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**D'APPOLONIA**  
ECMG

**REPORT OF THE**

**EXTERNAL COMPLIANCE  
MONITORING GROUP (ECMG)**

**THIRD SITE VISIT  
FEBRUARY 2008**

*Ahafo South Project, Ghana*

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**SUBJECT: THIRD SITE VISIT OF THE D'APPOLONIA ECMG TO THE AHAFO SOUTH MINING PROJECT, GHANA, FEBRUARY 2008**

### **Introduction and Executive Summary**

1. This report summarizes observations made during the third site visit (February 17 - 23, 2008) 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; and,
  - Recommendations for Improvement based on D'Appolonia's experience.

ECMG observations that require action and will be reviewed in subsequent assessments have been collated in Table 1 – Follow-up Issues. Table 1 will be updated by the ECMG following each site assessment. The ECMG has also provided 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 Limited (NGGL), a wholly owned Ghanaian subsidiary of Newmont Mining 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 Ghana, West Africa. The Project is an open cast gold mine and associated facilities. Construction initiated in April 2004 and mining started in January 2006 with the pouring of first gold in July 2006. The Ahafo South Mining Project is expected to add an additional 6.8 million ounces to Ghana's overall export of gold during the life of the mine. Current operations have an expected mine-life of more than 20 years.

Mining is currently conducted in two areas, the Subika and Apensu pits. Groundbreaking for a third pit, Awonsu, was starting at the time of the ECMG visit. The current NGGL workforce totals about 1019 permanent Ghanaian workers and approximately 59 expatriates. Contractors augment this workforce by an additional 1,471 workers to provide security, laboratory, vehicle and equipment maintenance, construction, catering, and transport services.

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 programs. Social compliance is independently evaluated and reported by other external assessors<sup>1</sup> outside of the D'Appolonia ECMG organization.

5. D'Appolonia's scope of work is to conduct semiannual visits to the Project in order to:
  - Identify areas and degrees of compliance with IFC/World Bank (WB) Policies and Guidelines:
    - IFC Operational Policy (OP) 4.01 - Environmental Assessment (October 1998),
    - IFC OP 4.04 - Natural Habitats (November 1998),
    - IFC OP 4.37 - Safety of Dams (September 1999 Draft),
    - IFC Hazardous Materials Management Guidelines (December 2001),
    - IFC Occupational Health and Safety (OHS) Guidelines (June 2003),
    - WB Operational Policy Note (OPN) 11.03 - Management of Cultural Property in Bank-financed Projects (1986, reprinted August 1999),
    - WB Pollution Prevention and Abatement Handbook (PPAH) General Environmental Guidelines (July 1998),
    - the WB EHS Guidelines for Mining and Milling - Open Pit (August 1995);
  - Provide practical guidance and advice to Project's field teams; and
  - Identify specific 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 (versus Ghanaian and International standards as presented in ESIA);
- Compliance with IFC EHS Safeguard Policies;

<sup>1</sup> Mr. Frédéric Giovannetti and Ms. Tasneem Salam. The reports of their reviews are publicly available at <http://www.newmontghana.com/> and [www.ifc.org](http://www.ifc.org).

- Facility review;
- Biodiversity Management Plan performance;
- Implementation of the Environmental and OHS Action Plans (as presented in ESIA); and
- Hazardous Material and Transportation Management.

During this visit, D'Appolonia initiated a review of an associated facility (i.e., the Volta River Authority's [VRA] Kumasi-Sunyani Transmission Line). A review of this component based on documentation provided by NGGL is included as part of this report.

6. Specific activities conducted during this site visit included the following:
  - Evaluation of implementation of the commitments contained within the Environmental and Social Action Plan (ESAP) of the ESIA. Items addressed in the ESAP 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. Items addressed in the OHS Action Plan include:
    - Hazardous materials and transportation management, including cyanide,
    - OHS 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 operating Apensu and Subika Pits; the groundbreaking associated with the Awonsu Pit; Water Storage Facility (WSF); Tailings Storage Facility (TSF); the Processing Plant; and associated infrastructure).
  - Meeting with the Project teams responsible for EHS compliance monitoring and review relevant plans, procedures and monitoring records.
  - Review of documentation provided by NGGL specifically related to with respect to the VRA's Kumasi-Sunyani Transmission Line.
  - 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 South Mining Project on February 22, 2008, 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 Mining 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, equipment and machinery.

The most fundamental observation made from the third visit is that NGGL has made substantial progress in working towards operations that are fully compliant with IFC

environmental policies and guidelines. Although construction and operations continue to be at a more advanced stage than the associated EHS Plans and Procedures, it is anticipated that this gap will be closed with NGGL's efforts to achieve ISO 14001 and OHSAS 18001 certifications by the end of 2009. The current environmental and health, safety and loss prevention (HSLP) management structure is consistent with ESIA commitments and nearly all of the key managerial positions are filled. A setback to this organization has been the high rate of management turnover, which has sometimes made it difficult for management to maintain continuity of actions.

Another important step forward taken by the project since the ECMG's July 2007 site visit is the submission of the final Environmental Management Plan (EMP) (December 2007) to Ghana's Environmental Protection Agency (EPA) pursuant to Legislative Instrument (LI) 1652 Environmental Assessment Regulations (1999). The EMP provides a summary of potential project-related impacts, related mitigation measures, management measures in the form of an Environmental Action Plan (which includes a monitoring and reporting schedule) and a HSLP Action Plan, the project's final Reclamation and Closure Plan, as well as the Reclamation Security Agreement (i.e., bond) between NGGL and the EPA. Regarding this latter component, NGGL is obliged to provide security to the EPA sufficient to secure performance of NGGL's legal requirement to carry out reclamation of project-disturbed areas pursuant to Ghana Regulation 23 of LI 1652. The initial Security bond of \$38,030,623.00 USD is equal to the total disturbance reclamation costs at year end 2009. The EPA issued an Environmental Certificate on 19 February 2008, which authorizes NGGL to continue operations in compliance with the stipulations as presented in the Certificate until 18 February 2011. In addition to conditions specified for blasting, compensation, waste rock disposal, and storage facilities and container disposal, the project must submit annual Environmental Reports and monthly Environmental Monitoring reports on mining operations to the EPA.

From an environmental standpoint, NGGL is generally working towards achieving acceptable environmental and natural resource management programs. In particular, substantial progress has been made with respect to reducing the concentration of Weak Acid Dissociable (WAD) cyanide entering the TSF with the implementation of a Short Term Compliance Action Plan such that the concentration of the influent to the TSF will be below 50 milligrams per liter (mg/l) WAD cyanide. This plan, implemented at the end of January 2008 is expected to be effective until construction of a Counter-Current Decantation (CCD) plant is completed that will further reduce the concentration of cyanide by washing the tailings. The CCD plant is expected to be commissioned by the end of March 2008. The TSF is operated as a "zero discharge" facility.

NGGL has continued the same waste management practices that were identified as not being consistent with good practice during the second ECMG visit, in particular the use of the Kumasi landfill for certain waste streams and the burying of putrescible kitchen waste in unlined pits. Nevertheless, NGGL is developing a program to eliminate these practices with the start-up of a composting facility. The scientists working to determine the best means to use stockpiled soil for reclamation have indicated that having compost available for reclamation will improve results. Wastewater treatment has been generally consistent with IFC guidelines, and, in any case, the treated effluent has not been released to the environment as it is sent to the TSF.

Ongoing environmental programs to monitor ambient air, surface water and groundwater continue to be well operated and results used to make improvements to operations. Infiltration and Acid Rock Drainage (ARD) kinetic testing continues to indicate that ARD should not be a significant long-term environmental issue. A cautionary note is with respect to groundwater, as initial groundwater modeling studies indicate that pit dewatering may potentially impact community wells, as well as some surface water flow regimes and wetlands. This groundwater model will need to be substantially refined based on studies to determine the connectivity of shallow and deep groundwater resources and the results of actual pit pumping. NGGL will likely need to develop contingencies for potential adverse impacts once further information can be generated to better predict the actual anticipated impact.

This ECMG site visit focused on the ecological aspects of the Ahafo South Project more than other visits with the addition of a team member specialized in biodiversity and natural resource management. With respect to topsoil management and the use of plant species to stabilize slopes, NGGL has undertaken research in association with the University of Ghana. This research still needs to continue, but the results to date have provided useful information for both topsoil management and the control of invasive species. A second key partnership is with respect to biodiversity management, where NGGL is collaborating with Conservation International (CI), an internationally recognized non-governmental organization (NGO) and leader in global conservation. This partnership is the first of its type in Ghana to develop a program for monitoring and protecting the biodiversity surrounding a mining project and it is hoped that the partnership will represent a new standard for future development of major projects. The Biodiversity Management Plan is still to be fully defined and implemented, but it is understood that this Plan is near to being finalized and will reflect a form of biodiversity management that also takes into consideration the interests of local communities on biodiversity use.

A significant improvement with respect to cultural resource management has been undertaken by NGGL with respect to archaeology. Geomatrix Consultants with the support of the University of Ghana has been contracted to conduct an archaeological survey of the Ahafo South and Ahafo North projects with the discovery of twenty one (21) sites ranging in age from prehistoric to historic. Two significant prehistoric sites were excavated in the area of the Awonsu Pit, before the Pit is mined and the mitigation for these sites is complete, with artifacts sent to the University of Ghana for further study and curation.

NGGL continues to improve their capability to react to emergency situations. A level of training has been achieved such that the emergency responders can react to the most significant accidents, fires, or medical situations, although the emergency response planning documents still need to be strengthened.

The TSF appears to be competently designed and is being constructed within the established design criteria. The one deficiency with respect to this facility identified in previous ECMG reports has been the lack of a detailed Emergency Preparedness Plan (EPP) with maps of potentially inundated zones. NGGL has demonstrated that they are in the process of initiating a comprehensive Impact Analysis such that potential very low probability failure modes can be identified and the potential consequences determined. It is anticipated that this work will then form the basis for the preparation of the EPP.

EHS auditing is being conducted on a more routine basis with respect to OHS than previously observed and corrective actions are being taken, although this auditing does not appear to be based on a systemic program. One aspect of this monitoring is with respect to the effects of pit blasting (vibrations) on local communities. The NGGL standard of 115 dBL for air overpressure on a few occasions was exceeded at villages next to the mine pits, but it should be noted that this is a conservative standard and within IFC limits.

Regarding ambient noise monitoring, reference is made to the WB's General Environmental Guidelines (July 1998) that require for Ambient Noise in residential areas outside project property boundaries a limit of 55 dB(A) at daytime and 45 dB(A) at nighttime. However, it is understood the ESAP refers only to compliance with Ghana residential standards and an industrial/commercial standard of 70 dB (A) for both day and night is what has been approved by the Ghana EPA for the area surrounding the mine. From the data on monitoring provided, most measurements show noise levels below this standard although occasional exceedances have been recorded. The ECMG understand that these villages are within the mining area and therefore industrial area limits should be applied. However, it is recommended that NGGL makes all reasonable efforts to further reduce operation noise at these locations to minimize disruption to the local communities.

**Table 1**  
**Follow-up Issues**

<b>Mission/ Issue No.</b>	<b>IFC Policy / ESIA Compliance</b>	<b>Opening Date</b>	<b>Closing Date</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
<i>EHS Management</i>						
M1.1	IFC (IFC OP 4.01 Annex C (January 1999) – requirements of content of EMP	Dec 06		NGGL should finalize all EHS related plans and procedures as soon as practical.	<b>Pending</b>	Description modified from the original M1.1.  NGGL is in the process of converting from its 5-Star EHS program to compliance with ISO 14001 and OHSAS 18001 by the end of 2009. Final EHS plans and procedures may not be completed until that time.  The final EMP was submitted to the Ghana EPA in December 2007. The Ghana EPA has accepted this document and issued the Environmental Certificate in February 2008.
M1.2	IFC (IFC OP 4.01 - Environmental Assessment [October 1998], paragraph 18)	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.	<b>Pending</b>	This has not been undertaken for the reasons described above. IFC parameters are being used in the field as the standards to be achieved, but the plans and procedures have not been finalized to reflect these standards.
M1.3	ESIA Chapter 2 – Environmental Management (p 2-43)	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.	<b>Pending</b>	This issue is nearly resolved. Corrective and preventive action procedures for site-wide management have been drafted for internal review. NGGL plans to use the Ellipse System for site wide corrective action register; however, a framework for the environmental corrective action tracking system for inspection has been completed for review and roll out while waiting for the site wide register.
<i>Environmental Organization and Staffing</i>						

<b>Mission/ Issue No.</b>	<b>IFC Policy / ESIA Compliance</b>	<b>Opening Date</b>	<b>Closing Date</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
Nil						
<b><i>Air Quality</i></b>						
Nil						
<b><i>Surface Water and Groundwater</i></b>						
M1.5	ESIA Chapter 4, page 4-133, para. 3, Chapter 5 – EMP p. 5-33	Dec 06	Feb 08	Develop a mitigation plan for the 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. Develop a mitigation plan for potential impacts to wetlands caused by the dewatering.	<b>Closed</b>	
<b>M3.1</b>	ESIA Chapter 4, page 4-133, para. 3, Chapter 5 – EMP p. 5-33, ESAP – basic commitment to eliminate or offset impacts from mining	Dec 06		Calibrate the groundwater model prepared to evaluate the effects of pit dewatering on the basis of additional measurements of drawdown and studies to determine the connectivity between shallow and deep groundwater regimes. Consider increasing the monitoring program applicable to mine dewatering activities and then develop mitigation measures for community wells and wetlands as appropriate.	<b>New</b>	The results of preliminary groundwater modeling indicate that drawdown from dewatering the pits could have the potential to impact community water supplies and local wetlands in the coming years. The description of the issue has been slightly modified to reflect the observation that substantial work is still necessary to evaluate the influence of pit dewatering before the need to develop impact mitigation measures can be defined.
<b><i>Reclamation, Revegetation, and Topsoil Management</i></b>						

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.8	ESIA (Chapter 5 [ESAP]; Table 5-3)	Dec 06		Develop Noxious Weed Management Plan in close cooperation with CI, who should also act as one of the final reviewers. As part of this effort and in coordination with CI and the University of Ghana, conduct further research and review of all non-native (and potentially invasive) species, particularly, <i>Leucaena</i> spp. and vetiver ( <i>Chrysopogon zizanioides</i> ). Although naturalized in Ghana, the encroachment and domination of elephant grass ( <i>Pennisetum purpureum</i> ) should also be further explored. Ensure that these species will not present long-term impacts to natural vegetation, and especially to local agriculture. <sup>2</sup>	<b>Pending</b>	Description modified from original M1.8 due to new observations made on site.
<b><i>Biodiversity and Ecological Management</i></b>						
M2.1	ESIA (Chapter 5 [ESAP]; Table 5-3 -in DRAFT Biodiversity Management Plan)	July 07		The multi-taxa biodiversity monitoring program should be developed and made available.	<b>Pending</b>	
M3.2	ESIA (Chapter 5 [ESAP]; Table 5-3)	Feb 08		The Biodiversity Management Plan (BMP) should be finalized.	<b>Pending</b>	
<b><i>VRA Transmission Line – Associated Facility</i></b>						
Nil						
<b><i>Waste Management</i></b>						
M1.10	ESAP – Table 5-5, p 22	Dec 06		Finalize the general Waste Management Plan.	<b>Pending</b>	
<b><i>Hazardous Materials Management</i></b>						

<sup>2</sup> Note that in the ECMG report for the July 2007 site visit, this item was included as part of Natural Resource Management/Biodiversity Section.

