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D'APPOLONIA
ECMG

REPORT OF THE

EXTERNAL COMPLIANCE MONITORING GROUP (ECMG)

**FIRST SITE VISIT
DECEMBER 2006**



Ahafo Mining Project, Ghana Ahafo South Area

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SUBJECT: FIRST VISIT OF THE D'APPOLONIA ECMG TO THE AHAFO MINING PROJECT, GHANA, DECEMBER 2006

Introduction and Executive Summary

1. This report summarizes observations made during the first field visit (December 4 – 7, 2006) by D'Appolonia S.p.A., Italy (D'Appolonia), serving as the External/Independent Environmental, Health and Safety (EHS) Compliance Monitoring Consultant (referred to as the External Compliance Monitoring Group – ECMG) for the Ahafo South Mining Project, Ghana (“the Project”).
2. This External Compliance Report is broken down into three key subject areas, as follows:
 - Compliance with International Finance Corporation (IFC) Policies and Guidelines
 - Compliance with the Environmental and Social Impact Assessment (ESIA) documentation
 - Recommendations for Improvement based on D'Appolonia experience

ECMG observations which require action and will be reviewed in subsequent assessments have been collated in Table 1, Follow-up Issues. Table 1 will be updated by ECMG following each site assessment. The ECMG also provided helpful recommendations for improvement based on the collective experience and expertise of the team members. These recommendations are not considered compliance requirements and there is no onus on the operation for implementation. ECMG, however, encourages the Project to consider the usefulness of the recommendations and incorporate them, as appropriate, into management activities.

3. Newmont Ghana Gold Ltd. (NGGL), a wholly owned Ghanaian subsidiary of Newmont Gold Corporation (Newmont), is developing gold reserves with mining and milling operations located along a mineralized zone that extends approximately 70 kilometers (km) in the Brong Ahafo Region of central Ghana, West Africa. The Project is the construction of a greenfield open cast gold mine and associated facilities at current (January 2007) estimated capital cost of US\$588 million. Construction initiated in April 2004 and mining started in January 2006 with the pouring of the first gold pour in July 2006. Current operations have an expected mine-life of more than 20 years.

Mining is currently conducted in two areas, the Subika and Apensu pits. A third pit, Awonsu, is included in the Ahafo South Mining Project, but it is still to be opened. Approximately 1,050 NGGL staff is working on site and 1,200 contractor staff.

4. In January 2006, the IFC approved financial assistance in the form of a loan to NGGL to continue development of the Project, approximately the southern half of the overall Ahafo mineralized zone. NGGL committed to apply the IFC Social and Environmental Safeguard Policies and Guidelines (as applicable in 2006) to the design, construction, operation, and closure of the Project.

IFC involvement and financing require both pre-finance project due diligence and post-finance project assurance related to the various social, environmental, and health and safety IFC Safeguard Policies relevant to the Project, as presented in the ESIA, which was disclosed on August 29, 2005. NGGL has committed to external/independent social, environmental, and health and safety compliance monitoring to provide an additional level of transparency to the implementation of social, environmental and health & safety management programs¹. Social compliance is independently evaluated and reported by other external assessors² outside of the D'Appolonia ECMG organization.

5. D'Appolonia scope of work is to conduct semiannual visits to the Project in order to:
- Identify areas and degrees of compliance or non-compliance with IFC Policies and Guidelines:
 - IFC Operational Policy OP 4.01 Environmental Assessment
 - IFC Operational Policy OP 4.04 Natural Habitats
 - IFC Draft Policy on Safety of Dams OP 4.37
 - the World Bank Operational Policy Note 11.03 Management of Cultural Property
 - World Bank Pollution Prevention & Abatement Handbook (PPAH) General Environmental Guidelines; the World Bank Environmental, Health and Safety Guidelines for Mining and Milling - Open Pit
 - IFC Hazardous Materials Management Guidelines
 - IFC Occupational Health and Safety Guidelines;
 - Provide practical guidance and advice to Project's field teams; and
 - Identify specific Environmental, Health and Safety (EHS) issues and conduct follow-up and closure of issues.

The Focus Areas of the EHS reviews are the following:

- EHS Management performance;
- EHS compliance (vs. Ghanaian and International standards as presented in ESIA);
- Compliance with IFC EHS Safeguard Policies;
- Facility review;
- Biodiversity Management Plan performance;
- Implementation of the Environmental and Occupational Health and Safety (OHS) Action Plans (as presented in ESIA); and

¹ The General Terms of Reference for the external/independent social, environmental, and health and safety compliance monitoring are publicly available at <http://www.newmont.com/en/operations/projectpipeline/ahafo/docs/supdoc.asp>

² Mr. Frédéric Giovannetti and Ms. Tasneem Salam. The reports of their reviews are publicly available at www.newmont.com and www.ifc.org.

- Hazardous Material and Transportation Management.

The review of associated facilities (i.e., the Volta River Authority's Kumasi-Sunyani Transmission Line) is not included in the scope of work of D'Appolonia.

6. Specific activities conducted during this mission included:

- Evaluation of implementation of the commitments contained within the Environmental Action Plan (EAP) of the ESIA. Items addressed in the EAP include: air quality; surface and ground water resources; soil resources; natural resources (flora and fauna, including aquatic organisms) and wetlands; noise and vibrations at off-site receptors; waste management; and cultural resources.
- Evaluation of implementation of the commitments contained within the OHS Action Plan (OHSAP). Items addressed in the OHSAP include:
 - hazardous materials and transportation management, including cyanide;
 - occupational H&S monitoring, including noise and vibrations,
 - OHS statistics; and
 - bilharzias, malaria and HIV/AIDS programs;
- Evaluation of compliance with IFC Policies and Guidelines, as above;
- Visit to the sites of the Project facilities (including the Apensu and Subika Pits; Water Storage Facility; Tailings Storage Facility; the Processing Plant; and associated infrastructure);
- Meeting with the Project teams responsible for EHS compliance monitoring and review relevant plans, procedures and monitoring records;
- Conducting a closeout meeting with NGGL EHS and management personnel focusing on key findings, correction of any factual inaccuracies and possible corrective/upgrade actions.

7. The closeout meeting was conducted at the Ahafo Gold Mine on December 7, 2006 and the information presented in this meeting has formed the basis for this report. The information, observations, and opinions presented in this report are those of D'Appolonia and are independent of those of NGGL and the IFC.

8. The Ahafo South Project is in operation and its facilities appear to be designed, operated and maintained according to good industry practice. Although evaluation of design, construction and operations aspects is not part of the ECMG scope of work, the organization was found to competently operate the site, which is well maintained and equipped with good facilities, campsites, workshops, equipments and machineries.

The most fundamental observation made from the first visit is that construction and operations are at a more advanced stage than the EHS Plans and Procedures, which are often still in draft version, although both the environmental and HSLP organizations are working to finalize their procedural framework. The current environmental and HSLP management structure is consistent with ESIA commitments and the key managerial positions are filled. Emergency response procedure preparation and training are ongoing, although there are aspects that should be strengthened.

From an environmental standpoint, NGGL is generally working towards achieving acceptable environmental and natural resource management programs. Fugitive dust emissions into ambient air are monitored, although gaseous pollutants are currently

not included in the monitoring program, and stack emissions are still to be monitored. Dust suppression activities in the mining area were observed to be extensive and generally well managed. A surface water and groundwater monitoring program has been ongoing for a number of years and has recently been reviewed with addition of sampling points and installation of extra ground water bores. Project drinking wells and some community wells are also consistently tested. An infiltration and ARD kinetic testing program has just been started and will be ongoing throughout 2007, complementing an initial pit lake study which developed a geochemical model that has predicted circumneutral pit lake water quality in the long term. The concentration of cyanide in the Tailing Storage Facility (TSF) decant pond has been always been below 50ppm Weak Acid Dissociable (WAD) cyanide guideline. The TSF is operated as a “zero discharge” facility.

Topsoil appears to be adequately managed in the mining area, and a comprehensive soil survey is currently ongoing to complement the ESIA data. A thorough and well-designed approach to natural resources management in the Project vicinity has been developed, although the planned Biodiversity Management Program is still to be fully defined and implemented.

EHS auditing is being inconsistently implemented, especially with respect to contractors and subcontractors, and corrective actions need to be expedited. Substantial effort is still needed to meet appropriate standards for waste management. Noise and vibrations from blasting is being monitored under the requirements of the Social Action Plan, and found to be within Project and IFC standards. A deficiency with ongoing activities is that NGGL has not yet undertaken archaeological surveys as part of their CRM program.

The Tailing Storage Facility (TSF) appears to be competently designed and is being constructed within the established design criteria. Reviews of the tailings dam design provided by an independent reviewer for NGGL demonstrate that the probability of the failure of the tailings dam is very low, given its design, but do not provide details on the basis of the hazard classification of the facility.

Table 1
Follow-up Issues

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.1	IFC	Dec 06		Although it is acknowledged that, according to the Ghanaian EPA environmental permit (EPA/EIA/143), NGGL is required to finalize and submit an Environmental Management Plan within 18 months after commencement of operations (January 2006), NGGL should finalize all EHS related plans and procedures as soon as practical.	New	
M1.2	IFC	Dec 06		Incorporate the contents of the applicable IFC Guidelines into the plans and procedures under finalization. The applicable and relevant IFC Guidelines are presented in Section 1 of the ESIA.	New	
M1.3	ESIA	Dec 06		Monitoring and assessment of compliance with ESIA commitments is an important part of the Project. A specific procedure should be developed and implemented as soon as practical, including the monitoring of contractors and subcontractors involved during Project development. It is recommended that levels of non-compliance be clearly defined based on potential or actual threat, damage or irreversible impact to a sensitive or important resource. An EHS non-compliance register should be maintained by the Environmental and HSLP Departments	New	
M1.4	IFC	Dec 06		Ensure that periodic workplace air quality monitoring is undertaken, meeting relevant IFC requirements (World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995), is in place.	New	Applicable IFC guidelines indicate that the Sponsor should monitor workplace air quality for those species that can be reasonably present.

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.5	ESIA	Dec 06		Ensure that mine dewatering does not irreversibly impact community water resources or else provide additional sustainable sources of potable water to the affected communities. Develop a comprehensive monitoring plan applicable to mine dewatering activities.	New	
M1.6	IFC	Dec 06		The Ghana Project Sediment Control Manual applies to all NGGL activities in Ghana, and therefore it should be used as a technical base to document current sediment control practices and develop the Ahafo Erosion and Sediment Control Plan. The plan should be site-specific, comprehensively discuss all measures applicable to the site, present their location and features in tools such as maps, identify maintenance, monitoring and reporting actions, and define responsibilities within the NGGL departments. The plan is required by the IFC and should be developed as soon as practical.	New	The plan is required by IFC and should be developed as soon as practical. A Sediment Control Manual is available.
M1.7	IFC	Dec 06		Develop the Closure and Reclamation Plan per the EPA requirements and deadline, and ensure that it is updated up on a three yearly basis and that IFC requirements are included. (World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995). This is an important compliance tool that should be detailed, and available to ensure successful and consistent closure and reclamation activities. Species selected for revegetation, topsoil management, revegetation cover objectives (e.g., percent of cover to be obtained in a set period), revegetation aftercare, monitoring, and maintenance protocols and methods are important aspects to be addressed in detail in the Closure and Reclamation Plan. Ensure that revegetation and monitoring are based on quantitative and/or replicable techniques and are well documented, indicating the amount of obtained cover, actions conducted, used fertilizers and other soil conditioning techniques	New	The plan is required by IFC and should be developed as soon as practical. A draft plan is available.

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.8	ESIA	Dec 06		Ensure that the committed noxious weed monitoring and control plan includes alien invasive plant species and ensure that any revegetation activities conducted as part of site reclamation are carried out with native species and non-invasive species relevant to the identified final land use. Develop the plan as soon as practical, taking into account that reclamation activities are already ongoing.	New	
M1.9	IFC	Dec 06		Conduct formal EHS audits of the off-site waste disposal facilities and waste management contractor practices for sewage sludge, food scraps and recyclable waste.	New	A formal EHS audit of the final waste disposal facilities and practices followed by waste handling Contractors should be conducted as soon as practical.
M1.10	ESIA	Dec 06		Urgently finalize the site-specific Waste Management Procedure/Plan.	New	The Project is a long-term operation, generating a significant amount of different hazardous and non-hazardous waste streams. As indicated by the ESIA, there are currently no methods for disposal of hazardous waste in Ghana. IFC requires that all wastes are disposed of in an environmentally acceptable manner, and in compliance with local laws and regulations.
M1.11	ESIA	Dec 06		Conduct stack emissions testing at the existing on-site incineration facility.	New	
M1.12	IFC	Dec 06		Expedite the finalization of all plans and procedures related to the management of hazardous materials.	New	
M1.13	IFC	Dec 06		Expedite the implementation of the recommendations identified in the research and risk assessment of Ghana road transportation and periodically review the risk assessment based on current transport conditions. Ensure that hazardous materials transport monitoring and control inside and outside the Project boundaries is adequately conducted and recorded in a specific register.	New	Hazardous material transport is a significant aspect to be addressed as soon as possible for Ahafo operations.

