

SUMMARY

AHAFO SOUTH PROJECT

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SUMMARY

Newmont Ghana Gold Ltd. (NGGL) is developing gold reserves at the Ahafo Project in the Brong Ahafo Region of Ghana, West Africa (**Figure S-1**). The Ahafo Project is located along a mineralized zone (Ahafo Project area) that extends approximately 70 kilometers (km) in the central portion of Ghana. Ghana is located on the Gulf of Guinea between Côte d'Ivoire (Ivory Coast) on the west, Togo on the east, and Burkina Faso to the north. Approximately 21 million people inhabit Ghana, an area approximately 670 km north to south and 560 km east to west totaling 238,540 square kilometers (km²) (about the size of Great Britain).

The Ahafo Project is part of Newmont Mining Corporation's (Newmont) 2002 acquisition of Normandy Mining Ltd. In December 2003, Newmont formalized its involvement in the Project by gaining approval of its foreign investment agreement with the Government of Ghana. Newmont has three subsidiaries organized under the laws of Ghana:

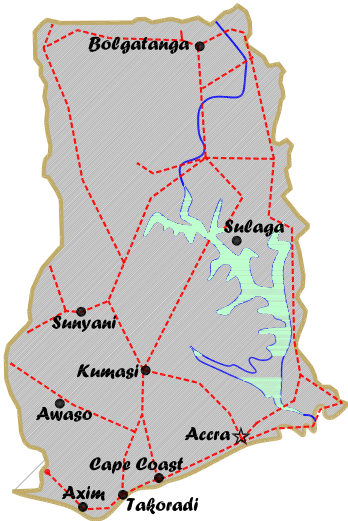
- Newmont Ghana Gold Ltd. (NGGL);
- Rank Mining Company Ltd. (Rank); and
- Golden Ridge Resources Ltd. (GRRL).

The current resource is the result of exploration by various interests, which were consolidated by NGGL following a merger with Normandy Mining Limited and purchase of Moydow Mines International, Inc. interests in Rank Mining Ltd. in 2003. Through these mergers and acquisitions NGGL acquired the rights to develop the area covered by permits previously issued by the Ghana Environmental Protection Agency (EPA) for the Ntotoroso and Sefwi projects, which were renamed by NGGL as the Ahafo Project. NGGL evaluated these mining leases and determined that development of the Ahafo Project would be modified from previously approved plans. As a consequence, NGGL has separated the Ahafo Project into two components; Ahafo South Project and Ahafo North Project. The Ahafo South Project (Project) is the subject of this Environmental and Social Impact Assessment (ESIA).

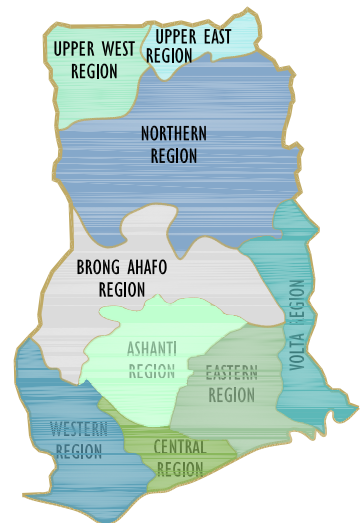
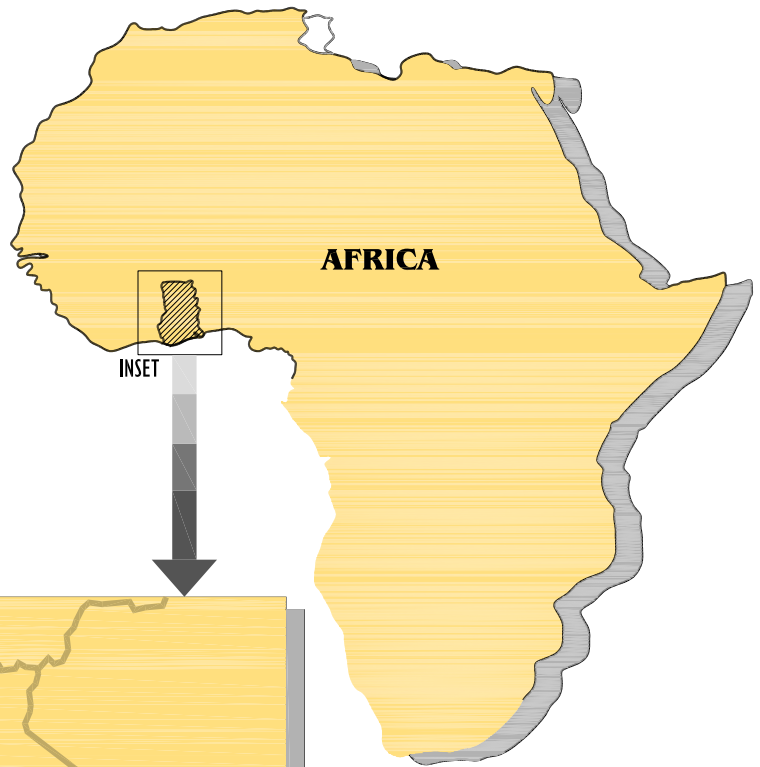
Newmont is seeking financial assistance from the International Finance Corporation (IFC) to continue development of the Project. In addition, Newmont seeks to apply IFC social and environmental safeguards and control requirements to the design, construction, operation, and closure of the Ahafo South Project. This ESIA has been compiled in accordance with IFC policies and guidelines to support application for financial assistance.

The Ahafo South Project can be considered a "greenfields" activity given the distance from historical mining centers associated with traditional Ghanaian mining districts. Although there is no historic commercial mining, local people do regard the area as having an artisanal mining history, although such mining is insignificant today.

In many places worldwide the environmental legacy of mining has been or is perceived to result in blighted communities, environmental damage, and altered landscapes. NGGL intends to demonstrate that by applying good practices at a greenfield site, it is possible to operate a modern gold mine which will benefit neighboring communities. Poor perceptions of mining do exist in communities in Ghana; although much of this is perception is the result of population influx seeking jobs and artisanal mining. NGGL recognizes that community aspirations and perceptions will need to be addressed such that people will not misrepresent the impact of the Project just because it is a gold mine. Project development has the potential to integrate current societal expectations, modern technology, and sustainable development to create opportunity for local, regional, and national level stakeholders.



Ghana Road Map



Ghana Region Map

General Location Map
Ahafo South Project
Brong Ahafo Region, Ghana
FIGURE S-1

Similarly, the Project also recognizes the demands of globalization related to social value, environmental protection, and participation and will strive to adhere to international principles of social responsibility, environmental protection, and global standards.

The Ahafo South Project is currently in development, including construction of the mill facility, tailing storage facility, water storage facility, construction camp, resettlement villages, and access roadways. The Project has received the necessary mining leases and licenses from the Ghanaian EPA to proceed with development. A variety of alternatives including facility locations, facility design, operational options, and closure/reclamation options were considered in designing and permitting the Ahafo South Project; both by previous mine lease holders and NGGL's recently completed permitting of the Project. NGGL has selected the best environmental and least social impacting alternative to implement for development of the Project.

The extractive sectors have been subjected to increasing expectations following the Global Mining Initiative, Mining, Minerals, and Sustainable Development, and the Extractive Industry Review. More explicit approaches to poverty reduction, human rights, governance, transparency, revenue management, renewable energy, and environmental performance are being demanded by the international community. NGGL has adopted Newmont's Social Responsibility Policy and commitment which seeks to meet and achieve this demand for change as summarized below.

NEWMONT'S SOCIAL RESPONSIBILITY POLICY

Newmont's future is dependent on the ability to develop, operate, and close mines in a manner consistent with the commitment to sustainable development, protection of human life, health, and the environment, and adding value to communities in which it operates.

- Sustainable development encompass these widely recognized principles:
 - Conservation and preservation of natural resources and the environment;
 - Equitable sharing of the benefits of economic activity; and
 - Enhancement of the well-being of people.
- Develop and use systems to identify and manage risks, and provide accurate information to support effective decision making.
- Train our people and provide the resources necessary to meet our objectives and targets.

NGGL as a subsidiary of Newmont commits to:

- Respecting the Universal Declaration of Human Rights in business operations;
- Respecting social, economic and cultural rights of local people;
- Adopting policies, standards, and operating practices that ensure ongoing improvement;
- Where appropriate and feasible set operating standards that exceed the requirements of local law;
- Assessing performance against stated policies and standards;
- Demanding leadership from all employees;

- Sharing success by partnering with stakeholders in appropriate community development programs;
- Consulting stakeholders in matters that affect them;
- Striving to communicate performance in an accurate, transparent and timely manner;
- Understanding that actions and conduct of NGGL employees and contractors are the basis on which stakeholders will evaluate NGGL's commitment to achieving the highest standards of social responsibility; and
- Implementing our Social Responsibility Policy in conjunction with Environment, Health, and Safety Policies since these issues can affect the communities in which we operate.

NGGL recognizes potential social and environmental effects can be created through development of mining projects. Such effects may range from bad publicity reflecting perceived problems or issues due to lack of communication and stakeholder engagement to actual and measurable environmental and social impacts resulting from poor design, construction, operation, or closure of specific mine developments around the world. To ensure proper and appropriate mine development occurs in Ghana, NGGL endorses the concept that communication with Project stakeholders is an essential component of any environmental and socio-economic assessment process. NGGL is committed to pro-active and ongoing communication with all agencies, organizations, and individuals with an interest in development of the Project.

Consultation and disclosure practices which NGGL will implement for the Project are described in the Public Consultation and Disclosure Plan (PCDP). The PCDP includes details of public involvement activities occurring:

- Before Newmont acquired the Ahafo concession;
- During development of Environmental Impact Statements (EISs) for securing the mining lease;
- During implementation of a public involvement program designed to address and resolve resettlement and compensation issues;
- During development of the Project; and
- Continuing throughout the life of the Project.

NGGL, in keeping with Newmont's corporate philosophy, is designing and operating the Ahafo South Project to be a model corporate citizen in terms of recognition of social and environmental concerns in communities where the Project may have an effect (planningAlliance (pA) 2005). To implement this approach, NGGL has undertaken the following:

- Ensuring fair and consistent recruitment practices, including recruitment of local skilled and semi-skilled labor to the extent possible;
- Improving the welfare of affected communities, including levels of health, education, and infrastructure;

- Operating on the basis of equal opportunity, regardless of race, gender, creed, color, or religious preference;
- Maintaining price stability and minimizing inflationary impacts;
- Providing compensation that results in minimal disruption to the community and supports re-establishment of lost livelihoods; and
- Undertaking properly administered land transactions defined in consultation with stakeholders.

AREAS OF INTEREST

NGGL recognizes the potential social and environmental effects that can be created through development of mining projects. Such effects may range from bad publicity reflecting perceived problems or issues due to lack of communication and stakeholder engagement to actual and measurable environmental and social impacts resulting from poor design, construction, operation, or closure of specific mine developments around the world. To ensure proper and appropriate mine developments occur in Ghana, NGGL as a subsidiary of Newmont endorses the concept of sustainability in mining projects; that is, “meeting the needs of this generation while ensuring the ability of future generations to meet their needs.” This concept in practice means that NGGL, in development of mine projects, would seek to create jobs, hire local semi-skilled and unskilled labor, provide the necessary training to ensure work is performed in a safe and productive manner, and develop a skilled labor force whose abilities can be applied to any manner of industrial and infrastructure project that requires such skills. Skill sets created by mining operations include but are not limited to mechanic, welding, pipe fitting, framing, equipment operation (dozers, loaders, haul trucks, light vehicle), blasting, drilling, electricians, maintenance, monitoring, trainers, laboratory technicians/workers, reclamation workers, mill operators, chemists, and management.

Mining projects of the scale and duration of the Ahafo South Project offer unique opportunities for development of skilled labor forces. The 15-year life of the Project will allow teaching, training, and skill development to occur. Other projects such as oil pipeline or transmission powerline projects may have a 6-month or one year construction schedule. These short-term construction projects do not provide sufficient time for a construction company to hire semi-skilled labor locally, train personnel, and meet the demands of the construction schedule.

Sustainability as it applies to extractive industries such as mining can be a misnomer because the extracted resource is not renewable; however, particular mine projects can lead to infrastructure development including electrical distribution into areas where no electrical power was previously available; potable water supply; sanitary sewage systems; waste handling and disposal systems; roads; bridges; housing; health care; communication system such as mobile telephones, and other components of societal needs that were not present in developing areas (White 2003).

Other aspects of “sustainability” associated with mine development include opportunities to educate workers, family members, and the community at large in activities not directly related to mining. Depletion of soil fertility associated with crop and agricultural practices in subsistence farming in Ghana can be addressed by education of farmers as to practices which could enhance crop production. Opportunities to create and maintain biological systems such that soil amendments are used to replace nutrient losses can be developed.

Study area boundaries were developed for each resource area and generally extend from the Amama Shelterbelt/Bosumkese Forest Reserve on the north and east; communities of Kenyase 1 and 2 on the south; and to the headwaters of the Subri and Awonsu drainages in the west. Study areas for each environmental resource are based on predicted locations of direct and indirect impacts associated with the Project. The Project area for all resources is defined as the 3,528 hectares (ha) required for mine development, buffer zones, and resettlement villages.

Three key areas of interest have been identified that relate to the Project are described below.

SOCIAL AND ECONOMIC EFFECTS

The Study area for the Human Environment includes the area socio-economically affected by Project construction and operation activities prioritized by NGGL for community development assistance. The Study area includes the Project area and surrounding communities of Wamahinso, Gyedu, Ntotoroso, Kenyase 1 and 2 and hamlets near those communities.