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.12	IFC (IFC Hazardous Materials Management Guidelines [December 2001]; Requirement #2 – <i>Hazardous Materials Management Program</i> ) <sup>3</sup>	Dec 06		Expedite the finalization of all plans and procedures related to the management of hazardous materials.	<b>Pending</b>	ISO 14001 and OHSAS 18001 audits have been completed and the relevant documentation is reported to be under revision following also the results of these audits. Good practice with respect to the handling of hazardous materials was observed in the field.
M1.13	IFC (IFC Hazardous Materials Management Guidelines [December 2001]; Requirement #2 – <i>Hazardous Materials Management Program</i> ) <sup>4</sup>	Dec 06	Feb 08	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 are adequately conducted and recorded in a specific register.	<b>Closed</b>	
M1.14	IFC (IFC Hazardous Materials Management Guidelines [December 2001]; Requirement #2 – <i>Hazardous Materials Management Program</i> )	Dec 06	Feb 08	Expedite the finalization all plans and procedures related to cyanide, as they are critical documents needed to be followed during the current operations phase.	<b>Closed</b>	

<sup>3</sup> Also see Guidance Note A: *Outline of a Hazardous Materials Risk Management Plan* in this Guideline, and, specifically the bullet on 'Operating Procedures'.

<sup>4</sup> Also see Guidance Note B: *Outline of a Hazmat Transportation Plan* in this Guideline.

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
<i>Occupational Health &amp; Safety Management</i>						
Nil						
<i>Emergency Preparedness and Response</i>						
M1.15	IFC (IFC Hazardous Materials Management Guidelines [December 2001]; Requirement #2 – <i>Hazardous Materials Management Program</i> )	Dec 06		Prepare a site-specific 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.	<b>Pending</b>	A Site-wide Risk Analysis is nearly complete and will form the basis for revising the Emergency Response Plan.
<i>Noise and Vibrations</i>						

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.17	ESIA (Chapter 4 [ESAP]; Page 4-58) (Chapter 5 [ESAP]; Page 5-5)	Dec 06		Verify that Project activities do not adversely impact the local communities from the standpoint of noise and vibrations that could originate from blasting and other than those associated with blasting, such as from Project-related vehicular traffic. Ensure that compliance with applicable and relevant standards is monitored.	<b>Pending</b>	Blast monitoring/vibration is a subject that is essentially an ongoing situation as long as mining activities continue. At local communities ground vibration levels are very low, but blast overpressure values occasionally exceed the NGGL limit of 115 dBL. It should be noted that the blast overpressure standard adopted by NGGL is conservative and the exceedances are within IFC standards. With respect to other ambient noise monitoring, it is understood the ESAP refers only to compliance with Ghana residential standards and an industrial/commercial standard of 70 dB (A) for both day and night is what has been approved by the Ghana EPA for the area surrounding the mine. From the data on monitoring provided, most measurements show noise levels below this standard although occasional exceedances have been recorded. However, it is noted that no data are available to distinguish if these noise levels originate from NGGL operations or from other source(s).
M2.4	IFC	July 07	Feb 08	Ensure that the standards used for workplace noise are at least as conservative as those adopted in the IFC OHS Guidelines (June 2003).	<b>Closed</b>	Monitoring is being accomplished in accordance with ACGIH standards which similar to IFC standards.
M3.3	IFC	Feb 08		Assess background noise in residential areas and ensure that noise levels do not exceed limits provided in the WB's General Environmental Guidelines (July 1998).	<b>New</b>	
<b>Occupational Health</b>						

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.4	IFC (WB EHS Guidelines Mining and Milling - Open Pit [August 1995], section 'Workplace Air Quality')	Dec 06		Ensure that periodic workplace air quality monitoring is undertaken and meet relevant IFC requirements.	<b>Pending</b>	Workplace ambient air quality measurements have been made. However, data show calibration problems. The item will be closed if calibration problems are corrected or clarified through appropriate quality control.
<b><i>Cultural Resource Management</i></b>						
M1.18	IFC (WB OPN 11.03 - Management of Cultural Property in Bank-financed Projects [1986, reprinted August 1999]; Paragraph 3)	Dec 06	Feb 08	Include archaeology reconnaissance survey within the scope of the cultural resource management surveys that should be undertaken as part of environmental baseline surveying.	<b>Closed</b>	An archaeological reconnaissance survey has been conducted with 21 sites identified in Ahafo North and Ahafo South Projects by the University of Ghana. Two significant sites have been excavated where groundbreaking for the Awonsu Pit has started.
<b><i>Tailings Storage Facility</i></b>						
Nil						
<b><i>Operations and Maintenance Planning</i></b>						
Nil						
<b><i>Emergency Preparedness Planning</i></b>						

Mission/ Issue No.	IFC Policy / ESIA Compliance	Opening Date	Closing Date	Description	Status	Comments
M1.19	IFC OP 4.37 and Annex to OP 4.37, where the contents of an EPP are defined	Dec 06		Prepare Emergency Preparedness Plan (EPP) for the potential failure of the Tailings Storage Facility (TSF) that clearly defines potentially affected areas based on potential release scenarios as determined on the basis of an Impact Analysis 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.	<b>Pending</b>	The description of this issue has been slightly modified to refer only to an EPP for consistency with IFC terminology. NGGL has initiated the establishment of a contract with Golder Associates to identify potential failure scenarios for the TSF on the basis of an Impact Assessment and then identify on a map where downstream impacts could take place. It is expected that this study will result in the preparation of an EPP. It should be noted that the TSF has not yet been constructed to the point where it would be classified as a dam with significant hazard and the risk-based failure scenarios will be associated with conditions when the facility is close to or at its maximum height.

## **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 and the Public Consultation and Disclosure Plan.

The ESAP, presented in Section 5 of the ESIA (available at [www.newmontghana.com](http://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 HSLP through responsible management of activities throughout various stages of the Project. At the time of the July 2007 ECMG site visit, the Newmont Mining's Five Star Management System, a global management system developed in-house by Newmont, was being phased out in anticipation of certification under ISO 14001/18001, scheduled for the end of 2009.

As mentioned in the Executive Summary/Introduction of this report, the final EMP (December 2007) has been submitted to Ghana's EPA pursuant to LI 1652 Environmental Assessment Regulations (1999). The EPA issued their Environmental Certificate on 19 February 2008, which authorizes NGGL to continue operations in compliance with conditions specified for blasting, compensation, waste rock disposal, and storage facilities and container disposal, the project must submit annual Environmental Reports and monthly Environmental Monitoring reports on mining operations to the EPA.

Newmont is implementing 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:*

Following a Corporate commitment that all Newmont Operations will be certified to ISO 14001 for Environmental Management and OHSAS 18001 for Health and Safety Management in early 2007, a gap analysis of the Newmont Integrated Management System (IMS) documents and site procedures was undertaken. An external audit of this process for the ISO 14001 certification was conducted by Integrated Management Systems, and the draft results made available for NGGL comment at the end of

October 2007. A similar review for OHSAS 18001 compliance was conducted by SGS and the results presented to NGGL at the end of November 2007.

Considerable effort needs to be expended for NGGL to achieve ISO 14001 and OHSAS 18001 certifications. This is well understood by NGGL, and progress is being actively tracked. Of the 19 IMS procedures 10 are final, with the remainder projected to be final before June 2008. All of the 10 Environmental Management System Procedures (i.e., Hydrocarbon, Chemical, Cyanide, Mercury, Tailings, Waste Rock, Waste, Water, Air Quality, Closure and Reclamation Planning) are still in draft form, but individuals have been assigned for their completion within the ISO 14001 framework. 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) are still in draft form, but are scheduled for completion within the OHSAS 18001 framework during 2008. Standard Operating Procedures (SOPs) are in a variable state of development and completion. In the case of the Environment Department, no SOP Register has been developed to track the development, management and control of SOPs.

General aspects to the effective implementation of an EHS management system that still require improvement have been previously identified by the ECMG and were also findings of the ISO 140001 and OHSAS 18001 audits:

- Procedures to define what constitutes a non-compliance/non-conformity with NGGL policy still need to be defined and a system to register and track them still remains to be developed. It is understood that the plan is to use the Ellipse System for a site-wide corrective action register, and that, in the case of the Environmental Department, a framework for the environmental corrective action tracking system for inspection has been completed for review.
- A process for tracking and reporting against relevant Key Performance Indicators (KPIs) has yet to be developed. KPI tracking is a basic component of an EHS management system.
- EHS compliance audits are being performed but do not appear to be part of an organized strategy. The lack of final plans and procedures for many EHS components is a detriment to conducting internal audits.
- ECMG found that it was sometimes difficult for NGGL staff to locate specific documents and demonstrate their status. Part of the problem appears to be that documentation within the NGGL system is not well organized with some not retrievable on the NGGL network, and it is apparent that a formal archiving procedure is needed.
- NGGP has a Change Management procedure, but the results of the ISO 14001 audit indicate that there is a highly variable level of understanding, expectations and implementation of change management processes. As discussed in previous ECMG reports, Change Management is normally considered to be a fundamental component to any EHS management system, but the existing system lacks key components, such as a classification system for the importance of a change and notification requirements for the different change classes. A major change (e.g., a decision to triple the size of the TSF) could be associated with Lender notification, for example. Also, as previously noted, the Change Management Procedure has requirements for follow-up, but it was not apparent

that the changes are being maintained in a register such that the environmental, social, and health and safety (H&S) staff can continue to track those changes within their ranges of responsibility.

- Significant improvements to the document control process were demonstrated to be in place through the HSLP department and most of the documents reviewed by the ECMG had good document control, such as the Hazardous Waste Management Plan and the Fauna (Wildlife) Management SOP, the latter clearly defining that it is a draft document. Nevertheless, the ECMG still found some confusion in terms of the status of some documents. For example, the Ahafo Cyanide Management Plan is indicated to be Version 2.0 and dated February 2008, but there is no indication if the document is draft or final. As another example, the Ahafo Tailings Management Plan is presented as a report by Golder Associates, but there is no indication as to whether this is to be considered as an official NGGL plan, either as a draft or as a final document.

Part of the scope of achieving ISO 14001 and OHSAS compliance is that relevant standards be incorporated within the plans and procedures currently being upgraded. IFC standards and policies are specifically included within this process, and it is expected that the documentation being prepared will appropriately reference these IFC requirements.

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. Since the July 2007 ECMG visit, 10 spills have been recorded and classified according to a scale of severity levels from 1 (least significant), to 5 (most significant): nine Level 1 incidents and one Level 2 incident associated with sewage overflow. The register was found to be reasonably detailed, and the incident closure status now appears to be consistently reported, but the incident closure status is not reported as part of the register.

Monthly environmental reports are submitted to the EPA in accordance with the EPA Act 490. An environmental permit register is in place.

NGGL has made substantial progress towards ensuring that Ahafo operations are in compliance with the ICMC, as discussed in Section 2.7 of this report. The Ahafo Cyanide Management Plan dated February 2008 is now considered to be a final document. An audit report prepared by Golder Associates dated February 18, 2008 submitted to NGGL and also to the ICMC for approval has verified that the deficiencies identified from the June 2007 ICMC Operations Audit have been effectively rectified and that the ICMC should award a "full compliance" status to NGGL. The previously identified deficiencies, with respect to the lack of a specific ICMC audit of the contractor Barbex for the transportation of cyanide and the high WAD cyanide at spigots exceeding 50 mg/l limit, have been remediated.

*IFC Policy Action Items*

- M1.1 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 (updated from recommendations provided in July 2007):*

- i) A Management of Change (MoC) process is in place, but several aspects could be improved:
  - Maintain an MoC register such that the EHS staff can track the implementation and consequences of the change, as well as close-outs of the actions as appropriate.
  - Ensure that efforts are made to identify whether a proposed change has potential EHS (and social) implications.
  - Ensure that the EHS organization screens all changes; the current Procedure requires EHS review, but documentation was not provided that this procedure is actually being followed.
  - Include engineering and procedural (e.g., standards) changes as part of the process, not just physical changes.
  - 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; it is recommended that major changes involve Lender notification and/or approval.
  - 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) Define procedures to define what constitutes a non-compliance/non-conformity with NGGL policy and develop a system to register and track them.
- iv) Develop a process for tracking and reporting against relevant KPIs.
- v) Develop a formal archiving procedure.

