Technical Review

Environmental and Social Impact Assessment

AHAFO SOUTH PROJECT

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BACKGROUND

The CENTER for SCIENCE in PUBLIC PARTICIPATION (CSP2) provides technical advice to public interest groups, non-governmental organizations, regulatory agencies, mining companies, and indigenous communities on the environmental impacts of mining. CSP2 specializes in hard rock mining, especially those issues related to water quality impacts and reclamation bonding.

This report provides technical analysis of Newmont Mining Corporation's (Newmont) Environmental and Social Impact Assessment (ESIA) prepared for the Ahafo South Project gold mine, located in the Brong Ahafo Region of Ghana, West Africa. The mine has already been permitted by the Ghanaian governmental authorities. Newmont prepared the ESIA for International Finance Corporation (IFC). Newmont seeks funding for the project for IFC (ESIA S-1) and the ESIA intends to help inform IFC's decision making process. The ESIA notes that "lenders will require certain compliances" (ESIA 1-40). Thus, this report's comments should be required and implemented in order to achieve compliances and necessary procedures and assurances to protect human health and the environment.

INTRODUCTION

The Summary of Project Information (SPI), prepared by IFC management for the Ahafo South mine project states that the project:

> ... is expected to become a demonstration case for how to handle environmental, social, and community development issues in Ghana. Ghana has a long history of mining and unfortunately in some cases mining operations have resulted in negative environmental and social impacts on local communities. It is expected that this project would become a model for other mining companies to follow; for example, the level of multi-stakeholder involvement in the resettlement process is expected to become the benchmark for the future.

However, the ESIA fails to set the stage to achieve these goals. If the IFC wants the Ahafo South project to be a model, it will have to ensure that Newmont corrects many ESIA deficiencies and further commits to improved analysis and features that will protect human health and the environment. The ESIA, as submitted, falls short of numerous IFC draft guideline requirements and fails to follow standard mining analytical methods and best procedures. The comments below suggest ways of correcting these deficiencies, but it is ultimately up to IFC to ensure that Newmont aims for and meets standards that adequately protect health and the environment. If IFC and Newmont are serious about achieving the SPI's goals, these shortcomings will need to be remedied at this earliest possible stage in mine activities.

Limitations of the Current ESIA:

There are several factors that limit CSP2's ability to fully comment on the Ahafo South ESIA. These are outlined below:

1) The first issue is that the data and reports upon which the ESIA is based are not presented in detail and are not available to the public on the Internet (where the ESIA is posted). As a result, comments on the ESIA are subject to further review of additional data/reports. Missing reports and data that are deemed of particular importance are listed at the end of these comments.

2) A second issue is that the Newmont has combined raw data to form composite or averaged results, upon which it appears to base its decisions. For example, Newmont's ESIA averages forest reserve quality to determine impacts and blends rock samples to assess potential impacts to water quality. Combining data, and not disclosing the raw data, makes it difficult to verify the validity of Newmont's conclusions, because the combinations result in inconclusive or unsupported results. Alternatively, if Newmont lacks raw data, such as individually analyzed core sample data, then its methods are fundamentally flawed, and the results remain significantly suspect and unsupportable.

3) A third issue is that additional critical studies that should have been completed prior to permit application, let alone construction, are absent. Construction has already started. Yet significant data that should influence decisions and designs is unavailable. These include the ongoing, but incomplete, studies of surface and ground water and acid-generation potential. Because the results of these studies are unknown, it is impossible to fully assess the mine's potential impacts and design credible detailed reclamation plans.

Until reliable and conclusive data indicates that lesser standards will protect human health and the environment, Newmont should commit, or be required to commit, to reasonable worst-case scenario environmental protection, mitigation, and monitoring.

Background

IFC's Summary of Project Information (SPI) identifies the Ahafo South area as greenfields - a region with no history of mining. Therefore, it is particularly important to establish standards that ensure protection of human health and the environment as opposed to bare-minimum standards. In the ESIA, Newmont sometimes proposes to utilize significantly less stringent human health and environmental standards in Ghana than those it uses in the United States. For example, Ghana does not have a hazardous/toxic waste law and Newmont has not committed to meet the restrictions required in countries with more protective laws, such as the United States' Clean Air Act, Toxic Substances Control Act, and Resource Recovery Conservation Act. In mines across North America cyanide is typically "killed", but in Ghana Newmont proposes to allow cyanide to be discharged into specified ponds. More examples are discussed below. There is no reason why Ghanaian people and the Ghanaian environment should be subject to inferior protections and practices. This is relevant for all of Ghana but should be particularly important for a greenfields project.