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.14	IFC	Dec 06		Expedite the finalization all plans and procedures related to cyanide, as they are critical documents needed to be followed during the current operations phase.	New	
M1.15	IFC	Dec 06		Prepare an ERP that can serve as a complete guide to emergency management, from a risk assessment to identify vulnerabilities to detailed procedures to respond to a full range of situations, ranging from small spills to natural disasters. Include maps to identify access and escape routes, muster points, as well as the risk "hot spots" and sensitive receptors where particular care is required to manage emergency situations.	New	Emergency contacts should be immediately updated in the existing ERP as a first step. This is a document where these types of revisions should be made immediately upon changes to responsible parties.
M1.16	IFC	Dec 06		Conduct noise surveys of the various workplaces and verify that the PPE assigned to the workers is appropriate for their noise environment	New	NGGL should procure equipment and conduct noise surveys of the various workplaces and verify that the PPE assigned to the workers is appropriate for their noise environment. The standards used for workplace noise should be at least as conservative as those adopted in the IFC Occupational Health and Safety Guideline.
M1.17	IFC	Dec 06		Verify that Project activities do not adversely impact the local communities from the standpoint of noise and vibrations that could originate from Project activities other than those associated with blasting, such as from Project-related vehicular traffic. Ensure that compliance with applicable and relevant standards is monitored	New	

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.18	IFC	Dec 06		Include archaeology reconnaissance survey within the scope of the cultural resource management surveys that should be undertaken as part of environmental baseline surveying.	New	NGGL has a Cultural Resources Management Plan that includes the process to be followed in case of a chance archeological find in the field. A reconnaissance survey for archaeological interest has not been implemented yet by NGGL at Ahafo, although other cultural heritage components were surveyed in previous studies. The time to initiate an archaeological program is now, while environmental baseline studies across the Project are in the process of being revisited or obtained for the first time.
M1.19	IFC	Dec 06		Prepare an Emergency Action Plan (or Emergency Preparedness Plan) for the failure of the TSF that clearly defines potentially affected areas based on a dambreak analysis with appropriate flood routing evaluation and contains notifications and chain-of-command procedures. Environmentally sensitive areas and receptors should also be identified on the maps of areas with potential impact.	New	

1 EHS Management

1.1 Plans and Procedures

Project Strategy:

NGGL EHS and social commitments are contained in the disclosed documents: ESIA, the Resettlement Action Plan (RAP) and the Public Consultation and Disclosure Plan (PCDP).

The Environmental and Social Action Plan (ESAP), presented in Section 5 of the ESIA (available at www.newmontghana.com), is an integral component of Ahafo South Mining Project's overall planning, design, budget, and implementation. It identifies the Project management programs and specific mitigation measures expected to reduce potentially adverse impacts to acceptable levels. The ESAP includes a requirement for environmental monitoring to verify the effectiveness of mitigation during all phases of the Project. The ESAP also specifies institutional responsibilities, an implementation schedule, and cost estimates. The Plan provides for modifications over time if information shows that changes should be implemented. An ESAP update was published in April 2006.

NGGL has committed to achieving the highest standard of performance in areas of Community and External Relations, Environmental Stewardship, and Health, Safety and Loss Prevention (HSLP) through responsible management of activities throughout various stages of the Project.

The Newmont Mining's Five Star Management System, a global management system developed in-house by Newmont, is being applied at Ahafo to monitor implementation of the social, environmental, and health, safety, and loss prevention action plans. The principles by which the environmental and HSLP programs are managed are, therefore, well defined under the Five Star Program. The Five Star management system standards and discipline specific standards are intended to form the basis for the development of site-specific HSLP procedures and associated Standard Operating Procedures (SOPs), which to a large degree are still under development. A Five Star Assessment is conducted annually at Ahafo, consistent with all of Newmont's operations.

In addition, Newmont has committed to implement the International Cyanide Management Code (ICMC), a voluntary industry program for companies involved in the manufacture and transport of cyanide and the production of gold. The ICMC covers the lifecycle of cyanide management and defines a series of principles and objectives that cover production of cyanide, transportation, handling and storage, operations, decommissioning of facilities, worker safety, emergency response, training and communications with the public.

Observations:

As indicated by NGGL, the Five Star System at Ahafo is currently in its initial development and implementation stage and several procedures are still not finalized. There are 19 Integrated Management System procedures and of this group only five were final for Ahafo at the time of the ECMG visit. Of the 57 associated SOPs, 12

were still to be finalized including topics such as Record Management, Emergency Control Management, and Incident Reporting.

All of 15 HSLP procedures (i.e., Occupational Health and Hygiene, Hazardous Materials, Surface Ground Control, Surface Fire Prevention, Energy Isolation, Mobile Equipment, Electrical Safety, Work Permit Systems, Machine Guarding and Conveyors, Explosives, Light Vehicles and Road Safety, Working at Heights, Pressurized Systems, Cranes and Lifting Equipment, and Medical Programs) were in draft form at the time of the visit. Of the 22 associated SOPs, nine were finalized. All of nine Environmental Management System Procedures (i.e., Hydrocarbon, Chemical, Cyanide, Tailing, Waste Rock, Waste, Water, Air Quality, Closure and Reclamation Planning) were also in draft form at the time of the visit.

During the site visit, the ECMG observed that the applicable IFC guidelines do not appear to be fully incorporated in the Project Environmental and HSLP procedures. Specific information and training on these guidelines and Project commitments do not appear to be consistently provided to the staffs of both departments.

The annual external Five Star Assessment of the Ahafo Project was conducted on November 27 – December 1, 2006. The results of the assessment were not available at the time of the ECMG visit.

Newmont is working towards ensuring that Ahafo operations are in compliance with the ICMC, as discussed in Section 2.7.

Important EHS management tools, including non-compliance registers and change management, were not found to be available to the staff, although records of inspections, environmental incidents and testing result were found to be in place and adequately maintained. An environmental incident register was available that included the list of all spills reported on site relevant to different substances, and the relevant amounts of contaminated soil cleaned. A total of 34 spills have been recorded and classified according to a scale of severity levels from 1 (least significant), to 5 (most significant): 32 level 1 incidents, one level 2 incident with diesel fuel and one level 3 incident, again with diesel fuel. The register was found to partially filled, with some older incidents not detailed and with the incident closure status not consistently reported.

In general, the environmental documentation, information and data were found to be easily retrieved by the staff. Monthly environmental reports are submitted to the Ghana Environmental Protection Agency (EPA) in accordance with the EPA Act 490. An environmental permit register is in place.

IFC Policy Action Items

- M1.1 Although it is acknowledged that, according to the Ghanaian EPA environmental permit (EPA/EIA/143), NGGL is required to finalize and submit an Environmental Management Plan within 18 months after commencement of operations (January 2006), NGGL should finalize all EHS related plans and procedures as soon as practical.
- M1.2 Incorporate the contents of the applicable IFC Guidelines into the plans and procedures under finalization. The applicable and relevant IFC Guidelines are presented in Section 1 of the ESIA.

ESIA Action Items

- M1.3 Monitoring and assessment of compliance with ESIA commitments is an important part of the Project. A specific procedure should be developed and implemented as soon as practical, including the monitoring of contractors and subcontractors involved during Project development. It is recommended that levels of non-compliance be clearly defined based on potential or actual threat, damage or irreversible impact to a sensitive or important resource. An EHS non-compliance register should be maintained by the Environmental and HSLP Departments

Recommendations for Improvement:

- i) Management of changes is an important part of the Project implementation. It is recommended that a specific procedure is developed and implemented as soon as practical, ensuring that health, safety, socioeconomic, and environmental issues be systematically and consistently addressed prior to the approval of any change. A management of change (MoC) process is specifically designed to:
- Ensure that the EHS organization screens all changes,
 - Include engineering and procedure (e.g., standards) changes,
 - Identify whether the change has potential EHS (and social) implications,
 - Assess and document the potential impacts of the change, consistent with the ESIA process,
 - Assign a change class and define notification procedures based on the assigned class,
 - Decide whether to accept or reject a proposed change,
 - Follow-up on accepted changes,
 - Ensure that the MoC process is transparent and auditable.
- ii) Develop a table comparing IFC Guidelines requirements and their means for implementation within NGGL procedures and include it in the Project documentation.
- iii) Review and upgrade the EHS management tools currently available to the staff (non-compliance registers, incident registers, etc.) and ensure that they are consistently completed and maintained.

2 Environment

2.1 *Environmental Organization and Staffing*

Project Strategy:

An Environmental Department and management structure has been developed in accordance with the ESIA (Volume 2). The Ahafo General Manager for Environmental and Social Responsibility (ESR) is responsible for compliance with Ghanaian and corporate environmental requirements, and each Department manager is accountable for maintaining their respective areas of responsibility to comply with applicable environmental standards. The General Manager ESR reports to the ESR Director, which in turn reports to Regional Vice President for Operations.

The Ahafo Environmental Manager reports directly to the General Manager ESR, supports the operations management team and is responsible for directing and maintaining compliance with applicable regulations, policies and standards. The Environmental Manager is responsible for implementing environmental monitoring programs, providing training support to Project staff with respect to environmental responsibility, and interfacing with governmental authorities concerning environmental issues. The Environmental Manager also reports to the Regional Environmental Manager.

Observations:

The current environmental management structure is consistent with ESIA commitments and the key managerial positions are filled. The Ahafo Environmental Manager is a Ghanaian national and is in place. The Ahafo ESR Department is strengthened by an expatriate ESR Development Manager and a coordinator for Five Star Best Practice implementation.

The Environmental Department organization includes three Senior Coordinator positions, respectively for Compliance (position filled), Monitoring (to be appointed) and Reclamation (to be appointed).

The Compliance team is staffed with four Environmental Officers. A technician is to be appointed. The Monitoring team is staffed with seven Environmental Officers and one technician. One Officer position reportedly is to be filled. The Reclamation team is the most complex and numerous based on the organization chart. A Coordinator is in place, as well as two Reclamation Supervisors, who report to him. A Reclamation Officer is to be appointed, who will be in charge of short term laborers (40 people). The positions in the two teams under the two Supervisors are partially filled, with hydro-seeder operators, technicians, and "lead hands" operators. Nineteen reclamation assistants are within each team.

The environmental training is ongoing through a different department within NGGL, although the ESR Department supports it. Approximately 80 percent of the environmental staff has reportedly completed their training. It was reported that an environmental training module has been developed for the workforce, including the contractors. NGGL indicated that Project-specific EHS training of contractors is under the responsibility of NGGL.

IFC Action Items

Nil

ESIA Action Items

Nil

Recommendations for Improvement:

- i) All positions, especially at environmental senior coordinator levels, should be appointed with qualified staff as soon as practical, as mining operations are ongoing.
- ii) A training matrix should be developed focusing on environmental topics and documenting the status of training of key positions in both NGGL and main contractor's staffs.

2.2. Air Quality

Project Strategy:

The environmental control measures indicated by the ESIA are relevant to the mitigation and control of both fugitive dust emissions and gaseous emissions. Fugitive dust is generated during mine operations, from processing plants, particularly from transfer points on conveyor systems, grinding, milling and stockpiling, and from increased vehicular traffic in the area. Gaseous and particulate emissions from point sources are associated to equipment and vehicle exhausts, combustion sources, and other facilities. The control measures to mitigate fugitive dusts include watering or use of other surface binding and/or wetting agents, reclamation and revegetation, vehicular speed control, road maintenance, and use of dust suppression sprays or dry dust collection systems on ore crushing circuits and transfer points at the processing plant. Gaseous emissions are mitigated through equipment maintenance and proper operation controls, as well as specific end-of-pipe treatments, including scrubbing of emissions from the carbon regeneration kiln at the processing plant.

The Project has committed to implement dedicated air monitoring programs for dust and gaseous emissions.

Observations:

In September 2006 the Project conducted a point and fugitive air emission sources survey to identify all point sources and non-point sources of emissions from operations to the ambient air. The survey identified the main emission sources and air pollutants of concern. An air quality specialist will be hired to provide support to the Environmental Department in measuring and modeling air quality parameters and to train the staff.

Fugitive dust emissions into ambient air are currently monitored through five dust monitoring gauges at Ahafo South and two sampling stations for fine particulate matter (PM10), located at the processing plant site and near the Senior Staff Village (SSV), between Subika pit and the community of Kenyase, at the southern border of the mine take area. A new PM10 monitoring station is being sourced to be located in the Kenyase area, outside of the operations boundary. Baseline PM10 monitoring

data are currently being collected in Ahafo North area, where construction and operations activities are still to begin. Ambient air quality for gaseous pollutants of potential concern was not found to be monitored and included in planned actions.