- vi) Make sure that the EHS staff has all appropriate management tools in addition to the environmental incident register (non-compliance registers, MoC registers, etc.), and ensure that they are consistently completed and maintained.
- vii) Verify that the document control system that appears to be well developed is applied to all documents, in particular so that the operating status of plans and procedures are clearly defined.

## **2 Environment**

### ***2.1 Environmental Organization and Staffing***

#### *Project Strategy:*

The Ahafo Environmental Department is organized into three teams: Compliance, Monitoring, and Reclamation. At the head of the department is the Environmental Manager, who reports to the General Manager for Environmental and Social Responsibility (ESR), responsible for compliance with IFC, Ghanaian, and corporate environmental requirements. The General Manager - ESR is supported by one administrative assistant, and an Environmental Manager based on the project site. The Director of Environmental Affairs, based in Accra, provides support to the Ahafo Environmental Department and, the General Manager- ESR, and both reports to the Regional ESR Director, who in turn reports to the Regional Vice President. The site Environmental Manager, supported by three Superintendents, respectively for Compliance, Monitoring, and Reclamation, reports directly to the ESR General Manager<sup>5</sup>.

#### *Observations:*

Although the current environmental management structure is consistent with ESIA commitments and all but one of the key managerial positions are filled, there has been considerable turnover within the past year and maintaining continuity and project history of environmental issues is a concern. Since the July 2007 site visit, the site Environment Manager has been given a new role as the Director of Environmental Affairs, based in Accra. He is a member of the Regional ESR management team and provides support to Newmont Project sites in Ghana. The new site Environmental Manager has been in place for one month. The Senior Coordinator positions for two of the three teams (Monitoring and Compliance) are filled; the Senior Coordinator for the Reclamation team is to be appointed, which has been the case since the ECMG's December 2006 site visit. In the meantime, a reclamation coordinator, with considerable experience and knowledge of project history, has been filling in for the missing staff member.

As also noted in the ECMG's report for the July 2007 site visit, no changes in the Compliance team were observed with four Environmental Officers in place and an environmental technician still to be appointed. The Monitoring team is fully staffed with eight Officers in place, four of which are dedicated to laboratory operations, and two technicians. Two officers have left their posts since July 2007, and these positions are to be appointed. 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

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<sup>5</sup> Note that updated organization charts for the Environment Department refer to these positions as 'Senior Coordinators', rather than 'Superintendents' as was the terminology used during the ECMG's July 2007 site visit.

the two teams under the two Supervisors are partially filled, with hydro-seeder operators, technicians, and “lead hands” operators. Twenty-four reclamation workers are within each team. This situation is unchanged since July 2007.

The environmental training is ongoing and tracked through NGGL’s Learning and Development Department, although the ESR Department supports it. Environmental content is included within inductions, refreshers, safety meetings and as individual environmental modules and includes oil spill management, noise/air monitoring, hazardous and non-hazardous waste management etc. Some reactive training takes place after incidents. Some training is requested by individual departments for individual topics. Some additional specific training is provided by Orica for cyanide handling etc and also for Shell personnel. Annual refresher training is required for every employee for safety, environment and community relations topics. A limitation to current SOP training that many SOPs are still being developed and the environmental content often needs to be strengthened for activities with significant potential environmental impact (also finding of ISO 14001 audit).

<i>IFC Action Items</i>
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Nil
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<i>ESIA Action Items</i>
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Nil
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*Recommendations for Improvement:*

- i) The Senior Coordinator/Superintendent Reclamation position should be appointed as soon as practical, as mining operations are ongoing (*repeat recommendation*).
- ii) Make sure that appropriate environmental procedures are included with SOPs being developed that are associated with activities with potential significant environmental impact.

## **2.2. Air Quality**

*Project Strategy:*

The environmental control measures indicated in the ESIA refer to the management and mitigation of both fugitive dust emissions and gaseous emissions. Fugitive dust is associated with mine operations including blasting, ore and waste rock hauling, dumping, grading, backfilling actions, as well as from increased vehicular traffic in the area. Gaseous emissions are generated from operation of mine equipment, combustion sources, and vehicular exhausts.

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 proper operation and equipment maintenance, 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 both dust and gaseous emissions control.

*Observations:*

According to the data made available during the third site visit, the monitoring of air emissions from operations to the ambient air is on-going. The SOP for air monitoring is still in draft form, planned for finalization in the first quarter 2008.

Monthly monitoring for the Ahafo South mine is conducted at five (5) dust monitoring gauges located within or nearby the Ahafo mine operations area (Ntotroso Township, Rank Camp, Kenyase Town, Plant Site, and Senior Staff Village [SSV]); another five (5) are positioned in the nearby villages (Yamfo Core Shed, Yamfo Town, Rubi Village, Adrobaa Township, and Terchere Nursery) to collect baseline data for the Ahafo North mine.

Monthly average results for thirty (30) day sampling were provided to the ECMG for 2007 and for January 2008. Ambient dust samples are tested at an off-site accredited laboratory (SGS) for the following parameters: total solids, insoluble and soluble solids, ash, combustible matter, and dust deposition. Dust concentrations for January 2008 were generally consistent with results obtained in January-February 2007. Although an overall increase of values was shown for parameters monitored at the KDM-Kenyasi location, dust concentrations generally decreased at the Plant site and at the Ntotroso Township where lower values were recorded. In response to complaints associated to high dust concentrations raised at certain local communities (i.e., Kantinka and Morokrom), two mobile units have been erected to monitor dust with respect to project activities and to acquire background air quality data. The ECMG observed one mobile unit nearby the Kantinka village.

Monitoring of ambient dust concentration includes PM<sub>10</sub> air quality measurements. The results of the weekly monitoring at the Ahafo South Rank Camp, the SSV, and the RFG3 weather stations were provided to the ECMG. Values above the guidance limit of 70 µg/m<sup>3</sup>, assumed by WB/IFC General Environmental Guidelines as reference concentrations immediately outside the project property, were observed at all three locations for the November/December 2007 period.

Ambient dust concentrations provided for the first week of January 2008 were significantly above reference limits; however, these data are consistent with baseline particulate monitoring from the Yamfo station which is not influenced by any mine activity and demonstrates background levels which also exceed WB/IFC standards. Data collected in the beginning of 2008 were likely influenced by the *Harmattan*, a dry and dusty West African trade wind that blows south from Sahara desert between the end of November and the middle of March. The very fine dust particles from the *Harmattan* wind often causes fog-like conditions, severely impeding visibility. This phenomenon was evident during the ECMG's visit. Moreover, dry season burning had also likely contributed to the recorded local particulate levels during this time.

Dust suppression activities in the mining area through the use of watering are extensive and generally well managed. The ECMG observed dust suppression measures at loading points, crushers and conveyor discharge points, and along certain community and public roads. At the time of the ECMG visit, significant dust concentrations were observed at the Awonsu pit where tree and brush clearing and

initiation of topsoil stockpiling were ongoing. Continuous dust suppression activities should be considered in that area.

*ESIA Action Items*

Nil

*Recommendations for Improvement:*

- i) Ensure that monitoring locations are consistent with results and equipment is calibrated to improve data quality and consistency (*repeat recommendation*).
- ii) Develop a dust deposition / ambient air quality / emissions monitoring data register, consistently presenting all results obtained from direct measurements and laboratory testing (*repeat recommendation*).

### **2.3 Surface and Groundwater**

*Project Strategy:*

The ESIA defines the need for the Project to construct a WSF, several environmental control dams (ECDs) designed for sediment control as well as Best Management Practices for erosion control, waste rock facilities, and a 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. Target release criteria for the sediment control system (ECDs) are 50 mg/l total suspended solids (TSS) for a maximum storm event of 25-year, 24-hours precipitation.

As Project policy, no discharge to the environment will occur if applicable standards are not met. In particular, target release criterion for TSS at the ECDs is set at 50 mg/l (WB EHS Guidelines Mining and Milling - Open Pit [August 1995]). No water discharge is allowed from the TSF.

Water quality monitoring program includes the sampling of the surface water streams in the surroundings of the mining operations, at the ECDs and any other Project water management structures. Twenty three surface water monitoring points have been selected, including locations at the ECDs and WSF. Water quality monitoring also includes the installation and periodic sampling and testing of nineteen groundwater monitoring points located upstream and downstream of the Project area, and eleven wells located in the surroundings of the TSF. The groundwater monitoring points are nested wells at two different depths: shallow (around 30 to 35 meters deep) and deep wells (around 85 to 90 meters deep). Testing includes water table elevation data and a

large set of physical and chemical parameters to fully characterize water quality. Pump-back wells are planned around the TSF as an additional measure to control potential unexpected impacts to groundwater.

The following table summarizes the ongoing surface and groundwater monitoring.

**Table 2 – Ongoing Surface and Groundwater Monitoring**

Type of Monitoring	Number of Locations/Points	Frequency
Surface Water -Ahafo South	23	Quarterly
Groundwater Monitoring - Ahafo South	19	Quarterly
Dewatering Wells	24	Monthly
NGGL Potable	6	Monthly
Community Potable Wells	20	Quarterly
TSF Piezometers	9	Weekly
TSF Wells	12	Monthly

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. Potable water testing is planned for both raw water and treated water. Twenty community wells are included in the sampling plan.

The project has adopted new terminology in 2008 for surface and groundwater monitoring points - 'compliance' and 'surveillance' points. 'Compliance' monitoring points are locations where there is a potential for a direct impact on water resources from mine operations, and where compliance with Ghanaian and IFC/WB standards is clearly warranted; examples include groundwater monitoring locations and surface water monitoring in the ECDs. 'Surveillance' monitoring points are not expected to be directly impacted by project activities but require monitoring for overall observation purposes in case of an incident or reported complaints; examples include monitoring of community water wells and nearby streams/ivers.

#### *Observations:*

##### Surface Water

NGGL has provided the calculation of the Tano River water inflow balance until January 15, 2008, at which date, a total volume of 7,481,657 m<sup>3</sup> water was abstracted from the river. Water extraction was conducted between July 31 and November 29, 2007 and then stopped in compliance with the permit requirements, which dictate that water abstraction is only allowed over seven months during the wet season (May to November) and with a maximum total (accumulated) abstraction volume of 9,500,000 m<sup>3</sup> and that the water level in the river during abstraction must not be lower than 187.1 m NLD. NGGL has applied and is waiting for the renewal of the abstraction permit which was valid until November 30, 2007.

Surface water quality monitoring results do not show evidence of any adverse impact due to Ahafo operations. Cyanides are mostly below their detection limit of 0.01 mg/l and however always below the World Health Organization (WHO) guideline value for short-term exposure of 0.6 mg/l.

### Groundwater

Six piezometers have been placed in the WSF dam (WS\_1 through WS\_6) and twelve monitoring wells (MB1 through MB8 and Pz1-TSF through Pz4-TSF) have been located in the TSF dam. These piezometers are aimed at monitoring water level and seepage in the embankments and along the banks of the two storage facilities and confirm the normal performance of these structures. The monitoring wells are sampled on a monthly basis and groundwater tested for physical parameters, nutrients, anions and cations, cyanides total and WAD, total metals and dissolved metals. Cyanides are reported below their detection limit of 0.01 mg/l and metals are generally below detection limits or at very low concentrations.

A comprehensive analytical program is also conducted for the pit dewatering water at Apensu and Subika pits. The results allow the characterization of the groundwater and control of discharges. It should be noted that Subika dewatering water has a relatively high concentration of sulfates, up to 476 mg/l. As a consequence, monitoring results of WSF water show increasing concentrations of sulfates, which have reached the maximum level of 37 mg/l in January 2008. The monitoring wells in the area of the TSF and around the Ahafo South area continue to be regularly sampled, and the results obtained do not suggest any adverse impact to local groundwater conditions resulting from Project activities.

Water supplies for the camps are reported within WHO standards, although some high values for calcium and magnesium are reported. Results from samples collected at some community wells throughout 2007 showed values mainly within WHO guidelines for potable water, although some microbiological contamination for total coliforms was detected (but fecal coliforms are consistently non detected), as well as some metal concentrations slightly above the relevant guidelines at some locations. One well at Ntoroso (KDBH-1) continues to exhibit relatively high nitrate values, possibly related to local activities such as animal husbandry, agriculture, and/or human contamination. Relatively high values of magnesium are reported from several wells.

The dewatering of the Apensu and Subika Pits started prior to the July 2007 ECMG visit and has continued. Groundwater modeling studies have been reported by Geomatrix in a Technical Memorandum dated August 6, 2007 and indicate that the groundwater drawdown may possibly affect local community wells and could also impact some local wetlands. The results indicate that the first impacts could be felt within about five years, although the strongest effects are predicted to occur in the 10 to 20 year range. One uncertainty to this modeling is the hydraulic connection between shallow and deep aquifer systems. The community wells are predominantly located within the shallow aquifer, whereas the pit pumping extracts water from the deep aquifer. The results from the monitoring of both shallow and deep aquifer systems will need to serve as feedback for the calibration of the groundwater model. Once this is accomplished, mitigation measures to the possible effects of the long-term groundwater extraction associated with dewatering of the mining areas can be determined, if required.