Without access to the original data and reports and because so much critical data is homogenized in the ESIA, the authors reserve the right to reevaluate the ESIA in light of full disclosure of data and reports. This data should have been disclosed by Newmont on its web site, and this disclosure should be required by the IFC before considering supporting the project. An example is Rank's (a Newmont subsidiary) draft EIA presented to EPA in December 2000 (SGS 2000b) (and the final, if there was one).

Adequate planning, design, and reclamation are essential components of a mine project and cannot be excused or waived because the project is already under construction (*See* ESIA S-35). IFC should not allow unsafe, uncertain, or problematic design features to persist simply because Newmont commits to doing more studies and analysis. This is particularly important in the context of reclamation costs and the way those resources are calculated and set aside (this is discussed in the Reclamation section below). IFC should demand specific detailed requirements, protections, and standards, or it risks not only its investment but also its reputation, entrusted to a mine operator that is just completing the necessary background mine-research at the same time as constructing the mine.

The ESIA significantly limits its review of mine design/plan/operation alternatives considered, asserting that the Ghanaian permitting history negates the need for more diverse or different alternatives. As a regulatory matter this is valid but the ESIA, mine project, and public participation could benefit from considering expanded options. This review recognizes that the project is under construction and at the ESIA juncture. But this review also recognizes that IFC or other financial/regulatory entities can still demand appropriate environmental protections and improvements to the mine plan.

Generally, the ESIA considers the correct topics, but lacks specific commitments. Newmont should commit to explicit results and standards for all human health and environmental matters, rather than noncommittal language such as "will strive for". Human health and the environment warrant the same planning, precision, and protection as the gold recovery processes. The latter are fully developed and assessed; the former are not.

SPECIFIC COMMENTS

1) Hazardous Materials and Wastes

Ghana has neither methods nor laws dealing with hazardous waste disposal. The ESIA notes that a Draft Hazardous Waste Control bill is currently before the Cabinet for consideration. Currently, hazardous wastes are disposed-of in landfills.

At any mine site, there is great potential for future problems caused by sub-standard waste disposal. The ESIA evidences that Newmont is aware of potential problems associated with toxic and hazardous waste disposal, but the ESIA does not sufficiently commit to methods and monitoring that are needed to avoid future liability and human health or environmental degradation. It is considered best practice in the United States and elsewhere to require up-front methods and protections rather than facing sizeable cleanup costs after problems occur.

Particularly because of the vast spectrum and quantity of toxics proposed for mine use, Newmont should commit to disposal of all chemicals to United States' standards (notably Toxic Substances Control Act (TSCA), Resource Conservation Recovery Act (RCRA), Clean Air Act (CAA) and Clean Water Act (CWA)), and all disposal facilities should meet Comprehensive Environmental Response Compensation and Liability Act (CERCLA) disposal requirements. This will ensure that disposal will not cause contamination after the mine is reclaimed.

That Ghana is considering but has not yet implemented hazardous materials laws should not excuse Newmont from treating hazardous materials in Ghana as seriously as Newmont treats hazardous materials in the U.S. Further, Newmont should commit to complying with future Ghanaian laws and regulations that are passed after the mine is active, and not attempt to seek "grandfather exclusion" from implementation.

Toxic or hazardous wastes should not be burned (*See* ESIA S-32) without a full analysis of potential impacts (such as dioxin formation, etc.). The ESIA states that:

> 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.

(ESIA 2-47). Wet food waste is generally waste or spoiled food that is thrown out. It is not clear why it would be burned as opposed to composting.

It is desirable that any incinerator should be constructed to US EPA standards, but even so, this does not necessarily protect humans and the environment from downwind contamination or ensure that burned material is not toxic/hazardous. Portable incinerators are available for many things, including ocean-going ships, but construction to governmental standards does not mean that emissions standards will be met. When burned, hospital waste and medical/infectious waste may emit various air pollutants, including hydrochloric acid, dioxin/furan, and toxic metals (such as lead, cadmium, and mercury). Burning unspecified paint and solvents provides additional and further concerns and unknowns. Burning contaminates downwind areas in a manner that is often difficult to detect until contamination is substantial and/or difficult to reverse/clean. The risks to human health and the environment are high, as are the costs to respond to contamination.

If properly applied, alternative technologies to burning, such as primarily microwave systems or steam autoclaves (such as for hospital waste), effectively disinfects waste for recycling or other non-harmful disposal. Alternative disposal to burning is available for almost all materials.

If burning is the only option being considered, in addition to committing to a US EPA approved disposal method, Newmont should commit to not releasing hazardous or toxic contaminants, such as dioxin, lead, mercury, furans, etc., into the air. Newmont should monitor for potential contaminants "at the top of the stack" (and not downwind) to ensure that none are being released. Long term monitoring should further test for potential contaminants in the event of any releases.