Dust samples are tested at an offsite laboratory for the following parameters: total solids, ash, soluble solids, insoluble solids, and combustible matter. Available monitoring data show that dust deposition levels at the SSV are within the guideline value of 4 g/m²/month beyond the boundary line of the site, as indicated by IFC for construction material extraction sites. A specific SOP for air monitoring is still in draft form and planned to be reviewed in early 2007.

Point source emission testing started through the use of basic personal detectors, but a new and more sophisticated analyzer is being sourced and should be available soon. Stack emission testing has not been conducted yet and is planned for first quarter 2007.

Dust suppression activities in the mining area through watering were observed to be extensive and generally well managed.

Workplace air quality monitoring is currently not being conducted to ensure compliance with relevant guidelines.

IFC Policy Action Items

M1.4 Ensure that periodic workplace air quality monitoring is undertaken, meeting relevant IFC requirements (World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995), is in place.

ESIA Action Items

Nil

Recommendations for Improvement:

- i) Update the relevant baseline study in the region, based on current measurements of PM10 ambient air quality in Ahafo North. Complement the baseline with gaseous pollutant measurements at project boundaries and locations of sensitive receptors.
- ii) Measure concentrations of NO_x and SO₂ in ambient air outside project property boundary, consistent with IFC guidelines (World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995).
- iii) Develop a dust deposition / ambient air quality / emission monitoring data register, consistently presenting all results obtained from direct measurements and laboratory testing.
- iv) Develop an air quality and point/fugitive emission monitoring procedure/plan, including existing sources (e.g., carbon regeneration kiln, existing non-hazardous waste incinerator) and planned ones (e.g., new hazardous waste incinerator).

- v) Ensure that locations of monitoring points are consistent with results from an updated air pollutant dispersion model including both point and fugitive emissions sources.

2.3 *Surface and Groundwater Quality*

Project Strategy:

The ESIA defines the need for the Project to construct a water storage facility (WSF), several environmental control dams (ECDs) designed for sediment and erosion control, some waste rock facilities, and a tailings storage facility (TSF). Aquifer characterization in the mine pits, pit-lake studies, and geochemical analyses of potential acid generating rocks have also been identified as necessary studies to be conducted. No releases of effluents containing cyanide or other chemicals to the environment will be allowed, except possibly under accidental/emergency conditions. A water/chemical solution recycle strategy is adopted by the Project.

Surface water control ditches are constructed as necessary to intercept and divert potential run-on water from flowing into mine pits, the TSF, or onto waste rock disposal facilities and ore stockpiles. These channels divert uncontaminated run-on water back into natural drainage downgradient from disturbed areas or into ECDs. Surface water control ditches have been designed and constructed to accommodate a 100-year, 24-hour precipitation event. Target release criteria for the sediment control system are 50 milligrams per liter (mg/l) total suspended solids (TSS).

Although the original plan was to complete the WSF 17 months prior to commissioning the process plant, allowing adequate time to accumulate a sufficient water quantity, recent analyses showed that water withdrawal from the Tano River, at an estimated rate of 2 to 18 percent of the river flow over a single wet season (April to November), was necessary to fill the WSF. The operation is currently updating its water balance and will be in a position after this update to predict the Tano pumping requirements. Water quality and flow monitoring activities in the Subri and Awonsu rivers will be conducted to provide baseline data and to monitor conditions during the Project operational phase. In addition, water quality monitoring plans include the sampling of the surface water streams in the surroundings of the mining operations, at the ECDs and any other Project water management structures. 16 surface water monitoring points have been selected, plus 5 locations at the ECDs and WSF. As Project policy, no discharge to the environment will occur if applicable standards are not met. In particular, target release criterion for Total Suspended Solids (TSS) at the ECDs is set at 50 mg/l (World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995). No water discharge is allowed from the TSF.

Water quality monitoring also includes the installation and periodic sampling and testing of 19 groundwater monitoring points located upstream and downstream of the Project area, and 8 wells located in the surroundings of the TSF. The groundwater monitoring points are nested wells at two different depths: shallow (around 30 to 35 meter deep) and deep wells (around 85 to 90 meter deep). Testing comprises water table elevation data and a large set of physical and chemical parameters to fully characterize water quality. In addition, an Acid Rock Drainage (ARD) kinetic testing program will be conducted to geochemically characterize waste rock drainage and pit-lake conditions. These further tests have been planned to confirm the preliminary

results from the static tests that indicate ARD will not adversely impact local surface and groundwater.

Pump-back wells are planned around the TSF as an additional measure to control potential accidental impacts to groundwater.

Water from mine pit dewatering will be not discharged from the site, unless it meets water quality standards and conditional to Ghana EPA approval. Dewatering wells are anticipated for the pits and the plan is for the dewatering water to be discharged to the WSF. A total of 8 potable water wells, 5 for the plant site and 3 for the operations village areas, are planned. Potable water testing is planned for both raw water and treated water. Fifteen community wells are also included in the sampling plan.

Observations:

Six monitoring wells have been placed in the WSF dam (WS_1 through WS_6), and three wells (TFS1 through TFS3) have been located in the TSF dam. These wells are aimed at monitoring water level and seepage in the embankments and along the banks of the two storage facilities.

Eight nested monitoring wells (MB1 through MB8) have been drilled at four locations in the proximity of the TSF. Nineteen monitoring wells (some nested) have been drilled upgradient (3 wells) and downgradient (remaining wells) of the Ahafo South mine area.

Five potable wells have been drilled and are operational at the plant site while three potables water wells, only two of which are in use, are located at the SSV and in the Kenyase area.

A surface water and groundwater monitoring program has been started to collect monthly samples and have them analyzed by an external laboratory in Accra. Surface water is collected from 16 monitoring points and from sampling stations at the four ECDs and the WSF. Groundwater samples are collected from 19 monitoring wells and 8 TSF wells (MB1-MB8) with data compared to baseline values and WHO guidelines. At the time of the visit, results available from the first two campaigns in October and November 2006 had not been completed, and analyses for metals, oil and grease and major ions were not available.

Groundwater level measurements have been started two months ago and will be carried out on a monthly basis. Depths to water are reported from less than 2 meters up to approximately 39 meters from top of the casing.

Project drinking wells and some community wells are tested monthly and compared with WHO guidelines. Results from samples collected at some community wells in August and September 2006 showed values mainly within WHO guidelines for potable water, although some microbiological contamination was detected, as well as some metal concentrations slightly above the relevant guidelines for some locations. Cyanide concentrations were reported below detection limits. In addition, treated drinking water used on-site is submitted to weekly microbiological testing and is also tested monthly for a larger set of parameters including metals. Exceedances of the WHO guidelines have been consistently detected for calcium and magnesium since May 2005, whereas exceedances for iron, zinc and aluminum were reported for some samples in 2005, but have been generally below WHO limits since January 2006.

Values always below detection limits have been reported for cyanide, heavy metals, and oil and grease since testing was initiated. No microbiological contamination has been reported. The drinking water plant at the site camp was found to be clean and well operated.

Surface water data from May to October, 2006 indicate an elevated nitrate concentration both at the Subika pit and ECD6, likely associated with mining operations. Nitrate abatement has recently been accomplished by improving blasting practices.

Flow meters for the Subri and Awonsu rivers will be in place by the end of the 1st Quarter 2007. A Project water balance model is being finalized and will be calibrated with real-time data collected in the Project area starting in late January. Preliminary results from this model indicate the need to extend withdrawals from the Tano River beyond the proposed one wet season timeframe, due to low rainfall levels. The Project has already applied for the appropriate permit from the Ghanaian Water Resource Commission to extend withdrawal from the Tano River into end of November 2007.

A draft Water Management Plan, dated October 2006, is available. NGGL is committed to further develop the plan to set the minimum requirements to manage water at mining facilities including site water balances, stormwater, discharges, and dewatering activities. Water monitoring activities are also briefly mentioned in the plan.

An infiltration and ARD kinetic testing program has just been started and will be ongoing throughout 2007. These data will also provide the basis for additional studies on pit-lake conditions needed to integrate the preliminary conclusions found by the initial pit-lake study, completed in September 2006. The initial study developed a geochemical model that has predicted circumneutral pit lake water quality with low iron, sulfate and trace metal concentrations (manganese and zinc) in the long term, for both the Apensu and Subika pit lakes. Thallium is the only trace parameter included in the modeling effort that is predicted to exceed the NGGL standard in the long term.

Dewatering of the mining pits through extraction wells will be necessary. The groundwater extracted from the pits will be directed towards the WSF and not the ECDs as originally planned. The Subika pit is planned to have four dewatering wells, approximately 200 meters deep with pumps located at a depth of about 100 meters. An initial analysis indicates an expected steady-state radius of influence (cone of depression) of about 2,300 to 6,600 meters. A groundwater model study for the Project area using available data, including the Subika pit dewatering information, has been commissioned and should be completed by the end of 2007.

IFC Policy Action Items

Nil

ESIA Actions Items

M1.5 Ensure that mine dewatering does not irreversibly impact community water resources or else provide additional sustainable sources of potable water to the affected communities. Develop a comprehensive monitoring plan applicable to mine dewatering activities.

Recommendations for Improvement:

- i) Develop a final Water Management Plan. The Plan should include all components of surface and groundwater monitoring, planned sampling schedule, SOPs, and baseline values. The Plan should include adequate maps showing all sampling points, and should clearly discuss the rationale behind the selection of these points. The Plan, or another specific document, should include drinking water quality monitoring, including community wells.
- ii) Define whether the WSF can be sustained with meteoric inflow from its watershed and provide sufficient water to the processing plant over the mine life, or whether additional water sources will be needed, such as continuing with Tano River withdrawals. In the latter case, an environmental assessment of the new scenarios on the regional water resources should be developed; the local communities should be consulted; and a specific change management procedure should be implemented.
- iii) Ensure that all data collected from the water monitoring network are promptly and consistently evaluated by the Environmental Department, both in terms of water level variations and chemical result trends. Ensure that when chemical laboratory results are received, non-compliances are consistently identified and promptly communicated. Potable water testing data should be consistently reviewed by the medical staff and actions taken as needed.
- iv) Develop a numerical groundwater model that can be used as a Project-wide decision making tool. It is expected that this model would be periodically updated and calibrated with the data collected on site. The hydrological model should also be incorporated within the regional water balance model to assess impact on the regional water balance.
- v) Provide the local authorities and communities with the water quality results when samples from community wells are collected, particularly when WHO guideline exceedances are found.

2.4 Soil Resources

Project Strategy:

The ESAP defines the measure to prevent and mitigate the impacts on soil resources. Potential impacts of concern include reduction of topsoil fertility and increased erosion due to surface disturbance, vegetation removal, and lack of adequate reclamation. NGGL is committed to implement actions to protect and preserve the topsoil in the mining area, and to reuse it during reclamation. Other important actions are related to erosion minimization through temporary and permanent erosion control

measures in disturbed areas. These will include sediment traps, fences and barriers, and stormwater management through drainage collection structures, including berms and other drainage, the most important of which are the four Environmental Control Dams (ECDs 2, 3, 5 and 6). The ECDs have been designed and constructed to accommodate a 10-year, 24-hour precipitation event and minimize potential erosion and sedimentation downstream of the mining area, collecting, settling, infiltrating, and evaporating run-on/run-off water from areas disturbed by mining operations.

NGGL is committed to reclaim all surface disturbance in accordance with applicable Ghanaian regulations and Newmont's Standards for closure and reclamation of mining facilities. Concurrent reclamation will be implemented during mining operations to control sediment and erosion and return the land to a beneficial use as soon as practical. The strategy of salvaging topsoil during surface mining activities will be complemented by a monitoring and control plan to ensure that reclaimed areas are protected from noxious weed invasion. Access roads, drill pads, sumps, and trenches and other temporary facility areas or disturbed land will be reclaimed as soon as they are not longer needed by the Project.

A reclamation team is in place to conduct and monitor all the soil resource protection activities. As part of its commitments, the NGGL environmental team will conduct periodic inspection of all reclaimed and revegetated areas, as well as of all the stormwater collection points and the ECDs, to monitor success of the reclamation activities and minimization of erosion and sedimentation impacts. Vegetation monitoring, including visual inspection, noxious weed identification and annual sampling for plant community characteristics, is expected to continue for three years after final reclamation. Soil surveys are also included to ensure adequate information to support reclamation and closure activities.