<i>IFC Policy Action Items</i>
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Nil
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*ESIA Actions Items*

M3.1 Calibrate the groundwater model prepared to evaluate the effects of pit dewatering on the basis of additional measurements of drawdown and studies to determine the connectivity between shallow and deep groundwater regimes. Consider increasing the monitoring program applicable to mine dewatering activities and then develop mitigation measures for community wells and wetlands as appropriate.

*Recommendations for Improvement:*

- i) Finalize a Water Management Plan that includes all of the components that will be required for surface and groundwater monitoring, especially taking into account the probability that the pit dewatering may have an impact to community wells and surface water (*repeat recommendation*).
- ii) Provide the local authorities and communities with the water quality results when samples from community wells and surface water bodies are collected, particularly should WHO guideline exceedances be found. Ensure that authorities are informed about anomalously high values of dissolved arsenic, if any.

**2.4 Reclamation, Revegetation, and Topsoil Management***Project Strategy:*

The ESAP defines measures 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 implementing 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 ECDs (ECDs 2, 3, 4 and 6). The ECDs have been designed and constructed to contain at least a 10-year, 24-hour precipitation event assuming a drained condition and minimize potential erosion and sedimentation downstream of the mining area by collecting, settling, infiltrating, and evaporating run-on/run-off water from areas disturbed by mining operations.

NGGL is committed to reclaiming all surface disturbances in accordance with applicable Ghanaian regulations and Newmont's Standards for closure and reclamation of mining facilities. The Reclamation and Closure Plan was updated in December 2007 and is included in the project's EMP, which was submitted to the EPA in order to meet the project's legislative requirements. The EMP also contains a copy of the Reclamation Security Agreement (bond) signed between NGGL and the Ghana EPA. As previously mentioned in the Executive Summary/Introduction of this report, pursuant to Ghana Regulation 23 of LI 1652, NGGL is obliged to provide security to the EPA sufficient to secure performance of NGGL's legal requirement to carry out reclamation of project-disturbed areas. The initial Security of \$38,030,623.00 USD is equal to the total disturbance reclamation costs at year end 2009. On completion of the work to reclaim the entirety of the disturbed areas, NGGL will apply to the EPA for a certificate of Final Completion. On and from the date Final Completion is achieved, NGGL will be released of all environmental responsibilities in the defined disturbed area provided that there is no ARD

occurrence. In the event of this scenario, NGGL would be required to provide the necessary remedial measures.

A responsibility of the Reclamation team is to conduct and monitor all soil resource protection activities. As part of its commitments, this team conducts inspection of reclaimed and revegetated areas to monitor the success of the reclamation activities and ensure the 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 five years after final reclamation. A Noxious Weed Management Plan is to be developed to manage the risk of invasive species infestation of reclaimed project sites. Access roads, drill pads, sumps, and trenches and other temporary facility areas or disturbed land will be reclaimed as soon as they are no longer needed by the Project.

*Observations:*

The ECMG reviewed the updated and revised Reclamation and Closure Plan (December 2007), which provides long-term, but general, objectives for open mine pits, waste rock disposal facilities, the mine and process plant, the TSF, the WSF, ECDs and other stormwater management facilities, ancillary facilities, roads, drill holes and monitoring wells. The plan emphasizes compliance with legal requirements, public safety, stakeholder involvement, land stability, and ecosystem reestablishment. Closure criteria have been defined in accordance with ESIA commitments and the Ghana EPA. The Reclamation and Closure Plan indicates that a disturbance register is maintained by the project, which identifies disturbed areas requiring erosion control or some other type of intervention, although the ECMG did not receive evidence of this in the field.

During this site visit, the ECMG spent considerable time reviewing and visiting examples of the project's ongoing interim erosion-control and reclamation measures, topsoil stockpiling and management, and the project's revegetation strategy and initial approach to invasive species management. As mentioned in the ECMG's report for the July 2007 site visit, NGGL contracted the University of Ghana from April to December 2007 to research the effectiveness of various erosion control measures. *In-situ* and *ex-situ* experiments have had success in revealing some effective long-term techniques in erosion control and revegetation. The project's Reclamation team is also testing various erosion control and revegetation methods *in situ*, and both parties (NGGL and the University) have developed a strong working collaboration. NGGL's investment of time and resources is evident and demonstrates its long-term commitment to this topic.

Erosion control is being carried out on an as-need basis primarily using revegetation techniques in combination with jute-matting and fencing. The ECMG visited examples of on-going efforts near the TSF, on the slopes of Apensu Pit, and on the grounds near the process plant. An important aspect to the project's approach is the avoidance of synthetic fertilizers and herbicides. The project has demonstrated success in using various combinations of plants as a means of erosion control, although some species are indeed non-native. The University of Ghana has demonstrated that planting rows of vetiver, *Chrysopogon zizanioides* R.<sup>6</sup> interspersed with Bahama grass (*Cynodon dactylon*) was more a more effective erosion control measure than natural revegetation or the application of jute-matting only. The former

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<sup>6</sup> Formally classified as *Vetiveria zizanioides* L.

technique was also the most effective in accumulating biomass, directly relevant to the long-term regeneration of topsoil over time. Of the three techniques, the Bahama grass / vetiver combination also showed the highest nutrient content (nitrogen, potassium, phosphorus).

Although the monitoring of interim reclamation and erosion-control measures is ongoing at the project site, it is sometimes difficult to understand the overall planning and management of these activities. NGGL's staff is clearly dedicated, knowledgeable, and competent, although their efforts may not be fully appreciated by an outside observer due to the apparent lack of standardized procedures and document management. A clear approach to erosion control and revegetation monitoring in addition to a system of record-keeping would contribute to this end.

The project is currently planning to avoid the use of commercial seed mixes. Instead, various locally collected seeds are being mixed and tested for effectiveness. Local communities are assisting in this effort to a large degree. For erosion control and revegetation on steep slopes, the project intends to use a seed mix of five native or naturalized grass species and two nitrogen-fixing cover crops. Species may include Bahama grass (*Cynodon dactylon*), *Eragrostis curvula*, *Stolozantes* spp., *Axonopus compressus*, *Centrosema* spp., and *Senna siamea*<sup>7</sup>. On cut slopes, the project intends to mainly rely on Bahama grass and vetiver (*Chrysopogon zizanioides* R).

Regarding topsoil management, NGGL currently is stockpiling topsoil to height of five or six meters. As the University of Ghana has demonstrated that anaerobic conditions develop in topsoil test pits as a function of depth, techniques should be researched to promote aeration (e.g., perforation at various intervals) to further increase the long-term viability of stockpiles. The University of Ghana was beginning to research this topic, including the use of microbes, when their contract expired in December 2007. Other alternatives to recover topsoil viability will also be assessed; alternatives include topsoil mixtures, fertilizers, among others.

Although some investigation has taken place regarding the potential long-term impacts of using non-native species in land reclamation (including *Chrysopogon zizanioides* R. [vetiver], which has not been previously introduced to the Brong-Ahafo region), further research is warranted in collaboration with CI. In this connection, the project's Noxious Weed Management plan is overdue and should give due attention to this important topic. The infestation of the project site by invasive species has the real potential to seriously compromise both the agricultural and biodiversity value of project disturbed areas. Despite the lack of a comprehensive Noxious Weed Management Plan, the project has developed some innovative approaches to invasive species management in the field, such as re-use of the woody parts of certain exotic species as a simple construction material. Near the close of their contract, the University of Ghana had also begun to investigate the possibility of composting certain exotic species.

The Ahafo South nursery has supported on-site revegetation as well as provided a source of seedlings donated to local communities. Currently located near the Apensu pit, this nursery is being re-located due to pit expansion. The relocation provides an opportunity for better design with larger capacity. Conservation International is advising the project on nursery design criteria and species selection. The overall

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<sup>7</sup> It is unclear if *Senna siamea* is in fact a nitrogen-fixer.

target for the Ahafo South nursery is to reach the capacity of the well-established Ahafo North nursery, which produces 60,000 seedlings/year. As demonstrated in July 2007 during a two-day capacity building workshop, the project is making a genuine effort to involve local communities in nursery development through activities that include a seed collection program and species selection; participating individuals are compensated for their effort.

Beyond revegetation, NGGL's larger scope is to support the reforestation of certain portions of the project area. The ECMG visited the project's successful reforestation of a borrow pit located in Ahafo North<sup>8</sup>. NGGL is using the site to pilot reforestation techniques, as well as to provide an additional source of seedlings to donate to local community organizations (e.g., hospitals, churches, villages). The project has also created two fish ponds on site as a means of promoting potential alternative livelihoods. The project will soon duplicate revegetation/reforestation efforts on a borrow pit located in Ahafo South. Reforestation is inherently an experimental process based on lessons learnt, and the ECMG encourages and strongly supports the project's forward thinking approach.

As the ECMG's visit was made during the dry season, several bushfires were witnessed on site. Despite the significant time and resources dedicated to revegetation, fire will have the capacity to instantaneously destroy the project's efforts. The ECMG encourages early attention and management of this issue. Community involvement will be essential as most of the fires are intentionally set by locals for hunting purposes.

Recommendations from the nursery capacity-building workshop (as previously mentioned in this section) indicated the need to develop a Rehabilitation Plan. The Rehabilitation Plan would be designed in accordance with the project's Biodiversity Community Use Survey (see Section 2.5 of this report) and would define more specific closure criteria in alignment with community interests. Ultimately, the project's Closure and Reclamation Plan and the Rehabilitation Plan should be directly linked, although it is acknowledged that this is a long-term process, which will require significant participation by both CI and the University of Ghana, as well as community involvement. The ECMG's general observation is that all parties – NGGL, CI, and the University of Ghana – share a similar vision in terms of long-term site reclamation, which is ultimately to reestablish a native forested habitat that supports ecosystem-based sustainable agriculture of value to local communities. This vision will require considerable planning and dedication, but NGGL appears to be on its way.

*IFC Policy Action Items*

Nil

*ESIA Action Item*

M1.8 Develop Noxious Weed Management Plan in close cooperation with CI, who should also act as one of the principal reviewers. As part of this effort and in coordination with CI and the University of Ghana, conduct further research

<sup>8</sup> The 75-acre borrow pit was used for aggregate extraction by the Government of Ghana for road construction in the 1990s. The area was donated to Normandy Ghana in 1999 and inherited by NGGL in 2002. Revegetation/reforestation efforts are on-going.

and review of all non-native (and potentially invasive) species, particularly, *Leucaena* spp. and vetiver (*Chrysopogon zizanioides* R.). Although naturalized in Ghana, the encroachment and domination of elephant grass (*Pennisetum purpureum*) should also be further explored. Ensure that these species will not present long-term impacts to natural vegetation, and especially to local agriculture.<sup>9</sup>

*Recommendations for Improvement:*

- i) Develop an Action Plan to implement findings generated from the University of Ghana's research conducted as part of their first contractual agreement with NGGL (April to December 2007).
- ii) Continue contractual arrangements with the University of Ghana; design TOR and determine new research priorities, direction, and timeline of activities.
- iii) Dedicate a staff member (or hire a consultant) to consolidate on-going efforts in erosion control and revegetation into a series of procedures and/or management plans. Establish an overall approach to monitoring and systemize record-keeping so that results and documents are easily retrievable.
- iv) Begin early planning of fire management by establishing potential management approaches that will eventually involve local communities.
- v) Consider publicizing the University of Ghana's research findings in an academic peer-reviewed journal.
- vi) Consider conducting a review of lessons learnt on state-of-the art reclamation and revegetation/reforestation techniques employed by other major companies, such as Alcoa and Lafarge who have had success in rehabilitation mine and quarry sites in African ecosystems. In this connection, the project may want to consider knowledge-sharing on a larger scale by organizing a workshop to share best practices amongst these and other companies. This recommendation is made in alignment with the project's Biodiversity Management Plan (BMP).

## **2.5 Biodiversity and Ecological Management**

*Project Strategy:*

The ESIA presents a discussion of the potential impacts on 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. The Project's ESAP outlines a series of commitments, environmental control measures and additional actions for these natural resources. These 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 (e.g., conservation education programs for local communities, education programs for the work force).

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<sup>9</sup> Note that in the ECMG report for the July 2007 site visit, this item was included as part of Natural Resources and Ecological Management section.

NGGL has strived to build alliances with local communities and with NGOs. As part of this effort, the Project has entered into a biodiversity partnership with CI, an internationally recognized NGO and leader in global conservation (referenced in this report as the NGGL-CI Partnership). As a result of this partnership, the Project is developing a Biodiversity Management Plan (BMP), which outlines both direct and indirect mitigation measures for impacts incurred on floral and fauna resources and their habitat. Conservation International officially entered into partnership with NGGL in 2006, and their current partnership memorandum of understanding is due to expire in 2009.

As described in Section 2.4 of this report, the project's approach to reclamation and revegetation also takes into account principles of biodiversity conservation and the sustainable management of natural resources. In this connection, and as previously described, the University of Ghana, in addition to CI, is also providing input to the management and ecological restoration of the project site.

#### *Observations*

The ECMG's biodiversity and natural resource management specialist had the opportunity to participate in the site visit and directly observe the project's implementation of ESIA, ESAP, and IFC commitments. For this reason, considerable attention was focused on the implementation of on-going fauna mitigation measures, invasive species management (covered in Section 2.4 of this report), wetland management, the status of the NGGL-CI partnership, and the development of the project's BMP.

#### Fauna Mitigation Measures

In accordance with ESIA/ESAP commitments, NGGL is implementing a series of fauna mitigation measures in association with cyanide management and treatment in the TSF (page 2-32, ESIA). During the ECMG's visit, fencing was observed around the TSF to deter wildlife from entering the premises. The fence line was discontinuous in areas where construction works for TSF expansion are ongoing, but the project indicated that the fence would be reestablished upon completion of these activities. A two-person environmental surveillance team (separate from the process team) is in place in the vicinity of the TSF to frighten away animals, rescue wildlife, and report wildlife mortality as per the project's Wildlife/Fauna Management SOP.