Ghana was the first country in sub-Saharan Africa to gain independence, in 1957. While it endured military rule for a period, the country has enjoyed uninterrupted democratic governance since 1992. The country has a comparatively stable political infrastructure, which is capable of attracting substantial foreign investment.

Ghana continues to endure macro-economic challenges. The 1999 terms of trade shock, precipitated by a collapse in the price of chief export commodities – gold and cocoa – and an escalation of petroleum prices following the government's decision to reduce fuel subsidies, led to a pronounced reversal in macro-economic performance. Ghana joined the Heavily Indebted Poor Country debt relief program in 2002.

Ghana was ranked 8th in the world in 2000 for gold production (Chamber of Mines of South Africa 2005). In 2002, mines in Ghana produced 2,241,125 ounces of gold, down 8 percent from production experienced in 2000. The Ghana Minerals Commission reports that revenues generated by gold mining in Ghana in 2002 (the last year of complete annual data) was \$646 million (US) with royalties of ₵142,587,137,200 (\$15,843,015 in 2004 US). Mining and quarrying accounted for 4.72 percent of the national Gross Domestic Product and contributed nearly \$620 million (US) to the balance of payments in 2002. Gold accounted for almost 93 percent of the total mineral royalties collected during 2002. Over 12,900 people were employed by gold mining in Ghana in 2002, and corporate taxes from large scale mining equaled ₵8,227,057,875 (\$914,118 in 2004 US) (Ghana Minerals Commission 2005).

The Investment Agreement between NGGL and the government of Ghana defines and fixes, in specific terms the effective tax and royalty burden the Project will carry during construction and operation. In Ghana, mining companies pay royalty to the central government for extraction of minerals from territorial land. The royalty constitutes 3.0 percent of NGGL's gross sales paid quarterly to the Internal Revenue Service as stipulated in the Investment Agreement. While the central government's consolidated fund captures a majority of the revenue, 10 percent of royalty payments are earmarked for the Asutifi District and local traditional authorities in the Study area.

The Ahafo South Project is expected to add an additional 6.8 million ounces of gold to Ghana's overall export. Compared to the number of total ounces exported in 2002, the addition of the Ahafo South Project would add approximately 500,000 ounces per year (an additional 22 percent above the 2002 volume). Long-term employment in the gold mining sector is expected to grow. Royalties generated by

the Project would also accumulate over the life of the Project. Assuming the price of gold remains near \$380 (US) per ounce and production meets expectations, the Ahafo South Project could generate over \$77.5 million or ₵697.6 billion in royalties to the government of Ghana over the anticipated life-of-mine.

Besides strengthening Ghana's position in the international and national gold arena, Newmont's Ahafo South Project will strengthen revenues of the Brong-Ahafo Region and the Asutifi District governments as well as increasing the income of local residents. Approximately 97 percent of households were engaged in farming as their primary livelihood activity prior to Project construction activities. Only 6 percent were salaried employees. As of May 2005, 458 Ghanaians have been employed in the construction effort and up to 750 local residents could find long-term employment with either NGGL or a contractor when the mine is operational in 2006.

Salaries for NGGL and contract workers will directly enhance the income levels of Project affected people. NGGL has committed to reserving 100 percent of unskilled jobs (both NGGL and contractor) for local residents. Average per capita annual income for unskilled workers at the Project is estimated to be ₵24,360,000 (\$2,700 US) per year. Senior Ghanaian staff will earn up to ₵100,200,000 (\$11,133 US) annually. In addition, about 5.4 people will be supported by each local worker from the Study area, given the existing population per household of 6.4 (dependency factor). This will be new money invested in the community to use on household and personal needs, thus spreading the reach of the salaries to increases in indirect employment and alleviating poverty.

In February 2004, NGGL opened a National Technical Vocational Training Center in Yamfo to provide education and training for employment at the Project or other employment opportunities in the area. By August 2005, 696 local people had completed work orientation training and entered the semi-skilled labor pool, and 314 people completed semi-skilled training in Metals, Administration, and Masonry subjects. Additionally, NGGL has entered into a Memorandum of Understanding with the National Vocational Training Institute to provide training support and infrastructure improvements to the existing facility. NGGL is committed to adhering to the philosophy of sustainable mining: Projects which meet the needs of this generation while ensuring the ability of future generations to meet their needs (White 2003).

As of August 2005, NGGL has compensated residents of the Project a total of \$920,694 (US) (₵8,286,246,000) for loss of their homes, and \$12,878,990 (US) (₵115,910,910,000) as compensation for those that farm in the Project area. A participatory consultation program was developed for this resettlement and compensation to ensure that there was broad community support for NGGL's actions and attitudes towards local residents. Resettlement villages are being built to a high standard with many amenities not available previously.

NGGL launched a sustainable community development program known as the Livelihood Enhancement and Empowerment Program (LEEP) (OICI 2005), a high impact, results oriented, sustainable integrated community development plan that is anticipated to last 18 months. Phase I of the program, launched in February 2005, focuses on economic growth, wealth creation, quality of life, and empowerment for over 823 Project affected households that have been relocated/resettled from the Project area and the 878 Project affected farming households that no longer have access to farming in the mining area. To ensure sustainability and community ownership of the LEEP program, NGGL will create an advisory committee to include both private (NGGL and other private businesses in the area); public (District Assemblies and Government Ministries); OICI and other non-governmental organization partners; donors; and community representatives (traditional authorities, women, men, youth groups) to obtain expertise and input to finalize Phase 2 of the LEEP. In addition, the advisory committee would secure participation in

the process through mobilization of human, material, and financial resources and technical expertise for implementation, monitoring and evaluation of the program.

Phase 2 of the LEEP will be initiated following the start of gold production (projected to be July 2006). Project affected people will have an opportunity to participate in the Phase 2 programs. In addition to the 5-year LEEP program, NGGL will work with local communities and regional development planning boards in a participatory fashion to assess additional opportunities to support sustainable community development that will continue throughout the life of the mine.

NGGL has also committed to development/improvement of a LEEP training facility in the community of Gyedu, which will be managed by ICCES. The facility will provide capacity building to Project affected people focusing on youth. OICI and the training center entered into a Memorandum of Understanding during May 2005 to assist with infrastructure improvements and provide management support. The training facility will initially focus on vocational training to 600 youths from the Project affected area.

As identified above, the LEEP program includes a Monitoring and Evaluation plan designed to provide data on project inputs, outputs, and outcomes during pre-project implementation of the LEEP, at the beginning of each major task, at the conclusion of each task, and during period site visits. Project inputs include infrastructure, equipment, and livestock; output is training; and outcomes include changes in agricultural productivity, income, and health and nutrition (OICI 2005).

Kenyase 2 and Ntotorso are “host” communities to resettled residents. NGGL expects to build new houses in these villages. In addition to the new housing stock in the resettlement villages, NGGL assisted local communities in the Study area during the exploration phase by:

- Establishing new water sources (boreholes);
- Renovating existing water sources;
- Supporting the Kenyase town water system; and
- Constructing a water storage facility on the Subri stream, this will remain as a permanent source of water for domestic and irrigation use after mine closure.

NGGL specialists are training individuals on five Community Water and Sanitation committees on effective management of community water and sanitation infrastructure and building management capabilities. Committee members are instructed to inform local resident’s of the importance of drinking only potable water, using proper sanitation practices, and instilling a sense of personal responsibility for maintaining water and sanitation facilities, which could benefit all residents of the Study area.

NGGL is committed to maintaining a safe and healthy work environment for employees at all its places of business in Ghana, and has developed malaria and HIV/AIDS policies which apply to all employees. NGGL has developed a malaria prevention program to reduce exposure of individuals to malaria. NGGL is committed to reducing and controlling mosquito presence in and around the Study area, potentially benefiting residents and workers alike. NGGL has developed a pro-active HIV/AIDS policy and has hired an HIV/AIDS Coordinator for voluntary prevalence testing and counseling. Employees infected with the virus will receive counseling and anti-retroviral treatment. In addition, NGGL will identify and train peer counselors and community educators to provide field services and hopefully educate and ultimately benefiting people in the Study area.

Electrical service is not currently available in most of the Study area; Over 90 percent of households use kerosene or paraffin for lighting. Electrification and telecommunications within the Study area will be improved due to the increased demand created by the Project. Electricity for the Project will be provided by the Volta River Authority (VRA) from 161kV substations at Kumasi and Sunyani. Development of the Project would provide VRA with a sufficient customer base to enable financing for completion of the previously planned project. Completion of the ring circuit would improve power availability to a large portion of northwestern Ghana. Communication services are currently lacking or restricted in and around the Study area. Government post offices and commercial telephone/postal agencies are located in Kenyase 2, but are not reliable. Because of demand by Project personnel, mobile phone coverage became available in Kenyase 1 and Kenyase 2 in September 2004 (pA 2005). This network was installed to support Project communications. No estimate of the number of people to be served is currently available.

RESETTLEMENT AND RELOCATION

The Ahafo South Project involves construction of open mine pits, waste rock disposal sites, mill and ore processing plant, tailing storage facility, water storage facility, environmental control dams, bypass roads, and resettlement villages. These facilities, combined with a buffer safety zone of 500 meters around disturbance areas, would result in a Project area of 3,528 ha. At the present time, NGGL has completed surveys to determine the number of project affected people that would be physically and economically displaced on a major portion of the Project area. These surveys encompass approximately 2,992 ha; the surveyed area does not include the Amama Pit, waste rock dump, haul road, environmental control dam, and the waste rock dump expansion areas associated with the Subika Pit area (pA 2005).

NGGL has not started resettlement planning for the Amama Mine pit, associated waste rock disposal facility, environmental control dam, connecting haul road, and waste rock dump expansion associated with the Subika Pit. A separate RAP would be prepared in due course as this area is not covered in the Ahafo South RAP. Resettlement and compensation associated with this area would be negotiated on the basis of principles, policies, procedures, and rates previously applied in the Project area and as outlined in the Resettlement Action Plan (RAP) (pA 2005).

Based on surveys completed in 2005 (pA 2005), construction of the Project would result in physical and economic displacement of 823 households (5,185 people) living in the Project area. The Project would also result in economic displacement of an additional 878 households (4,390 people) that possess farmland within the area. The total number of households impacted by the Project is 1,701 (up to 9,575 Project affected people).

NGGL has developed resettlement planning to be a collaborative process. Resettlement principles, policies, procedures, and rates have been determined through multi-stakeholder involvement in a Resettlement Negotiation Committee (RNC). This committee includes representatives of Project-affected people, households, traditional authorities, district and regional government representatives, non-governmental organizations, and NGGL.

NGGL's resettlement and relocation program is being conducted in accordance with World Bank Operational Directive (OD) 4.30 and Equator Principles which have been adopted by 14 countries. NGGL is demonstrating its commitment to maintaining its social responsibility policy by adhering to both Ghanaian laws and international best practices defined in World Bank's OD 4.30.

NGGL has collected baseline data on land use, ownership, and census from a variety of sources including the national census (2000), Ghana Poverty Reduction Strategy Paper (2003), Brong-Ahafo Region Handbook (n.d.), Asutifi District Medium Term Development Plan (2003-04), and two socio-economic surveys undertaken by SGS Environment for Normandy Mining Ltd. in 1999 and 2000. NGGL has also undertaken a census and socio-economic survey of the Study area, prepared by its non-governmental organization partner, Opportunities Industrialization Centers International (OICI 2004b) and a land use and structure inventory prepared by pA as the basis of the Resettlement Action Plan (pA 2005).

Survey data includes district demography, social services, health care facilities, community centers, district economy, infrastructure (water supply, sanitation systems, solid waste management systems, household fuel systems, transportation networks, telecommunication networks), household organization, and district land data (land uses, rights, land cover). These data are used to design resettlement and relocation activities as well as a community development plan.

As of August 2005, NGGL has compensated Project affected people a total of \$920,694 (US) (¢8,286,246,000) for loss of their homes, and \$12,878,990 (US) (¢115,910,910,000) as compensation for those that farm in the Project area. A participatory consultation program was developed for this resettlement and compensation to ensure there was broad community support for NGGL's actions and attitudes towards local residents. Two resettlement villages are being built to a high standard with many amenities not available previously (pA 2005).

NGGL has minimized the scale of physical and economic displacement created by the Project through implementation of the following (pA 2005):

- Minimizing size of Project components and distance between them;
- Minimizing buffer areas; and
- Restricting Project area to sparsely populated areas.

FOREST RESERVES AND BIODIVERSITY

Areas of productive Forest Reserves have been designated in the vicinity of the Ahafo South Project area. These areas include the Bosumkese Forest Reserve and the Amama Shelterbelt Forest Reserve. The Ghanaian Forest Reserve concept was established in 1927 when the state approved the Forest Ordinance forming the Forest Service Division, which received powers to reserve forest areas for specific management. Existing legislation has resulted in creation of 282 Forest Reserve areas in Ghana. The majority of Forest Reserves are divided into Conversion, Production and Protection Areas which are defined below.

1. **Conversion Forest Reserve Areas:** Those areas which have undergone previous degradation and have been targeted for replanting.
2. **Production Forest Reserve Areas:** Those areas from which timber extraction is permissible following strict logging and other controls.
3. **Protection Forest Reserve Areas:** Those areas which represent contiguous blocks of forest set aside under the following designations.