2) Cyanide Disposal

Cyanide should be destructed when it leaves the process circuit. The ESIA states that:

> 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.

(ESIA S-23; *See also* ESIA 2-32). That some regulatory agencies agree does not mitigate the fact that most mines have cyanide leaks. It is reasonable and prudent, therefore, to keep cyanide from all discharges from active process circuits. No cyanide should be discharged to the tailings pond, supernatant pond, or any other out-of-process disposal or "holding" site.

There is no "cyanide-kill" process proposed for the tailings. The use of a cyanide-kill process, like the widely applied INCO SO_2 process, to lower the level of cyanide before it enters the tailings pond, is common practice in North America. The cyanide-kill process is used not only to protect wildlife that may inadvertently come in contact with the tailing ponds water, but also to lower the level of residual cyanide in the interstitial water in the tailings themselves. Cyanide levels from the mill in the tailings will likely be well in excess of 100 mg/l. Cyanide will degrade in the tailings pond water above the tailings, but not in the interstitial tailings water. As a result, seepage to groundwater will contain high levels of residual cyanide.

Even thought most mines in the US destruct cyanide, cyanide levels vary significantly in their discharges/ponds. The reason for this is not entirely clear, but many if not most mines still have leaked or otherwise released cyanide into the environment. With cyanide kill, at least the level of cyanide entering the environment is lower.

The ESIA claims that photo degradation will treat cyanide in the tailings and other ponds (ESIA 4-125). This statement ignores that photo degradation only works at or near the surface of the pond, and therefore does not degrade buried or interstitial cyanide that is in the tails once the tails are deposited.

The ESIA doesn't recognize clear cut-off limits for, and appears to leave the door open to increasing the WAD (weak acid dissociable; a common form of cyanide measurement) cyanide levels it will tolerate for environmental and/or wildlife exposure when it states:

> In some instances it may be found that WAD cyanide levels greater than 50 mg/L may be protective of wildlife, however, this situation requires thorough investigation and review.

(ESIA 2-32). This suggests further weakening of environmental protection and the release even more cyanide from mine facilities. This contravenes common mining practice in North America, and safe practice.

3) Incomplete Studies

Among the numerous studies that Newmont plans to complete in the future, and which should have been completed before mine permit application, let alone mine construction, three stand out as particularly important and which deficiencies creates extremely dangerous uncertainty. These are the Pit Lake Study, Geochemical Analysis, and Aquifer Characteristics (ESIA S-36). The first is essential to determine what will become of the pit; the second to determine reliably whether acid mine drainage will occur; and the third to determine how the mine will impact groundwater. These three studies form the foundation of major portions of the reclamation plan. Without them the reclamation plan and reclamation budget are suspect. The fiscal liability alone from these three data gaps could in a worst-case scenario reasonably swallow the entire reclamation budget.

4) Waste Rock

The waste rock piles must protect human health and the environment. As discussed in the Water Resources section below, potential contaminants such as mercury and the potential for acid mine drainage are present, although Newmont has not adequately characterized the degree of hazard present. Especially in this light, but in general, the waste rock piles must therefore be fully reclaimed, including adequate bottom and top liners.

Newmont's proposed plan is deficient in many ways. The ESIA describes that:

> 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. The low permeability base will be constructed incrementally as waste rock placement proceeds. French drains will be constructed to allow for flow from streams and seeps that will be covered by the waste rock disposal facility. French drains will be constructed of minimum 300 mm diameter (acid-neutralizing) waste rock, a non-woven geotextile fabric placed over the rock, covered with 600 mm of low permeability materials and compacted to a maximum design permeability of 1 x 10-6 centimeters per second (cm/sec). Based on current data, potentially acid generating (PAG) waste rock would not be encountered at the Ahafo South Project.

(ESIA 2-10). The low-permeability material <u>under</u> the waste rock piles must be defined and be fully impermeable. This includes two factors. The first is the material, which must be sufficiently homogenous and characterized to be adequately compactable. The second is the actual compaction method and efficacy. Newmont is making the assumption that the permeability will be 1 x 10-6 cm/sec., but Newmont must be clear about how it will assure that this permeability is achieved. This includes compaction testing and independent quality assurance to confirm the results.

In addition to creating structures under the waste rock piles, such as French drains, to facilitate flow under the piles, existing streams should be permanently diverted around the piles and reconnected with their existing channels below the piles. If the French drains were to become clogged or inundated by flows, then the waste rock piles could conceivably be undermined, with potentially catastrophic results. Therefore, while there needs to be a mechanism to handle water under the piles, water should also be diverted around the piles to prevent undermining and extend the lifespan of the French drains.