The ECMG observed that propane guns lined the periphery of the TSF and were fired at regular intervals as an additional means of discouraging wildlife from approaching tailings with potential high levels of cyanide. No waterfowl were observed in or near the TSF during the site visit. Although not specified in the ESIA, NGGL takes the additional precaution of cutting grasses near the TSF before they seed to inhibit further growth (a food source) and discourage wildlife and livestock from drinking from the TSF.

The ESAP also requires that the project establish a fishery resource in the WSF with a species known to feed on insects, including mosquito larva. It is understood that tilapia and catfish were introduced to the WSF in 2005 as a vector control measure in fulfillment of this commitment. Tilapia and mudfish also appear on a seasonal basis in the ECDs, despite the fact that most of the ECDs are desiccated during the dry season.

### Wetland Management

In previous ECMG reports from both the December 2006 and July 2007 site visits, the ECMG expressed some concern regarding the ability of the WSF to compensate for the lost wetlands / swampy drainage areas that were previously located in the vicinity of the project area now occupied by the TSF (see 'Subri drainage area', page 4-80 of the ESIA; no ecological description provided). A related concern is the potential impacts that dewatering of mine pits might have on surrounding wetland/drainage areas, as also mentioned in Section 2.3 of this report.

A Geomatrix draft Final Technical Report on Wetlands (May 2007) confirms other wetland / drainage areas located southeast of Subika pit (downstream of ECD 4), which likely form part of the same 'Subri drainage area' as referenced in the ESIA; the report describes "*a complex of wetlands and ephemeral channels...a prominent example of an extensive stand of elephant grass...Discharge of shallow groundwater appears to support nearby monotypic communities of elephant grass at this extensive area, extending south from Ntotoroso, east of the NGGL plant site, bounded by the Tano River on the east.*" D'Appolonia visited this area and confirmed these findings. Findings from a Community Biodiversity Use survey conducted by CI (report pending, March 2008) do not indicate any particular biodiversity, social, cultural, or economic value to these wetlands sites. The Geomatrix wetland reports, as well as the project's ESIA, support these findings.

Given the composition of this wetland/drainage area (i.e., primarily monotypic stands of elephant grass [*Pennisetum purpureum*], which is considered to be a weedy species in this region) and the findings of the Community Biodiversity Use survey, the ECMG considers the project's current assessment and management of these wetland / drainage areas adequate. On the other hand, the ECMG would encourage the project to focus wetland-related efforts on ensuring that the WSF develop into a wetland habitat of value.

### NGGL-CI Partnership and the Biodiversity Management Plan

During an interview with CI, the ECMG received an update regarding activities conducted as part of the NGGL-CI partnership. In general, there appears to be a strong spirit of collaboration between the two partners, and CI has been involved with biodiversity and ecological management of NGGL's project activities on a number of levels. One of the most predominant recent endeavors, as indicated above, is the Community Biodiversity Use survey conducted by CI in the Ahafo South project site. This survey will be critical in determining the final closure criteria of reclaimed areas to be included in the project's Rehabilitation Plan (as discussed in Section 2.4 of this report). Closure criteria generated from this level of analysis will be significantly more detailed to enhance the project's existing Reclamation and Closure Plan.

As part of the Biodiversity Community Use survey, CI conducted a series of interviews with local community members now living in the project's resettlement sites. The survey report will contain recommendations for bettering the ecological environment of these areas (e.g., landscaping, planting medicinal herbs and trees for shade and wind breaks, etc.). Another important activity organized via the NGGL-CI partnership was a meeting with stakeholders at the Kenyase District Assembly. The public event was intended to create awareness amongst various stakeholders in the District on the NGGL-CI collaboration and on NGGL's commitment to further integrate biodiversity into its operations, as well as into its corporate policy. NGGL-CI also held a knowledge sharing/outreach meeting with Ghana's Chamber of Mines

on the importance of biodiversity conservation in mining operations. In this respect, NGGL is breaking new ground in Ghana, and the ECMG encourages the project to maintain this approach through steady long-term planning and strategizing to ensure CI's involvement throughout project operations, and even, decommissioning.

In the ECMG report from the July 2007 site visit, numerous comments were made on the content of the draft BMP report. Since that time, the draft BMP has not been updated. In the meeting with CI and NGGL, the ECMG reemphasized that the BMP should be results-oriented, containing a monitoring component, and is in need of an overall goal, objectives, and targets (see the ECMG report from the July 2007 site visit for more detailed comment). NGGL and CI should also ensure that the BMP adequately covers the topics contained in the BMP's original outline provided in Chapter 4 of the ESIA.

A repeated recommendation in the ECMG reports was the development of the multi-taxa Biodiversity Monitoring Plan. This was indicated in the draft BMP (Section 5.2.2, *Scope of Work*) and is still to be developed. NGGL and CI confirmed the importance of this task and ensured that a plan would be developed as part of the BMP or as a separate document. An updated BMP and an outline of the biodiversity monitoring plan are planned for April 2008.

*IFC Policy Action Items*

Nil

*ESIA Action Items*

M2.1 The multi-taxa biodiversity monitoring program should be developed and made available.

M3.2 The BMP should be finalized.

*Recommendations for Improvement:*

- i) Begin long-term planning for the WSF area – conduct a feasibility study on the potential of this area to support viable wetland habitat in the future.
- ii) Design a basic, qualitative, biology-based aquatic monitoring program (e.g., macro invertebrates, benthic organisms, fish, waterfowl) in the WSF as part of long-term planning and monitoring efforts.
- iii) Maintain (NGGL and/or CI) a simple register of the official documents and information/advice transferred between the two parties so that the various outputs generated from this important partnership are readily retrievable for monitoring purposes.
- iv) Dedicate the time and resources necessary to generate a more comprehensive, implementable version of the BMP (repeat recommendations from the ECMG report for July 2007 site visit are below).
- v) The June 2007 version of the BMP is in draft format. Although it is understood that the BMP is not finalized until sufficient additional baseline data are gathered and evaluated, it is recommended that NGGL develop a final version that contains the following: an overall objective or goal; further details on the implementation

of each task; roles and responsibilities; a timeline for implementation; a logistical framework containing targets, outcomes, and monitoring indicators; and monitoring and evaluation mechanism (*repeat recommendation*).

- vi) It is recommended that the BMP contain a section that summarizes all biodiversity related baseline studies and rapid assessments (i.e., provide a list of all the baseline studies/rapid assessments performed). The Project has dedicated a significant amount of time on these efforts, and it would be useful to have a comprehensive and accurate list of these assessments, where they took place, and their overall objective referenced in the BMP document (*repeat recommendation*).
- vii) Section 1.4, Biodiversity Action Plan, in the BMP should be fully developed and finalized (*repeat recommendation*).
- viii) The planning and implementation of the long-term multi-taxa biodiversity monitoring program (one that lends itself to inferential statistics) should be expedited (*repeat recommendation*).

## **2.6 VRA Transmission Line – Associated Facility**

### *Project Strategy:*

A new VRA 161kV overhead power transmission line between Kumasi and Sunyani substations has been planned for some years. The NGGL project provided the impetus to start construction since NGGL requested that VRA realign the originally planned route of the transmission line so that it could provide a stable source of electricity to the mine site. VRA and NGGL entered into a Memorandum of Understanding whereby NGGL would finance the realignment. The line was thus identified as an associated facility in the project's ESIA. The powerline is being constructed in a 30-meter wide right-of-way (RoW), extending 154-km and totaling an approximate 470-hectares, including access tracks<sup>10</sup>.

In addition to supplying electricity to the mine site, the transmission line will provide an alternative power supply route to the load centers located in Brong Ahafo, Northern, Upper East, and Upper West Regions of Ghana. Final deliverables at completion of the VRA transmission line project include a 154-km transmission line from Kumasi through Ahafo to Sunyani; 154-km of fiber optic groundwire; a new 161 kV/11.5kV substation at Kenyase; and, upgraded substations at Kumasi and Sunyani. As the IFC considers the VRA transmission line an associated facility to the Ahafo South Project, gross compliance with applicable Operational Policies is required.

The realigned RoW crosses four forest reserves (i.e., Gyemera, Offin, Tano Offin, and Amama). In the Tano Offin Forest Reserve, the Forest Service Division identified Compartment 98 (72-km from the Kumasi Substation) as a 'Globally Significant Biodiversity Area' due to the occurrence of endemic and rare species (i.e., Ghana 'Black Star' rated species), and the IFC also considers this area Critical Habitat as defined by OP 4.04 - Natural Habitats (November 1998). A legal logging road crosses through Compartment 98, and the area is threatened by illegal logging off this route as well as by the clearing of land for agricultural purposes. In response to these findings, the RoW was routed to the south of this sensitive area.

<sup>10</sup> 472-hectares is the figure provided on page 4-155 of the Ahafo South Mine Project ESIA; the first inspection report for monitoring of the VRA RoW, produced by NGGL in August 2007, estimates 380-hectares.

A Gap Analysis was conducted by an independent consultant in August 2006 to determine if there were any gross policy violations of the IFC's Operational Policies, including OP 4.04 - Natural Habitats, among others. In the Final Report produced from this exercise, it was determined that there were no gross policy violations at the time of writing; however, a series of recommendations were made to ensure future compliance. Those relevant to OP 4.04 include further measures to reduce impact on critical habitat identified within the Tano Offin Forest Reserve. NGGL committed to conduct biannual inspections of the RoW to monitor any potential encroachment in the vicinity of Compartment 98.

*Observations:*

According to the VRA monthly Progress Report for December 2007, which provides updates mainly on the construction and financial management of the transmission line, the following activities were reported as 100 percent complete for the line section between Kumasi and Kenyase: bush clearing, access road construction, excavation, and concreting; erection of the 279 towers in this section was 96 percent complete and the stringing of the conductor, fiber optic groundwater, and shieldwire was 55 percent, 77 percent, and 80 percent complete, respectively. The line section between Sunyani and Kenyase, which involved the construction of 98 towers and the subsequent stringing of conductors, was completed in May 2006.

NGGL, accompanied by VRA staff, conducted the first biannual inspection of the transmission line RoW in August 2007. The inspection was preceded by the first bi-annual consultation between NGGL and VRA, in which the inspection activity was discussed and planned; NGGL's first biannual review of VRA records, including the VRA Annual Report on the transmission line and monthly progress up to August 2007, was also conducted during this time. NGGL's findings for both the document review and the RoW inspection are provided in a document entitled, "Inspection Report: VRA Transmission Line - Kumasi- Sunyani Right Of Way" (August 2007).

The NGGL Inspection Report provides the status of construction of the transmission line (bush clearing, access roads, excavation, tower erection, stringing, construction of substations etc.), a summary of interviews held with resettled property owners, and environmental monitoring of the RoW. In summary, the NGGL-VRA team made the following observations along the RoW relevant to critical habitat and biodiversity conservation, in general:

- No obstruction of water courses, and water monitoring results for the Tano and Offin streams showed no exceedances, except for total coliforms<sup>11</sup>;
- The clearing of vegetation had not gone beyond the RoW (30 meters);
- No evidence of encroachment in the Tano Offin Forest Reserve; and,
- RoW reroute from Compartment 98 observed.

In general, the first biannual monitoring for the transmission line was well-executed, although documentation could be improved. For example, the Inspection Report does not present a methodology or an approach to monitoring potential activities associated with illegal logging and bushmeat hunting; observations were also not made on this

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<sup>11</sup> Report attributes the presence of coliforms to the use of both these streams by nearby communities for sanitary purposes.

level. The report mentions that there was ‘no deliberate destruction of fauna’, but it does not provide the means by which this conclusion was made.

As previously mentioned, the Final Report produced from the Gap Analysis conducted by the independent consultant in August 2006 contained several recommendations to help ensure ongoing compliance with IFC policies. It is not clear which of these recommendations have been executed. For example, it was recommended that VRA develop an Access Management Plan for Compartment 98 and that a change management procedure be integrated into VRA’s Environmental and Social Management System. Although it is understood that NGGL does not have control over VRA’s environmental management, it is not clear if NGGL and VRA have discussed these recommendations or if VRA plans to implement them in the future.

<i>IFC Policy Action Items</i>
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Nil
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<i>ESIA Action Items</i>
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Nil
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*Recommendations for Improvement:*

- i) Include methodology and monitoring parameters for illegal logging and bushmeat hunting (snare, shells) as part of bi-annual monitoring.

## **2.7 Waste Management**

*Project Strategy:*

According to the ESIA, “Non-hazardous waste disposal will be conducted in accordance with Ghanaian requirements and NGGL’s waste disposal protocols. NGGL will monitor waste generation and disposal conditions during construction, operation, and closure. Should conditions warrant, NGGL will implement additional waste minimization, treatment, and disposal measures beyond those currently identified”.

The general Waste Management Plan, which should outline the minimum requirements for the management of hazardous, non-hazardous wastes, and wastewater generated at NGGL Ahafo Operations, remains in draft form. However, a number of SOPs for various waste streams are updated to reflect ongoing waste management practices in the field (e.g., “Desilting of Washing Bay and Interceptors Management Landfill Management”, “Medical Waste Procedure”, “Landfill Disposal Management”). The Hazardous Waste Management Plan, which identifies waste items to be classified as hazardous, their management within the operations area, and the final disposal receptor, is updated and finalized. The Hazardous Waste Tracking Register is being updated.

The project continues to dispose of inert and putrescible waste in an on-site trench, although the use of the Kumasi Metropolitan Landfill for the disposal of this waste category was reported to have been fully discontinued. The option of composting is under design.