- ***Special Biological Protected Areas*** – A contiguous portion of the Forest Reserve set aside for the protection of biodiversity. These are usually areas with a high concentration of rare plants or of an unusual forest type.
- ***Provenance Protection Areas*** – These areas are set aside for the protection of specific species provenance (economic gene banks) or as a provenance of a threatened ecological zone.
- ***Institutional Research Plot*** – These area areas of the forest in which research is on-going. There are seven areas under the Forestry Research Institute of Ghana. Each Forest Reserve also has a maximum of one hectare set aside as a Permanent Sample Plot.
- ***Hill Sanctuary*** – All contiguous forested areas with a slope greater than 15 percent are protected as a Hill Sanctuaries, in order to reduce soil erosion etc. The threshold of a 15 percent slope is often extended to cover all watersheds or areas where a number of rivers are sourced.
- ***Community Sacred Groves*** – Community worship or taboo sites.

The Ahafo South Project is not expected to directly impact the Bosumkese or Amama Shelterbelt Forest reserves; however, NGGL recognizes that future actions, indirect impacts, or induced impacts may result from mine development, but will not permit significant conversion or degradation of any critical natural habitat. Development of Ahafo South will be in accordance with IFC Natural Habitats Policy OP 4.04.

The Bosumkese and Amama Shelterbelt forest reserves contain remnants of the Eastern Guinean Forest that at one time covered extensive areas of central Ghana including the Project area. Typically, forest communities are characterized by a three-story canopy structure with emergent tall trees often exceeding 50 m in height, with the uppermost canopy having a mixture of evergreen and deciduous species.

The western side of the Bosumkese Forest Reserve is extensively degraded, but a reforestation program is underway to restore some of the degraded forest (SGS 2005). Local farmers are growing crops in degraded parts of the forest reserve and fast-growing trees have been planted.

Potential impacts on the Forest Reserves include the induced creation of access into the reserves via new roads, powerline access routes, and general proximity of the mine to reserve areas. NGGL proposes to use an existing Biodiversity Management Program to address management needs of Forest Reserves near the Ahafo South Project. NGGL is committed to assess biological diversity to determine if critical natural habitats exist in the Forest Reserve areas prior to any disturbance in such areas. The following illustrates the key aspects to be considered by NGGL.

- Conduct biodiversity assessment of proposed disturbance areas using local/international experts;
- Areas determined to be critical natural habitat will be evaluated relative to the IFC Safeguard Policy on Natural Habitats (OP 4.04) to avoid significant conversion or degradation of any natural or critical habitat; and
- Offset or mitigation will be used by NGGL to minimize adverse affects on the areas biodiversity.

BIODIVERSITY MANAGEMENT PROGRAM

Biodiversity is a measure of the variety of life, and its processes; including the variety of living organisms, genetic differences among them, and the communities and ecosystems in which they occur (Langner and Flather 1994). Biodiversity is often interpreted as a measure of biological complexity and variation within the Project area. Although there is little specific regulatory guidance on methods for assessing and monitoring biodiversity, the concept is widely interpreted as a measure of ecosystem integrity and stability. Following the Convention on Biological Diversity at the 1992 UNEP Earth Summit, international projects funded by the World Bank and many other ending institutions undergo biodiversity assessments and monitoring.

NGGL recognizes that the activities of exploring and developing mineral resources may have an impact on biodiversity. Likewise companies engaged in exploration and mineral resource development can be a positive force for biodiversity conservation. Through sound environmental management, many, if not all, of the risks or impacts to biodiversity from mineral resource development can be avoided or mitigated. Further, there are good business reasons for mining companies, including NGGL, to contribute to efforts to ensure the healthy functioning of ecosystems in and around their areas of operation. To this end NGGL is committed to seek to work in effective business-NGO-government partnerships focused on biodiversity conservation in and around the Project area.

The biodiversity management program will be incorporated into the Project environmental management program to promote biodiversity conservation related to the following activities. Of obvious importance is the proximity of Forest Reserve areas to Ahafo South mine development and future foreseeable actions which may encroach upon established Forest Reserve areas.

Biodiversity Partnership

NGGL will incorporate biodiversity management into its operational and business planning activities. NGGL currently conducts biannual flora and fauna surveys as a continuation of baseline surveys conducted during development of the ESIA. To better develop the foundations upon which policies and procedures related to biodiversity management will be developed, NGGL has entered into a global partnership with Conservation International Foundation, a not-for-profit public benefit corporation considered a leader in conservation of biodiversity worldwide. As part of this global partnership, NGGL and Conservation International – Ghana (CIG) will collaborate to ensure biodiversity considerations and opportunities and NGGL's Ghana operations are evaluated and managed such the CIG and NGGL can together make measurable contributions to conservation of Ghana's natural biodiversity. During the construction phase of Project development, CIG and NGGL will be conducting planning and biological assessment programs integral to developing an anticipated 3-year project work plan that will include Rapid Biological Assessments and development of guidelines for implementing biodiversity management.

General areas of focus for the partnership are described in Chapter 5 of the ESIA and include integration of biodiversity conservation, track performance of conservation measures, distribute biodiversity information and data, review opportunities to support regional conservation projects, promote conservation in mining community, and other stakeholders.

Biodiversity Partnership Work Plan

NGGL and CIG have identified a work plan which will be implemented at the Project area during 2005. Primary components of the Plan include:

- Integration of Biodiversity Conservation with NGGL Environmental Standards and the Development of Meaningful Biodiversity Indicators;
- Integration of NGGL's Environmental Management Strategies Relative to Landscape-Scale Conservation Planning and Priority Setting;
- Identification of Opportunities for NGGL to Make Targeted, Outcome Driven Conservation Investments in Ghana; and
- Promotion of Biodiversity Conservation Concepts within the Mining Sector.

PROJECT HISTORY

The current gold resource in the Ahafo Project area was identified through exploration by various interests that were consolidated by NGGL following a merger with Normandy Mining Limited and purchase of Moydow Mines International, Inc. interests in Rank Mining in 2002. As a result, NGGL holds mining licenses LVB 7523/2001 Area A, LVB 7523/2001 Area B, and LVB 7524/2001; prospecting license PL 151 and prospecting license applications Dekyem, Goa, and Bonsu, which cover approximately 270 km² needed for development of the Ahafo Project. The Ahafo Project includes the area covered by these leases, which grants NGGL the right to mine and extract gold over a period of 30 years. Lease areas are shown on **Figure S-2**. The government of Ghana has granted mining leases to NGGL and Rank (Ahafo and Rank Mining Leases, respectively).

In April 1999, Centenary Gold Mining Company Ltd (a subsidiary of Normandy) submitted a Scoping Study and Draft Terms of Reference for the Sefwi Belt Gold Project (Yamfo – Sefwi) to the Ghana EPA. The Scoping Study and Draft Terms of Reference for the Environmental Impact Assessment were accepted by the EPA with comment on additional information that would be required before authorization for preparation of an Environmental Impact Assessment (EIA) was granted. The Draft EIS was submitted in March 2000 (SGS 2000a) to the Ghanaian EPA. The review process, which included two public hearings, one each in the “north” and “south” of the Ahafo Project area, gave rise to a number of comments and concerns. The Final EIS addressed those concerns and Environmental Permit No. 0043 was issued by the Ghanaian EPA for the Sefwi Belt Gold Project in October 2000.

In November 2000, following environmental baseline studies of the Project area, Rank submitted a Scoping Study and Draft Terms of Reference for the EIA of the Ntotoroso Gold Project. The report was reviewed by the Ghanaian EPA and permission for preparation of a draft EIA was granted. Rank presented a draft EIA to EPA in December 2000 (SGS 2000b). Environmental Permit No. 0041 was issued by EPA for the Ntotoroso Gold Project in February 2001.

Reviews conducted by the Ghanaian EPA for both projects (Ntotoroso Gold Project and Sefwi Belt Gold Project) included analysis of environmental baseline conditions; alternatives and options for siting facilities; displacement and resettlement of individuals in the project areas; and closure and reclamation of areas disturbed by proposed mining.

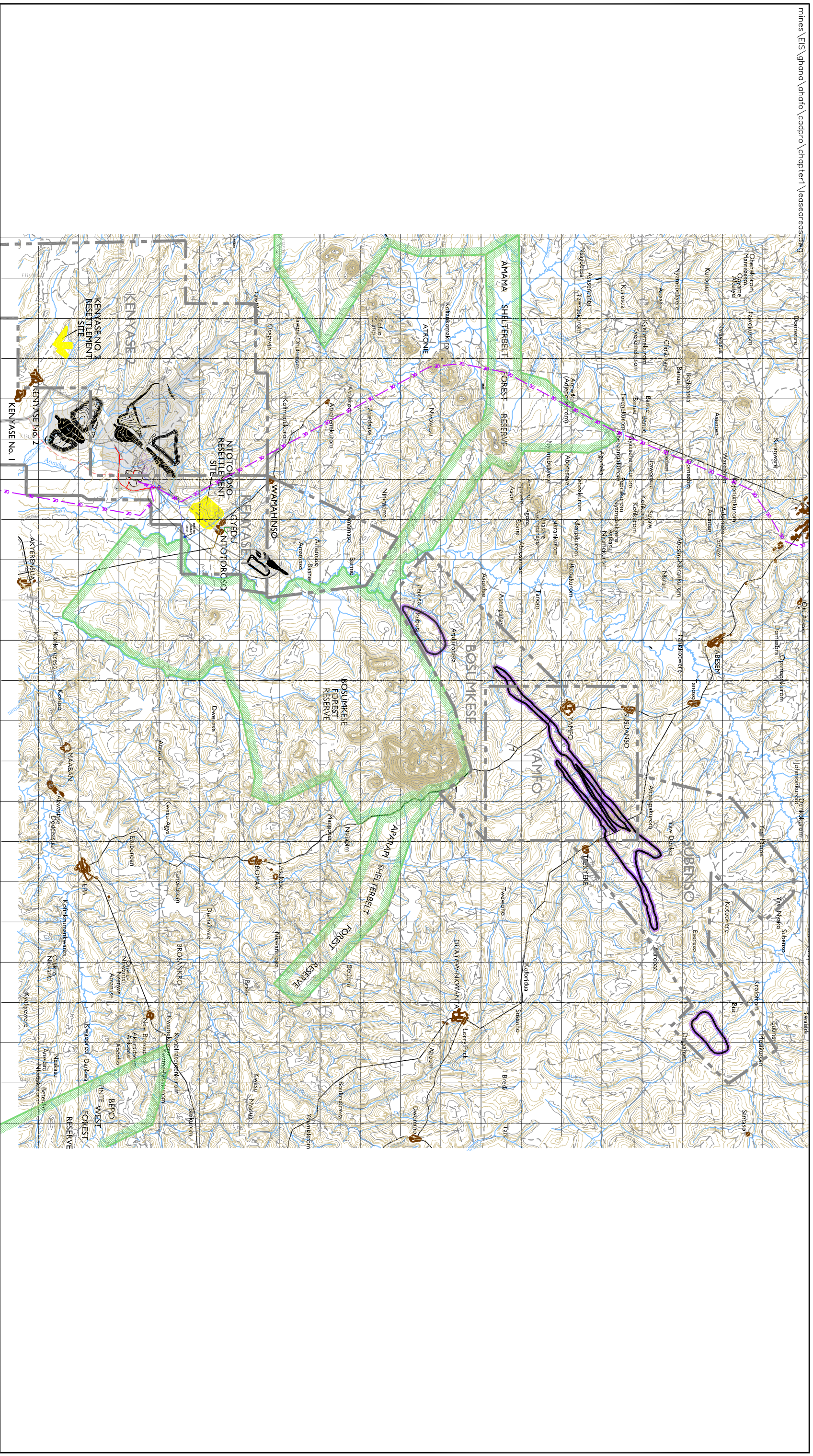
Through merger and acquisition, NGGL has obtained rights to develop the Ntotoroso and Sefwi Belt Projects. NGGL evaluated these mining leases acquired from previous owners and determined that development of the Ahafo Project would be modified from previously approved plans. As a consequence, NGGL has separated the Ahafo Project into two components; Ahafo South Project and Ahafo North Project. The Ahafo South Project is the subject of this Environmental and Social Impact Assessment (ESIA). The Ahafo North Project is considered to be reasonably foreseeable future development within the Ahafo Project area.

In March 2004, Ghanaian EPA (2004) informed NGGL that changes arising from integration of the two projects and revised Project design as a result of NGGL's studies would require submittal of an updated Environmental Impact Statement that addressed the changes. The primary changes NGGL made to the existing mine and reclamation plans was to combine two mine concessions into one operable mine unit. The modification also addressed additional resource information collected since transfer of ownership to NGGL and NGGL's interest in seeking increased efficiency in overall project development and enhanced environmental design safeguards. An EIS addressing these changes was prepared and submitted to the Ghanaian EPA in September 2004. The Ghana EPA issued Environmental Permit No. EPA/EIA/143 for the Ahafo South Project in April 2005.

The Ahafo North Area development schedule is currently uncertain; however, exploration activities will be ongoing to better define potential project conditions and schedules. NGGL recognizes the importance of informing local communities regarding project exploration and impacts resulting from temporary land access and short-term compensation requirements related to exploration activities. NGGL will disclose a Guide to Land Access and Compensation (GLAC) document to better inform local and regional stakeholders regarding the process for land access and compensation that will be employed by NGGL for future exploration and development activities.

