

Prepared for  
PT Freeport Indonesia  
Jakarta, Indonesia

Audit Report:  
2008 External Environmental Audit



**MWH**

**BUILDING A BETTER WORLD**

## EXECUTIVE SUMMARY

As part of the 300K expansion Environmental Impact Statement (ANDAL), PT Freeport Indonesia (PTFI) voluntarily committed to perform an External Environmental Audit every three years, with the first audit conducted in 1996. MWH (formerly Montgomery Watson Harza) was selected to conduct the 2008 External Environmental Audit, the fifth external audit of its type that has been completed since the 300K ANDAL commitment.

The External Environmental Audit consisted of an independent, professional, team-based evaluation focused on environmental considerations. The Audit team, consisting of MWH staff and Indonesian and international subcontractors, performed facility observations at the PTFI project site in Papua the week of November 9, 2008. At PTFI's request, several representatives from the Indonesian regulatory community (Ministry of Environment, Department of Energy and Mineral Resources, Environmental Impact Agency of Papua Province, and the Mimika Environmental Office in Timika) were invited to participate as observers in the Audit. Several accepted the invitation then subsequently cancelled, with only one participant from the Mimika Environmental Office joining the field exercise.

The Audit was conducted in general conformance with ISO 19011:2002 and the Audit Procedures Manual (APM) prepared specifically for this Audit. The Audit addressed all key operational areas and support facilities that comprise PTFI's Papua operations, and reviewed PTFI's general compliance with the key Indonesian government environmental requirements including the Contract of Work (COW), ANDAL, and Environmental Management Plan/Environmental Monitoring Plan (RKL/RPL) requirements.

Major areas of consideration included:

- Sustainable development (SD);
- Environmental management systems;
- Regulatory compliance;
- Exploration activities;
- Overburden, tailings, and other waste management;
- Stormwater and groundwater management;
- Mine closure and reclamation;
- Emergency planning and response; and
- Biodiversity programs.

Key results from the audit are summarized below. Detailed assessments, explanations, and recommendations are provided in the body of the main report.

### Sustainable Development

The Freeport McMoRan Copper & Gold, Inc. (FCX) corporate framework for sustainable development has been based on the guidance and principles of the International Council on Mining and Metals (ICMM). PTFI was observed to be diligently following the cited sustainability guidelines applicable to this Audit. PTFI, as FCX's largest operation, has served as a key learning center and proving ground of sustainable development issues for FCX.

## Environmental Management Systems

PTFI's ISO14001-certified Environmental Management System (EMS) is a maturing, functional, and well-recognized system which has been integrated across the PTFI Papua operation. The EMS is well-embedded, from the work-controlling document level to high-level strategy making. The system has been refined over a period of years, to reduce environmental risk and seek continual improvement.

The PTFI Environmental Policy, last updated in March 2007, is posted in key project areas in English and Bahasa Indonesia; most of the workforce was familiar with it.

The environmental monitoring program is comprehensive, and PTFI has complied with all regulatory monitoring and sampling requirements.

PTFI demonstrates a strong commitment to continuous improvement, setting objectives on a yearly basis using a mature aspects and impacts register. This enables the development of action plans that reduce the impacts of significant environmental aspects targeted for that year. The Audit team identified specific suggestions for continued improvement in the monitoring program, laboratory practices, action plans, EMS performance reporting, corrective action implementation, and communication of the Environmental Policy.

## Regulatory Compliance

Regulatory requirements and statutory changes have occurred since 2005, increasingly delegating various types of environmental regulatory authority to provincial and regency levels. PTFI should continue to work closely with the regional government on environmental management issues in preparation for this change.

New laws and regulations require interagency authority adjustment, specifically for compliance monitoring, and in some cases will require modification of PTFI's current RKL and RPL requirements. The Audit team recommends that PTFI refine its plan for continuous adjustment to meet the dynamic regulatory amendments and the frequent changing of Ministerial Decrees for technical directives at the operational level.