Contaminated soil is collected and temporarily stored at the on-site hazardous waste storage shed. A waste dump volatilization pad is under construction with completion projected for the second quarter 2008. Contaminants such as oil/grease, fuel, and chemicals are temporarily stored at the hazardous waste storage shed before final disposal to the Kumasi Metropolitan landfill by a contractor. Waste oil and lubricants are temporarily stored at the Shell/Storage Yards and disposed off site for reuse by a contractor.

Two permanent packaged Sewage Treatment Plants (STPs) are installed at the plant site and at the SSV. Treated effluent from both facilities is sent to the TSF where it is mixed with tailings decant water and recycled for processing. Excess sludge is hauled by truck to the Kumasi Metropolitan landfill by a contractor. The option of sludge dewatering and reuse as compost is being developed.

*Observations:*

Although the ECMG recognizes that plans are in place to improve overall waste management on site, in general waste disposal practices have not significantly changed since the last ECMG site visit.

Solid and Liquid Waste Management

The onsite inert/putrescible waste trench visited during the July 2007 site visit has now been covered and reinstated while a new similar one was reported to be opened. Leachate management is still not in place. The ECMG was informed of a number of piezometers located downstream from the trench, which the project was planning on using to detect potential groundwater contamination. The ECMG raised some concern regarding the effectiveness of this approach due to their distance from the trench as well as ongoing pit dewatering, which could also affect groundwater. The composting of putrescible waste is under design and should be in operation by next June (2008). The ECMG encourages this practice as the current disposal of putrescible waste without leachate management is not considered good practice, as described in the "General Environmental Guidelines," Pollution Prevention and Abatement Handbook (1998). The disposal of waste in open pits is an activity not consistent with best practice as defined in IFC guidelines, but is not considered a non-compliance with IFC written policy. Accordingly, this item has been removed from Table 1 as being an IFC non-compliance.

Used tires from heavy vehicles continue to be stored in a dedicated area, although a final disposal solution has not yet been defined. The two potential disposal options, to recycle them in South Africa through a specialized contractor or to bury them in a rock disposal area, are still under evaluation. During the site visit, the storage yard for new/used tires was observed to be well maintained with stockpiles properly covered to prevent the accumulation of rainwater.

No change in the management and disposal of hazardous material was observed. As specified in the Hazardous Waste Management Plan, all items classified as hazardous continue to be temporarily stored at the hazardous storage area before final disposal to the Kumasi landfill by a contractor. While waste oil and grease are reported to be sold to manufacturing companies in Tema and Aura for use in firing steam boilers and spent batteries recycled and reused by a contractor (Presank), any item contaminated with oil/grease, fuel or chemicals is still sent to the Kumasi landfill for disposal by

open burning. This practice is not consistent with the IFC “General Environmental Guidelines” from the standpoint of emissions.

The Hazardous Waste Tracking Register has been updated since the last ECMG visit and now correctly reflects the final disposal site for the majority of the hazardous waste streams (e.g., Presank depot for spent oil and grease, Kumasi landfill for contaminated items). In general though, hazardous and inert waste recording could still be improved in practice, especially in terms of the estimation of the final quantities of waste produced. During the site visit, the project explained that a new system to quantify the amounts of waste is under evaluation.

A bioremediation/volatilization pad for treatment of oily contaminated soil, which was considered an option under evaluation during the ECMG’s July 2007 site visit, has now been fully designed and was submitted to the Environmental Department for final revision. The site of the facility has been selected, and it is expected to be in operation by the second quarter 2008. As mentioned during the previous site visit, the ECMG encourages this approach, which will reduce the amount of waste being sent to the Kumasi Metropolitan landfill and further contribute to overall goal of permanently discontinuing the use of this facility. Although the use of the Kumasi landfill is not consistent with best practice as defined in IFC guidelines, it is not considered a non-compliance with IFC written policy. Accordingly, this item has been removed from Table 1 as being an IFC non-compliance.

The Mantract, Liebherr, and Shell workshops were visited during the site visit. The high standards of hazardous waste management, good housekeeping, segregation, and organization that were observed in July are still maintained at all three sites. Environmental and H&S policies were properly posted in the offices and in the different working areas and evidence of environmental awareness and training were provided to the ECMG during the visit. Oil spill kits continue to be available, and spill prevention measures are implemented. As previously noted by the ECMG, the lubricants storage area and the fueling area at the Shell workshop are not roofed.

According to the medical waste procedure, medical waste should be “*segregated at the Ahafo Site Clinic before transporting for incineration*”. As already reported during the July 2007 visit, the processing of medical waste by the on-site incinerator has been discontinued, and medical waste, reported to be produced in limited amounts, is currently stored at the Ahafo site clinic. In December 2006, the ECMG had recommended that the project “*Conduct ash testing at the existing on-site incinerator facility.*” This has been carried out (using the SGS laboratory), although results are only marginally relevant at this time as the incinerator is not currently in operation. Nevertheless, the project may want to consider ash testing (and subsequently developing ash disposal procedures consistent with the test results) in the future if and when the incinerator is back in use.

The ECMG visited the STP at the plant site, which was found to be well maintained and operational, consistent with observations made in the previous ECMG visits.

#### Wastewater Management

Effluent monitoring for both STPs is ongoing, and results indicated compliance with the Ghanaian regulatory effluent discharge criteria. No changes in the final disposal of treated effluent and excess activated sludge from the STPs were observed since July 2007. Sludge from both STPs still is hauled from Ahafo to the Kumasi

Metropolitan landfill. Montgomery Watson Harza (MWH) has been contracted to assist NGGL in establishing appropriate effluent criteria and design modifications to improve the operation of the two STPs. The proposed plant improvements will enable the project to adopt even stricter discharge limits than those required by both Ghanaian and IFC guidelines as shown in the following table<sup>12</sup>.

<b>Parameter</b>	<b>National Environmental Quality Standards – IFC Guidelines (EPA Act 1994)</b>	<b>NGGL Proposed Wastewater Treatment Plant Design Criteria<sup>13</sup></b>
COD (mg/l)	250	100
BOD (mg/l)	50	20 (CBOD)
TSS (mg/l)	50	20
NO <sub>3</sub> -N (mg/l)	75 (NO <sub>3</sub> )	15
Total Phosphorus (mg/l)	2	5
Total Coliforms	400	200

With these new effluent criteria in place, discharge effluent would no longer be routed to the TSF, and instead treated water would be used for watering lawns of Camp A and the SSV, as a dust suppressant, and to meet water requirements for the process plant.

By the time of the ECMG visit, the performance of the STPs had been assessed, and MWH had already identified a number of plant design modifications; these include the following:

- Provide raw wastewater screens to protect downstream equipment from damage and clogging of pipes;
- Provide additional process tanks and modify the current piping layout to enhance the performance of the activated sludge process increasing the biological oxygen demand (BOD) and TSS as well as nitrogen and phosphorus removal capacity;
- Revise and improve the current aeration system capacity; and,
- Revise the waste sludge solids handling process to allow mixing of the sludge from the Ahafo Site and SSV STPs and the Rank and Kenyasi septic systems into an aerated sludge holding tank to be located at the Ahafo Plant STP prior to dewatering and composting.

As also observed during the July 2007 site visit, waste activated sludge generated from the sludge sewage treatment processes and from the septic systems (de-activated) at the Rank and Kenyasi camps are still being disposed of at the Kumasi Landfill. In addition to the high costs associated with this practice, NGGL has taken the initiative to experiment with a more environmentally (and socially) effective solution for sludge disposal. The project first explored the use of sludge drying beds for volume reduction, followed by the application of the dried solids for land reclamation measures, but this technique was found not to be suitable during the rainy season. The project has now adopted the practice of dewatering the sludge and reusing it as compost for land reclamation and topsoil management activities. The project may further this composting method by mixing the dewatered biosolids with

<sup>12</sup> IFC EHS Guidelines for Precious Metal Mining.

<sup>13</sup> Values to be achieved on a 30-day monthly average basis.

dry waste, such as paper products, or vegetable wastes for further enrichment of the end product.

*IFC Policy Action Items*

Nil

*ESIA Action Items*

M1.10 Finalize the general Waste Management Plan.

*Recommendations for Improvement:*

- i) Discontinue the practice of on-site trenching of food/putrescible waste, and expedite the design of composting this waste together with sewage sludge waste.
- ii) Consider reactivating the on-site incinerator for medical waste disposal as outlined in the Medical Waste Procedure (*repeat recommendation*).
- iii) If offsite incineration is implemented for Project waste streams (e.g., medical waste), ensure that the facility is well operated and sufficient safeguards are implemented, according to applicable and relevant regulations (*repeat recommendation*).
- iv) Consider roofing the lubricants storage area and the fueling area at the Shell workshop to minimize the amount of potentially contaminated runoff generated at these two sites (*repeat recommendation*).

## **2.8 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;

- Personnel protective equipment (PPE) requirements;
- First-aid procedures; and
- Labeling of materials and posting of Material Safety Data Sheets.

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: WB EHS Guidelines Mining and Milling - Open Pit (August 1995); IFC Hazardous Materials Management Guidelines (December 2001); and IFC Environmental and Social Guidelines for OHS, (June 2003).

*Observations:*

The HSLP plans and procedures relative to the management of hazardous materials are still to be finalized. D’Appolonia has been raising this issue since their first site visit in December 2006.

NGGL’s Maintenance Department is responsible for contractor management, including those contractors responsible for handling hazardous substances (e.g., Liebherr, Mantrac, Shell). NGGL provides safety training to its own personnel as well as for contractors’ personnel. Contractors handling hazardous substances do have specific procedures in place, and hazardous substances were found to be segregated and appeared well managed at the time of the site visit.

The Shell flammable substances depot, which stores most of the combustible materials on site, has a site specific procedure in place (i.e., the Material Handling Program [December 2007]) that includes the management of health, safety, and environment (HSE) issues. The depot is subject to a biannual audit by Shell Ghana. Hazardous materials are stored in two separate areas in the Shell depot: low hazard substances are stored in an open area, which is paved and drained through a valve (normally closed) to an oil water separator; and, higher hazardous substances are stored in an enclosed, (metallic) fenced area, which is locked and roofed. The ECMG had made the recommendation in the past to roof the area containing the low hazard substances, which would also reduce the need for the oil water separator to treat potentially contaminated rainwater; this is also understood to be an issue of importance by NGGL/Shell.

The handling and storage of hazardous materials in the area of the processing plant is confirmed to be satisfactory; good practice is in place.

*IFC Compliance Action Items*

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

*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 (*repeat recommendation*).

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.

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 (WAD – cyanide concentration <50 mg/l) in the 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 relevant WB guidelines (EHS Guidelines Mining and Milling - Open Pit [August 1995]), 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 (H<sub>2</sub>O<sub>2</sub>) cyanide destruction unit is available on site for emergency use.

NGGL has an operational Ahafo Cyanide Management Plan (February 2008) 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, 2006, the pre-operations phase of the Ahafo Project was certified under the 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:*

During this site visit, the ECMG was supplied with the results of an audit conducted by Golder Associates on 25 to 29 June 2007 and re-issued as a revised report to NGGL and the International Cyanide Management Institute on February 15, 2008 to evaluate compliance with the ICMC. In addition, the ECMG was provided the operational Ahafo Cyanide Management Plan, Revision 2, dated February 2008. The results of the audit indicate that all aspects of cyanide management items have been classified as having 'Full' compliance, with the exception of the cyanide transfer facility at Tarkwa, Ghana operated by the cyanide supplier Orica. The Transfer Facility at Tarkwa has been found to be in "Substantial Compliance" and a Corrective Action Plan has been prepared to bring the facility to "Full Compliance" by September 2008. This audit also confirmed that the cyanide transporter (Barbex Technical Services Ltd) is fully compliant.

The one limitation to achieving full compliance at the Ahafo mine has been the persistent exceedance of the 50 mg/l WAD cyanide at the spigot entry into the TSF. The decant water within the TSF has always been below this 50 mg/l standard, but atmospheric degradation of the WAD cyanide flowing over the tailings to the decant pond has been necessary for this to be achieved. For the latest audit results to recommend that NGGL receive a "full compliance" with respect to WAD cyanide discharge, NGGL has implemented a Short-term Compliance Action Plan, which has reduced the WAD cyanide concentrations to below 50 mg/l since February 1, 2008. The permanent solution being developed by NGGL is the construction of a CCD cyanide recovery plant located where tailings are discharged from the process plant to the tailings disposal system. The purpose of this plant, which is scheduled for commissioning at the end of March 2008, is to treat the tailings to recover liquid containing cyanide. The plant is intended to reduce the amount of cyanide used at the mine through recovery of usable cyanide back to the process plant and to deliver WAD cyanide concentrations to the TSF of less than 50 mg/l.

TSF decant water is also monitored and WAD cyanide was reported between 6.05 and 0.03 mg/l in 2007, with a significant reduction observed starting from April 2007 and values consistently below 0.5 mg/l. Metals are also monitored and again observed at low concentration or non-detect.

During this third site visit, the ECMG observed a cyanide truck performing unloading operations. The personnel involved in the cyanide unloading were found to be wearing the prescribed PPE.

*IFC Policy Actions*

Nil

*ESIA Action Items*

Nil

*Recommendation for Improvement:*

Nil

### Flammable Materials Management

#### *Project Strategy:*

Flammable Materials (fuels and lubricants) are used at the site for vehicle supply. These materials are transported to the site from the Tema refinery (distance approximately 400 km). Fuel is stored in two tanks in a dedicated area managed by Shell. In the same area a storage area for storing of drums of lubricants is present. The operations of transporting, unloading and distributing the fuel to the users are under the responsibility of Shell.