PUBLIC PARTICIPATION

NGGL has undertaken a comprehensive suite of consultation, disclosure activities, and stakeholder engagement exercises since acquiring the Ahafo concessions in 2002. All Project stakeholders – individuals, groups, and organizations with an interest in the Project or that may be affected by the Project– have been actively engaged in the consultation process. Workshops, briefings, and educational programs on the Project have been provided to local community groups; international, national, and local government agencies; and environmental, human rights, non-governmental, and media organizations. In addition, specific engagements have involved local stakeholders during the



Lease Areas
 Ahafo South Project
 Brong Ahafo Region, Ghana
 FIGURE S-2

crop and resettlement negotiations process and public hearings to discuss issues related to the environmental impact assessment. Specific duties have also been empowered to the local communities including development of a job quota system to provide equitable distribution of employment opportunities, verification of an individual's local status, determination of a family's eligibility for resettlement or relocation compensation, and conflict investigation and resolution with regard to the resettlement and compensation program. A detailed description of the public participation process is contained in the Resettlement Action Plan (pA 2005) and in the Public Consultation and Disclosure Plan.

PUBLIC SCOPING – TERMS OF REFERENCE

Primary issues associated with the Ahafo South Project have been identified through the public involvement process which provided interested and affected parties opportunity to identify issues and concerns and receive Project related information. The Scoping Report and Terms of Reference (SGS 2004a) identified the following issues during the scoping process:

- Land tenure and crop compensation;
- Employment opportunities;
- Process and communication;
- Expectations and benefits;
- Social responsibility;
- Development and need for infrastructure;
- Social disruption;
- Environmental impacts;
- Assessment of Alternatives; and
- Legal and policy.

AHAFO SOUTH PROJECT DESCRIPTION

The following is a summarization of the Ahafo South Project. A detailed description of the Project is included in Chapter 2 – *Project Description* in the ESIA.

The Ahafo South Project is located approximately 300 km northwest of the capital city, Accra, 107 km northwest of Kumasi, and 40 km south of the regional capital of Sunyani. NGGL's life-of-mine plan for the Ahafo South Project involves development of four mine pits to produce and process approximately 7.5 Mt of ore annually over a 15-year period. Current resources are estimated at 105 Mt of ore producing 6.8 million ounces of gold (approximately 500,000 ounces annually). Initial development (Project area) involves approximately 2,528 hectares (ha) for construction, operation, and buffer areas for the following facilities and mine components:

- Four open-cut mine pits (Amama, Subika, Awonsu, and Apensu; formerly named the Bosumkese, Area E, Kenyase East, and Kenyase Central pits respectively);
- Waste rock disposal facilities;
- Mill and processing plant;
- Water storage facility (dam and reservoir) to provide water for processing plant;
- Tailing storage facility (dam and impoundment);

- Environmental control dams and other storm water and sediment control structures; and
- Ancillary facilities (resettlement sites, bypass roads, accommodation camps, and mine services).

Open pits (Amama, Subika, Awonsu, and Apensu) will be developed and supply ore during the initial phase, after which additional deposits to the northeast are planned for development during subsequent phases. Surface disturbance associated with mine components is shown on **Figure S-2**.

SITE PREPARATION

Site preparation includes removal of merchantable timber, clearing, grubbing, construction of access roads, and salvaging growth media for future use in reclamation. A Construction Camp to house workers is among the initial projects currently under construction. A bypass road is also under construction around the Kenyase 1 and 2 Townships to accommodate deliveries of equipment and supplies to the mine site without traveling through Kenyase village.

MINE PITS

The Ahafo South Project involves removal of ore and waste rock from four open pit mines identified as Amama, Subika, Awonsu, and Apensu (these pits were formerly named the Bosumkese, Area E, Kenyase East, and Kenyase Central pits respectively). Ore and waste rock will be drilled and blasted in sequential benches to facilitate loading and hauling. Blasted ore and waste rock will be loaded into off-road, end-dump haul trucks using shovels and front-end loaders. Within each mine, benches will be established at approximately 6-m vertical intervals with bench widths varying to include safety berms and haul roads. Haul trucks will move within the pit(s) using roads on the surface of benches with ramps extending between two or more benches. A 500-m buffer zone will be established around the perimeter of mine pits as a safety barrier for fly rock produced during blasting.

The Amama pit will be mined to a depth of 144 m and disturb approximately 44 ha; Awonsu pit is designed to be excavated to an overall depth of 140 m and disturb approximately 52 ha; Apensu will be mined to a depth of 285 m with surface disturbance of 75 ha; and Subika pit will be mined to a depth of 270 m disturbing 88 ha. Groundwater inflow into each pit will be routed to a collection sump and pumped to the tailing storage facility or water storage facility for eventual use as makeup water in the process plant and mill.

WASTE ROCK DISPOSAL FACILITIES

Development of the Ahafo South Project will require construction of five waste rock disposal facilities within 60 to 100 m of each mine pit. Subika mine will have two waste rock disposal facilities located to the east and west of the pit. Waste rock disposal facilities have been engineered for stability and designed, where practicable, with boundaries to blend with surrounding topography. Overall height of waste rock disposal facilities will range up to 100 m above existing ground levels. Slopes of waste rock disposal facilities will be graded to 3.0H:1.0V.

Waste rock will be placed by end-dumping down an advancing face in successive horizontal lifts. Ditches will be constructed around the base, sides, and upslope position to divert surface water runoff away from the area. Waste rock disposal facilities will be constructed on a base of compacted, low permeability materials designed to prevent vertical migration of fluids and sloped to allow drainage to an environmental control dam.

Based on current data, potentially acid generating (PAG) waste rock would not be encountered at the Ahafo South Project. However, if kinetic testing of waste rock to confirm static tests indicates a potential for acid generation, NGGL would implement the following procedures to manage PAG material:

- PAG waste rock will be encapsulated within the waste rock disposal facilities;
- Surface drainage upslope of the base perimeter of the waste rock disposal facility would be diverted with ditches to prevent run-on to the disposal facility; and
- A low permeability cap would be constructed on the final lift of PAG material.

Waste rock geochemistry, description of PAG material, and potential for generation of acid mine drainage is discussed in Chapter 4 – *Geology and Minerals*.

TAILING STORAGE FACILITY

The tailing storage facility will be constructed in the Subri stream drainage as cross-valley storage between two embankments (north and south) as shown on **Figure S-2**. The northern upstream embankment will also serve as the downstream dam for the water storage facility. The tailing storage facility was designed by Knight Piésold Pty Limited (Knight Piésold 2003) and independently reviewed by Chlumsky Armbrust & Meyer (CAM)(2005). The facility will be 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, and IFC Operational Policy 4.37 Safety of Dams. The tailing storage facility will be operated as a "zero-discharge" facility, with all water returned for use in the ore processing circuit, and no water discharged to the environment.

Tailing will be pumped from the processing plant to the facility via an overland HDPE and steel pipeline. The pipeline will be contained within a bermed trench lined with 1.5 mm textured HDPE liner. The pipeline is designed so that the contents will drain either to the tailing storage facility or to a 7,000 m³ lined event pond near the plant site should an accidental release occur.

Tailing deposition will be by the sub-aerial technique whereby tailing is pumped from a perimeter pipeline along the east side of the tailing storage facility to encourage formation of beaches over which the slurry flows in a non-turbulent manner towards a supernatant pond at the southern end of the facility. Deposition of tailing is carried out on a cyclical basis with tailing deposited over an area until a predetermined thickness is established. Deposition then moves to an adjacent area to allow previously deposited layers to dry and consolidate. Over time, a tailing beach will develop that slopes away from the deposition zones towards the supernatant pond. Water will be pumped from the supernatant pond by use of a series of pump out decant towers.

Operation of the tailing storage facility will be in accordance with NGGL's 5-Star tailing storage facility Performance Standard. Operational monitoring, performance, and stability of the facility will include the following programs:

- Tonnes of solids pumped to tailing storage facility;
- Water volume (m³) to the tailing storage facility;

- Precipitation and evaporation at the tailing storage facility;
- Amount of return water from the tailing storage facility;
- Collection efficiency of the underdrain system based on sump pump monitoring; and
- Concentration of WAD cyanide in the supernatant pond.

WATER STORAGE FACILITY

The water storage facility dam is a cross-valley embankment, which forms the north embankment of the tailing storage facility, and creates the dam for the water reservoir on the northwest flank. The water storage facility will impound water from a 28-km² area of the Subri stream watershed. At full capacity the reservoir will extend about 5 km northwest to southeast, flood approximately 128 ha, and provide 6 million cubic meters (Mm³) of water for mine processing operations.

The water storage facility is scheduled for completion 17 months prior to commissioning the process plant. This will allow adequate time to accumulate a sufficient quantity of water to accommodate ore processing activities. However, withdrawal from the Tano River will be considered should drought conditions occur that preclude accumulation of an adequate water supply. Withdrawal of water will only occur during one wet season (April to November) and would remove approximately 2 to 18 percent of river flow, depending on base flow conditions. The water storage facility was designed by Knight Piésold Pty Limited (Knight Piésold 2003) and independently reviewed by Chlumsky Armbrust & Meyer (CAM)(2005). The water storage facility will be constructed and operated in accordance with relevant sections of the Ghana Minerals and Mining Law, 1986, Ghana Mining Environmental Guidelines, and IFC Operational Policy 4.37 Safety of Dams.

SURFACE WATER CONTROL DITCHES

Surface water control ditches will be constructed as necessary to intercept and divert potential run-on water from flowing into mine pits, tailing storage facility, or onto waste rock disposal facilities and ore stockpiles. These channels will divert uncontaminated run-on water back into natural drainage down gradient from disturbed areas or into environmental control dams.

ENVIRONMENTAL CONTROL DAMS

Five environmental control dams have been designed for the Ahafo South Project area. These dams will be located to collect sediment and runoff from construction and mining activities. Impounded water will be used in dust suppression and as makeup water in the ore processing circuits.

PROCESS PLANT

The process plant is nominally designed to process an average of 7.5 Mt annually consisting of a blend of both run-of mine (ROM) primary and oxide ore. The Ahafo South Project process plant would treat a blend of oxide and primary ores during the initial period of operation. Oxide reserves would be exhausted by about year three after which only primary ore would be processed.

Run-of-Mine (ROM) ore would be hauled by truck from the open-pit mines and placed on the ROM ore storage pad or directly into the ROM hopper. ROM and oxide ore would be blended in the mill feed to optimize process plant throughput. Dust suppression sprays and dry dust collection systems would be installed on the respective crushing circuits and all ore transfer points.

Ore would feed directly from the ROM hopper into a single stage primary crusher. Crushed material would be transported by conveyor to the semi-autogenous grinding (SAG) mill. The ground material would be transferred to a cone crusher for further size reduction and returned to the grinding circuit. From there crushed ore is moved through a closed circuit system of hydrocyclones where it is sized, and if necessary through a ball mill, where it is re-ground into finer material. Lime and water are added during the grinding process.

Ore slurry from the hydrocyclones would be transferred through leach feed thickener tanks into the Carbon in Leach (CIL) circuit. The CIL circuit consists of eleven interconnected tanks each with a capacity of approximately 3,250 m³. Thickened slurry would gravity flow through the series of tanks. Lime, to control pH of the slurry, would be introduced with the main thickened slurry inflow and by additions to the first few tanks. Cyanide to dissolve the gold would be manually added to the first few tanks in the circuit. Fresh, regenerated carbon that adsorbs dissolved gold would enter the circuit at the last CIL stage tank and be pumped counter-current to the slurry flow. A pump would be used to transfer slurry and gold-laden carbon from the CIL tanks to a loaded carbon recovery screen. The washed loaded carbon would gravitate to the stripping plant near the gold recovery room. Discharge from the last CIL stage would flow to the tailing tank and onto the tailing storage facility after final screening for remaining carbon.

Activated carbon impregnated with gold, would be periodically removed from the circuits and transferred to the stripping/refining facility, where gold is separated from the carbon. Barren process solution, the solution resulting after adsorption of gold onto carbon containing lime and cyanide, is recycled back into the process system.

The gold room recovery and refining facility consists of an acid wash carbon-stripping circuit, electrowinning circuits, and carbon regeneration kilns. Gold contained in the gold-bearing solution (electrolyte) resulting from acid wash stripping the activated carbon is transferred to electrowinning cells, where a direct current is passed through stainless steel anodes and stainless steel mesh cathodes cause the gold in solution to plate onto the cathodes. The cathodes are washed with high-pressure spray water and the gold slime recovered in a frame filter press. Gold sludge filter material is then dried in ovens and direct smelted with fluxes in a diesel-fired furnace to produce doré bars. Barren carbon would be transferred to a carbon regeneration kiln circuit for reuse.

Once initial operations are underway and water begins to accumulate in the tailing impoundment, process water would be principally obtained from tailing decant return and run-off from within the tailing facility. Makeup water required for milling process could also be provided from the fresh (raw) water storage pond or from a process water pond used to temporarily store process water.

Permanent cyanide destruction facilities have not been incorporated into the process plant design. Free and weak acid dissociable (WAD) cyanide levels are predicted to be less than 50 mg/l in the supernatant pond in the tailing storage facility following tailing deposition. Some regulatory agencies believe that a cyanide concentration of 50mg/l is appropriate for protecting wildlife and livestock. Photo-degradation of cyanide and tight process controls would likely ensure levels of cyanide in the supernatant tailing pond are maintained at this level. NGGL has developed a cyanide management and treatment program

to validate predicted concentration and demonstrate its social responsibility commitment to protect workers, community, and the environment.