## Exploration Activities

The evaluation of exploration activities was limited, as the only exploration activity at the time of the Audit was drilling to identify a limestone deposit for a potential cement plant. Representative exploration sites (active and closed) should be included in the next internal compliance/EMS audits undertaken.

## Overburden Management

PTFI's overburden management strategies are designed to mitigate and/or control acid rock drainage (ARD). This management strategy employs the use of a combination of overburden segregation (including strategic placement of Type 1 limestone); overburden blending to provide a net neutralizing chemical profile; and cover schemes designed to control water infiltration and provide long-term availability of alkalinity.

MWH supports PTFI's implementation of the combination of surface water drainage, regrading and the rock drain at the toe of the overburden stockpile (OBS) and believes that these three closure techniques will collectively be the most effective management method to stabilize the Lower Wanagon OBS slope and reduce erosion rates. The Audit report includes a number of recommendations to evaluate the specific details related to implementing these approaches.

## Storm water and Groundwater Management

Significant progress in managing stormwater and surface water has been made. PTFI developed a series of action plans summarized in the Mill and Mine Drainage Master Plan. Aspects of this plan could be improved and specific recommendations (mostly related to ongoing sediment management), are provided by the Audit team.

The large majority of the key facilities had stormwater management provisions in place, including positive drainage around buildings and collection sumps that included oil/water separators to capture discharge from contained areas where lubricants or reagents were used or stored. The Audit team provides recommendations for improvement of stormwater management for two locations: port site and Wanagon OBS.

## Tailings Management (ModADA)

The current PTFI management practice of controlled riverine tailings transport and deposition to an engineered area remains the best option available for the operation. The lateral limits of environmental impacts associated with tailings disposal within the Modified Ajkwa Deposition Area (ModADA) are fixed and defined by the levee systems.

Impacts associated with the fraction of tailings, not reporting to the ModADA, remain consistent with those anticipated and covered by the Government of Indonesia (GOI) approved 300K ANDAL. PTFI commissioned a detailed evaluation of sediment retention technologies, and large-scale implementation and evaluation of these techniques is ongoing.

PTFI hydrology staff has continued to refine the groundwater regime, including flow gradients and velocities for the ModADA and adjacent areas including Timika, using monitoring data from wells and piezometers. MWH recommends that the groundwater flow and transport model for the ModADA be finalized, including potentiometric levels and local and regional groundwater gradients.

The current procedures and high level of commitment of all relevant PTFI departments has greatly facilitated the effective implementation of the tailings ARD control program. Overall, the results suggest that the risk of ARD from tailings depositing in the bulk of ModADA in 2008 has been low to negligible. An independent review of the ARD program by Environmental Geochemistry International (EGI) provided an interpretation of recent ModADA geochemistry data and found that the Acid Neutralizing Capacity (ANC) to Maximum Potential Acidity (MPA) ratio continues to meet or exceed the Standard Operating Procedure (SOP) target of 1.5 at all locations. Further recommendations for prevention of ARD in the ModADA are provided in the Audit report.

MWH continues to recommend that PTFI evaluate the environmental implications of the Otomona River post-closure. Each option poses challenges that should be carefully evaluated in relation to regulatory requirements, so that preferred options may be incorporated into current planning activities.

PTFI has completed a comprehensive Tailings River and Management Plan (TRMP) Incident Action Plan (TIAP) written in both English and Bahasa Indonesia. The TIAP is a significant improvement in emergency planning, but certain aspects need refinement.