#### *Observations:*

The fuel and lubricant storage area was visited by the ECMG and found to be equipped with containment bunds and a concrete floor to contain spills. Portable extinguishers are provided around the area. Due to the Flash Point of the materials stored, no fixed firefighting system is needed, according to the design standards adopted. If necessary, the foam truck operated by NGGL Emergency Response Team (ERT) can intervene. At the time of the ECMG site visit, no spill kit was observed in the truck unloading area.

The Shell HSE procedure “*Road Transport of Goods, Equipment and Products*” (November 2003), which was provided to the ECMG during the July 2007 site visit is still applicable. This procedure covers the organization and responsibilities for road safety, the hazards and effects management process for road transport, and road safety planning.

According to Shell, no changes in the road or country condition are evidenced to require an update of the Road Transport Risk Analysis, and this appears to be reasonable.

As described in the ECMG’s report for the July 2007 site visit, driving is allowed during daytime only, and a maximum speed of 60 km/h is allowed. Only trained drivers are allowed, with training provided by the “Friends of the Driver” association. First aid and equipment for a containment of small spills are provided with each truck. In case of an emergency, the Tema refinery will be alerted, which in turn alerts the emergency center closest to the accident location.

Since July 2007, one fatal traffic accident occurred during fuel transport from Tema to the project site. In response to this event, the project made some modifications of transport procedures, forbidding tankers from leaving the Ahafo site after 16:30 to avoid possibility of nighttime travel and further reducing the speed in the crossing of populated areas.

A Site-Specific Operating Manual detailing the Emergency Plan dated December 2007 was available.

<i>IFC Policy Action Item</i>
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Nil
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<i>ESIA Action Item</i>
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Nil
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*Recommendation for Improvement:*

Nil

### **3 Occupational Health and Safety**

#### ***3.1 Occupational Health & Safety Management***

*Project Strategy:*

The Project policy was described in the ECMG's report for the first site visit (December 2006), as follows:

*“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.”*

The policy and principles as evidenced in the first visit have not been modified and are still valid. The HSLP organization in place at the first visit time is still operational. As noted in Section 1.1 of this report, NGGL is planning to obtain certification under the OHSAS and ISO14001 standards, which will replace the current Newmont Five Star system.

*Observations:*

Since the ECMG's July 2007 site visit, the staffing at the HSLP Department has increased from 43 to 55 people. The HSLP Department is divided into five units; namely, HSLP (12 people), Emergency Response (26 people), Occupational Health and Hygiene (2 people), Malaria control (12 people), and Services (3 people). According to the December 2007 revision of the department's organization chart, five positions remain vacant. It should be noted that two of these vacancies are at a relatively high level - Assistant Superintendent of the HSLP Unit.

The accident register and investigation procedures in place have not been revised since the ECMG's July 2007 site visit; at the time of this visit, a new procedure to improve accident investigations including action tracking was under preparation and was expected to be issued within 2007. According to the data provided to the ECMG in February, approximately 30 percent of accidents are not followed-up properly under the present accident investigation procedure.

The updated accident statistics made available to ECMG (updated to November 2007) show a total recordable accident frequency ratio (TRAFR) around 0.05 and a lost time accident frequency ratio (LTAFR) that has increased during 2007, reaching a value of 0.82 in November. According to the HSLP Department, these values are very low in comparison to other Newmont accident statistics in mining operation. The increasing LTAFR in 2007, even though still very low, suggests a need to continue giving attention to safety training, Job Hazard Analyses, the updating of SOPs etc.

According to information and data provided by management of the HSLP Department, light vehicle use remains the major cause of incidents. The general widespread use of appropriate PPE observed during previous ECMG visits is confirmed, as well as generally good housekeeping both in NGGL and in the contractors' areas. Firefighting equipment testing, checked at random on portable equipment, was found to be carried out periodically. In general, the ECMG observed no unsafe H&S acts during the visit.

The Training Management System, observed during the previous ECMG site visit, is still in place with greater emphasis on personnel safety training.

As was observed in July 2007, HSLP technical procedures and standards still have not been finalized. Nevertheless, given the low accident statistics and observations made on site, it appears that safe procedures are indeed being implemented in the workplace, and the attitude of the management and staff towards HSLP issues is generally positive. As HSLP has now reached a good level of safety performance in practice and a reasonable level of department staffing and personnel training, it is recommended that HSLP management now turn their attention to the finalization of an appropriate set of procedures, including monitoring, in compliance with the IFC's Hazardous Materials Management Guidelines (December 2001).

NGGL supervises contractor occupational safety; weekly and monthly safety training to contractors' staff are also provided. As mentioned in the "Hazardous Materials" section of this report, the ECMG visited the Liebherr and Mantrac workshops and the Shell depot area; HSE practices and documented procedures of a high quality were observed. Each contractor is also subject to internal audits on HSE practices by their respective companies.

No Lost Time Accident (LTA) was recorded for these contractors in the last 1000 days of operation, and no major spill has been reported.

<i>IFC Policy Action Items</i>
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Nil
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<i>ESIA Action Items</i>
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Nil
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*Recommendations for Improvement:*

- i) HSLP technical standards and procedures should be finalized to cover the most important concerns in Ahafo operations (*repeat recommendation*).

### **3.2 Emergency Preparedness and Response**

*Observations:*

During the first and second site visits, the ECMG raised several concerns on the Emergency Preparedness and Response (ERP) Plan, especially the need to systematically identify potential emergency scenarios, followed by a risk assessment of these scenarios to identify the most critical hazards and develop the appropriate prevention, mitigation and emergency plans commensurate with the risk. Emergency

response procedures and maps for emergency management also were not present. At the time of the ECMG's third site visit, the ERP Plan still had not been updated, although the ECMG was informed that a Risk Analysis, covering all site activities, is nearly complete. The results of the Risk Analysis will form the basis of the ERP update and the relevant SOPs.

Comments made on the ERP in the ECMG reports for the first and second site visits are still relevant to the current situation and include the following: *"no hazard identification appears to have been done to assess the hazards that are specific to the site and operations, and, therefore, the content of the ERP is of a general nature and lacking precise information to deal with an emergency at the Ahafo site. As an example, certain hazards that should be considered (e.g., liquid fuel fires) are not described at all in the report. Also, general statements such as 'Keep personnel and equipment out of possible flash flood areas' or 'Initiate measures to abate the release if this can be done safely' are given, but there is no indication or maps to indicate where the possible flood areas are located and no indication of means and procedures to abate and contain a release is presented."* The recommendations made in the ECMG's report for the first two site visits are therefore repeated in this section, and it is advised that they are taken into consideration when updating the ERP after the Risk Analysis is completed.

The ECMG reviewed the ERT staffing, equipment, the development of related procedures. In general, there is a noted improvement in ERT capabilities since the July 2007 visit. The ERT staff has received training and appears to be capable of handling a general emergency situation. One additional ambulance has been made available to the ERT in addition to the equipment already noted in the ECMG's report for the July 2007 visit (i.e., a fire truck, a spill emergency trailer, a general emergency truck, a water truck, one ambulance).

Some progress was observed regarding construction works to enlarge and improve ERT areas, including the provision of additional facilities for staff and equipment (e.g., the foundations had been installed for new containers). These improvements however were not finalized, and the ERT area remains the same as observed during previous visits. The equipment, the radio room, the staff room, and the compressor for refilling air bottles are all within the same standard size container. An improvement in these conditions, such as, at the least, the separation of the compressor and the radio/documentation area from the other areas, is strongly advised.

During this site visit, the ECMG reviewed the ERT response SOPs to be followed in the event of various emergency scenarios (e.g., fire, cyanide spill). Dated between 2006 through 2007, these procedures were found to be action-oriented and relatively precise. The ECMG was informed that ERT emergency response drills are performed, but no periodic drill schedule or plan was observed.

Emergencies on site can be reported directly to security by telephone and/or announced on radio (Channel 1)<sup>14</sup>. Security then alerts the ERT to take appropriate action. The specific steps that should be taken to alert security of an emergency or to call in to the radio were not found however to be clearly stated as part of any specific procedure.

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<sup>14</sup> Without the ERP in place it is not clear if there is a different procedure to be followed for emergencies off-site.

A related issue is the insufficient visitor safety induction process on site. Visitors are currently not provided with an emergency number to call in case of an emergency on site (e.g. fire, medical emergency etc), nor are they made aware of muster points or provided with any general instruction on how to behave in the event of an emergency situation. It is acknowledged that the project is developing procedures for visitor safety induction in 2008, which will include a dedicated room and safety training equipment (e.g., a video).

*IFC Policy Action Items*

M1.15 Prepare a site-specific 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) Continue to focus on practical training of the ERT (*repeat recommendation*).
- ii) Disseminate information site-wide, and especially in project dormitory and residential areas, on general emergency preparedness and response to general emergencies, providing emergency contact phone numbers, muster point locations on dedicated maps.
- iii) Develop a comprehensive visitor safety induction, which includes, at a minimum, emergency contact names and numbers and muster point locations.
- iv) Improve the overall accommodations of the cramped ERT area, such as by separating the communications room, the equipment maintenance, and the ERT waiting areas.
- v) Develop and implement a drill schedule, specifying relevant drill activities, for various emergency situations as part of the ERP.

### **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 guidelines are the following: WB EHS Guidelines

Mining and Milling - Open Pit (August 1995), and IFC Environmental and Social Guidelines for OHS (June 2003).

For the ambient noise in community areas, reference is made to the WB's General Environmental Guidelines (July 1998) that require for Ambient Noise in residential areas outside project property boundaries a limit of 55 dB(A) at daytime and 45 dB(A) at nighttime. The ESAP refers only to compliance with Ghana residential standards that are the same as the WB standards, but it is understood that an industrial/commercial standard of 70 dB (A) for both day and night is what has been approved by the Ghana EPA for the area surrounding the mine.

*Observations:*

Community Monitoring

Noise and vibrations from blasting are 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(L) for the blast overpressure. As described in greater detail in the December 2006 ECMG report, these standards are very conservative in terms of what constitutes best practice and effectively represent a comfort level, rather than what could cause actual damage or represent public harm.

Blast monitoring data through February 18, 2008 were reviewed and found to be within Project standards, except for a few excursions of the measured air blast, which exceeded the internal NGGL Project standard, but were still within IFC guidelines. The air blasts recorded from the Subika Pit at Kantinka village exceeded the 115 dB(L) comfort standards 16.6 percent of the time during 2007. Monitoring from the Apensu Pit in the area of the TSF exceeded this standard 20.8 percent of the time. It is emphasized that the excursions above the NGGL limit of 115 dB(L), the largest of which was 129.1 dB(L) recorded from a blast at the Apensu Pit on February 4, 2008, are still below the IFC standards of a maximum of 140 dB(L) with 95 percent required to be below 133 dB(L). The increase in depth of these two pits should also make the noise levels at external receptors lower in the future.

Based on a standard of 70 dB (A) occasional non-compliances with the Ghana EPA standards for industrial/commercial use have been recorded. A set of noise monitoring data from January to May 2007 (measurements mainly concentrated during May) done on six locations in the surroundings of the Ahafo site was provided to the ECMG. Sound levels (Leq, in dBA) are found to be highly variable; values between 32 and 106 dBA during daytime have been found in Kantinka Village, while in the other locations the values reach maximum levels between 68 to 97, and minimum levels between 20 and 50 (daytime). No data are available to distinguish the contribution to noise from NGGL operations from background noise sources or other activities.

Update of Community Noise Monitoring data has been provided for Manu Shed, Kantinka, Morokrom, and Kenyase Bypass with additional measures in October and November 2007, and in January 2008. Measurements in Agbesi and Kwabena Atta settlements were provided for October and November 2007, measurements in Mariama settlement have been discontinued in November with the note "Building collapse - No one leaving here".

The new measurements confirm in general data provided during previous visits but with an increase in night time noise values. Assuming that 70 dB (A) is the applicable standard, most measurements show noise levels below this standard, but some excursions up to 84.2 dB (A) in Kantinka village and 77.5 dB (A) in Mariama Settlement have been recorded. If IFC or Ghana EPA residential standards are considered, daytime values exceed 55 dB(A) only in certain readings, but the nighttime standard of 45 dB(A) is consistently exceeded.<sup>15</sup> It is again to be noted that no data are available to distinguish the contribution to noise from NGGL operations from background noise sources or other activities.

#### Workplace Monitoring

The noise surveys performed in January 2007 are being updated by the Industrial Hygiene function that has the responsibility to perform plant noise control. The ECMG has visited the process plant in operation; showing personnel wearing noise protection where necessary. The information provided confirms that occupational noise is being addressed and that appropriate actions are in place to control the working environment.

#### *IFC Policy Action Items*

M3.3 Assess background noise in residential areas and ensure that noise levels do not exceed limits provided in the WB's General Environmental Guidelines (July 1998).

#### *ESIA Action Item*

M1.17 Verify that Project activities do not adversely impact the local communities from the standpoint of noise and vibrations that could originate from blasting and other than those associated with blasting, such as from Project-related vehicular traffic. Ensure that compliance with applicable and relevant standards is monitored.<sup>16</sup>

#### *Recommendations for Improvement:*

Nil

### **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

<sup>15</sup> Note that these limits are consistent with those specified for residential noise in IFC's updated General EHS Guidelines (2007).

<sup>16</sup> Note that it is possible that this objective has been achieved, but it is not practical to make this assessment with the data as presented. Therefore, the item is not closed. A specific evaluation of data should be developed and/or an ad-hoc campaign, designed to distinguish conditions associated with Project activities in the closest community receptors and background conditions, should be conducted.

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: WB EHS Guidelines Mining and Milling - Open Pit (August 1995); and IFC Environmental and Social Guidelines for OHS (June 2003).

*Observations:*

Workplaces Air Monitoring

NGGL has established an unofficial monitoring program to monitor ambient air quality associated with Ahafo Mine operations. Thirteen (13) air monitoring workplaces were established throughout the project including mining, processing plant, residential facilities, sanitary, and other areas. Although the ECMG recognizes that ambient air quality measurements are ongoing and different groups of workers were reported to have been monitored for dust exposure, lead in air, etc., no specific results were provided.