Cyanide Management and Treatment Program

NGGL cyanide management practices are largely derived from the International Cyanide Management Code (ICMC) discussed in *Chapter 1*. All aspects of the ICMC will be implemented at the Ahafo South Project. Cyanide related facilities will be managed in such a manner as to protect workers, the community, and the environment including primary environmental receptors of air, water (surface water and groundwater), soil, and flora.

The process plant and tailing storage facility will be constructed and operated to minimize cyanide use to the extent possible, thereby limiting concentrations of cyanide in the mill tailing and process solution ponds. All facilities will be operated to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.

A concentration of 50 mg/l WAD cyanide or lower in solution is typically viewed as being protective of wildlife and livestock. This is a generalization and NGGL will undertake a risk assessment to ascertain site-specific cyanide mortality on wildlife and livestock. In some instances, WAD cyanide levels greater than 50 mg/l may still be protective of wildlife, however, this situation requires thorough investigation and review. NGGL will evaluate and manage additional risks due to metal-cyanide complexes (e.g., copper cyanide complex) to be protective of human health and the environment.

NGGL will regularly monitor WAD cyanide levels (and other specific metal-cyanide levels as required) in all solution ponds that contain cyanide. Additionally, NGGL will minimize access of wildlife and livestock to solution ponds with a WAD cyanide concentration equal to or less than that identified by the risk assessment. NGGL will implement further measures (i.e., fencing with round-the-clock surveillance, filling collection ditches with gravel, and covering or netting solution in ponds and impoundments, or treatment of tailing solutions) to restrict access by wildlife and livestock should short-term concentrations of WAD cyanide exceed levels determined by the risk assessment to be protective of workers, the community and the environment including primary environmental receptors of air, water (surface water and groundwater), soil, and flora. Should results of the risk assessment identify the need for installation of a cyanide detoxification circuit, NGGL would install such a facility as appropriate.

To ensure that any short term increase in cyanide levels in the supernatant pond (caused by a processing plant problem) can be lowered to less than the 50 mg/l target, facilities for destruction of cyanide using hydrogen peroxide in a mobile emergency cyanide destruction facility would be available.

ROADS

A new road will be constructed around the Kenyase Township to connect with the Kenyase – Ntotoroso Road. The main purpose of the road is to divert Project traffic from travel through Kenyase 1 and 2 to provide safe access for equipment and supplies to the Ahafo South Project area. Following construction the road will be finished with a two-coat, stone-chipped bitumen seal. All new roads will have continuous v-drains with level spreaders at approximately 200 m intervals to retain sediment and reduce stormwater flow velocities.

The Kenyase – Ntotoroso Road will be upgraded and eventually realigned around the Ahafo South Processing Plant. The realignment will divert the existing road to the east from a point about 1 km south

of the process plant and will rejoin the existing road about 1 km north of the process plant site. Depending on future needs an additional road may be established south of Area E from a point near the Senior Staff Village and extend to the processing plant.

Haul roads developed in the Project area will be 30-meters wide (running width) to safely accommodate haul truck traffic with a maximum grade of 10 percent. Haul roads will be maintained on a continuous basis to ensure safe, efficient haulage operations and to minimize fugitive dust emissions. Haul roads will be constructed using in-situ material; however, oxide or neutral mine waste rock may be used, as necessary, for construction or routine maintenance.

Mine roads would be private with restricted access enforced through mine security. Hazard potential would likely increase due to increased traffic delivering materials and equipment during the construction phase. Mine roads within the Project area include:

- Haul roads designed for use by 120-ton haul trucks
- Access roads designed for use by light vehicles

ANCILLARY FACILITIES

Ancillary facilities at the Ahafo South Project will include an equipment fueling and maintenance area, topsoil stockpiles, explosives magazine, mine services area, utilities, worker accommodation, and storm water control facilities. The mine services area will be located immediately south of the plant site and include the administration office, security post, first aid clinic, heavy equipment workshop, light vehicle workshop, tire shop, wash down bay, mine services water services, refueling station, and mine control facilities. Locations of ancillary facilities are shown on **Figure S-2**.

Expatriate and senior Ghanaian staff will be provided with housing. Junior staff will be provided a housing allowance with which to obtain rented accommodation in Kenyase or Ntotoroso. The first contractors on site will be camp construction and earthmoving contractors. These contractors will likely rent accommodation in local villages for their workforce. The owner's construction management team will be temporarily housed at the Rank camp until the construction camp becomes available.

EXPLOSIVES MAGAZINE

An explosives magazine will be located between the tailing storage facility and the Kenyase East waste rock disposal facility. The site will be fenced, bermed, lighted with 24 hour security and operated in accordance with Explosive Regulation 1970, L.I. 666.

MEDICAL UNIT

A clinic will be constructed as part of the construction senior staff camp and retained through the life-of-mine. The medical clinic will provide emergency first-aid and medical treatment for workers at the Project site. The medical unit will also distribute first-aid kits and supplies to the plant and workshops. An ambulance will also be acquired for use at the mine site.

GENERAL AND MINE ADMINISTRATION

A general administration building will be constructed adjacent to the process plant. The structure will be provided with potable water, electricity, and amenities connected to a package sewage treatment plant.

Offices for mine equipment maintenance contractors will be provided at the mine workshop. A laboratory will be constructed adjacent to the administration building.

ELECTRICAL POWER

Electricity for the Project will be provided by the Volta River Authority (VRA) from 161kV substations at Kumasi and Sunyani via an overhead power line connected ring circuit. Current existing electrical infrastructure is located to the north of the Project area along the route from Kumasi to the northwest to Techiman and southwest to Sunyani. The VRA has previously identified the need to complete an additional power line from Kumasi to Sunyani to provide improved power reliability to large population centers (i.e., Sunyani) and establish the grid suitability for northern expansion. VRA identified a planned route from Kumasi directly to Sunyani which would allow the completion of a ring circuit to improve reliability to the northern region and meet the needs of the grid infrastructure for future northern expansion. VRA's planned Kumasi-Sunyani route was identified in 1999 as part of the overall strategic electrical infrastructure plan for Ghana. Construction of the VRA power line is considered an "associated facility" to development of Ahafo South Project. Forest Reserve and compensation issues associated with alignment of the power line are in compliance with IFC policies. NGGL and IFC have received a commitment from VRA that the line is being planned in accordance with World Bank Group Policies. Discussions with the VRA and the Ghanaian Forestry Commission indicate there would be no significant degradation of critical natural habitat in areas of forest reserve through which the power line passes. VRA will also implement a consultation program and Resettlement Action Plan covering compensation to people affected by the power line.

Development of the Ahafo Project will provide VRA with sufficient near-term customer base to enable financing for completion of the previously planned ring circuit project. The length of the Kumasi to Sunyani power line will be approximately 150 km, with an estimated installed electrical load of 47 MW with a predicted peak continuous load of 35.98 MW. Consultants sponsored by NGGL will support VRA's efforts by providing engineering, procurement, logistical support, and help VRA arrange financing.

SECURITY

The security camp accommodation will be a 160-person barrack style building with basic recreational facilities. Four levels of security will be employed across the site.

FIRE SERVICES

Water for fire suppression will be obtained from the raw water pond at the plant site. A diesel driven pump will start automatically on loss of raw water pressure to provide a secure fire service to the plant area, mine service area, and accommodation villages.

EMPLOYMENT

Construction of the Project is scheduled to occur over a 29-month period and employ approximately 1,500 people, including 300 expatriates and 1,200 nationals. The anticipated workforce once mining operations begin will total about 620 permanent Ghanaian workers and approximately 40 expatriates. An additional 350 contractors will augment this workforce to provide security, laboratory, vehicle and equipment maintenance, catering, and transport services.

Recruitment

Recruitment of employees for the Ahafo South Project will focus on providing employment opportunities for local area residents. Except for positions requiring special qualifications and/or experience, employment of qualified applicants will be by the following order of priority:

- Current Project employees;
- Villages within 5 km of Project (e.g., Kenyase 1, Kenyase 2, Ntotoroso, Gyedu, and Wamahimso);
- Brong Ahafo Region; and
- Ghana.

NGGL anticipates in excess of 20,000 applicants for a limited number of positions; 17,000 applications have been received for the construction phase. The recruitment and selection process will commence 18 months prior to commissioning the process plant. NGGL policy dictates that unskilled labor will be recruited from within the area of mine development. Construction contractors will be required to source locally.

Training and Development

In response to the need of recruiting a skilled labor force NGGL has developed training programs that prepare local residents to compete for available skilled positions. The area has a farming based economy with limited regional industry and a shortage of skilled labor in available in the concession area. NGGL recognizes that importation of required skill levels will likely have a disruptive effect on local communities resulting in undesirable social and economic pressures.

Training and development programs will consist of the following key features:

- Maximizing local area employment opportunities will be a major objective.
- Selection process will require trainees to be local with a minimum 9 years schooling and will target 18 to 26 year olds;
- A centralized competency based training system that provides training needs assessment, training and development programs targeted at job requirements and formal certification and accreditation; and
- Appropriate training workshop and classroom facilities and required equipment and training aids.

NGGL anticipates this approach will have cost and efficiency implications, particularly at start-up, but is considered essential to achieve commitments to social responsibility. In the long-term, maximizing use of local labor resources will reduce administration costs and reduce allowances related to relocation, accommodation, and transport.

EXTERNAL AFFAIRS MANAGEMENT

NGGL, as a subsidiary of Newmont, will develop and operate the Ahafo South Project under the Newmont Corporate Social Responsibility Policy and Five Star Management System, which includes management systems and discipline specific standards on Community and External Relations (Newmont 2003).

Each year, the operation will be assessed against the above standards and the management systems standard by external social assessors. As such, the Project will operate in full compliance with all applicable Ghanaian regulations pertaining to its local stakeholders. Furthermore, in recognition of the evolving state of the regulatory structure in Ghana, and in recognition of ever-increasing requirements from shareholders and financial institutions, the facility will operate in accordance with generally accepted International Standards and Practices that relate to social issues. Consideration of these objectives will be included in planning and implementation of all aspects of the operation.

In accordance with Five Star Management System requirements, periodic auditing and reviews will be conducted by internal/external auditors to verify environmental conformance and confirm management responsibilities are in accordance with External Affairs procedures.

External Relations Management Structure

The General Manager will be responsible for compliance with Ghanaian and corporate social responsibility requirements, including general oversight of the operations commitments to external stakeholders. The Manager for External Affairs will report directly to the General Manager and be responsible for the development and overseeing the implementation of procedures and programs for community relations, local NGO relations, community development, communications and land access required for the Ahafo Project to ensure an integrated approach to these issues that result in long term sustainable positive outcomes. Reporting to the Manager for External Affairs will be the Community Relations Superintendent, the Community Development Superintendent, and Communications Officer.

ENVIRONMENTAL MANAGEMENT

NGGL will develop and operate the Project under the Newmont Corporate Environmental Policy and Five Star Management System as standard operating procedure. Key elements of the policy include:

- Recognition that sound environmental management is essential to successfully operate the facility;
- Accountability of all staff for minimizing environmental risk and assuring compliance with regulatory requirements as well as Newmont Corporate environmental objectives;
- Implementation of monitoring programs to provide early warning of any deficiency or unanticipated performance in environmental safeguards;
- Training and orientation of employees in order to perform their jobs in compliance with sound environmental practices;
- Consideration of environmental factors to be included in all new or modified facilities and in the purchase of equipment and material by NGGL;

- An environmental incident reporting system would be established and reports prepared in a timely fashion;
- Environmental response planning would be completed to provide the basis for response to environmental incidents, including spill prevention and counter measure plans, monitoring plans, and mitigation plans;
- Periodic reviews would be conducted to verify environmental performance and to continuously strive towards improvement; and
- Procedures would be implemented to assure ongoing dialogue with government entities in connection with regulatory changes, which may affect the operation.

Environmental Management Structure

The General Manager will be responsible for compliance with Ghanaian and corporate environmental requirements. Each Department manager will be accountable for maintaining their respective areas of responsibility to comply with applicable environmental standards. The Environmental Manager will support the operations management team and be responsible for directing and maintaining compliance with Ghanaian laws and Corporate Policy, implementing environmental monitoring programs, providing training support to Project staff with regards to environmental responsibility, and interfacing with governmental authorities concerning environmental issues.

ENVIRONMENTAL MANAGEMENT FOCUS AREAS

RESOURCE MONITORING

Air Quality

Fugitive dust emissions will be controlled through use of direct water application, chemical binders or wetting agents, and revegetation of disturbed areas concurrent with operations. All ore transfer points in the processing plant will have water sprayer units. Dust deposit gauges and volumetric sampling methods will provide specific information appropriate to assess health and safety issues. Baseline air quality and climatological data are being collected to allow comparison to future data collected in NGGL's air quality monitoring program.

Water Resources

The purpose of hydrologic monitoring is to establish baseline data and report changing conditions as mining operations continue and expand in the area. Water quality, water table elevations, and/or flow rates are measured monthly, quarterly, or semi-annually at designated monitoring wells, springs/seeps, and surface water stations.

WASTE MANAGEMENT

Several types of waste would be generated during construction and operation of the Ahafo South Project including: household waste, non-toxic industrial waste (tires, discarded metal parts and fittings, plastic packaging and containers), waste oil and filters, refinery slags and cupels (recycled into the milling

circuit), and solid and liquid laboratory waste (acidic and aqueous solutions, solvents, crucibles, cupels, and slag). Waste disposal will be conducted in accordance with Ghanaian requirements and NGGL's waste disposal protocols.

