Tailings Management at Porgera

The Porgera mine operates under a comprehensive permit issued by the Government of Papua New Guinea (PNG). Under this permit, the Porgera Joint Venture (PJV) is required to follow a stringent government-approved environmental management and monitoring program.

Consistent with other mining projects in the area, riverine tailings and erodible waste rock disposal were in place before Barrick acquired its interest in the mine in 2006. During the planning and development phase of the mine, the PNG Government approved the practice of riverine tailings in 1989.

Following a comprehensive review, Barrick put in place numerous improvements to reduce the discharge of tailings and improve environmental processes and performance at PJV, engaging with world-leading scientific and environmental experts. Our commitment to further improvements continues today.

Public Reporting

Barrick has improved transparency and public reporting related to environmental management at PJV. The Porgera 2010 Annual Environmental Report has been independently review by CSIRO and is publicly available. The site's 2009 Annual Environmental Report has also been released, following CSIRO review. Future reports will also be made publicly available as a matter of standard company practice.

Additional information can also be found in the Porgera Riverine Tailings and Waste Rock Management pamphlet.

Background

The Porgera mine faces unique geological and environmental challenges. The mine is located in the extremely rugged mountainous terrain of PNG, a country situated in what is known as the 'Pacific Ring of Fire', a region where earthquakes occur. The Porgera Valley features very steep terrain and deep soil cover and experiences sudden, very high rainfall, leading to frequent landslides.

While best practices in construction and management of tailings impoundments can control certain risks, there is no adequate means of controlling the threat to ground stability posed by seismic activity, and high rains – natural forces that combine in an uncommon manner in the Porgera Valley. These significant risk factors and concerns make safe construction and operation of a conventional tailings storage facility unviable.

PNG Government approval for riverine disposal was granted only after careful review of Porgera 's Environmental Plan and was contingent upon the mine demonstrating, through ongoing monitoring, that river water quality further downstream meets ambient quality standards set to protect public health (including drinking water guidelines) and aquatic ecosystems. The PJV environmental permit requires extensive river monitoring and strict compliance with discharge and monitoring requirements.

Evaluation Study by Barrick Review

Upon Barrick acquiring its interest in the PJV in 2006, a comprehensive two-year review was conducted to assess and evaluate alternatives to improve and reduce the discharge of tailings. The $5 million review examined the feasibility of building a large tailings storage facility (TSF) and other alternatives to mitigate environmental impacts. The evaluation team included an external engineering firm and other experts and took into account a full range of highly complex technical, environmental, social and regulatory factors - many unique to PNG and the Porgera Valley. The review examined nearly 30 separate alternatives in the pre-screening and screening phase. Options, ranging from construction of a conventional tailings dam, to thickening of tailing and storage waste dumps, to in-pit disposal, were discussed. A number of these options were then evaluated against standard scientific and practical criteria.

The study confirmed significant risk factors in ensuring a stable foundation for a large traditional tailings storage facility due to high rainfall, seismic activity and steep, highly erodible terrain, consistent with research conducted during the original mine permitting process in 1989. In addition, social factors such as the law and order challenges in PNG and, in particular, the presence of illegal miners, were identified as significant risk factors. Reviewers recognized that groups of illegal miners would likely dig and pan for gold from tailings captured within the tailings impoundment, leading to erosion of the dam structure. Given geographic, seismic and other scientific, technical and social considerations, alternative options were subsequently ruled out. Based on extensive analysis, including from independent experts, we concluded that riverine disposal of tailings at this operation was the most viable option from a technical standpoint.

Porgera Environmental Management and Monitoring Program

Extensive effort and research has been undertaken to design mining processes and practices at the Porgera mine in order to minimize its impact on the environment. Examples of the measures in place include:

- Tailings undergo significant precautionary treatment at the site before discharge to mitigate any potentially harmful effects. This includes a multi-step neutralization process in the mine's treatment plant and a series of chemical processes that destroy cyanide and neutralize the pH of the water. The mine's processing plant neutralisation circuit has demonstrated a track record of successfully neutralizing the tailings. The following actions have this neutralizing effect:
    - Cyanide destruction of CIP (carbon in pulp) tails was added in 2007 — which breaks down cyanide into stable compounds. PJV became Cyanide Code certified in 2009.
    - The sequential addition and mixing of the processing plant effluents extracts dissolved metals in the water by the process of co-precipitation.
    - Slaked lime is also added to the tailings to raise pH prior to discharge.

- The Porgera mine's extensive water quality and biological testing and monitoring use processes that were developed and optimized in conjunction with the Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia's national science agency. Porgera also conducts extensive biological testing to determine the impact of discharges on the aquatic environment.