Once established, waste rock piles are very difficult and expensive to move, especially with the space limitations present in the existing mine layout (ESIA Figure 2-2 evidences that there is not a lot of space to move a waste rock pile if it became necessary). The potential for water undermining the waste rock piles must be avoided.

The proposed 600 mm compacted layer therefore is generally considered to be too thin to adequately protect below the waste rock pile and keep leakage from migrating down. The potential for acid production is discussed below in the Water Resources section, but suffice it to say that existing data does not dismiss the need for waste rock pile design to better protect the environment.

The ESIA states that if, during mining, waste rock is determined to have acid producing potential:

> A low permeability cap would be constructed on the final lift of PAG material. The cap would be constructed of random wheel compacted clay or alluvium to provide a barrier to limit infiltration fluid migration and thereby reduce the volume of acid rock drainage. The low permeability cap would be 600 mm thick and sloped to promote runoff, further reducing potential for water to contact PAG waste rock. The cap would be covered with 600 mm of growth medium and designed so regrading during final reclamation would not breach the cap.

(ESIA 2-11). Similar to the comment above, the proposed 600 mm of growth media <u>over</u> the liner is too shallow cover. Something more like three meters of cover is more appropriate as a minimum. The 600mm of proposed cover material is shallower than the root zone of some plants and would most probably not be thick enough to prevent root penetration of the low-permeability layer. An additional reason to impermeably cap the waste rock piles is that such capping could improve wetlands hydrology because of increased runoff (ESIA 4-81).

This underscores the need to preserve cover material (discussed below in the Reclamation section) and the need to plan for adequate cover material at the start of the mine. Reclamation cover should be more in the order of three meters, rather than just over one-half meter. Further, to preserve the cover material from settling into the waste rock, and to prevent upward migration of contaminants into the cover materials and topsoil, Newmont should create capillary barrier of size-graded material that is biggest just on top of the waste rock and smallest just below the replaced cover materials.

The low permeability standards proposed are generally acceptable, but Newmont must commit to representative permeability testing to insure that the designed permeability is reached.

Random wheel compacted clay or alluvium is not a sufficient cover for the tailings pond. Random wheel compaction is notoriously inconsistent. Newmont should commit to a compacted swelling clay liner. This is the only way to insure that the tailings ponds are not infiltrated by water.

5) ***Tailings Ponds***

a) Design and Safety Concerns

As proposed, the tailings ponds design at the Ahafo South project will not protect the human health or the environment and significantly ignore standard practices and potential liabilities from failure. The ESIA states that:

> The tailing storage facility site is located within a low seismic hazard zone, with expected peak ground acceleration for events having a 10 percent chance of exceedance in 50 years of between 0.4 m/s2 and 0.8 m/s2. Seismic accelerations experienced at Ahafo from the most significant event (4.4 March 1997 227 km from site) would have been a peak of 9mm/s2 (based on Esteva and Rosenblueth method). The selected design peak horizontal ground acceleration adopted for the tailing storage facility is 0.1 g (Lycopodium 2003).

If the design basis earthquake that led to the selected peak horizontal ground acceleration of 0.1 g is a 1-in-500 year event, as is implied by the tailings pond description at 2-10, then this is not safe. The Maximum Credible Earthquake, usually assumed to be the 1-in-10,000 year event, should be used to establish the design peak horizontal ground motion. It appears that the ESIA may be using a lower earthquake magnitude to compensate for the weaknesses of the upstream method of dam construction (discussed below). (Note: Lycopodium 2003 is not available to this reviewer, but the title is "Ahafo Project Feasibility Study", and it appears not to be a geologic or seismic study. It is unclear whether adequate site-specific stability or seismic analysis has been completed.).

Another reason for conservative seismic analysis and design is that Newmont's design places a water storage facility/dam directly above the tailings pond. If the water storage facility were to fail it could cause tailings pond breach or failure. The water storage facility is planned to operate after the mine is closed and reclaimed, meaning that its dam needs to last into perpetuity, rendering inadequate anything less than the maximum credible earthquake design.

From the description at ESIA 2-12, it appears that sand underlies the tails pond. Therefore, without adequate liners the material will transmit leaks to soils and/or groundwater. As described above, Newmont must be clear about/specify how it will assure that impermeability is achieved.