Observations:

A topsoil stripping and management procedure for Ahafo has been available since January 2006 and complies with industry standards. A topsoil inventory is being maintained by the Environmental Department. By the end of November 2006, approximately 1.8 millions m³ of topsoil were stripped since construction started in February 2005. The topsoil volume currently needed for Phase 1 reclamation and closure is approximately 4.2 millions m³. The disturbed area in the 2006 mine plan is approximately 1,065 hectares, slightly higher than 986 hectares planned in the ESIA. As reported by NGGL, plant species have been selected for the revegetation and two nurseries have been established.

A comprehensive soil survey is currently ongoing in both Ahafo North and South areas. The survey will allow for the definition of soil pedons at locations distributed throughout the area of concern; sample and analyze physical and chemical properties of representative profiles, including parameters such as pH, Organic Matter Content, Effective Cation Exchange Capacity, Exchangeable Bases and Base Saturation, and Nutrient Content (nitrogen, phosphorus, potassium); describe the variability of soil types; and, establish appropriate map units. The survey results should be available by mid 2007, and should result in the development of a consistent baseline throughout the Project area.

According to IFC guidelines for open pit mining and milling (World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995), an erosion and sediment control plan needs to be developed and implemented.

IFC requires that the plan includes measures appropriate to the situation to intercept, divert, or otherwise reduce the stormwater runoff from exposed soil surfaces, tailings dams, and waste rock dumps. IFC encourages integrating vegetative and non-vegetative soil stabilization measures in the erosion control plan. Sediment control structures are to be installed to treat surface runoff prior to discharge to surface water bodies. All erosion control and sediment control measures need to properly maintained. NGGL developed a Ghana Project Sediment Control Manual, presenting specific guidelines and best management practices for sediment control. This manual is well developed and presents most of the contents and discussions that are needed for an erosion and sediment control plan as required by the IFC.

In 2005, NGGL developed a conceptual (Draft) Closure and Reclamation Plan for the Ahafo South Mining Project in compliance with requirements of the Ghanaian EPA. This draft plan was published in April 2006 in the Project website. The draft plan is conceptual; it outlines existing site conditions; and briefly describes ore processing, mining operation, waste rock disposal facilities, water management, tailing storage facility, reclamation of the site including all mine facilities, and short- and long-term monitoring programs. As also indicated in the draft plan, NGGL recognized the need to update the draft Closure and Reclamation Plan with new information such as updated mine and waste dump plans and updated geochemistry characterization data. There is a requirement to submit the Closure and Reclamation Plan to the EPA by end of January 2007. It is also an EPA requirement that NGGL provides updates to the reclamation plan as mine development proceeds.

A pilot reclamation in a borrow pit area has been conducted and 63 hectares have been recently revegetated.

IFC Policy Action Items

- M1.6 The Ghana Project Sediment Control Manual applies to all NGGL activities in Ghana, and therefore it should be used as a technical base to document current sediment control practices and develop the Ahafo Erosion and Sediment Control Plan. The plan should be site-specific, comprehensively discuss all measures applicable to the site, present their location and features in tools such as maps, identify maintenance, monitoring and reporting actions, and define responsibilities within the NGGL departments. The plan is required by the IFC and should be developed as soon as practical.
- M1.7 Develop the Closure and Reclamation Plan per the EPA requirements and deadline, and ensure that it is updated up on a three yearly basis and that IFC requirements are included. (World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995). This is an important compliance tool that should be detailed, and available to ensure successful and consistent closure and reclamation activities. Species selected for revegetation, topsoil management, revegetation cover objectives (e.g., percent of cover to be obtained in a set period), revegetation aftercare, monitoring, and maintenance protocols and methods are important aspects to be addressed in detail in the Closure and Reclamation Plan. Ensure that revegetation and monitoring are based on quantitative and/or replicable techniques and are well documented, indicating the amount of obtained cover, actions conducted, used fertilizers and other soil conditioning techniques

<i>ESIA Action Item</i>

Nil

Recommendations for Improvement:

- i) Conduct monitoring in the pilot revegetation area to establish adequate monitoring procedures and integrate this pilot effort into updates of the Closure and Reclamation Plan.

2.5 Natural Resources and Ecological Management

Project Strategy:

The ESIA presents a discussion of the potential impacts to flora, fauna, wetlands, aquatic organisms, and forest reserves associated with project activities in the Ahafo South Project area. Potential indirect and cumulative impacts are also discussed. NGGL has strived to build alliances with local communities and with non-governmental organizations (NGOs). As part of this effort, the Project has committed to and is in the process of developing an extensive Biodiversity Management Program, which includes a Biodiversity Partnership with Conservation International (CI), an internationally recognized NGO and leader in global conservation.

The ESAP outlines a series of commitments, environmental control measures and additional actions for flora, fauna, forest reserves, wetlands and aquatic organisms. Except for the Biodiversity Management Program, control measures (e.g., noxious weed monitoring and control plan, fencing around mine pit rims, policies for employees and contractors, reclamation of certain facilities, and sediment and surface water control and management) are primarily designed to address direct impacts. Some additional control measures are also presented in Chapter 2 of the ESIA and include conservation education programs for local communities (also referenced in the Expanded Data Collection section in Chapter 5), education programs for the work force, and replanting of an area equal to that disturbed by the Volta River Authority (VRA) 161 kV distribution line.

The ESAP presents an outline of the Biodiversity Management Program (a more expanded outline is presented in Chapter 4 of the ESIA). The outline includes the following four components: 'On-Site Biodiversity Management'; 'Off-Site Biodiversity Management'; 'Biodiversity Partnership' (with CI); and the 'Biodiversity Partnership Work Plan'.

The ESAP also includes sections on Environmental Monitoring Plans, Environmental Studies, and Expanded Baseline Data Collection. Vegetation monitoring is the only natural resources topic included under the Environmental Monitoring Plans section. In the Environmental Studies section, a risk assessment of cyanide and metal-cyanide complexes caused by the tailing storage facility on wildlife and livestock is included. The Expanded Data Collection section includes a discussion of a series of potential programs or actions that could be implemented by the Project to help curb overexploitation of bushmeat in the project vicinity. Notably, the Expanded Baseline Data Collection section of the ESAP emphasizes the Project's commitment to an adaptive management strategy, which is especially relevant to the management of

natural resources. Other ESAP sections related to natural resource management include Interim Reclamation/Revegetation and Environmental Training Program.

The ESAP update completed in April 2006 mentioned that the Biodiversity Management Plan is scheduled for 2006 with CI (although postponed from 2005 to 2006), and that CI is conducting additional rapid biodiversity assessments and monitoring. The document also reports that the risk assessment of wildlife and livestock exposure to cyanide and metal-cyanide complexes and a review of regional reclamation practices in various vegetative communities were also completed.

The applicable and relevant IFC policy is the Operational Policy (OP) 4.04 on Natural Habitats (November 1998).

Observations:

The NGGL documents reviewed by the ECMG presented a thorough and well-designed approach to natural resources management in the project vicinity. The documents were highly professional, well-organized, and demonstrate NGGL's commitment to biodiversity conservation. The ECMG commends NGGL's for taking a proactive approach through the partnership established with CI, as these types of alliances are essential to the proper integration of conservation priorities into the policies and practices of extractive industries.

Biodiversity Management Plan

NGGL's proposed Biodiversity Management Program is impressive, and the ECMG commends the Project for taking steps to initiate a program that, if fully implemented, may have the potential to set an industry best-practice example. However, it is still undefined when and how this program will be implemented, and this should be expedited given that project activities are quickly moving forward. As mentioned, the ESAP update (April 2006) states that a Biodiversity Management Plan is scheduled for 2006, but the ECMG has received no evidence that such document is being drafted in December 2006.

It is unclear what Project activities will be included in the first two components of the Biodiversity Management Program, namely 'On-site Biodiversity Management' and 'Off-site Biodiversity Management'. The Project has taken many preliminary and necessary steps to manage biodiversity both on-site and off-site (e.g., fauna and flora surveys, habitat assessments, consultation with local stakeholders), but it is not clear if these and/or other activities will specifically be included as part of 'On-site Biodiversity Management' and 'Off-site Biodiversity Management.'

One important aspect that appears to be missing from the Biodiversity Management Program is a long-term, multi-taxa biodiversity monitoring plan in the Project vicinity. While the Project appears to be conducting a series of additional fauna and flora baseline investigations (discussed below), none of the Project commitments address the need for a biodiversity monitoring program designed to measure and monitor potential long-term project-related impacts on flora and fauna. It is also noted that biodiversity monitoring appears to be in line with Newmont's corporate Five Star Management System, which includes "*the implementation of monitoring programs to provide early warning of any deficiency or unanticipated performance in environmental safeguards*". Early warning detection of potential ecosystem stressors is indeed the crux of biodiversity monitoring.

Biodiversity offsets appear to be covered in two sections of the Biodiversity Management Program – the ‘Off-site Biodiversity Management’ section and the ‘Biodiversity Partnership Work Plan’ section (i.e., third bullet under the ‘Identification of Opportunities for NGGL to make Targeted, Outcome Driven Conservation Investments in Ghana’ [ESIA Chapter 4/page 4-67]), although the Projects commitments regarding biodiversity offsets do not appear to be fully developed and transparent. In the ‘Biodiversity Partnership Work Plan’ section, it is stated that “*Biodiversity Offsets will be developed... should future foreseeable actions result in disturbance to Forest Reserve areas...*” and programs will be implemented as “*...opportunities arise*”. Within the ‘Off-site Biodiversity Management’ section, no specific activities are defined. A considerable amount of habitat will be lost in the Project area due to mining activities, and, given the extent of the disturbance, indirect and secondary impacts on nearby forest reserves are likely.

Control Measures

As previously mentioned, the Project’s proposed natural resource related control measures presented in Table 5-4 (Chapter 5 of the ESIA) mainly cover direct impacts; the ECMG presumes that mitigation measures for indirect and secondary impacts will be elaborated as part of the Biodiversity Management Program.

Two mitigation measures presented in Chapter 2 of the ESIA have not been included in Table 5-4; these are conservation education programs for project workers and replanting (at a 3 to 1 ratio) of an area equal to that disturbed by the VRA’s 161 kV distribution line through forest reserves. The latter is relevant to an associated facility component which is not included in the ECMG scope of work. It is therefore mentioned here, but not further developed in the recommendation section. However, as clarified by IFC, the 3 to 1 re-planting ratio would apply to any forest reserve disturbed area, not just the power distribution line and, therefore, would also apply to the forest areas that could potentially be disturbed if a conveyor is built to link Ahafo North and South. This will be covered in future monitoring reports, as needed.

Natural resource control measures as listed in Table 5-4 of the ESAP appear reasonable. A concern is raised regarding the wetlands control measure that states, “*New wetlands will be created by the water storage facility and possibly environmental control dams. The net effect is likely that more wetlands would be created than destroyed.*” Although wetland creation (and restoration) is a valid mitigation measure under certain circumstances, the creation of a functionally equivalent wetland in compensation for those that were lost due to mining activities or any other disturbance is labor intensive and its success is not guaranteed. Wetland ecosystem functioning is dependent on particular a geomorphic setting and consequent hydrological regime. The assumption that the potential ad-hoc creation of wetlands due to the water storage facility will create an equivalent wetland in terms of function or size could be questioned. Two alternative recommendations on this are proposed in the section below.

A final point regarding the control measures stated in Table 5-4 is related to the noxious weed monitoring and control plan. The ECMG presumes that any control or monitoring plan of ‘noxious’ weeds will include alien invasive species. Related to this, the section ‘Interim Reclamation/Revegetation’ presented in ESAP does not specifically state that reclamation measures will ensure that any ensuing revegetation is carried out with native species only.

Additional Investigations

In late summer and early fall of 2006, the Project developed a series of work plans for additional baseline surveys on vegetation, fauna, wetland, and aquatic resources to be conducted on both the Ahafo North and South Project areas, and supplement / complement baseline data collected during the ESIA development. The work plans outline a professional and logical approach to further sampling, describing study objectives, study area descriptions, scope of work, study schedule, personnel, and references. Notably, as part of these further baseline investigations, a cumulative impact study is also proposed.

Of the four study sites, the Kenyase site is located just west of the South Ahafo project area. It appears that sampling sites (transects or otherwise) will not be randomly selected. Without randomly selected sampling sites, the Project may have difficulty drawing inferences about the properties of unsampled sites. The ECMG understands the Project's needs to sample certain vegetation communities (e.g., forest reserve, secondary forest fragments, fallow, savannah, etc.); therefore it would be preferable that a stratified random sampling design be used to select study sites, with sites stratified according to community type, and selected randomly within strata in proportion to the size of the unit. This would be especially important if these baseline surveys will be used as part of a follow-up long-term monitoring plan.

A diversity index (i.e., Shannon-Weaver) is included as part of baseline survey analysis. While diversity indices can provide some information regarding community structure, they may be difficult to interpret meaningfully. Furthermore, they can be insensitive to substantial changes in species composition.