As observed during the ECMG July 2007 site visit, monitoring results obtained for point source emissions testing (i.e., for sulfur dioxide, nitrogen oxide, and carbon monoxide) seemed to indicate some problems with the equipment calibration. This issue has still not been resolved.

Stack emission testing, initially planned for first quarter 2007, has not yet started. According to the information provided during the last visit, stack emission monitoring is foreseen for second quarter 2008 through the use of 350 TESTO gas emissions analyzer.

General Industrial Hygiene

The Industrial Hygiene team has been staffed with one additional person (two total), and training has been provided, including participation in industrial hygiene courses in the United States. This team also carries out Job Hazard Analyses using a risk-based qualitative approach to identify occupational health issues of related project activities. In addition to noise and dust exposure, the team has identified the exposure to lead in laboratories as an occupational health hazard. In response to this finding, the project has taken precautions, such as the preclusion of pregnant women from laboratories.

Malaria Prevention and Control

The malaria control program, initiated at the time of the first ECMG site visit and led by an entomologist, is on-going. As described in the ECMG report for the July 2007 visit, International SOS conducted a baseline study in November 2006 that gave rise to 64 recommendations to minimize the risk of contracting malaria. A follow-up table on the implementation of these recommendations was updated in June 2007 and provided to ECMG in July 2007. An updated table was not made available to the ECMG during this visit.

The ECMG observed various measures taken to control malaria within the “control zone”, defined as 500 meters from the Ahafo Camp A site; these include larval control by larvicide, covering the tires of mine trucks with plastic sheets to help prevent them from becoming breeding sources (inspected once per week), screening and mosquito nets in dormitories and residential areas, and indoor spraying; a Malaria

travel pack is also provided to all visitors upon arrival to the Ahafo site and additional mosquito netting is being provided at outdoor recreational and gathering areas.

Mosquitoes are collected from traps each month to monitor the population size.

Statistics updated as of November 2007 indicate an average of 124 malaria cases per month from January to November 2007; this is a substantial improvement with respect to 2006 data, considering that in the period from January to June 2006 an average of 424 malaria cases were recorded per month. These data confirm the adequacy of the measures developed on site to reduce malaria risk of contracting malaria, and it is confirmed that most of the cases are due to employees contracting malaria outside the “control zone”, in Accra or in the villages.

The project is also working with local communities to raise awareness on malaria prevention, and mosquito nets are being distributed as well information on malaria prevention. NGGL also works in cooperation with the Government of Ghana program to increase the distribution and use of mosquito nets.

#### HIV and Other Disease Control

Although less important than in some other African countries, HIV is still a health concern in Ghana. The HIV/AIDS program, mainly addressed to community education and distribution of condoms to prevent the spread of HIV/AIDS, is continuing to be developed as part of NGGL's community health program.

No other exotic diseases have been reported, with the exception of one case of tuberculosis in 2007.

#### *IFC Policy Action Item*

M1.4 Ensure that periodic workplace air quality monitoring is undertaken, meeting relevant IFC requirements (WB EHS Guidelines Mining and Milling - Open Pit [August 1995]).

#### *ESIA Action Item*

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 (*repeat recommendation*).
- ii) The Project should collect data and provide scientific evidence that the ongoing operations and associated facilities do not create breeding grounds for mosquitoes and other disease vectors (*repeat recommendation*).

## **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 WB OP 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 good 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 (April 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:*

The two previous ECMG reports identified a deficiency in terms of the evaluation of cultural resource management in that cultural resource management had been conducted to the point of identifying sacred sites of community significance (e.g., cemeteries, religious shrines, sacred landmarks, etc.), but archaeological surveys had not been conducted as part of the baseline surveys. Both reports recommended that an archaeological baseline survey be conducted within the scope of the cultural resource management surveys that should be undertaken as part of environmental baseline surveying. This situation has been rectified and a regional survey has been conducted by Geomatrix as published in a report entitled "Draft Baseline Technical Report, Archaeological Resource Study, Ahafo North and South Lease Areas" dated February 5, 2008. Fieldwork was conducted by Prof. Yaw Bredwa-Mensah of the University of Ghana. Prof. Bredwa-Mensah was assisted by an archaeological technical assistant as well as several locally hired individuals who were nominated by traditional leaders.

The results of this survey are that 21 archaeological sites have been identified in the Ahafo North and Ahafo South areas. Within the Ahafo South area ten archaeologically significant sites were identified of which five were attributed by the archaeological team as being of a prehistoric nature with one attributed to the Iron Age, with the remainder having two or more of the following characteristics: Iron Age significance; historic; and/or religious significance. Two archaeological sites were identified within the area of the Awonsu Pit scheduled for groundbreaking in February 2008. Both of these sites (effectively one site) were fully excavated and the artifacts recovered such that construction can now proceed. This site was visited in the field with Prof. Bredwa-Mensah. The sites are Late Stone Age and were identified by grooved striations in rock where stone tools were polished. In association with the rock grooves, Prof. Bredwa-Mensah also encountered a waste pit containing the actual stone tools, pottery fragments and pieces of stone jewelry from which it was possible to determine that the sites were from the Kintampo culture, commonly associated with the second millennium B.C. The discovery is considered highly significant, because little is known about cultures living in the forests of Ghana.

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 if chance finds are encountered. 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.*” This follow-up work still remains to be completed.

<i>IFC Policy Action Items</i>
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Nil
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<i>ESIA Action Item</i>
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Nil
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*Recommendations for Improvement:*

- i) The archaeologists working on the project should review the NGGL CRM plan to make sure that it is site-specific and practical to implement. This 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.
- ii) Based on D’Appolonia’s experience, the number of archaeological sites identified by means of a regional reconnaissance is typically 20 percent of the number of sites that will be encountered if a good chance finds protocol is implemented at the time vegetation is stripped. Training of field monitors, managers, equipment operators, etc. should be undertaken to make sure that sites are identified and protected.
- iii) Consider maintaining an open contract such that the archaeologists from the University of Ghana such that they can quickly respond to a chance find.
- iv) Make sure that the archaeologists have sufficient resources to complete their studies and publish the results after completing their field work. This is an opportunity for NGGL to make a significant contribution to Ghanaian culture.

## **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 self-performed by NGGL, supported by design and QA/QC services provided by

Knight Piésold for the current phase of the facility expansion. The current phase of construction will provide tailings capacity until approximately 2Q 2010.

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 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 TSF 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 in the December 2006 report and are not repeated here. The applicable and relevant IFC guideline is OP 4.37 - Safety of Dams (September 1999 Draft).

*Observations:*

The tailings dam appears to be designed and constructed within the established design parameters. At the time of the site visit, the overall height of the facility was being raised five meters, which represents an increase in height of the tailings dam and also the upstream water supply dam. Waste rock was starting to be placed on the downstream side of the tailings dam and this waste rock will eventually be a substantial buttress to minimize the potential for the downstream failure of the TSF. As the facility increases in height, the water level in the WSF will not rise correspondingly, as the water level in the WSF is controlled by a spillway where flood waters are diverted around the TSF. When the TSF reaches its maximum capacity, the level of tailings will be much higher than the water level in the WSF. The final form of the TSF will be such that the dam structure will nearly surround the entire TSF, not just where it currently impounds the TSF on the downstream side.

As noted in the two previous ECMG reports, 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. It is understood that impacts from potential failure scenarios will be evaluated as part of an Impact Analysis conducted as part of the development of an EPP by Golder Associates discussed in greater detail in Section 5.3 of this report. This information could be used to evaluate the appropriateness of the dam’s classification.

*IFC Policy Action Items*

Nil

*ESIA Action Items*

Nil

*Recommendation for Improvement:*

- i) It is strongly recommended that NGGL comprehensively justify the hazard classification of the TSF. A best practice approach should involve an evaluation to determine the potential human and environmental impacts of a dambreak event. See also recommendations for emergency action planning (*repeat recommendation*).

## 5.2 Operations and Maintenance Planning

*Project Strategy:*

At the time of the December 2006 ECMG visit, a document entitled “*Ahafo Project, Tailings Storage Facility, Operations Manual*” had been prepared for the TSF, as required by the IFC OP 4.37 - Safety of Dams. This manual described the design in detail and presents operational and emergency procedures for the management of the facility. This document has been supplemented by a revised document entitled “*Ahafo Tailings Management Plan*” dated November 2007, which overlaps with the “*Operations Manual*.”

*Observations:*

At the time of the site visit, the ECMG was provided with the November 2007 “*Ahafo Tailings Management Plan*” prepared by Golder Associates. It is understood that this document is considered by NGGL to be final, although this is not indicated on the document itself. The Ahafo Tailings Management Plan covers the basic requirements for tailings management 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.

The document also provides a description of what situations might constitute an emergency and assigns responsibilities to individuals/organizations for different emergency levels, but does not provide detailed procedures for notification and evacuation that might have to be followed.

The designer and construction manager, Knight Piésold also has the responsibility for conducting annual inspections of the TSF. A requirement of OP 4.37 is that dam inspections be conducted by independent dam specialists, although the IFC may accept assessments of dam safety if full-level inspections and dam safety assessments that are acceptable to the IFC have already been conducted and documented. The initial design of the TSF was independently reviewed by Chlumsky, Armbrust and Meyer (CAM) in 2005, but this firm was not retained to conduct any follow-up inspections. The current situation is not a clear non-compliance with OP 4.37, but is something that NGGL may need to revisit with the IFC. In terms of fulfilling the requirements of an Operations Manual, the Ahafo Tailings Management Plan is consistent with good practice and IFC requirements.

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.” The risk assessment for the deposit (failure modes, effects and sensitivity analysis) was carried out in 2005 and the Tailings Management Plan indicates that the risk assessment should be updated annually at the time of the annual audits in open forum with mine management present. All mitigation measures should be recorded in the incident or objectives list with nominated forum at time period specified. 2008 will be the first year for the TSF Risk Assessment to coincide with the Professional Engineer’s annual site visit that will take place some time around July-August 2008.

*IFC Policy Action Items*

Nil

*ESIA Action Items*

Nil

*Recommendation for Improvement*

- i) Evaluate the need for contracting for independent TSF inspections in consultation with the IFC.

### **5.3 Emergency Preparedness 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:*

In terms of emergency preparedness, OP 4.37 requires that if the dam is large (15 meters or more in height) it requires the preparation of an EPP. The contents of this Plan are provided in an Annex to OP 4.37, as follows:

*“Emergency Preparedness Plan. This plan specifies the roles of responsible parties when dam failure is considered imminent, or when expected operational flow release threatens downstream life, property, or economic operations that depend on river flow levels. It includes the following items: clear statements on the responsibility for dam operations decision making and for the related emergency communications; maps outlining inundation levels for various emergency conditions; flood warning system characteristics; and procedures for evacuating threatened areas and mobilizing emergency forces and equipment.”*

The typical means to determine the contents of an Emergency Action Plan is to identify potential failure modes and then determine the potential consequences of the failure(s). The results should be the identification (on a map) of potential human and environmental receptors that could be impacted. NGGL was able to demonstrate that they are in the process of contracting Golder Associates to conduct an Impact Analysis and prepare the maps of the areas potentially affected. It is anticipated that this will form the basis for preparing an EPP consistent with IFC requirements.

*IFC Policy Action Items*

M1.19 Prepare an EPP for the potential failure of the TSF that clearly defines potentially affected areas based on potential release scenarios as determined on the basis of an Impact Analysis 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

*Recommendation for Improvement:*

- i) Involve the HSLP group with the emergency planning for the TSF facility (*repeat recommendation*).

**List of Acronyms and Abbreviations**

ARD: Acid Rock Drainage  
BMP: Biodiversity Management Plan  
BOD: Biological Oxygen Demand  
CBOD: Carbonaceous Biochemical Oxygen Demand  
CCD: Counter-Current Decantation  
CI: Conservation International  
COD: Chemical Oxygen Demand  
CRM: Cultural Resource Management  
ECD: Environmental Control Dams  
ECMG: External Compliance Monitoring Group  
EHS: Environmental Health and Safety  
EMP: Environmental Management Plan  
ESIA: Environmental and Social Impact Assessment  
EPA: Environmental Protection Agency  
EPP: Emergency Preparedness Plan  
ERP: Emergency Response Plan  
ERT: Emergency Response Team  
ESAP: Environmental and Social Action Plan  
ESR: Environmental and Social Responsibility  
H&S: Health and Safety  
HSE: Health, Safety and Environment  
HSLP: Health, Safety and Loss Prevention  
ICMC: International Cyanide Management Code  
IFC: International Finance Corporation  
IMS: Integrated Management System  
KPI: Key Performance Indicator  
LI: Legislative Instrument  
LTA: Lost Time Accident  
LTAFR: Lost Time Accident Frequency Ratio  
MSDS: Material Safety Data Sheet  
MoC: Management of Change  
NGGL: Newmont Ghana Gold Limited  
NGO: Non-Governmental Organization  
OHS: Occupational Health and Safety  
OP: Operational Policy  
OPN: Operational Policy Note  
PPAH: Pollution Prevention and Abatement Handbook  
PPE: Personal Protective Equipment  
RoW: Right-of-Way  
SOP: Standard Operating Procedure  
SSV: Senior Staff Village  
STP: Sewage Treatment Plant  
TRAFR: Total recordable Accident Frequency Ratio  
TSF: Tailings Storage Facility  
TSS: Total Suspended Solids  
VRA: Volta River Authority  
WAD: Weak Acid Dissociable  
WSF: Water Storage Facility  
WB: World Bank  
WHO: World Health Organization