Hazardous Waste

There are currently no methods for disposal of hazardous waste in Ghana. The Ghanaian EPA is responsible for provision of guidelines for such wastes. A Draft Hazardous Waste Control bill is currently before the Cabinet for consideration. Bio-medical and other hazardous waste are currently managed through landfilling.

In response to a global mandate for environmentally sound management of hazardous waste, NGGL has embarked on a life cycle approach to address chemicals and other hazardous waste management in an integrated manner. This involves a broad range of stakeholder institutions and organizations including non-governmental organizations. NGGL is committed to working with the EPA to implement a comprehensive National Chemicals Management Profile. The profile was prepared by EPA with assistance from the United National Institute of Training and Research and the Inter-organization Programme for Sound Management of Chemicals.

NGGL has a waste minimization program to evaluate hazardous substances used on mine property. Where possible, alternative products that do not generate waste or generate inert solid waste rather than hazardous waste, would be used.

Sewage Disposal

Packaged sewage treatment plants will be located at the construction senior staff camp, construction junior staff camp, and senior staff village. A permanent facility will service the construction senior staff camp, security barracks, and the plant. A separate plant will be constructed at the senior staff village. Treated effluent will be discharged to local drainages. This effluent will be monitored daily to ensure compliance with relevant discharge standards.

Solid Waste

Solid, non-hazardous waste (e.g., tires, lumber, concrete, and paper) will be disposed in a landfill constructed within a waste rock disposal facility. The specific disposal site on the waste rock disposal facility will change to coincide with area of active waste rock disposal facility. Wet waste from food processing facilities and medical waste from the clinic will be incinerated in a purpose-built incinerator constructed to meet U.S. EPA standards.

HAZARDOUS MATERIALS MANAGEMENT

NGGL has completed major hazard assessments for its existing operations worldwide. The assessments have been completed in recognition of specific mining practices, process chemical requirements, and site specific operational control programs.

Cyanide Use

NGGL is a signatory to *The International Cyanide Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold* (International Cyanide Management Code - ICMC). The ICMC is an

industry voluntary program for gold mining companies and focuses on the safe management of cyanide and cyanidation mill tailing and leach solutions. The objective of the Code is to improve management of cyanide used in gold mining and assist in the protection of human health and reduction of environmental impacts. Refer to the *International Agreements, Policies, and Standards* section of Chapter I for more discussion of ICMC. Primary components of the cyanide management plan are as follows:

➤ **Sodium Cyanide Transport Contingency Plan;**

- **Prevention:** All contractors and carriers shall operate in accordance with U.S Code of Federal Regulations (CFR) 49 Rules, and the Loss Control Department of NGGL to establish an auditing system;
- **Response:** NGGL will provide an escort for each convoy transporting hazardous materials and in specific cases, where the substance is purchased FOB mine, provide an auditor during transport, until the material reaches the mine site. Each supplier will have its own Contingency Plan, developed in accordance with this plan and on contractual terms established by NGGL.; and
- **Coordination:** NGGL will establish a Security Communication Center to operate 24 hours per day, all year round, with an emergency dedicated line, to receive alarm calls and activate the plan.

Spill Prevention, Control and Response Plan

The Spill Prevention, Control and Response Plan (SPCR) was developed and implemented in recognition of hazards and risks associated with onsite activities related to cyanide handling, storage, other process reagents, fuels, and waste handling onsite. The Plan establishes critical risk areas, hazardous materials, and control measures.

Emphasis of the plan is to clearly establish characteristics of onsite hazardous materials in relation to site specific conditions. The Plan also specifically details the most common hazards, handling procedures, emergency response requirements, and training requirements. All NGGL personnel handling or working with hazardous reagent handling are regularly trained to manage incidents related to the transport of sodium cyanide. The Plan provides additional details regarding specific actions.

Emergency Response Plan

The Emergency Response Plan was developed and implemented as a comprehensive document for management of incidents that may occur at the Ahafo South Project site. The Plan establishes critical aspects of incident management including notification, incident management, organization, and responsibilities. The Plan has been developed to compliment the Sodium Cyanide Transport Contingency Plan and the Spill Prevention, Control and Response Plan.

Diesel Fuel

Approximately 2 million liters of diesel fuel will be stored on-site in aboveground two storage tanks. A lined secondary spill containment basin will be constructed around bulk storage tanks to contain 110 percent of the volume of the largest tank. Secondary containment will meet Newmont's minimum

permeability standard equivalent to untreated concrete. The Spill Prevention, Control and Response Plan address releases of petroleum products.

Reagents

Reagents used in the beneficiation process include sodium cyanide, lime, sodium or potassium hydroxide, and hydrochloric acid. These chemicals will be stored according to the compatibility principle in a secure and contained area located within the plant site.

ENVIRONMENTAL CONTROL MEASURES

Standard operational environmental control measures, mitigation measures, and monitoring programs have been developed and would be implemented by NGGL for the Ahafo South Project. The primary project areas where these measures and programs apply are as follows:

- Mining and Surface Disturbance Management;
- Sediment Control;
- Noise and Vibration;
- Air Quality;
- Flora and Fauna;
- Water Quality; and
- Chemical Management.

Detailed descriptions of the components of these measures and monitoring programs are included in Chapter 2 – *Project Description*.

RECLAMATION AND CLOSURE PLAN

A draft reclamation plan (Plan) has been prepared by MFG, Inc. (2005) for the Ahafo South Project. The Plan describes reclamation objectives and specific reclamation/closure activities for mine pits, waste rock disposal facilities, tailing storage facility, water storage facility, mill and process plant, environmental control dams and other stormwater management structures, and ancillary facilities. Final grading and contouring are described for the Project area.

Mine Pits

Reclamation objectives for open mine pits will be to assure public safety by restricting access to the pit area. Backfilling or partial backfilling of the open pits is not currently planned, but may be considered during later phases as warranted. It is assumed that after mining, pit walls will ravel to create a stable, final slope and as such, additional stabilization or regrading will not be necessary. Based upon current information, pit lakes may develop passively and partially fill some or all pits over time. However, surface drainage from the pits does not appear likely due to the relatively high annual evaporation rates (with respect to annual precipitation) at the site.

Available information suggests an absence of potentially acid generating (PAG) material within the planned mine pit boundaries, except for minor amounts of sulfide ore. It is assumed that any resulting pit lakes will not require water treatment; however, future studies will be required to confirm this assumption in those pits where lake development is likely. Public access to the pit areas will be restricted by constructing earthen berms, brush barriers, and installing warning signs around the

perimeters to deter accidental access. Disturbed areas outside the footprint of the open pits will be recontoured such that the final topography is generally consistent with the adjacent landforms and avoid ponding along the pit perimeters.

Waste Rock Disposal Facilities

Short-term reclamation objectives for the waste rock disposal facilities are to minimize potential for erosion, slope failures, and sediment transport from the waste rock surface and to facilitate final reclamation. Long-term objectives include preventing ponding, promoting controlled runoff surface water, and preventing erosion from the reclaimed surfaces.

Plant Site

Portable equipment of value including vehicles, furniture, and computers will be removed from site for subsequent reuse or salvage. Decommissioning the crushing and screening plant will be initiated once the last ore has been processed. The CIL plant will be decommissioned once all economic recoverable gold solution has been processed. Immovable assets that have been properly decommissioned, such as office and plant buildings, shall be transferred to the government of Ghana as described in terms of the mining lease. Contaminated soil from the spillage of oils and lubricants shall also be removed and placed in an approved disposal facility. Stripped areas in the vicinity of mill and process plant will be scarified, covered with topsoil, graded to match contours of surrounding topography, and seeded.

Tailing Storage Facility

Reclamation of the tailing storage facility will commence upon termination of tailings deposition. Reclamation objectives for the tailing storage facility include controlling erosion, managing stormwater runoff, minimizing dust generation, and establishing vegetation on the facility. Testing completed by NGGL indicate the tailing would not be acid generating. Given currently available information, establishing a vegetated soil cover appears to be the most appropriate long-term reclamation strategy for the tailing storage facility.

Reclamation of the tailing surface will commence upon termination of tailings deposition in the tailing storage facility. After removal of the pond in the low area adjacent to the final spillway, the tailing surface will be allowed to dry to the point where cover placement is possible without excessive deformation of the tailing surface. The tailing storage facility under-drainage system is expected to continue to operate for a number of years after completion of capping and revegetation as excess pore water continues to drain from the tailings.

Water Storage Facility

The water storage facility will be created by impounding water against the upstream side of the north embankment of the tailing storage facility. The water storage facility will remain operational after mine closure and reclamation of the site, in perpetuity. Extreme storm events will be managed by the overflow spillway located near the southeastern portion of the reservoir. Water passing through the spillway will be routed via a series of diversions to the Awonsu tributary of the Tano River.

Environmental Control Dams

Upon completion of closure and reclamation activities, accumulated sediments will be removed from the areas upstream of the environmental control dams. Where possible, sediment and topsoil collected

from the base of the environmental control dams will be transported to the nearest topsoil stockpile or redistributed in areas that require additional reclamation growth media. The environmental control dams will then be breached to restore free flowing conditions.

Ancillary Facilities

Ancillary features will be sorted into salvageable versus non-salvageable items. Any non-salvageable and non-saleable materials will be disposed of and buried in waste rock disposal facilities. All building structures will be demolished except those being transferred to the Government of Ghana. Electric power line support structures will be left for public use. High voltage power lines from maintained by the Government of Ghana will remain functional to the main substation. Final grading and revegetation of the site will involve establishing soil stability, minimizing erosion and establishing a sustainable post-closure land use scenario.

Monitoring

Procedures for short-term and long-term monitoring of the mine site after closure will be established to ensure that mining activities do not affect surrounding areas and is a continuation of the operational monitoring program. The items scheduled to be monitored should not be considered as an all-inclusive monitoring list, and will be updated as mining and reclamation activities progress. An environmental report will be submitted periodically to the Ghanaian EPA.

OCCUPATIONAL HEALTH AND SAFETY

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

TRAINING

The Loss Control training program is provided to all new employees and contractors working on NGGL projects. The program involves training relative to worker responsibilities, unsafe working conditions, personal protective equipment (PPE), company policies, housekeeping, and basic safety rules.

Operators at the Project site will be trained in all aspects of their work stations, hazard recognition, chemical handling procedures, first aid, personal hygiene, electrical safety, rigging and lifting, vehicle safety, pond safety, fire safety, safety practices for working around machinery with moving parts, and other topics that may relate specifically to a job assignment or physical location at the Project.

MATERIAL HANDLING

NGGL has developed a material handling program specific to chemicals and other materials located on NGGL properties. These specifications and handling procedures include information regarding the transportation, storage, handling, and mixing of cyanide, caustic soda, and sodium hypochlorite. The material handling program also addresses explosives – handling, storage, and use.

WORK STATION MONITORING

NGGL has developed a workstation monitoring program intended to evaluate, document and monitor potential physical and chemical stresses in the workplace. Monitoring programs have been developed for employees with respect to applicable environmental parameters. NGGL maintains a professional on-site staff, in addition to consultants and other technical professionals, to ensure all monitoring programs, data collection techniques and data interpretation are properly implemented.

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment is mandatory under NGGL policy for all activities based upon job risk assessment in accordance with international best practices. At a minimum, all employees will be required to wear hard-hats and steel toed boots in designated work areas. Rubber gloves, rubber arm protectors, rain suit coveralls, face shields, splash goggles, safety belts and lanyards, dust respirators, hearing protectors, welding hoods and goggles, and high voltage insulated gloves will be available and required where appropriate. Safety showers will be provided at locations within the processing plant, work shop, warehouse, and laboratory.

EMERGENCY RESPONSE AND CONTINGENCY PLANNING

NGGL has developed contingency plans and emergency response plans for activities that could potentially impact health and safety or the environment. Emergency response and contingency plans will be implemented on a site-specific, as-needed basis, depending upon specific working conditions.

QUALITY PROCEDURE DOCUMENTATION

NGGL has generated safety procedures, standard operating procedures, and quality procedures to cover all aspects of construction and operational phases of the Project, including documents on transportation, handling chemicals, operating machinery, and emergency response procedures.

ALTERNATIVES

The Ahafo South Project is currently under construction in accordance with permits previously issued by the Ghanaian EPA for the Ntotroso, Sefwi, and Ahafo Project (South). As such, alternatives for location of mine facilities (waste rock disposal facilities, plant site, tailing storage facility, water storage facility, haul roads, access roads, and general mine infrastructure) were previously analyzed and decisions made through the Ghanaian EPA's Environmental Impact Statement compilation for each project. Current operations must, therefore, comply with conditions imposed under the previous permits. Development of meaningful alternatives for this Project is, therefore, limited to the No Project Alternative and those options that apply to Closure and Reclamation Plan Alternatives.

Analysis of alternatives considered for location of the tailing and water storage facilities and processing plant under previous EISs noted above, led to elimination of sites based on one or more of the following conditions:

- Site would require greater surface disturbance due to unsuitable topography;
- Greater loss of farm land and displacement of people;

- Site located immediately upstream of village or hamlet;
- Potential to contaminate downgradient potable water pumping station;
- Close proximity to the Tano River;
- Drainage area would not provide adequate water resources for ore processing;
- Geotechnical concerns for stability and settlement; and
- Located to distant from processing facility.