An innovative Community Biodiversity Use Assessment was also conducted by CI for the Ahafo North Project area and submitted in October 2006. This assessment provided useful results on how local communities utilize and value surrounding natural resources.

IFC Policy Action Items

Nil

ESIA Action Items

M1.8 Ensure that the committed noxious weed monitoring and control plan includes alien invasive plant species and ensure that any revegetation activities conducted as part of site reclamation are carried out with native species and non-invasive species relevant to the identified final land use. Develop the plan as soon as practical, taking into account that reclamation activities are already ongoing.

Recommendations for Improvement:

- i) Taking into consideration that operations are ongoing, the Project should expedite the finalization of the additional biodiversity assessments and monitoring, reportedly being conducted by Ghana Wildlife Society and overseen by CI.

- ii) Develop a comprehensive and up-to-date Biodiversity Management Program document, clearly presenting the following aspects:
 - actions related to the four components as outlined in Chapter 4 of the ESIA (i.e., Onsite Biodiversity Management, Offsite Biodiversity Management, a Biodiversity Partnership, and a Biodiversity Partnership Work Plan),
 - mitigation measures for the secondary and indirect impacts highlighted in Chapter 4 (e.g., induced access for bushmeat hunting and illegal logging, potential increased mortality, decreased reproductive rates of species in adjacent habitats, increased removal of native vegetation for crop production, etc.),
 - approach for the biodiversity offset mitigation program.
- iii) Develop a long-term multi-taxa biodiversity monitoring program that lends itself to inferential statistics.
- iv) Develop a conservation education program for project workers to be included as part of the Project's 'Environmental Training Program'.
- v) Reevaluate the wetland control measures given realistic worldwide experience on successful wetland creation:
 - Consider conducting a feasibility study, and subsequent action plan, if necessary, to determine if functionally equivalent wetlands could indeed be created in compensation for lost wetlands; or,
 - Develop an offset mitigation component in compensation for the lost wetlands, such as sponsoring a related investigation that may promote wetland or watershed conservation in the Project vicinity.
- vi) Where diversity indices are used, consider to substantiate findings with: a) a comparison of number of individuals between sites, and b) similarity indices (e.g., Jaccard Index [C_J] or Sorenson's [or Bray-Curtis] [C_S]), which would allow detection of changes in taxonomic composition at monitored sites relative to reference sites.

2.6 Waste Management

Project Strategy:

Non hazardous waste management as defined in the ESIA includes the creation of a non-hazardous solid waste landfill facility located within a waste rock disposal area. An on-site incinerator, meeting U.S. EPA standards, is also planned to process wet food waste produced by the Project activities. In addition, the ESIA has indicated the need to develop a comprehensive non-hazardous waste management program in accordance with Ghana requirements and NGGL disposal protocol.

Because of the lack of offsite infrastructure to treat and dispose of hazardous waste in Ghana, the need for a hazardous waste management plan has also been identified in the ESIA. In addition, the Project has recognized the need to develop a waste minimization program aimed at reducing hazardous waste and to explore alternative products used in the Project operations that would generate or eliminate hazardous waste. The Project has planned to install and use an on-site incinerator to process organic liquid, solvents, paints and medical waste produced by the Project activities.

Two permanent packaged Sewage Treatment Plants (STPs) are installed at the camp and at the SSV.

NGGL has committed to monitor solid and liquid waste generation (including wastewater) and disposal conditions throughout all Project phases. The applicable and relevant IFC policies include: World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995; World Bank Pollution Prevention and Abatement Handbook, General Environmental Guidelines, July 1998.

Observations:

An inert waste dump site has been created in a location within the mining area. The dump site is supervised and trucks are reportedly inspected for contents before being allowed to dump. An entry log is kept by the site supervisor, but amount of waste dumped is not recorded. Disposed waste was observed to be uncovered with soil cover reportedly placed only every 3 to 4 weeks. In addition, poor segregation was observed with some mixed food and some hazardous waste (e.g., paint cans) present.

The Project has built two permanent STPs, one located at the site plant and camp and the other at the senior staff village (SSV). The camp STP was visited and found to be well maintained and operational. Plant treatment capacities, as indicated in the ESIA, are 260 m³/day for the site plant STP and 80 m³/day for the SSV site. Effluent volume data shows that the average output of the SSV facility (from May 2005 through October 2006) has been 13.5 m³/day, while for the site plant the average effluent output (from March 2005 through October 2006) has averaged 124.6 m³/day with peaks of 195 m³/day. Both the STPs appear to be sufficient to treat current demand, although during workforce peaks the STP at the site plant may be insufficient and should be carefully monitored. Although the original design and operations called for the discharge effluents to be directed towards leaching fields, current practice is a zero discharge to the environment as the effluents are being re-directed, after testing, to the lined TSF. However, weekly testing of the effluents at both STPs show the plants not to be operating to optimum performance with various parameters (BOD COD, TSS, turbidity, total coliform, E. coli, and fecal coliform) exceeding performance criteria. The sewage sludge is collected and disposed of by an off-site Contractor in Kumasi. An audit to verify that the final disposal facility is environmentally acceptable has yet to be conducted by NGGL.

A non-hazardous waste incinerator with a burning rate capacity of 100 Kg/hr was built within the fenced process plant boundaries. Records indicate that incinerated quantities have been kept since February 2006 with wet food, dry food, and other combustibles quantities logged daily. When lack of dry food material prevented the proper incinerator operations (e.g. some weeks during May, June and November 2006) the non-hazardous waste was handled by a Ghanaian licensed contractor. An audit of the final disposal facility used by the Contractor has yet to be performed by NGGL. In addition, incinerator emission and ash tests have not yet been performed.

Hazardous material is mostly sent to a storage shed in Kenyase, but an isolated storage facility is under construction near the camp and should be available in January 2007. Final disposal is then handled by Ghanaian certified Contractors. Documentation review indicates that the final destination of most hazardous material is a facility located in Kumasi. Medical waste is either incinerated at the on-site facility or taken to an off-site facility by a certified Contractor. An audit of the

Contractors, to verify that their operations and waste final disposal are meeting Project requirements in terms of environmental, health and safety protection, has yet to be performed by NGGL.

Overall the waste management practices appear to be lagging behind with respect to past and current project activities. A project-wide waste management plan, indicated in the ESAP update issued on April 2006 as being completed in January 2006, has yet to be finalized, although a draft waste management procedure is currently available. Waste transport relies on each site Contractor with apparently limited coordination. Although solid waste segregation and minimization has been carried out at some site facilities (e.g., truck shop), this practice was found not to be implemented consistently throughout the Project areas/operations where waste segregation and recycling practices could be employed.

IFC Policy Action Items

M1.9 Conduct formal EHS audits of the off-site waste disposal facilities and waste management contractor practices for sewage sludge, food scraps and recyclable waste.

ESIA Action Items

M1.10 Urgently finalize the site-specific Waste Management Procedure/Plan.

M1.11 Conduct stack emissions testing at the existing on-site incineration facility.

Recommendations for Improvement:

- i) Analyze SSV and Plant site STPs capacities against present and future Project development and eventually upgraded. The causes of the performance issues in terms of effluent quality should be assessed and remedial actions implemented.
- ii) Include quantitative testing in the EHS audits of the off-site waste disposal facilities and waste management contractor practices, to verify that the facilities used by the waste management contractors are compliant with Project standards.
- iii) Conduct ash testing at the existing on-site incinerator facility. Develop ash disposal procedures consistent with the test results.
- iv) Improve waste register procedures and develop a system to accurately report waste production rates (either daily or weekly quantities) for each individual waste stream.
- v) Consider designing and implementing a Project-wide waste minimization and recycling program.
- vi) Consider designing and installing a centralized waste management facility, including a waste segregation and treatment facility, the planned U.S. EPA compliant incinerator, a bioremediation facility, and a non-hazardous waste engineered landfill to satisfy Project requirements and present needs and expected growth.

2.7 *Hazardous Materials Management*

Hazardous Material Transport, Storage, Use and Disposal

Project Strategy:

The basic procedures developed by NGGL for the management of hazardous materials are outlined in the ESIA under the title of "Material Handling" specific to chemicals and other materials located on NGGL properties and cover the following materials and activities:

- Cyanide transportation, storage, handling and mixing;
- Caustic soda transportation, storage, handling and mixing;
- Sodium hypochlorite transportation, storage, handling and mixing; and
- Explosives and accessories handling, storage and use.

Specific procedures developed with regard to material handling, include the following:

- Spill response actions;
- Disposal of shipment containers;
- Emergency evacuations;
- Mixing and usage precautions;
- PPE requirements;
- First-aid procedures; and
- Labeling of materials and posting of Material Safety Data Sheets (MSDSs).

The NGGL training programs cover the management of hazardous materials.

The ESAP defines an additional goal of hazardous materials management associated with community safety to be "reduction in conflicts during transportation of hazardous materials on roads; increase in safety of public and workers during transport of materials."

The applicable and relevant IFC guidelines are the following: World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995; IFC Hazardous Materials Management Guidelines, December 2001; and IFC Environmental and Social Guidelines for Occupational Health and Safety, June 2003.

Observations:

Within the HSLP organizations, the plans and procedures relative to the management of hazardous materials are not yet finalized. Relative procedures still in draft form include those entitled "Hazardous Materials" and "Explosives." Under the category of Environmental Management Systems Procedures, relevant documents still in draft form include those entitled "Hydrocarbon Management," "Chemical Management," and "Cyanide Management." The SOP under the category of Environmental Management Systems entitled "Hazardous Substance Management" is an operational document currently in Version 1 last reviewed in February 2006.

Although the hazardous materials management plans and procedures are not all finalized, the handling and storage of hazardous materials at the area of the processing plant appeared in general to be satisfactory. The storage area for hazardous material is a concrete platform under roof and the area was found to be clean and the different

materials well segregated, although this area could be made more secure by adding bunding around the platform and/or enclosing the area for better protection against rain. An additional hydrochloric acid storage area is on a paved surface, but not roofed. A temporary cover was put in place and NGGL confirmed that they will proceed with a more adequate solution for roofing. Work areas where hazardous materials could be present within the processing plant and also in the truckshop/workshop areas were found to be clean and well managed. MSDSs were found to be present in the work places where hazardous materials are used.

As indicated by the ESAP update, a transportation plan development including route risk assessment was developed by the Project. The "Transport Management Plan for Sodium Cyanide Product" – July 2005 – and the "Research and Risk Assessment of Ghana Road Transportation" – July 2005 - were made available and reviewed by the ECMG. The Transport Management Plan has the aim at detailing the procedures to be adopted and actions required during all phases of emergency response management associated with the transportation of both sodium cyanide solution and solids, while the Research and Risk Assessment has the scope to highlight relevant high and extreme risks associated with the routes and transport of NGGL procured products including sodium cyanide. In addition the HSLP department indicated that the overall concept of hazardous waste transport was being reviewed and in the case of cyanide transport they expected to prepare a new standard to be ready for implementation on or about June 2007. Currently, the safety procedures followed for the transportation of cyanide are the responsibility of the cyanide vendor (Orica) and the transporter (Barbex). Although the ESAP indicates that a "Road Safety Task force [was] initiated January 06 with local youth groups/Local Police/national/local government," the External Social Compliance Monitoring Report of June 29, 2006 indicates that community safety from truck traffic in general still needs to be improved, especially with respect to the school at the Ntotoroso resettlement site, which is adjacent to the main road leading from Kenyasi through the Plant Site to Ntotoroso. It is not apparent that there are any special provisions for hazardous waste transportation.

IFC Compliance Action Items

M1.12 Expedite the finalization of all plans and procedures related to the management of hazardous materials.

M1.13 Expedite the implementation of the recommendations identified in the research and risk assessment of Ghana road transportation and periodically review the risk assessment based on current transport conditions. Ensure that hazardous materials transport monitoring and control inside and outside the Project boundaries is adequately conducted and recorded in a specific register.

ESIA Action Items

Nil

Recommendations for Improvement:

- i) Sort out the differences in what is expected from the HSLP and environmental groups such that their different responsibilities are clearly defined.

- ii) Consider the implementation of additional spill control systems and rain protection at the hazardous materials storage area at the processing plant.

Cyanide Management

Project Strategy:

Cyanide is the means for extracting gold from the mined ore. The ore is first subject to crushing, grinding and milling and then processed with carbon-in-leach cyanidation, which is then followed by elution and refining for gold recovery. There is a secondary gravity flotation circuit for collecting gold concentrates for intense cyanidation and electrowinning prior to refining and gold recovery. Cyanide is delivered to the site as solid sodium cyanide in a truck-mounted isotank for solid-to-liquid sparging, which allows the cyanide supplier to mix the solid sodium cyanide with water at the site to achieve the required 30-percent strength for offloading in a designated mixing tank. The cyanide solution is conveyed from the mixing tank in use to storage tanks for delivery to the processing circuit. The cyanide solution conveyances are within double containment and pumped within instrumented and monitored pipelines.