Quality control and assurance in the construction is essential, particularly regarding the compacted liner's actual compaction. Random wheel compaction is not adequate because it leaves the possibility of "missed" or unevenly compacted areas where the liner will not achieve the permeability target, and could lead to "enhanced leakage" into groundwater. It would be enhanced because the different permeabilities between the liners are important to the physics of the liners acting together. Newmont must therefore commit to representative compaction testing and independent quality assurance to confirm the results.

b) Liners

In addition to improved compaction on the compacted liner, a full synthetic liner, rather than the partial synthetic liner proposed in the ESIA, is necessary because the tailings will contain residual cyanide at levels significantly above water quality standards. This is possible even if a cyanide destruction process is employed. If cyanide leaks into groundwater, or is deposited anywhere out of the sun, cyanide degradation will not take place. This will result in cyanide contamination, such as in groundwater. Cyanide degradation will only take place in the tailings pond water on top of the tailings. As discussed above, even if a cyanide kill is employed the <u>entire</u> tailings pond should be underlined.

Lining just the lower portion appears to be a cheap way of construction in an attempt to use the least amount of liner and still underline the area most likely to have standing water and therefore a pressure head (*See* Figure 2-3). Such construction may attend to the head created by standing water but is not adequate protection. The entire pond should be lined. Lining should not cause a significantly increased incremental cost and will significantly protect water resources. Moreover, if leaking does occur because of inadequate lining, which is probable, the overall cost will be significantly higher than had the pond been lined in the first place.

The mine plan proposes to pump tailings from the processing plant to the tailings pond. This will be in a pipe contained within a bermed trench lined with 1.5 mm textured HDPE liner. If a liner is appropriate for the pipe transporting the material to the tailings pond, it should also appropriate for the tailings pond itself, where materials will reposit forever. Note that the bermed trench calls for a 1.5 mil liner, which is approximately the same thickness as a typical ZipLoc food storage bag (thicknesses vary widely between purposes and brands for trash, food, and freezer bags). While HDPE is chemically resistant and may be stronger than food storage bags, 1.5 mil is still thin enough to be simply damaged by walking on it, dropping or placing materials on it (pipe for instance), or equipment driving over it. All could cause holes or tears from direct trauma or grinding stones or debris into or through the plastic.

Therefore, this, and all liners at the mine, must be protected during handling and placement, and have protective measures under and over them, such as 10 inches of fine sand, to protect them from damage once placed. After installation and before sand placement the liners should be inspected. Finally, monitoring must be sufficient to detect liner leaks. Otherwise, leaks from hidden places, such as under the center of the tailings pond or a waste rock pile, will not be detected until the contamination has spread. To insure this does not happen at the tailings pond, a double liner with interlayer leak detectors/monitoring is recommended.

c) Dam Construction

There is no description of the type of dam construction to be utilized for the construction configuration of the dam extensions/tailings impoundment (*See e.g.* Figure 2-4), indicating that it is highly likely that Newmont proposes using upstream-type extensions/construction on top of the centerline-type starter dam. It would be significantly safer to use the downstream-type construction used for the starter dam for the dam extensions. If upstream dam extensions will be utilized, then it is disingenuous to show only the starter dam, and not the dam extensions, while labeling this Figure 2.4 a "Typical Section."

Therefore, it must be assumed that upstream raises are planned for the south embankment. The primary concern with upstream tailings dam construction is its susceptibility to failure during earthquakes. If the tailings upon which the dam is constructed can be saturated with water they do not form a stable foundation for the dam under seismic loading. Tailings are placed in the TDF in saturated state, and in order to be safe under seismic loading must be dewatered. Tailings are materials are relatively uniform in their size and shape, and typically have very low permeability, a fact often cited by mining engineers to argue that liners are not needed for tailings facilities. As a result, it will be difficult to properly drain the water from all the tailings under the proposed dam expansion.

Downstream construction, as is used in the starter dam, should be used to extend the height of the tailings dam.

The ESIA states that,

> The tailing storage facility would be designed to contain storm events of return period up to 1 in 100 years. In the event a storm exceeding the design event occurs, discharge from the facility would be controlled via an emergency spillway.

(ESIA 2-19). Because there will be significant levels of cyanide in the tailings pond, even if cyanide destruction is employed, it should be designed for the Probable Maximum Flood (PMF), not the 1 in 100 year storm event. Use of the PMF is standard for no-discharge tailings pond design. That the mine has a water impoundment directly above the tailings pond, posing a flooding threat if that impoundment failed underscores the importance of pond seismic design and stability, and full compaction and synthetic liner underlining the tailings pond. Designing the tailings ponds' emergency spillways "to handle storm events of average recurrence interval of 1 in 1,000 years" (ESIA 2-19) does not address adequate storm protection for the tailings pond itself. This further underscores the possibility and importance that the entire tailings pond be designed to handle the PMF.