- We have a team of more than 20 on-site environmental staff with technical expertise, many of whom are involved in monitoring, who ensure the implementation of the site's detailed Environmental Management Plan.

- Under the mine's environmental permit, the formal compliance point for measuring water quality downstream of the mine is the point known as SG3. SG1 and SG2 are considered indicator sites under the mine's Environmental Management and Monitoring Program. The PJV takes measurements starting at SG1, 8 km downstream from the mine. Further downstream, additional measurements are taken at SG2, 42 km downstream from the mine. Both of these measurement points are at locations where population is scarce and the river is not used as a source of drinking water or for domestic use (The Porgera Riverine System). Then, at the compliance point under the environmental permit known as SG3, further measurements are taken, as well as at further points downstream.

Permit Compliance

Since Barrick acquired its interest in the mine in 2006, the PJV has continued to operate and comply with PNG permit conditions, which are specific and stringent, while engaging in continuous improvement of environmental performance. The, PJV has met compliance with mixing zone water quality criteria at SG3 (compliance point) since the start of mining operations. Porgera also monitors other sampling points both closer to the mine and further downstream.

Monitoring results are sound and the mine has never exceeded its compliance levels. Results to date show that the river system is operating as predicted and downstream of the mixing zone and water quality and sediment are consistent with metal limits established by the Australia and New Zealand Environment and Conservation Council (ANZECC). Porgera's

2010 Annual Environmental Report confirmed that dissolved concentrations of all relevant trace metals at SG2 were lower than the respective compliance criteria set for SG3. This occurred even though SG2 is not an official compliance point and is located about one quarter of the down-river distance to SG3 (42 kms downstream).

Compliance criteria are significantly more stringent than PNG's public water quality requirements, as set out in the PNG Schedule of Water Quality Standards (applied country-wide under the PNG Environmental Act).

Porgera is in compliance with provisions of the PNG Mining Act (1997), the PNG Environment Act (2000) and related regulations. In 2006, when the PNG Government converted the Porgera Environmental Plan approval to an Environment Permit under the new Environment Act (2000), the mine's compliance standards were reviewed and were not amended.

Continuous Improvement

Barrick has put a number of measures in place to reduce the environmental impact of the tailings, which have resulted in material improvements.

Given the limited practical and feasible alternative approaches to riverine tailings disposal, Barrick has taken significant steps to improve environmental performance and ensure that the PJV mine deposits fewer tailings in the river system. These actions are in keeping with Barrick's commitment to a responsible course of action at PJV, as well as the "precautionary principle" and OECD Guidelines' Commentary, which calls for "continual improvement of the system" of environmental management. Progress to date includes:

1. A new $42 million tailings paste plant commissioned in mid-2011, which has had a significant positive impact on the tailings stream. The plant process removes significant portions of the coarser content of the tailings mixture; cement is then added to these coarser solids and the mixture is used to fill the voids in the underground mine, a process known as "cemented paste backfill."

   The environmental benefits of the use of this process are two-fold: it reduces the

total quantity of the tailings solids discharged by approximately eight percent for permanent storage underground, and it creates a finer tailings mix in general, which tends not to settle onto the riverbed, and is more likely to be carried through the river system as washload, rather than being retained in natural accretion zones. The company plans to use this plant to produce paste in the maximum amount that can be stored in available underground areas. Additionally, plans to increase ore production from the underground mine will result in an opportunity to store more tailings in the underground voids in the mine as backfill, thus diverting further tailings from the river.

2. In November 2009, Porgera was officially certified under the International Cyanide Management Code for safe and responsible management of cyanide use and disposal. This achievement is consistent with Barrick's commitment to implement the Code at its operations worldwide that use cyanide. The cyanide destruct circuit commissioned by the mine in 2008 has reduced cyanide discharge concentrations four-fold. Significantly, the use of the cyanide destruct circuit has also resulted in reductions in dissolved metal concentrations detected at SG2.

3. PJV is implementing Barrick's global Environmental Management System, a framework of policies and obligations that govern environmental performance and is aligned with international standards. In 2012, the operation is also pursuing International Organization for Standardization (ISO) 14001 standard certification. To achieve this certification, an Environmental Management System (EMS) must be formally certified by a third-party to meet all requirements. Meeting ISO 14001 is an important tool that confirms the company's ability to control environmental impacts, improve environmental performance, and systematically set, manage and achieve environmental objectives. This standard can also provide assurances to stakeholders.