NGGL has an operational Ahafo Cyanide Management Plan (May 2006) that describes the measures that the Project will implement to minimize the risks to employees, communities and the environment from its use of cyanide, as well as NGGL's commitment to programs for employee safety and training and its plans and procedures for responses to cyanide exposures and releases. The Plan also includes NGGL's commitments to the public disclosure of cyanide-related information.

On October 4, the pre-operations phase of the Ahafo Project was certified under the International Cyanide Management Code (ICMC) based on an external third-party audit conducted on August 23, 2006. The ICMC, also known as the Cyanide Code, is a voluntary industry program for the gold mining industry to promote:

- Responsible management of cyanide used in gold mining;
- Enhance the protection of human health; and
- Reduce the potential for environmental impacts.

Companies that become signatories to the Code must have their operations audited by an independent third party to demonstrate their compliance with the Code.

Observations:

The ICMC certification was assigned the Ahafo Project based on pre-operational conditions. However, a relatively large number of plans and procedures still remain to be finalized for Operations, including the Cyanide Management Procedure. HSLP Management SOPs entitled "Uploading Liquid Sodium Cyanide" and "Cyanide Related Emergencies" are still draft documents. As noted above, the procedures for the management of cyanide up to its delivery at the processing plant are currently the responsibility of Orica for the cyanide supply and Barbex for cyanide transportation. A cyanide sparging operation at the processing plant was observed by ECMG to be conducted by a worker, who was working without complete PPE (no gloves). ECMG was not provided with documentation to indicate that the auditing of the cyanide management being conducted by both the supplier and transporter is being undertaken by either the environmental or HSLP organizations within NGGL. As noted above, NGGL reported that the overall cyanide transportation process is currently being

evaluated by the HSLP department and a cyanide transportation management procedure or SOP is expected to be prepared by June 2007.

IFC Policy Actions

M1.14 Expedite the finalization all plans and procedures related to cyanide, as they are critical documents needed to be followed during the current operations phase.

ESIA Action Items

Nil

Recommendation for Improvement:

- i) Although the auditing of cyanide transport operations is the role of the transport company as per the International Cyanide Management Code, NGGL should consider an audit program of the transportation/delivery operations being undertaken by contractors.

TSF Cyanide Management

Project Strategy:

After completion of the processing, the cyanide within the tailings is recycled using a tailings wash circuit to achieve acceptable wildlife and livestock contact concentrations (Weak Acid Dissociable cyanide concentration <50 mg/l) in the Tailings Storage Facility (TSF), where the tailings are piped. The Project has committed not to discharge cyanide contaminated water into any stream within any receiving water body. The tailings water is decanted and conveyed back to the process facilities for re-use. As defined by the IFC guidelines (World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit), measures to prevent access by wildlife and livestock are required for all open waters (including tailings impoundments) where WAD cyanide is in excess of 50 mg/l. A hydrogen peroxide (H₂O₂) cyanide destruction unit is available on-site for emergency use.

Observations:

The Tailings Management Procedure is still a draft document. Nevertheless, the cyanide management aspects of the tailings facility are being carefully monitored. Since the beginning of July, the concentration of cyanide in the TSF decant pond has been less than about 15 mg/l, with only one anomalous excursion above 50 mg/l Weak Acid Dissociable (WAD) cyanide. Since the beginning of September, the cyanide concentration in the TSF decant pond has rarely exceeded 3 mg/l. Based on data presented since the beginning of July through the beginning of December (156 measurements of the incoming tailings), the WAD cyanide concentration ranged from 1.3 – 109.2 mg/l in spigot grab samples. Since September 1, more than half of 106 samples have exceeded the reference target of 50 mg/l before dilution and decomposition in the spigot grab samples, a situation that contrasts with the concentration of cyanide in the TSF decant pond. The design of the TSF is such that the tailings enter through numerous pipes along the back side of the water supply dam. This allows for solid portion of the tailings to precipitate while the supernatant liquid accumulates after flowing for much of the length of the impoundment. The cyanide decomposes over the course of its transport towards the area where the supernatant liquid is impounded next to the dam.

NGGL reported that it is planning the installation of a tails washing plant to recycle cyanide that would normally go to the TSF, back into the plant. This washing of the cyanide would ensure that WAD cyanide levels are below 50 mg/l at the spigot. NGGL indicated that the projected date for operation of this plant is the end of 2007.

<i>IFC Policy Action Item</i>

Nil

<i>ESIA Action Item</i>

Nil

3 Occupational Health and Safety

3.1 Occupational Health & Safety Management

Project Strategy:

The ESAP indicates Project policy towards occupational health and safety as stated:

“NGGL currently maintains and actively manages an extensive occupational health and safety program (“Loss Control”) at the Ahafo South Project site. The program, including appropriate training and monitoring procedures, will continue once operations commence to ensure high standards of health and safety are maintained.”

NGGL has a training program that includes occupational health and safety at a general level for all employees, as well as job-specific training to identify hazards and site-specific and job-specific procedures to provide worker protection. Training topics include: nature of hazardous materials; selection and use of applicable PPE; and hazardous materials handling procedures, including cyanide, sodium hypochlorite, caustic soda and explosives. NGGL has defined an HSLP monitoring program to document and monitor potential physical and chemical stresses in the workplace. As defined in the ESAP, this monitoring is expected to include:

- *“Periodic monitoring of employees potentially exposed to hazardous workplace stresses, incorporating both short-term and long-term exposure levels. Workers are monitored primarily for metals;*
- *Periodic monitoring of exposure control methods to assess effectiveness in reducing or eliminating worker exposures;*
- *Sample collection and analysis including air quality, blood samples, and observational data;*
- *Observation of worker behavior during normal activities;*
- *Worker interviews to determine whether exposures are common characteristics of the specific work environment; and*
- *A quality assurance/quality control (QA/QC) program to ensure proper data collection.”*

As part of the monitoring, the professionals managing this program have the responsibility of data compilation and interpretation.

The applicable and relevant IFC guidelines are the following: World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995; and IFC Environmental and Social Guidelines for Occupational Health and Safety, June 2003.

Observations:

An HSLP staff is in place with the exception of an industrial hygienist. Although construction started in April 2004, the current staff covers the operations phase and has been in place a relatively short time. HSLP is currently organized into four departments (with plans to add an additional department for industrial hygiene) who report to the HSLP Manager, who is also supported by a Senior HSLP Coordinator:

- HSLP Coordination (2 professionals supported by 2 field staff)
- Malaria Control (1 biologist supported by 9 field staff for inspections/spraying, etc.)³
- Emergency Response (1 coordinator supported by a staff of 9 to be in place by January 15, 2007)
- Five Star Coordination (1 coordinator supported by an administrative assistant and a secretary)

As reported by NGGL, contractors also have their individual H&S staff. The numbers of available staff to monitor and identify possible solutions for the HSLP aspects of the Project is of concern, because operations runs for 24 hours, such that the staff has to be divided to cover individual shifts.

In spite of the lack of final plans, as discussed in Section 1.1 above, H&S procedures appear to be followed. Statistical data are maintained to document the occurrence of accidents. With more than 9,000,000 exposure hours in 2006 up to the end of October, NGGL reports that there have been only two lost time accidents (LTAs) and 14 medical treatment accidents with no loss of life. Vehicular accidents represent the single greatest hazard to the Project. The HSLP staff was able to provide documentation that they are involved with monitoring of H&S conditions and receive follow-ups to verify that unsafe conditions have been corrected. Training includes the dissemination of "Pre-Shift Information" related to workplace safety topics prior to the commencement of work.

The ECMG observed a generally widespread use of appropriate personnel protective equipment (PPE), with a few exceptions that were discussed with NGGL staff in the field. The HSLP reported that they have the authority and have acted to stop work when they observe the lack of or inappropriate use of PPE, or otherwise observe unsafe situations. In terms of documenting procedures that are followed when an accident occurs, the HSLP staff indicated the following process:

- Preliminary Incident Report (Levels range from 1 – 5 with 1 being the least severe and 5 being the most severe); if the incident has a rating of ≤ 2 , recommendations

³ The malaria control staff is supported by the medical staff, currently managed by the Contractor S.O.S., who is also conducting evaluations of appropriate procedures for the management of mosquitoes and the prevention and treatment of malaria, as well as sexually-transmitted and other diseases.

are provided, but there is no additional investigation; if the accident is rated > 2, then there is additional investigation and follow-up.

- For moderate to severe accidents a panel is assigned to prepare an assessment of the incident and the information made available to responsible parties in the form of a final Incident Investigation Report that includes attached interviews and interpretation.
- Job Hazard Analysis (JHA) procedures are reviewed by responsible parties.
- Revised work procedures to prevent similar occurrences in the future are issued, as appropriate.

An example of the Project documentation to a moderate (Level 3) injury associated with the employee of a Contractor was reviewed. The incident was described on the basis of an Incident Investigation Form, which did indicate that the injury resulted in group meetings and discussion that formed the basis for the Contractor to prepare a JHA that led to the preparation of revised work procedures. Although this appears to be the appropriate response to an injury, the HSLP Department was not able to produce the backup documentation, which should have consisted of the JHA and revised procedures, as well as the complete investigation report with the employee interviews.

<i>IFC Policy Action Items</i>

Nil

<i>ESIA Action Items</i>

Nil

Recommendations for Improvement:

- i) Ensure that all H&S staff are in place and adequately trained on-the-job by senior specialists as soon as practical.
- ii) Work to make sure that the Contractors and their subcontractors are part of the HSLP management structure, with dedicated staff trained and mobilized for each crew, as needed.

3.2 Emergency Preparedness and Response

Project strategy:

An Emergency Response Plan (ERP) has to be prepared with the intent of being implemented as a comprehensive document for management of incidents that may occur at the Ahafo South Project site. This Plan has the following stated goals:

- *“Provide for an effective response to emergency situations;*
- *Minimize the effect on personnel and surrounding communities;*
- *Minimize property and equipment loss;*
- *Coordinate inter-departmental and inter-plant responses; and*
- *Ensure the cooperation of outside agencies.”*

The HSLP group is organized such that there are dedicated individuals to implement this Plan.

Observations:

The ERP in its current form has several deficiencies and should not be considered to form an adequate basis for assuring that emergency scenarios have been properly identified and appropriate response procedures established. Some of the significant limitations to this document are as follows:

- Emergency contact information is not up-to-date. There have been substantial changes in management personnel since the document was last revised in June 2006.
- Potential emergency scenarios are not described and properly assessed. For example, there is no comprehensive description of the activities that could be associated with the different types of chemical spills that could occur. Fundamental information, such as the symptoms of cyanide poisoning, is not provided in the ERP.
- Except for defining a plan for notification, which, as previously noted, is out-of-date, the ERP does not provide procedures to confront an emergency situation. For example, emergency response procedures for cyanide spill control and site decontamination are not provided in the ERP. Detailed handling procedures describing appropriate PPE, use of ferrous sulfate, pH control, excavation of neutralized material, soil testing, decontamination with sodium hypochlorite, etc. would be expected to be included in an adequate ERP for this situation.
- The ERP is not supported by a specific Risk Assessment for Operations. ERPs are normally based on risk assessment, such that plans can be based on the likelihood of occurrence of different emergency scenarios at different locations.
- Maps have not been prepared to identify the risk “hot spots” and human and environmental sensitive receptors, and the ERP does not provide location-specific plans in response to the identification of these special areas. An adequate ERP would be expected to contain maps and routes to facilitate the emergency response strategy and effectiveness and also include any environmentally sensitive areas that could require special consideration.
- In the case of a natural disaster, the only procedure included in the ERP is that “*the supervisor will keep personnel away from high risk areas.*” The water supply dam and tailings facility need to have their own Emergency Action Plans, according to best international standards, that are at least cross referenced in the ERP.

The capabilities of the Emergency Response team within the HSLP organization were reviewed. The group consists of a supervisor with a staff of nine expected to be in place by the beginning of January 2007. This group has recently received equipment, including a new fire truck, to manage emergency response situations. The equipment is suitable for firefighting, and an emergency trailer equipped to face environmental spills and/or releases is available at the plant site, but not all equipment suitable for the control of chemical spills is available. The Emergency Response team was found to lack sufficient training. The team members have received some informal training, but the complete, formal and professional training that they will need to be emergency responders has not yet been given to the team.

A work crew at the tailings dam was randomly selected to evaluate the preparedness of the workers to manage the occurrence of an accident. In this case, none of the workers were found to have first aid training, nor was there a first aid kit available

with the work crew. This is a serious deficiency that should be promptly addressed with the active support of NGGL HSLP Department and Management.