The content of the tailings pond is simply too toxic to protect it against only a 100 year (averaged) event. Newmont and other financial parties will likely have left the project site before the greater-than-100 year event, but even following reclamation it is quite possible for a greater than 100 year storm to remove tailings or otherwise damage the tailings pond. Flows over the pond could distribute tails into reclaimed materials or erode tailings or otherwise damage reclamation, not to mention carry tailings off-site.

Additionally, the ESIA does not adequately describe or ensure that water exiting the emergency spillway will be safely diverted and stored. During mine operation this water could contain tailings contaminants, and after mine closure it could contain sediment and depending on reclamation success (or the storm event disturbing tailings) could also contain tailings contaminants. The diversions and watercourses below the emergency spillway must be sufficiently designed and constructed to handle the maximum potential water going thru the spillway. The same applies for the dam behind which these waters will flow (ECD 2?).

Cleanup in the event of failure after the mine closes would be left to public and governmental resources. Newmont should design its long-term facilities (e.g. tailings pond, waste rock piles, all dams and diversions, etc.) to survive the maximum probable precipitation event, not just the 100 years average.

6) Pits

The results of hydraulic conductivity tests performed in the eight piezometers in the Apensu mine pit area have a fairly large range (*See* ESIA 4-128). Average conductivity is not indicative of anything useful and therefore the actual data should be used to determine hydrologic conductivity. Of great concern is that averaging misses or hides potentially high conductivity that could lead to inflow into or drainage from the pits. The pits must be adequately characterized, including 50 feet from the pit's edge to insure that conductivity into or out from the pit is captured. This is particularly important because the ESIA identifies at a minimum that the pit is hydrologically connected to the surrounding water resources:

> During mining, dewatering would create a groundwater cone-of-depression surrounding each pit that would keep groundwater flowing toward the mine pits. Therefore, no impacts would occur to groundwater quality in these areas. After cessation of mining, however, dewatering would cease and the pits would fill to steady-state pre-mine groundwater levels after several years. At that time, water in the pit lakes could mix with the natural groundwater flow system intercepted by the pits. Quality of water that would develop in the pit lakes is being evaluated relative to ongoing geochemistry studies described in the Geology and Minerals section above. Kinetic testing of rock will provide information to confirm results of current whole rock and acid-base-accounting work completed to date.
>
> A pit lake study initiated by NGGL will provide information regarding the relationship between the formation of an open body of water and the groundwater flow system in the vicinity of each mine pit. The study will evaluate whether water loss associated with the evaporative surface formed by the pit lake would effectively create a "sink" in the water table that would cause groundwater to flow towards the pit after mining ceases.

> In other cases, groundwater inflow could equilibrate with groundwater outflow and the mixing of groundwater with water in the pit would be analyzed to determine whether any offsite effects may need to be addressed in the closure plan.

(ESIA 4-133). These tests, particularly kinetic should have been completed before this point in permitting and construction, and have great ramifications to ground and surface water quality and flow/quantity. The results of these tests could indicate significant environmental (and financial) impacts during or, more likely, following mining.

There is no discussion of whether the pit lakes would have net evaporative loss or gain. This is important from a groundwater recharge and groundwater quality perspective. Further there appears to have been no modeling of pit water quality. The ESIA discusses the unknowns of the pit, and that is the object of the hydrology study. However, this should be known to determine the potential for contaminated pit water and potential impacts to ground or surface waters, and humans and wildlife.

Backfilling the pit will not mitigate these unknowns because the pit could still be hydrologically connected to surface waters, posing a threat to surface water quality and anyone or anything exposed.

The ESIA entertains pumping and treating pit water as a means of addressing potential poor quality water in pit lakes. Aside from the need to better predict pit water quality, discussed elsewhere, this method of treatment is costly and must continue into perpetuity. Given the reasonable possibility that this will be needed for mine closure, and the great environmental risks of pump or treatment failure, Newmont should now commit to financial requirements to construct and operate such a long-term treatment method. Such capital decisions should not be left until after the gold has been removed and only the mine's liabilities remain. Each of the four pits could be somewhat different and should be analyzed and evaluated separately.

7) *Water Resources*

a) Wetlands

Wetlands value and performance are not adequately considered. The ESIA states that:

> The Ahafo South Project would result in the filling of riparian/wetland areas in the Subri drainage as a result of construction of the tailing storage facility and the water storage dam. Although wetlands would be lost through construction of ancillary facilities, new wetlands would be created by the water storage facility and environmental control dams. The net effect would likely be that more riparian/wetland areas would be created than destroyed. None of the wetlands that could be affected have been identified as having high ecological functions and values, warranting conservation priority.
>
> Indirect impacts to wetlands would result from altered streamflows in drainages downstream from water impoundments and the mine pits.

