, and exposure to diverse perspectives, enriching the overall knowledge and expertise of the organization.

Participating in quarterly working groups provided our teams with a sense of belonging to a global initiative, enabling them to exchange ideas and insights across continents. These collaborative sessions fostered the establishment of international relationships with peers from diverse backgrounds, transcending borders and facilitating valuable cross-cultural learning experiences.

Furthermore, Gold Fields gains valuable insights and learning experiences through engagement with independent technical review board members and independent reviewers. These experts provide objective assessments and guidance, ensuring rigorous scrutiny of tailings management practices. This collaboration promotes accountability, transparency, and continuous improvement within Gold Fields' operations.

Overall, the benefits of substantial conformance extend beyond compliance with the GISTM, enabling Gold Fields to advance their tailings management practices, enhance environmental and social performance, and contribute to the overall sustainability of their operations.

## **Conclusion**

In conclusion, the concept of substantial conformance within the Global Industry Standard on Tailings Management (GISTM) holds significant benefits for companies like Gold Fields and the broader mining industry. Throughout this paper, we have highlighted key points related to substantial conformance and its implications for tailings management practices.

The benefits of substantial conformance include the integration of interdisciplinary teams; the embedding of human rights and environmental considerations into design; the fostering of a culture of sharing and openness through AGMs; the assurance of facility integrity, technological advancements, and global collaboration; and the valuable learning experiences gained from independent technical reviewers.

However, the journey towards substantial conformance is not without its challenges. Gold Fields encountered obstacles such as language barriers, extensive learning requirements, cultural transformation, tight timeframes, global coordination, community engagement, and interdisciplinary skill development. However, these challenges were met with determination, resilience, and a collaborative approach.

The significance of substantial conformance lies in its ability to drive positive change and elevate tailings management practices to new heights. It promotes a comprehensive and holistic approach that goes beyond mere compliance. By integrating diverse disciplines, considering social and environmental factors, and fostering a culture of transparency and learning, substantial conformance contributes to improved safety, sustainability, and stakeholder trust.

As we look to the future, it is imperative to maintain the momentum and continue striving for excellence in global tailings management practices. We call upon industry stakeholders, academia, and regulators to collaborate, share knowledge, and actively work towards refining and implementing best practices. By engaging in ongoing dialogue, learning from each other’s experiences, and embracing innovative approaches, we can collectively enhance the safety, environmental responsibility, and social performance of tailings management.

## **References**

- International Council on Mining and Metals (ICMM). (2020a). Global Industry Standard on Tailings Management. International Council on Mining and Metals.
- International Council on Mining and Metals (ICMM). (2020b). Global Industry Standard on Tailings Management Good Practice Guide. International Council on Mining and Metals.
- International Council on Mining and Metals (ICMM). (2020c). Global Industry Standard on Tailings Management Conformance Protocols. International Council on Mining and Metals.