Barrick's Precautionary Approach

Recognizing the nature of the mining industry and that mining, like all human activity, impacts the environment, Barrick adopted a precautionary approach. We acknowledge that there are impacts to the existing natural environment, both temporary and long-lasting, due

to the presence of our mining operations. We take a precautionary approach to environmental management throughout the life of a mine - from development through closure – by first assessing potential impacts, then evaluating how to avoid, mitigate or control these impacts. This approach is applied to all Barrick sites around the world, including Porgera. Controls typically include putting in place multi-layers of environmental protection and robust environmental management systems that include advanced planning against possible future events.

As part of this approach, in 2009, Barrick approved and initiated the implementation of five corporate-wide environmental standards: a Water Conservation Standard, a Biodiversity Standard, a Mine Closure Standard, an Environmental Incident Standard and a Climate Change Standard. These standards align with international standards in a variety of areas of environmental management, including cyanide management and water reporting.

Third-Party Verification

Barrick relies on world-class science, government regulations and stakeholder engagement to inform its environmental practices. The company conducts a variety of environmental audits and independent assessments, many of which are performed by third-parties. These audits verify that management systems are adequate to ensure performance commitments are achieved and that operations are in compliance with government regulations and internal standards.

At PJV, independent, site-specific checks are also undertaken to determine that environmental monitoring results are accurate and that current ecological effects have been identified. All samples that require trace metals analysis, including water, sediment and biological samples are sent to independent external laboratories, such as the National Measurement Institute in Australia, to measure the very low levels of trace metals. This testing method has been used on all relevant samples since baseline studies were conducted prior to the commencement of mining and for the two decades since. As of 2011, a CSIRO laboratory validates the National Measurement Institute data by analyzing trace metals in duplicate samples.

The Porgera Annual Environmental Report is prepared by the PJV for the PNG Department of Environment and Conservation and produced in accordance with PJV's Environmental Management Plan. The report contains detailed measuring data and monitoring results. The report is independently reviewed by CSIRO, which provides expert, third-party input to ensure it is technically sound. In addition, a multi-year investigative program by PJV and CSIRO is underway to determine the presence and ecological effect of trace metals in lowland river environments. The investigations are aimed at providing an early warning of potential ecological effects.

The Porgera Environmental Advisory Komiti (PEAK) is a multi-stakeholder advisory body which seeks to ensure PJV activities are consistent with international best practices in social, economic and environmental terms. PEAK was established in 1997 as an independent body to oversee the implementation of a series of CSIRO recommendations for environmental improvements at PJV. PEAK members, who include technical experts, representatives from the PNG Government, international NGOs, NGOs from PNG, as well as representatives of the Porgera mine, continue to make valuable contributions. In 2010, PEAK released its first report card on the health of the river system downstream from the mine, with data and assistance from PJV. The PEAK report analyzed testing data and made detailed observations about the measurements of each of the testing points. This report has also been disclosed to the public.

The Porgera Riverine System

Riverine disposal at Porgera is different in many respects than at other mines around the world, due in part to natural conditions at the site. The area's high elevation, mountainous terrain, high rainfall and seismic activity not only pose engineering challenges to the mine, but contribute to high rates of runoff and soil erosion in areas unaffected by the mine (such as areas found upstream of the mine). The Porgera river system, which becomes the Lagaip and Strickland rivers downstream of the mine, is a fast-moving system that moves through steep terrain in its upper reaches. Similar to other highland rivers, the river is turbulent and rapid flowing in this section, and, due to its erosive qualities, carries a naturally occurring high sediment load. Overall, the natural physical aspects of the river (e.g, altitude,low temperature and fast flow/turbidity) has suppressed the abundance of aquatic life. Other unique qualities of the main river system are its high alkalinity and the natural capacity of

sediments to adsorb dissolved metals, which results from naturally occurring limestone being eroded and carried through the river.

An ongoing joint study of the Strickland River system undertaken by the University of California (Berkeley) and the Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia's national science agency, recognized that the river system is one of the fastest accumulating riverine floodplains in the world, rising by about one centimeter per year. This demonstrates that the system naturally carries a great deal of silt. Strict ongoing monitoring of water and fish samples confirms that Porgera's addition to sediment load is well within the river system's natural ability to carry large amounts of sediment.

PJV provides logistical support to these studies and in return, receives information on mine-related sediment deposition in the region. Results to date show that the river system is operating as predicted and downstream of the mixing zone, the water quality and sediment are consistent with metal limits established by the Australia and New Zealand Environment and Conservation Council (ANZECC).

The company recognizes that there are localized, temporal impacts to the river system. Based on numerous studies and biophysical factors associated with the river system, the PJV maintains that these negative impacts on the river system are reversible over the long-term.