The overall situation with respect to emergency response is that the HSLP organization is just starting to develop capabilities and NGGL should not consider that the Emergency Response system would be adequate to promptly and effectively respond to a serious emergency.

IFC Policy Action Items

M1.15 Prepare an ERP that can serve as a complete guide to emergency management, from a risk assessment to identify vulnerabilities to detailed procedures to respond to a full range of situations, ranging from small spills to natural disasters. Include maps to identify access and escape routes, muster points, as well as the risk "hot spots" and sensitive receptors where particular care is required to manage emergency situations.

ESIA Action Items

Nil

Recommendations for Improvement:

- i) Commence complete and formal training of the Emergency Response Team.
- ii) The NGGL HSLP Department should consistently verify the compliance of the Contractors' first aid training programs by checking the work places, vehicle convoys, etc. to verify the presence of trained first aid responders and adequate first aid kits at appropriate locations.
- iii) Keep emergency contacts up-to-date in the ERP. This is a practical goal, considering that the document is available through the Ahafo site intranet.
- iv) Develop contingency procedures to make the ERP available to responsible parties should the emergency involve the shutdown of the Ahafo site intranet.

3.3. Noise and Vibrations

Project Strategy:

Sources of noise and vibrations include machinery, generators, the overall processing plant, vehicular traffic and blasting. Given that noise and vibrations can adversely affect both community and workplace environments, there are requirements for monitoring within the Project social staff, as well as with the HSLP department. The ESAP and ESIA indicate a requirement for noise and vibrations monitoring only within the context of the potential impact to the local community. Noise and vibrations are, of course, a normal part of industrial hygiene in the workplace and the HSLP department has SOPs related to noise management and exposure guidelines.

The applicable and relevant IFC guidelines are the following: World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995; and IFC Environmental and Social Guidelines for Occupational Health and Safety, June 2003.

*Observations:*Community Monitoring

Noise and vibrations from blasting is being monitored under the requirements of the Social Action Plan. The Project has established limits for vibration compliance to be compliant limits of 5mm/s peak particle velocity (ppv) and 115 dB for the air blast. It should be noted that these standards are very conservative in terms of what constitutes best practice. The draft IFC Guideline for “*Precious Minerals Mining*”⁴ defines acceptable standards to be 20 mm/s ppv (with 95% of the peak vibrations to be <10 mm/s ppv) and a maximum air blast of 140 dB linear (with 95% of the measured peaks to be within 133 dB linear). These standards adopted by the IFC are intended to minimize annoyance to people rather than to protect property. Building damage typically does not start to occur until much stronger ground motion and air blasts than the levels assumed as the Project standards are produced by the blasting.

Blast monitoring data from July through September were reviewed and found to be within Project standards, except for a few slight excursions of the measured air blast, which exceeded the Project standard, but were still within the IFC guidelines. It is understood that the community monitoring is ongoing and that additional equipment is being procured. If NGGL can ensure the achievement of the noise and vibration standards established for the Project, community impacts should be negligible and potential complaints should be manageable.

ECMG was not provided information to indicate if a noise monitoring program was being conducted in local communities to evaluate if other Project sources, such as vehicular traffic or machinery, have any community impact. Compliance with applicable and relevant standards cannot be assessed.

Workplace Monitoring

Within the HSLP department, two standards entitled “*Noise Management Action Plan*” and “*Exposure Monitoring Guide*” will provide the occupational health standards for the workplace for noise and vibrations. Neither of these SOPs has been finalized and noise monitoring surveys of the workplace have not been conducted. The HSLP Department currently is not in the possession of noise monitoring equipment with which to conduct quantitative surveys. It is understood that workers in noisy areas do have ear protection as part of their PPE, but the noise levels have not been quantified on the basis of measurements. Compliance with applicable and relevant standards cannot be assessed.

IFC Policy Action Items

M1.16 Conduct noise surveys of the various workplaces and verify that the PPE assigned to the workers is appropriate for their noise environment.

M1.17 Verify that Project activities do not adversely impact the local communities from the standpoint of noise and vibrations that could originate from Project activities other than those associated with blasting, such as from Project-related vehicular traffic. Ensure that compliance with applicable and relevant standards is monitored.

⁴ IFC Environmental Health and Safety Guidelines for Precious Minerals Mining, Draft, July 2004.

<p><i>ESIA Action Item</i></p> <p>Nil</p>

Recommendations for Improvement:

- i) Make sure that the standards used for workplace noise are at least as conservative as those adopted in the IFC Occupational Health and Safety Guideline⁵.

3.4 Occupational Health

Project Strategy:

NGGL has principles for occupational health and hygiene that are well established at the Corporate level within their Five Star Program, specifically the HSLP Standard 30 titled "Occupational Health and Hygiene," which has the stated intent "to anticipate, recognize, evaluate, and control occupational exposures to levels which potentially eliminate occupational disease by minimizing occupational health risk." This intent is reflected in the procedures defined in the ESIA, in particular for malaria and HIV/AIDS.

The applicable and relevant IFC guidelines are the following: World Bank Environment, Health and Safety Guidelines Mining and Milling - Open Pit, August 1995; and IFC Environmental and Social Guidelines for Occupational Health and Safety, June 2003.

Observations:

As the position of industrial hygienist has not yet been filled, the ECMG did not find appropriate documentation to indicate that a systematic survey of industrial health has been conducted throughout the Project, as previously noted in Section 3.3 with respect to noise in the workplace. Nevertheless, taking into account the location of the Project in Western Africa, the most serious aspects of occupational health are those that relate to malaria and HIV/AIDS, but also other infectious diseases including shistosomiasis (bilharzias). Since the startup of construction in April 2004, NGGL has established strong policies for malaria and HIV/AIDS as reflected in Appendix A to the ESIA. NGGL has clearly understood the need to educate its workforce as can be observed from the large number of warning posters throughout the Project facilities. Malaria prophylaxis is an important component of this strategy.

One of the scenarios considered in the ESIA (Chapter 5 – Community Health and Safety) is that the construction of the environmental control ponds and the water supply reservoir will create breeding grounds for mosquitoes that could have an adverse effect to the local community or the Project workforce. As reported in the June 2006 External Social Compliance Monitoring Report, communities around the Water Storage Facility (WSF) have reported an increase in the incidence of mosquitoes and have expressed a concern of family members contracting malaria. As a consequence, the HSLP Department hired an entomologist to evaluate mosquito breeding grounds. The current medical Contractor, International SOS, has also provided an entomologist and NGGL has contracted a specialized consultant to evaluate potential mosquito control procedures. Conditions potentially conducive as a

⁵ IFC Environmental and Social Guidelines for Occupational Health & Safety, June 24, 2003.

breeding ground for mosquito larvae were observed by the ECMG at Environmental Control Dam (ECD) 6, where a significant amount of semi-stagnant, low water was present, with hydrophilic vegetation scattered in the pond water.

The medical staff maintains statistics on the occurrence of diseases with emphasis on malaria. The most recent and current statistics indicate that the percentage of malaria cases per month is about 2% of the workforce. The review of the occurrence of malaria by a specialized consultant hired by NGGL confirmed that the correct statistics are indicative of the 2% monthly occurrence. It is noted, however, that these statistics do not allow distinguishing the different work groups with different degrees of immunity to malaria.

Although the implementation of the disease control program may have been late, as well as the recognition of the severity of African malaria, procedures and adequate attention appear now to be in place to locate breeding grounds associated with Project activities and determine practical solutions to mitigate potential effects on the work force and local communities.

Another important worker health factor relates to the management of food preparation, catering and hygiene. The ECMG did not have the opportunity to evaluate food served in the field, but did enter the kitchen at the main camp. The conditions in the kitchen were found to be sanitary, with good segregation of the food preparation processes. The storage areas were clean and uncluttered and there was no clear evidence to indicate the presence of pests and vectors.

<i>IFC Policy Action Item</i>

Nil

<i>ESIA Action Item</i>

Nil

Recommendations for Improvement:

- i) NGGL needs to make sure that the statistics reflect the different groups working on site (nationals and expatriates) to evaluate the effectiveness of malaria control procedures.
- ii) The Project should continue to collect and provide scientific evidence that the ongoing operations and associated facilities do not create breeding grounds for mosquitoes and other disease vectors.

4 Cultural Resource Management

4.1 Cultural Resource Management Surveying and Planning

Project Strategy:

The ESIA defines NGGL's commitment for cultural resource management to be World Bank Operational Policy 4.11, *Safeguarding Cultural Property in an IFC-Financed Project*. Actually, the title of OP 4.11 is "Physical Cultural Resources" and

the appropriate reference is OPN 11.03 “*Management of Cultural Property in Bank-Financed Projects*”, which is an international best management practice that requires developers to identify and preserve archaeological (prehistoric), paleontological, historical, religious resources, and unique natural features. The IFC currently supplements OPN 11.03 with Performance Standard 8, Cultural Heritage dated April 30, 2006. As part of the ESIA preparation process, a survey entitled “*Newmont Ghana Gold Limited, Cultural Heritage Survey at Ahafo, Ahafo Gold Project, Reference – B333, Version 1.0 dated March 2005*” was prepared by SGS Environment. The survey identified 18 sites including cemeteries, shrines, water bodies, a tree, and a hill. Subsequent to this survey, a Cultural Resource Management Plan dated August 2006 was prepared. This document references IFC Performance Standard 8.

Observations:

Prior to the involvement of NGGL at the Ahafo South site, surveys of cultural resources were not conducted, as they were reportedly not required by the Ghana EPA for obtaining a mine license through the ESIA process. NGGL hired an environmental contractor to conduct a cultural heritage survey that identified sites that are sacred to the modern community, but did not include an evaluation of possible archaeological resources. Performance Standard 8 is intended to include archaeology as part of a cultural heritage survey. Implementation of a cultural resource management program as part of an environmental baseline survey is described by the World Bank within the document *Cultural Heritage in Environmental Assessment*⁶ where additional details regarding the expectations of the World Bank Group are outlined.

The Cultural Resource Management (CRM) Plan prepared in August 2006 provides general guidelines for the identification of cultural properties and indicates that work will stop and appropriate procedures followed should chance finds be made. This document provides basic procedures for the management of cultural resources. There is a general requirement for archaeological follow-up, stated as follows: “*The CRM will ensure that all archaeological collections and associated records are processed, maintained and preserved. The CRM will negotiate a curation agreement with a national repository, museum, university, or other approved facility for final curation of artifact collections and associated records removed from land controlled by NGGL. Contracts for conducting archaeological surveys or excavations will include a provision for curation of collected artifacts.*”

The requirements for archaeological baseline surveys prior to disturbing within the CRM Plan is as follows: “*Prior to any ground disturbing activities an inventory of all cultural heritage sites and exclusion zones will be located using GPS equipment and photographed (when permissible).*” This requirement is appropriate as a general commitment, although omits defining the work that would be required of archaeologists prior to making an inventory.

⁶ The World Bank Environment Department, September 1994, *Cultural Heritage in Environmental Assessment*, Environmental Assessment Update No. 8.

IFC Policy Action Items

M1.18 Include archaeology reconnaissance survey within the scope of the cultural resource management surveys that should be undertaken as part of environmental baseline surveying.

ESIA Action Item

Nil

Recommendations for Improvement:

- i) The CRM plan should cover the types of archaeological materials that might be encountered and what workers should look for, field procedures for chance archaeological finds, notification protocols, procedures for inventory, excavation, interpretation and curation, and reporting requirements.

5 Tailings Storage Facility (TSF)

5.1 *Design and Construction Update*

Project Strategy:

The TSF was designed by Knight Piésold Pty Ltd (KP) in 2004. The design of the tailings pumps, pipework and return water system were carried out by Lycopodium Engineering Pty Ltd (Lycopodium). Construction management is currently being conducted by Knight Piésold.

The TSF has been started as a single main embankment at the south end of the Subri River (South Embankment). The upstream limit to tailings deposition is the Water Storage Facility (WSF) dam (North Embankment). The facility is planned to ultimately comprise a four-sided main embankment constructed in annual stages over 11 years utilizing mine waste rock and, if necessary, fill from designated borrow areas. The plans for final completion of the TSF are not yet finalized, pending decisions yet to be made for mining associated with the Ahafo North area. The tailing storage facility is operated as a “zero discharge” facility, with all water returned for use in the ore processing circuit, and no water discharged to the environment.