> Changes in hydrological regime would have potential to reduce areas of wetlands downstream from these facilities. Due to the seasonal nature of surface water flow in these tributary drainages, however, these hydrologic effects should be minor. Non-point sediment discharge from soil disturbance associated with mine development and operation could be deposited in wetlands if such sediment loss is not controlled near the source areas.

(ESIA 4-80). This discussion measures wetlands by geographic area and undervalues qualitative factors such as wetland function, value, and assessment. These topics are well understood and documented (*see e.g.* the USGS' analysis at http://water.usgs.gov/nwsum/WSP2425/functions.html). The ESIA does not examine the lost wetlands performance and function compared to created wetlands' performance and function. A wet area, such as around a pond, does not necessarily create or function as a wetland, but that is impliedly what Newmont is calculating in its assessment of wetlands.

The ESIA's statement that wetlands were not identified as having conservation priority does not consider the values of existing wetlands compared to the wetlands that *may* be created by mine construction. The ESIA undervalues wetlands' impacts and significantly ignore the impacts that could occur from mine-caused wetland losses. It seems that the seasonal nature of surface flows would increase wetlands' importance, because they help hold water and mitigate high flows' impacts on land (e.g., reducing flooding following a monsoon or hurricane).

The ESIA discussion further ignores the impacts on wetland performance. Suggesting that soil discharge could be deposited in wetlands simply ignores cause and effect, does not quantify impacts, and does not identify how the mine will restore and replace wetlands value and function lost to unplanned activities.

Finally, the ESIA concludes that "[o]nce NGGL completes reclamation of the area disturbed by initial construction activities, baseline conditions associated with wetlands are expected to resume." (ESIA 4-81). This statement is unsupported and suspect because the many years of mine activities are likely to significantly change the structure, function, and existence of wetlands that existed prior to mining. Simply turning the water back on, so to speak, does not mean that wetlands will return or function.

b) Acid Mine Drainage

The ESIA's discussion of acid mine drainage (AMD) formation is inadequate because the actual potential for AMD is neither fully analyzed nor characterized. IFC's Environmental Health and Safety Guidelines for Precious Minerals Mining (Draft, July 2004) demands "[c]omprehensive testing and mapping of [metal leaching] and AMD of all formations foreseen to be disturbed or otherwise exposed by the mine". The ESIA discusses and generalizes AMD production and potentials but does not comprehensively meet this requirement.

The ESIA states that:

> In order to evaluate potential for acid rock generation for the waste rock disposal facilities and tailing storage facility, numerous oxide and sulfide composite samples in the mine pit areas were tested using static testing methodology (acid-base accounting) (see Geology and Minerals section in this chapter). Results show low to non-existent acid-generation potential and very high neutralization capacity for representative waste rock. Small amounts of unoxided sulfide ore material are considered "slightly acidic". Overall, there is low risk of acid mine drainage from the various waste rock disposal facilities and the tailing storage facility.

(ESIA at 4-124). This ignores many geologic and logistical uncertainties, or at a minimum fails to conduct and/or present necessary data or studies to draw these conclusions. The use of composite samples distorts differences in rock types and how those rocks will be differently handled, treated, and disposed in the mine's operations. The data do not fully support that the potential for acid production is low, and the ESIA does not appear to consider that neutralizing potential may not effectively neutralize acid that is produced. The discussion in the Geology and Minerals section is similarly lacking.

The ESIA states that "[g]old occurs with pyrite and quartz in primary ore and is rarely associated with arsenopyrite and rutile." This is supported by data presented in Table 4-24; however that data is inclusive. The data presented in Table 4-24 includes no description as to how the data was sampled and averaged. The data presented in the ESIA is insufficient to reliably predict the probability of AMD formation. There is little or no discussion of sulfur content. From the AGP (*See e.g*. 4-100) we can possibly predict that sulfur will be relatively low, even in the sulfide intervals. The reports referenced as Newmont Mining 2003 b, c, d, and e, would be particularly valuable to assess related ESIA conclusions.

Further, there is no distinction in the data presented in the ESIA between waste rock and ore. Ore and waste rock may be geologically different, as evidenced by the fact that one has gold to be mined and the other does not and is considered waste. More importantly, the two will be handled very differently during mine operations. The ore will be processed and homogenized. The waste rock will be transported to the waste rock piles as it is removed from the pit, and therefore must be carefully sampled to insure that sampling is representative. The geochemical characterization should include not only the waste rock but also the pit walls within 50 feet of the pit itself. This appears not to have been done, and while these data may be included in the upcoming data report, they are essential to determine critical environmental protection and reclamation design features.