As a result of Ghanaian EPA review of the revised Ahafo South Project through the 2004 Environmental Impact Statement (SGS 2004), NGGL is implementing the best environmental and social option considering the range of reasonable alternatives considered and the potential impacts identified for each of the alternatives. In addition, implementation of mitigation measures that further reduce or eliminate impacts of the selected alternative have been required by the Ghanaian EPA for the Ahafo South Project. These measures are identified in the *Project Description* section of this Summary and Chapter 2 of the EISA. Details of the alternatives that were considered through the project design and permitting process are included in Chapter 3 – *Alternatives* of the ESIA.

Design of the Ahafo South Project evolved through several iterations where options were considered for ore processing, mine pit layout, mining method, and location of various facilities. Design options also were considered for disturbance footprints for waste rock disposal areas and the tailing storage facility. Newmont and predecessor companies evaluated several locations, sizes, and designs for these mine components. These evaluations recognized the need to minimize the disturbance footprint and location of these facilities to likewise minimize the amount of land that would be affected; especially where specific tracts were being used for crop production or residences. Design consideration included avoidance or minimizing effects to these areas to the extent possible.

The September 2004 Environmental Impact Statement (SGS 2004a) for the Ahafo Project (South) describes a number of alternatives considered in early stages of Project planning (see Section 4.2 and Appendix II.6 of the September 2004 EIS). These alternatives include locations for the water storage facility dam, tailing storage facility, waste rock disposal facilities, and ore processing plant facility.

NGGL has initiated several environmental studies and technical investigations designed to confirm and validate existing baseline data and expected operational impacts of the Ahafo South Project area. These studies will be useful in later mine-life years to better understand social implications and opportunities related to post-closure conditions and potential land uses. Specifically, these studies include:

- **Pit Lake Study** (Golder Associates, Inc.) – This study will identify whether pit lakes would form after mining and identify water quality expected in pit lakes such that post-closure uses can be defined.
- **Geochemical Analyses** (Newmont) – Kinetic testing of waste rock to confirm results of static testing regarding potential for acid generating rock. These tests will confirm appropriate closure and reclamation techniques which facilitate post-mined land use objectives.
- **Aquifer Characteristics** (Golder Associates, Inc.) – This study will provide an analysis of the groundwater conditions in the mine pit and tailing impoundment areas for purposes of predicting effects to groundwater (quantity and quality). These tests will confirm appropriate closure and reclamation techniques which facilitate post-mined land use objectives.
- **Soil Survey** (Contractor to be determined) – This study will augment soil information collected to date in the Project area and will be used to determine condition of soil currently being used for crop

production. The survey results will also determine the amount and quality of suitable soil available in the area to support post-reclamation agriculture practices.

The reclamation and closure plan is summarized in Chapter 2 of this document. Based on review of available baseline data, a number of reclamation or closure alternatives have been identified. These closure alternatives will be evaluated by NGGL once ongoing studies are completed in the Project Area and potential effects on resources have been fully analyzed.

NO PROJECT ALTERNATIVE

As previously indicated, the Ahafo South Project is currently under construction and therefore consideration of action alternatives is focused on options for closure of the Project. For purposes of analyzing potential effects of the Project (both adverse and beneficial) and comparing these effects to baseline conditions, an analysis of the “No Project” alternative is included in the ESIA.

Under this alternative, NGGL would not proceed with development of the Project and would not recover defined ore reserves, construct the tailing storage facility, construct ore processing and ancillary mine facilities, or place waste rock in disposal facilities. Potential impacts predicted to result from development of the Project would not occur.

Elements of sustainable social and economic environments would not be realized as a function of the Project’s contribution to these resources. Gains in economic value (payroll, taxes, and royalties), training and skill acquisition, enhancement of medical services, and general empowerment of individuals within the Project area would not occur, at least as a result of this Project. Investment in this region of Ghana would not occur and the secondary and tertiary economic effects of the mine would not be realized. Infrastructure improvements necessary to support the Project would also not occur.

CLOSURE AND RECLAMATION PLAN ALTERNATIVES

PIT LAKE MANAGEMENT

These alternatives will be evaluated should results of current studies indicate that poor quality water would reside in the mine pits after cessation of operations. The need for these alternatives is to provide positive measures that would limit or eliminate direct exposure of humans and animals to the pit lakes should poor quality water reside in mine pits after cessation of operations. If water quality is acceptable, an opportunity to develop a source of irrigation water and/or an aquaculture facility would be considered.

A. Partial Backfill

Partial backfill of mine pits would be designed to place inert or non-reactive rock in mined-out pits to a level above the water table. Backfill placement to this level would eliminate direct contact for humans and wildlife to water in the pit. The amount of material that would be rehandled to complete partial backfill is dependent on the water table elevation associated with each mine pit and feasibility of backfill operations.

B. Pumping and Water Treatment

Where conditions allow, water levels in mined-out pits could be maintained by pumping from sumps in the pits and treating the water to meet effluent standards. Operation of a water treatment plant would occur until water quality in the pit meets applicable standards. Pumping water that inflows to the pit and water treatment could be conducted in concert with partial backfill of mined-out pits to reduce the amount of water requiring treatment to maintain pit lake levels.

Other options include consideration of using treated water for potable water supply to hamlets and villages in the Project Area or discharge to the Tano River to augment flow. These opportunities can be evaluated throughout the life of the Project when monitoring data would provide a more precise indication of post-closure water conditions in the mine area.

C. Fencing/Berm Installation

This option could be used as a stand-alone measure or in conjunction with other water management options. Fencing and/or berm installation could be effective in reducing contact between animals/humans and the pit lake. Such a measure would likely require security to ensure that the fence is maintained and that conditions of the pit lake are effectively communicated to people.

D. Development of Irrigation Source and/or Aquaculture Facility

Should water quality in the pit lake stabilize to a condition where limitations on use of the water could be removed, opportunities to use the water to support food production (aquaculture), potable water supply, or other uses could be developed.

WASTE ROCK DISPOSAL FACILITIES

Results of additional testing to be completed on waste rock (kinetic testing) associated with the Ahafo South Project will be used to predict the quality of water that will emanate from the base of waste rock disposal facilities as a result of precipitation leaching through the pile. Should predicted water quality indicate that effluent from the base of waste rock disposal facilities exceed applicable quality standards, closure options that could be considered include construction of a cap that would limit the amount of precipitation infiltrating into the waste rock disposal facilities and/or collection of seepage from the toe ponds and treatment of the seepage to meet water quality standards.

Consideration will also be given to modification of the waste rock disposal site slopes to increase the amount of surface area that could be farmed or cultivated in the post-closure period. This alternative would also evaluate the need to increase the amount of soil salvaged during construction of the facility in order to maximize the soil replacement depth at reclamation. Increasing soil replacement depth could enhance the value of the land for crop production. Reducing slopes of waste rock dumps would, however, increase the disturbance footprint of these facilities.

A. Reduce Slopes to Maximize Post-Mining Land Use for Subsistence Farming

Topography surrounding the Ahafo South Project site is relatively flat. Construction of waste rock disposal facilities for each mine pit would result in elimination of existing farm or cropland sites and displacement of residences to other locations. Post-mining land use is likely to include subsistence farming uses. As such, consideration of reducing side slopes of waste rock disposal piles to increase

the area that could be used for farming or cropland should be considered. This option would need to consider whether reduction in slope of the facility would impact existing farm or cropland areas.

B. Maximize Soil Replacement Depth

Maximizing soil replacement depth on waste rock disposal facilities could result in enhancing the post-mining land use for cropland or agricultural production. Increased soil depth would result in an increased rooting depth and moisture holding capacity of the soil horizon.

C. Construct Capping System to Reduce Infiltration

Placement of a specific cap design on the waste rock disposal facilities may reduce the amount of precipitation that could migrate through the rock pile and thereby reducing the amount of water that may require collection and treatment at the toe of each disposal facility. Cap designs that store and release water would be effective in reducing the amount of water that infiltrates through the waste rock pile.

D. Water Treatment Facility Operation to Treat Effluent

Precipitation that eventually infiltrates the waste rock disposal facilities would be collected in toe ponds and analyzed for a suite of trace metals. If water quality of this effluent does not meet applicable standards, the water would be treated to meet standards prior to discharge.

TAILING STORAGE FACILITY

Effluent draining from the tailing storage facility underdrain collection system may exceed water quality standards. Depending on the closure period, options that consider maintaining a water treatment facility may need to be evaluated. Using the reclaimed tailing storage facility as farm land in the post-closure period may also warrant consideration.

A. Water Treatment

Draindown from the tailing disposal facility would be collected as necessary (if quality does not meet applicable standards) and treated through operation of a water treatment plant. Water treatment would continue until draindown ceases or meets applicable standards.

B. Post-Closure Use as Farm Land

Reclamation options for the tailing storage facility include placement of soil in sufficient depths to support subsistence farming on the site. Soil replacement depths would need to consider mobility of any residual constituents that may remain in the tailing material during closure operations.

SUMMARY OF IMPACTS

Table S-I is a summary of potential impacts previously described for the Ahafo South Project for each of the following resources:

- Social and Economic Resources
- Cultural Resources

-
- Visual Resources
 - Noise and Vibration
 - Flora
 - Fauna
 - Forest Reserves and Biodiversity
 - Wetlands
 - Aquatic Organisms
 - Air Quality
 - Geology and Minerals
 - Surface Water Resources
 - Groundwater Resources
 - Soil Resources

Also included in **Table S-I** are environmental control measures that address potential impacts associated with the Ahafo South Project. These environmental control measures have been specified by NGGL for the Ahafo South Project is included in NGGL's design, operation, and management of the Project. Additional environmental control measures that may be needed beyond those listed in **Table S-I** are discussed in Chapter 5.

| TABLE S-1 Summary of Potential Impacts and Control Measures Ahafo South Project | |
|--|--|
| Potential Impact | Control Measures |
| HUMAN ENVIRONMENT | |
| Social and Economic Resources | |
| <p>Converting an agricultural-based economy to a cash, industrial-based lifestyle.</p> <p>Displacing and resettling Individuals and communities.</p> <p>Disrupting access to communities located near the Project site.</p> <p>Influx of new residents, many of whom may have different cultural expectations and values</p> <p>Potential for spread of infectious diseases, including HIV/Aids.</p> <p>Improved housing developments in resettlement communities.</p> <p>New employment opportunities.</p> <p>Increased annual income and reduction of poverty.</p> <p>Training and educational opportunities.</p> <p>Loss of access to some areas.</p> <p>Limited direct impact on potable water sources of local communities as a result of construction and operation of the Project.</p> <p>Increasing cross-cultural tension as expatriates move into the racially and tribally homogeneous Study area.</p> <p>Increasing social problems such as prostitution, teen pregnancy, drugs, drunkenness, and increased crime.</p> <p>Increasing social problems and potential for inflation of housing costs in the local communities.</p> <p>Increasing risk to local resident's health and safety.</p> <p>Increasing waterborne diseases.</p> <p>Increasing risks related to transporting and using chemicals including sodium cyanide</p> <p>Impacting water quantity/quality used for drinking water.</p> | <p>NGGL has initiated a program to relocate/resettle individuals and families and to compensate for loss of agricultural crops and structures.</p> <p>NGGL has reduced the scope of physical and economic displacement associated with the Project through the following:</p> <ul style="list-style-type: none"> ▪ Minimizing size of mine infrastructure elements and shortening distances between them, in order to reduce size of the Project area as much as possible. ▪ Minimizing buffers around mine infrastructure in order to reduce size of the Project area as much as possible without compromising health and safety of nearby residents. ▪ Restricting construction of mine-related infrastructure to rural, sparsely settled areas, distant from towns and major public facilities or infrastructure (pA 2005). <p>Project construction and operation is expected to result in improvements to existing District and local infrastructure including: transportation, water supply systems, sanitation systems, solid waste management systems, electrical systems, and telecommunication network.</p> <p>For resettling persons/households, NGGL has provided a replacement plot within a Resettlement Village for their residential use.</p> <p>NGGL has commissioned OICI to provide Financial Management Training Programs for non-resident farmers and displaced households.</p> <p>NGGL is training individuals on Community Water and Sanitation Committees in the communities of Ntotoroso, Gyedu, and Wamahinso. Training includes effective management of community water and sanitation infrastructure.</p> <p>NGGL has rendered the following specific types of support to date:</p> <ul style="list-style-type: none"> ▪ Extra assistance with the logistics of resettlement and reconciliation to a new community and home. ▪ Rental allowances. ▪ Resettlement near family, friends and neighbors to help maintain informal social/support networks. ▪ Transport allowances. ▪ Special support as needed. |