## Mine Closure/Reclamation

General closure conditions are consistent with the 2005 Audit with the following exceptions:

- Closure success is more apparent at the mine and the Carstenz OBS, as more inactive surfaces have become available for reclamation and historical reclamation plantings have matured. Those portions of the Carstenz OBS that are now at final post-mining configuration are reclaimed and revegetated; and
- PTFI is currently responding to new regulations by the Minister of Energy and Mineral Resources Number 18 Year 2008 concerning Reclamation and Mine Closure, which call for existing mines to submit a Mine Closure Plan by the end of May 2009. This regulation also required a Five Year Reclamation Plan, which was submitted in December 2008 and forecasts a total of 325 additional hectares to be reclaimed at the Grasberg Open Pit stock piles during years 2009-2013.

## Waste Management

Waste management is a central theme for the internal environmental inspection program, carried out annually. A site-wide waste management plan is strongly recommended, along with procedures to allow better classification of waste streams. The plan should be based on a comprehensive waste audit program.

It is recommended that storage of all hazardous (B3) materials be centralized if possible, and that a B3 storage facility be developed at the MP38 landfill. Additional recommendations address contamination, inert landfill management, security, and existing hazardous materials storage.

As per the 2005 Audit recommendations, the air curtain incinerator near the MP73 landfill has been decommissioned, and the fuel storage and containment facilities around the Mill area have been improved. Fuel storage at the bottom of a failure slope remains a high risk. The limited geotechnical modeling of this area that has been undertaken to date should be supplemented with a detailed site-specific geotechnical risk assessment. A future location for fuel tank storage sites should be assessed with regard to environmental aspects, such as geotechnical stability.

## Emergency Preparedness and Response Programs

The PTFI job site has a mature safety culture. Safety signage in risk areas was found to be appropriate, staff understands their obligations, personal protective equipment is widely used, and area supervisors actively ensure compliance. In most operational areas, spill kits are easily found and well-stocked.

The Audit team recommends that Code of Practice COP-14 be modified to provide clear guidance on extended spills involving hydrocarbons and waterways, with particular reference to the unique environmental circumstances found in the Lowlands. PTFI should follow international best practice and adopt a validation sampling approach to provide verification of successful land-based remediation of hydrocarbon spill sites.

Responses to emergency situations (real or simulated exercises) deserve further examination and should be closed out by documenting and implementing performance improvements and follow-up actions.

## Biodiversity Considerations

PTFI biodiversity programs extend across the operations from highlands to the coast. The Audit review of biodiversity aspects of PTFI operations was high-level (e.g., not data based) and determined that PTFI is achieving their biodiversity management objectives.

PTFI's highland reclamation programs have focused on the use of native species and practice great caution with use of non-native species, which fulfills requirements of their reclamation plan. PTFI's highlands reclamation operations have completed extensive research, experimentation and monitoring to determine optimal native species and methods for restoring and stabilizing disturbed areas.

The Tailings Reclamation Development Center at MP21 produces plants and seeds for reclamation and grows edible and other commercial crops, demonstrating the technical feasibility of agricultural and other commercial cropping activities on soils containing tailings. PTFI has expended considerable effort in demonstrating effective techniques for revegetating the ModADA, but as it is still an active area of operation, decisions on eventual uses remain many years away.

Deposition of tailings and natural sediments has created islands and formative bars in the Ajkwa Estuary. The increased sediment loads from the ModADA resulted in expansion of the mangrove communities in the estuary, in particular on the newly-formed Ajkwa Island. Mangrove ecosystem conditions (fauna and flora) in the Ajkwa River estuary appear to be in good condition, suggesting that PTFI's management and monitoring activities (as per RKL/RPL requirements) are successful in the project area.

PTFI's marine and estuarine monitoring program is extensive and implemented well. The program has produced an extensive database for evaluating the effect of the tailings and natural sediment on aquatic life, which are consistent with those predicted by the 300K AMDAL and Environmental Risk Assessment. The program also is providing a significant contribution to knowledge of the biota and ecology of southern Papua and the Arafura Sea.

PTFI has made significant contributions over the years to the biodiversity knowledge base of the region through supporting research, publications, and its own research and monitoring programs. The Audit team provides recommendations for further improvements within each of these various biodiversity programs.