The basic design characteristics of the TSF are tabulated as follows:

DESIGN STANDARDS	
Earthquake Design Basis	0.1g
<i>Storm Events:</i>	<i>Design Applications</i>
1:2 yr	Temporary diversion structures during construction.
1:10 yr/24 hr	Diversion channel erosion protection.
1:100 yr/24 hr	Diversion channel capacity.
1:100 yr/24 hr in addition to the maximum operating volumes for average climatic conditions or 1:100 wet year, whichever is most critical	TSF capacity.
1:100 yr storm event	Emergency spillway.
1:5000 yr 6-, 18-, 72-hr intensity	TSF permanent spillway structure at

and 72-hr volume	reclamation.
OPERATIONS	
Capacity – Final - Starter	94.7 Mt of dry tails over 13 years. 7,500,000 tons of dry tails – 12 months initial capacity.
Production Rate	22,523 tons/day of dry tails (average, based on 333 days/yr).
Production Days/Year	333 (91.3% availability).
SOUTH EMBANKMENT/TAILINGS EMBANKMENT	
Construction Process	Downstream construction technique until dam abuts with waste rock disposal area
Dam Characteristics	Downstream slope of 1V:2.5H, an upstream slope of 1V:3H and a crest width of 20 m. Upstream toe cut-off key and drain. The zones in the embankment consist of an upstream low permeability zone (laterite oxide waste with permeability $< 1 \times 10^{-8}$ m/s.) with HDPE lining, a chimney drain zone (washed sand) and a downstream structural zone (compacted run-of-mine waste to full embankment height with low permeability zone)
Slurry Characteristics	43% – 48% solids by weight. SG = 2.73-2.77. Slurry settled density = 1.35 to 1.50 t/m ³ . Permeability of: 5×10^{-6} (primary) to 5×10^{-8} (oxide) m/s.
Fluid Management	Basin drainage gravity system into a sump then pumped to supernatant pond. Decant tower removal of supernatant solution via pipeline to the plant. Collect surface water (runoff) via decant.
General	Deposition towards South Embankment. Minimum tailings freeboard of 0.3 m plus 100 yr/24 hour storm event below spillway. After start-up the supernatant pond is maintained upstream of the South Embankment adjacent to it.
Construction Materials	Undercut unsuitable foundation soils from entire embankment footprint for use as drainage material, seal or structural zone fill (if suitable). Drainage material from borrow pit off site. Structural zone fill of mine waste rockfill. Seal material from selected mine waste (fine soil).
NORTH EMBANKMENT/WATER STORAGE FACILITY DAM/	
Construction Process	Centerline for basic dam – upstream construction in advanced stages of tailings impoundment construction, if determined to be feasible based on geotechnical characteristics of tailings
Dam Characteristics	Upstream toe cut-off key and drain. Zoned embankment constructed of run of mine waste fill with a filter, drain, and seal zone on the upstream face. Run of mine waste for the embankment to full height. 8 m crest width for each raise.
General	Minimum freeboard of 1.0 m plus 100 year/24 hour storm event. South side – tailings freeboard 0.3 m. Spillway for WSD to handle Probable Maximum

	Flood (PMF) event.
Construction Materials	Undercut unsuitable foundation soils from entire embankment footprint for use as drainage material, seal or structural zone fill (if suitable). Drainage material from borrow pit off site. Fill from mine waste. Seal material from selected mine waste (fine soil).
TAILINGS BASIN	
Required Basin Permeability	1×10^{-8} m/s soil liner comprising in situ soils scarified and re-compacted throughout basin area to form a soil liner (300 mm thick). In some areas, if required, material will be imported to provide the liner. Composite liner (soil liner plus 60 mil smooth HDPE geomembrane liner) beneath supernatant pond.
Extent of Composite Liner	Larger area of average supernatant pond plus 25 yr/24 hour storm events; or 1 in 25 yr return period wet year.
Basin Drain Layer	Leachate collection and recovery system (LCRS) installed beneath soil liner in alluvial sands of main stream.
Leachate Collection and Recovery Systems (LCRS)	Trench drains excavated in alluvial sands with slotted pipe, backfilled with sand and sealed below basin soil liner.
Tailings Drainage System	Main collector drains and branch drains throughout basin area that collect water to a sump, pumped to the supernatant pond. Finger drains on soil liner only where basin area gradient is less than 5%, at 20 m spacing.
Main Drains	Corrugated, perforated tubing wrapped in geotextile, surrounded by sand with erosion protection rock (on soil liner areas) or temporary liner protection (where geomembrane present).
Branch Drains	Corrugated, perforated tubing, surrounded by sand and wrapped in geotextile (continuously seamed or heat welded) and covered with rock erosion protection (where no geomembrane present).
Finger Drains	Corrugated, perforated tubing, surrounded by sand and wrapped in geotextile (continuously stitched or heat welded).
Embankment Seepage Collection Tower	Vertical tower located at final extent of waste dump toe.
Soil Liner Erosion Protection	No erosion protection. Water bars on soil liner at 20 m centers to direct surface flows to branch and collector drains. Inspect and repair, as required.
Main River Bed Channel	Convey tailings supernatant water within rock erosion protection.

The applicable and relevant IFC guideline is the OP 4.37 (draft) on Safety of Dams (September 1999).

Observations:

The practice of having the TSF designer Knight Piésold also conduct the construction monitoring is good practice. This helps verifying that the design characteristics will be appropriately implemented.

The TSF appears to be competently designed and is being constructed within the established design criteria. Based on information provided by NGGL to supplement what is presented in the ESIA, several aspects of the design of the TSF are more conservative than presented in the ESIA, in particular for earthquake resistance. Whereas the above table taken from the Operating Guidelines for the TSF indicates a design basis of 0.1 g for seismic design, the actual Maximum Design Earthquake (MDE) is reported to be 0.2 g.

The design criteria are based on the hazard classification of the TSF, which is classified as “significant” according to ICOLD (International Committee on Large Dams) Guidelines where there are three classifications: low, significant and high. Dams assigned the significant or medium hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. The basis for the “significant” classification for the Ahafo TSF is not provided in either the ESIA or the Operating Guidelines for the TSF, and should be clarified, since the designation of the degree of hazard for the impoundment has significant implications in terms of what is considered to be “best practice” for design and operations. For example, the TSF is designed for a 100 year flood, which may be acceptable if the impoundment is considered to be of medium hazard, but might not be considered as acceptable if the facility is considered to be high hazard. U.S. practice, for example, is stated by Wu et al. (2005)⁷:

“To use a design storm of less than the PMF [Probable Maximum Flood], the plan must substantiate through a conservative dam-break analysis, that failure of the impoundment is unlikely to cause loss of life.””

Reviews of the tailings dam design provided by an independent reviewer for NGGL demonstrate that the probability of the failure of the tailings dam is very low, given its design, but do not provide details on the basis of the hazard classification of the facility. This would require the assumption that the dam will fail and that the consequences of its failure are understood, which implies conducting a dam break analysis where flood routing maps have been prepared.

IFC Policy Action Items

Nil

ESIA Action Items

Nil

⁷

Wu, K. K., L. Owens and J. W. Fredland, 2005, *Tailings pond design*, in Rajaram, V. et al (eds.) Sustainable mining practices – a global perspective, A. A. Balkema Publishers, pp. 237 – 252.

Recommendation for Improvement:

- i) NGGL should comprehensively justify the hazard classification of the TSF. This should involve a dambreak analysis and flood routing evaluation to determine the potential human and environmental impacts of a dambreak event. See also recommendations for emergency action planning.

5.2 Operations and Maintenance Planning*Project Strategy:*

A document entitled “*Ahafo Project, Tailings Storage Facility, Operations Manual*” has been prepared for the TSF, as required by the IFC guideline OP 4.37 on Safety of Dams. This manual describes the design in detail and presents operational and emergency procedures for the management of the facility.

Observations:

An Operations Manual for a TSF needs to present the design of the facility, the sequencing of activities, procedures for the placement of tailings and minimum basic QA/QC procedures, including:

- Measuring water content and particle size distribution of the tailings;
- Freeboard measurement of the dam wall, and water level measurement at the spillway or the decant tower;
- Monitoring rainfall and evaporation;
- Frequent periodic measurements of pore pressure in the dam, documentation of dam movements with instrumentation/measurements;
- Quantity of tailings deposited and volumes of water decanted; and
- Periodic (at least annual) of the wind and water erosion of the tailings facility.

In terms of fulfilling the requirements of an Operations Manual, the manual for the Ahafo Project is generally complete. The results of materials testing and a freeboard monitoring program are reported in monthly reports summarized in the TSF Monthly TSF construction/operations reports. Stability of the dam is monitored by settlement monuments. At the time of the ECMG mission, new piezometers were in the process of being installed to replace piezometers that needed to be discontinued because of dam construction, but NGGL was able to provide monitoring records for the discontinued piezometers and it is expected that the new piezometers will be measured at least on a monthly basis.

It is common that the management of a tailings facility be founded on the basis of a quantitative risk analysis. In the ESIA, Chapter 2 it is indicated that “*NGGL will conduct a site-specific risk assessment to determine the level of risk posed by the design and operation of the Ahafo South Project.*” A formal risk assessment has been conducted only for potential impacts to wildlife.

IFC Policy Action Items

Nil

<i>ESIA Action Items</i>

Nil

Recommendation for Improvement:

- i) Conduct a complete risk assessment to evaluate all processes associated with the construction and operations of the TSF.

5.3 Emergency Action Planning

Project Strategy:

The Project description for the TSF states the following commitment: *“The tailing storage facility will be state-of-the-art using rotational, subareal tailing deposition and designed, constructed, and operated in accordance with Newmont’s Standards for Tailing Management and relevant sections of the Ghana Minerals and Mining Law, 1986, Ghana Mining Environmental Guidelines, Final Draft, 1994; State of Nevada (U.S.) Administrative Code Chapter 445A, which governs design, construction, operation and closure of mining facilities; and IFC Operational Policy 4.37.”*

Observations:

IFC Operational Policy 4.37 has a requirement for the preparation of Emergency Preparedness Plans. As stated in OP 4.37: *“For large dams—that is, dams that are 15 meters or more in height..... [requires] preparation and implementation of detailed plans: a plan for construction supervision and quality assurance, a plan for instrumentation, an operation and maintenance plan, and an emergency preparedness plan.”* A formal Emergency Preparedness Plan, in the case of dams usually referred to as an Emergency Action Plan (EAP), has not been prepared for the TSF. This type of Plan would be expected to have the following contents:

- Warning signs specific to the impoundment;
- Preventative actions;
- Supplies and resources;
- Detailed notification requirements and chain-of-command; and
- Danger reach maps that show the flood inundation areas for a normal pool and design storm failure with evacuation routes clearly marked.

The Operations Manual, Section 6.6 provides an abbreviated EAP, but the discussion omits the presentation of maps of the potentially affected areas and the procedures that would actually be followed to notify downstream potentially affected parties. This plan provides emergency procedures for specific activities, not for catastrophic failure.

The HSLP Department was found not to be familiar with the TSF Operations Manual and the procedures that would need to be followed in the case of a failure of the TSF.

IFC Policy Action Items

M1.19 Prepare an Emergency Action Plan (or Emergency Preparedness Plan) for the failure of the TSF that clearly defines potentially affected areas based on a dambreak analysis with appropriate flood routing evaluation and contains notifications and chain-of-command procedures. Environmentally sensitive areas and receptors should also be identified on the maps of areas with potential impact.

ESIA Action Items

Nil

Recommendations for Improvement:

- i) Involve the HSLP group with the emergency planning for the TSF facility.

List of Acronyms and Abbreviations

ARD: Acid Rock Drainage
BAPP: Biological Acid Production Potential
BOD: Biological Oxygen Demand
COD: Chemical Oxygen Demand
CRM: Cultural Resource Management
EAP: Environmental Action Plan
ECD: Environmental Control Dams
ECMG: External Compliance Monitoring Group
EHS: Environmental Health and Safety
ESIA: Environmental and Social Impact Assessment
EMIS: Environmental Management Information System
EPA: Environmental Protection Agency
ERP: Emergency Response Plan
ESAP: Environmental and Social Action Plan
GSHAP: Global Seismic Hazard Assessment Program
H&S: Health and Safety
HSLP: Health, Safety and Loss Prevention
ICMC: International Cyanide Management Code
IFC: International Finance Corporation
JHA: Job Hazard Analysis
LTA: lost time accident
MCE: Maximum Credible Earthquake
MSDS: Material Safety Data Sheet
NGGL: Newmont Ghana Gold Limited
NGO: Non-Governmental Organization
OWS: Oil/Water Separator
PMF: Probable Maximum Flood
PPE: Personal Protective Equipment
QA/QC: Quality Assurance/Quality Control
SOP: Standard Operating Procedure
SPLP: Synthetic Precipitation Leachability Procedure
SSV: Senior Staff Village
STP: Sewage Treatment Plant
STD: Sexually Transmitted Disease
TSF: Tailings Storage Facility
TSS: Total Suspended Solids
WAD: Weak Acid Dissociable
WSF: Water Storage Facility
WB: World Bank
WHO: World Health Organization