| TABLE S-I | |
|--|---|
| Summary of Potential Impacts and Control Measures | |
| Ahafo South Project | |
| Potential Impact | Control Measures |
| | <p>To prevent increases in waterborne diseases, NGGL will take the following measures:</p> <ul style="list-style-type: none"> ▪ Establish a fishery resource in the Subri Reservoir and introduce species such as Tilapia, which feed on insect larva, including mosquito larvae. ▪ Develop an educational program related to waterborne disease and on parasite cycles of selected species such as <i>Schistosoma spp</i> ▪ Prevent community or residential development adjacent to the banks of the reservoir. ▪ Monitor presence of vector-borne diseases in the reservoir (SGS 2000a). <p>NGGL has developed a malaria prevention program presented in the Appendix A. NGGL has developed HIV/AIDS standards and guidelines in Appendix A.</p> |
| Cultural Resources | |
| Losing artifacts and historical/archaeological information and disturbance of graves. | <p>NGGL has commissioned a cultural resources survey to identify shrines and cemeteries.</p> <p>NGGL will notify the national museum of discovery of cultural artifacts or historical features, and will allow museum professionals an opportunity to evaluate any findings.</p> |
| Visual Quality | |
| Modifying existing landscape. | <p>Waste rock disposal facilities will be designed, where practicable, with boundaries to blend with surrounding topography.</p> <p>Reclamation of disturbed areas no longer required for operation will be conducted concurrent with operations.</p> <p>Reclamation of disturbed areas at end of mining will restore vegetative communities on all land disturbance except for pit highwalls.</p> |
| Noise and Vibration | |
| Increasing the general level of noise and vibration within the vicinity of its operations. Generating continuous and intermittent noise and vibrations from mining activities. | <p>Blasting times will be made known to the public to avoid surprise effects. Sign boards will be located in Ntotoroso, Ghedu, Kawkuadekrom, Kenyase 1, and Kenyase 2. Blasting will be performed only during daylight hours.</p> <p>Vibration induced by blasting will be minimized because controlled blasting technology will be applied.</p> <p>All private buildings and infrastructure within 500 m of the planned ultimate pit rim will be relocated to ensure safe distance.</p> <p>A noise monitoring program will be implemented to ensure that noise from activities and equipment at mine facilities meet or fall below the noise guidelines established by the Ghana EPA at the nearest residential uses to the mine site.</p> <p>Blasting demonstration will be organized for public witnessing under the close supervision of the Ghana EPA and the relevant governmental and traditional authorities.</p> |

| TABLE S-I | |
|---|---|
| Summary of Potential Impacts and Control Measures | |
| Ahafo South Project | |
| Potential Impact | Control Measures |
| BIOLOGICAL ENVIRONMENT | |
| Flora | |
| <p>Ground disturbance and vehicular traffic could increase incidence of noxious weed invasion and spread.</p> <p>Removing agricultural crops, trees, and other plant species during surface disturbance actions.</p> <p>Crop and timber production potential on unreclaimed disturbed land would be permanently lost (mine pit highwalls).</p> <p>Increased population density creating an increased demand for crop production. Site-specific and local reductions in crop land from the mine footprint would increase demand for unaffected land outside of the mine disturbance area for crop production, charcoal, and other natural amenities derived from plant communities. Shortened fallow cycles and reduced productivity of land over the long-term due to increased local demands for production of food crops and cash crops.</p> | <p>A noxious weed monitoring and control plan will be developed to ensure that reclaimed areas are protected from noxious weed invasion.</p> <p>Disturbed areas no longer essential for mine operations will be reclaimed concurrent with mining activities.</p> |
| Fauna | |
| <p>Development of the mine pit, waste rock disposal facility, tailing storage facility, and other ancillary facilities would remove wildlife habitat reducing availability of forage, security, and breeding cover for wildlife inhabiting the area. All species dependent on these sites would be killed or displaced. Displaced animals may be incorporated into adjacent populations, depending on variables such as species behavior, density, and habitat quality. Adjacent populations may experience increased mortality, decreased reproductive rates, or other compensatory or additive responses.</p> <p>The mine pit highwalls would be lost as habitat for terrestrial species. If water in the pit contains high concentrations of heavy metals or other constituents, long-term ingestion by wildlife may pose a risk to some species.</p> <p>Black kit young and eggs would be destroyed if nesting trees are removed.</p> <p>Mortality of bush baby and Bosman's potto would occur as trees are removed.</p> <p>Habitat loss and mortality of species with conservation priority (First Schedule Ghana Wildlife Regulations), as a result of the Project, could result in site-specific losses of biodiversity. Population densities of species of conservation priority would be reduced or eliminated in mined areas.</p> | <p>Fencing or berming/ditching around the mine pit rim would prevent or minimize terrestrial wildlife from entering the mine pit.</p> <p>Some species of wildlife could use habitat developed on reclaimed waste rock disposal facility.</p> <p>Administrative controls, including policies that prohibit employees and contractors from engaging in hunting activities on all mine properties, would be implemented.</p> <p>Depending on water quality in the pit lake, some species of bats, birds, and other wildlife may be able to use the pit lake as a drinking water source.</p> <p>Reclamation of the tailing storage facility to support crop production would benefit "generalist" species of wildlife that utilize habitat with high levels of human activity.</p> <p>A large proportion of protected wildlife species with potential to be affected by the Project and alternatives have been recorded in the forest reserve. Reclamation activities following mining would create habitat for habitat generalists and habitat enhancement in forest communities would improve habitat for forest-dwelling species.</p> <p>Alternative A would reduce risk to wildlife from exposure to constituents of concern would be eliminated.</p> |
| Forest Reserves | |
| <p>Indirect impacts may occur related to potential induced activity related to improved access and/or use of Forest Reserve areas due to increased workers in the Project area.</p> | <p>See Biodiversity Management Program discussion in Chapter 5 – <i>Environmental and Social Action Plan</i>.</p> |

| TABLE S-I | |
|---|---|
| Summary of Potential Impacts and Control Measures | |
| Ahafo South Project | |
| Potential Impact | Control Measures |
| Wetlands | |
| Filling wetlands in drainage as a result of construction of the tailing storage facility and water storage facility. | New wetlands will be created by the water storage facility and possibly environmental control dams. The net effect is likely that more wetlands would be created than lost. |
| Changes in hydrological regime possibly reducing wetland areas downstream from water impoundments and mine pits. | All surface-disturbing activities will be conducted in accordance with project sediment control guidelines/BMPs and an approved Construction Management Plan. |
| Increasing sediment in wetland areas from soil disturbance associated with mine development and operation. | Seasonal surface water that flow toward the mine facilities will be diverted in channels around the facilities and back to natural drainages. Runoff from disturbed areas and water that collects in the mine pits during operations will be diverted to one of the environmental control dams. |
| Aquatic Organisms | |
| Alternating natural stream flow patterns as a result of mine facility construction will affect fish and aquatic insects present in the stream. | Minimize disturbance of natural drainages to the extent possible. |
| Increased breeding habitat for mosquitoes and aquatic invertebrates such as snails at the water storage facility. Because mosquitoes are carriers of malaria, and snails are host for a stage in the life cycle of a parasite that causes the disease bilharzia in humans, humans may be negatively affected by enhanced habitat for aquatic organisms. | Seasonal surface water flow toward mine facilities will be diverted in channels around the facilities and back to natural drainages. Runoff from disturbed areas and water that collects in the mine pits during operations will be diverted to one of the environmental control dams. |
| Mine pits remaining after mining will partially fill with water. Depending on water quality, these water bodies may become habitat for fish and other aquatic organisms. If water quality is poor, fish and aquatic organisms likely would not become established in the pit lakes. | Water quality and/or flow rates will be measured monthly, quarterly, or semi-annually at designated springs/seeps and surface water stations. |
| PHYSICAL ENVIRONMENT | |
| Air Quality | |
| Fugitive dust generated during mine operations resulting from blasting, ore and waste rock hauling, dumping, grading, and backfilling actions. | Fugitive dust emissions will be controlled through use of direct water application, chemical binders, or wetting agents. |
| Dust generated from transfer points on conveyor systems, grinding and milling operations, and stockpiling. | Disturbed areas will be revegetated concurrent with operations where possible. |
| Dust generated from increased vehicle travel through villages. | Speed limits are set for vehicles traveling through populated areas to limit dust generation. |
| Gaseous emissions resulting from operation of mine equipment and light vehicles. | Haul roads will be maintained on a continuous basis to ensure safety and minimize fugitive dust emissions. |
| | Dust suppression sprays and dry dust collection systems will be installed on respective ore crushing circuits and all ore transfer points in the plant. |
| | Gaseous emissions will be minimized through proper operation and maintenance of equipment. |

| TABLE S-I | |
|---|--|
| Summary of Potential Impacts and Control Measures | |
| Ahafo South Project | |
| Potential Impact | Control Measures |
| Surface Water Resources | |
| Degraded surface water quality as a result of direct disturbance to the land (increased erosion and sedimentation), and exposure of fresh rock and mineral surfaces to weathering and leaching (potential for acid generation and/or increased leaching of metals). | Seasonal surface water that flows toward the mine facilities will be diverted in channels designed to transport the 100-year, 24-hour storm event. Runoff from disturbed areas and water that collects in the mine pits during operations will be diverted to one of the environmental control dams and/or used for make-up water needs. |
| Accidental spills of chemicals and petroleum products used for mine processing activities. | Base of waste rock disposal facilities will incorporate a French drain system to allow natural surface water and springs to flow beneath waste rock. Low permeability layer will be constructed above the drain system. |
| Blocking or diverting surface water flow from natural drainages. | Excess water that collects in the tailing storage facility will be recycled to a process water pond at the plant site. |
| Short-term increase in sediment load to the drainages during construction of road crossings. | Water quality and flow will be monitored in streams and at other seep/spring locations. |
| Changes in topography resulting from mining activities that progressively modify watershed characteristics of sub-basins. | Mine closure actions will include removal of sediment accumulated behind environmental control dams and the dams will be breached to restore free-flowing conditions. |
| Increasing overland runoff volume as a result of vegetation removal for land development. | No settlements will be developed below the tailing storage facility within the mining concession boundary. |
| Surface water captured by mine-related facilities and not released back into the natural drainages, affecting downstream water users. | Emergency response plans, backup systems, and treatment methods have been developed to prevent or respond to spills of mine process chemicals and fuels. |
| Waste rock disposal facilities increase overland runoff due to steeper slopes and less vegetative cover; these effects would be localized. | If mine pits remain open after cessation of mining, diversion channels will prevent natural surface water runoff from entering the mine pits. |
| Mine pit dewatering increasing stream flow if discharged to drainages. | Waste rock disposal facilities will be placed on a low permeability layer and covered with growth medium. A minimum 1 percent gradient would be maintained on lift surfaces to further reduce infiltration. |
| | Potentially acid-generating (PAG) waste rock will be encapsulated within the waste rock disposal facilities using acid-neutralizing rock with an overlying low permeability layer. This will limit exposure of PAG rock to meteoric water. |
| | Waste rock disposal facilities will be inspected quarterly and following heavy precipitation to detect abnormal conditions. |
| | Only water that meets Ghanaian EPA water quality standards will be discharged from the facility. |
| | Roads will be constructed with ditches and culverts to collect and convey water runoff from road surfaces to sediment traps or ponds. |
| | Implement Best Management Practices (BMPs) to prevent or |

| TABLE S-1 Summary of Potential Impacts and Control Measures Ahafo South Project | |
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| Potential Impact | Control Measures |
| | <p>reduce increased sediment load to streams outside of direct disturbance areas.</p> <p>Discharge of water containing cyanide or other chemicals will be prevented by operating all gold extraction and processing operations using a water/chemical solution recycle system. No effluent will be released to the environment, except possibly under an accident.</p> <p>Continued operation of the water storage facility will be a potential source for potable water in the area.</p> |
| Groundwater Resources | |
| <p>Localized groundwater drawdown immediately surrounding the mine pits.</p> <p>Potential impacts to groundwater quality from the waste rock disposal facilities, tailing storage facility, ore stockpiles, mine pits, septic systems, landfills, or spills of chemicals and fuels.</p> | <p>After cessation of mining and dewatering, pit lakes will develop in each mine pit, with water levels eventually approaching pre-mine elevations (20 to 30 meters below ground surface).</p> <p>Potentially acid-generating (PAG) rock will be encapsulated within the waste rock disposal facilities using acid-neutralizing rock with an overlying low permeability layer. This will limit exposure of PAG rock to meteoric water.</p> <p>To prevent leakage, process water pond will have multiple geomembrane liners and a leachate collection system. The ROM pad will be constructed on low permeability clay material.</p> <p>The tailing storage facility would be constructed with a low permeability base, and geomembrane liner where beneath the supernatant pond. An underdrain collection system will be constructed at the base of the facility to collect and discharge any seepage to a collection pond.</p> <p>Reclamation of the tailing storage facility and waste rock disposal facilities will minimize infiltration of precipitation into these facilities.</p> <p>Groundwater monitoring wells will be installed downgradient of the tailing storage facility and waste rock disposal facilities, and sampled at a frequency and duration per approval of Ghana EPA.</p> <p>Community boreholes and potable wells will be monitored for water quality and water elevations to ensure sources are unaffected by dewatering activities.</p> <p>Continued operation of the water storage facility will recharge groundwater with good quality water.</p> |
| Soil Resources | |
| <p>Surface disturbance resulting in reduced fertility, loss of soil structure, reduced infiltration and water holding capacity, erosion, and reduced productivity</p> <p>Increased soil erosion due to vegetation removal, and immediately following soil replacement before new vegetation has been established.</p> <p>Impacting previously uncultivated areas as relocated populations</p> | <p>NGGL will salvage soil to be used in reclamation.</p> <p>Stormwater-related erosion will be controlled using various BMPs, including brush barriers, sediment ponds, small check dams, sediment fences, and other controls until vegetation is established to provide stable soil conditions.</p> <p>All surface-disturbing activities will be conducted in accordance with project sediment control guidelines/BMPs and an approved</p> |

| TABLE S-1 Summary of Potential Impacts and Control Measures Ahafo South Project | |
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| Potential Impact | Control Measures |
| begin to relocate crops. | Construction Management Plan. Regraded areas will be ripped and scarified to reduce soil compaction. Previously salvaged growth media will be placed to a minimum depth required to support plant community development over regraded areas, finish graded, fertilized, and seeded. Deforestation and land clearance will be limited to the extent practicable and will be conducted only on an as-needed basis. |