Because of the gaps in the ESIA's data, it is difficult to determine how much blending or isolation is appropriate when acid generating rock is encountered. Because of these unknowns, and the huge impact they could have on the water quality and the environment, Newmont should provide more data and analyses before mining in order to ensure that waste material is not inappropriately placed when mining begins.

The ESIA proposes that 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. (ESIA S-45).

The ESIA may mislead some readers to conclude that because there are basic materials that the basic materials will neutralize any acid that is generated. Acid minerals tend to decompose at different rates than basic/neutralizing minerals, with the former usually taking longer than the latter. As a result if there are equal quantities of the two minerals, acid will still probably form and contaminate because the naturalizing material will weather first. Even if the acid is neutralized by the basic materials, the mine rock contains neutral metalloids which will remain in solution in a basic environment, and will contaminate water resources when mobilized. The ESIA acknowledges that even a net neutral pH does not solve the problems and lining, monitoring, and treatment - but the extent of the required commitments remains unclear.

An example of potential acid-producing material that is not adequately characterized, but is not fully discussed in the ESIA, is anchorite. The ESIA states that:

> ... primary (sulfide) ore typically contains between 3 and 12 percent carbonate minerals and approximately 1 percent sulfide minerals (Table 4-26). Ankerite-dolomite accounts for the bulk of carbonate minerals present while calcite and siderite are present in lesser amounts. Pyrite is the predominant sulfide mineral present, although arsenopyrite is reported. Oxide ore typically contains only trace amounts of ankerite-dolomite and pyrite, but may contain 8 percent or more goethite and up to 33 percent kaolinite. . . .
>
> In addition, the ankerite end-member of the series contains up to 33 percent iron by weight that can result in substantial delayed acid formation when any iron released during dissolution re-precipitates as ferric hydroxide. Traditional static acid neutralization potential titrations do not fully account for the mineralogic component or its elevated iron content.

(ESIA 4-103). Ankerite is a complex iron carbonate. The ESIA states that ankerite could produce acid but the extent is unknown. Additionally, the ESIA acknowledges that there could be substantial delayed acid formation, but Newmont has not yet completed the testing necessary to determine whether this may or may not be a significant problem. (ESIA 4-103).

As a result, in this region with highly weathered in-situ rock, the actual potential is unknown. The mine must commit to absolute isolation and protection of potentially acid producing materials to insure water resources are protected. This should include committing to specific testing, handling, treatment, isolation, oversight, and reporting regimens.

c) Water Quality

The Ghanaian cyanide standard (Table 4-36) is essentially a drinking water standard, and should not be used as a discharge standard or a standard intended to protect aquatic life. Similarly, the Ghanaian arsenic standard is high and will not protect aquatic life. The US EPA arsenic drinking water standard is now 0.01 mg/l, which should be used to protect human health and the environment.

Table 4-37 is a homogenized accounting, which is not necessarily representative for any one waterbody or site. Additionally, the antimony numbers do not make sense. Amounts of iron and manganese and aluminum are high. This could be from suspended solids and in any case do not represent standard water quality measurements necessary to assess water resources.

The ESIA reports that:

> The Subri stream and tributaries comprise the largest sub-basin in the Project area. Of the 24 surface water monitoring stations in the Project area, 10 of them are within the Subri sub-basin. Water quality is similar to other streams in the region with exceedances of water quality standards for color, turbidity, TSS, iron, manganese, and aluminum. The standard for mercury (0.001 mg/l) was exceeded in the upper Subri sub-basin (NSW9), Subika stream (KSW13), and downstream of their confluence (KSW2). Samples from spring KSW9 exceeded the 0.01 mg/l standard for arsenic (75% of samples) and the 2.0 mg/l standard for zinc (50% of samples). One sample from station NSW9 (upper watershed) also exceeded slightly the arsenic standard.

(ESIA 4-119). From the map of water quality monitoring stations (Figure 45-7) it is not apparent that 24 monitoring stations are sufficient for over 2,500 ha of mine operations and buffer included in the Ahafo South mine. For example, there is a drainage to the east of the waste rock dump above the Subika Pit that could potentially be impacted by waste rock drainage, but does not have a surface water monitoring site.

In the Subri sub-basin the presence of mercury, zinc, and arsenic underscore that the mine could encounter these and/or other potential contaminants to surface or ground water quality. This underscores that the mine should determine mineral and water quality data sufficient to more clearly identify water quality threats and problems. The mine must be on the lookout for - and extensively monitor for - higher levels of these contaminants in the waste rock. If these metals are in the streams before mining, it is highly probable that they will be in the waste rock and ore that is removed, and in the pit walls. They pose a significant threat to water quality because the increased surface area and fracturing of waste rock could yield increased leaching and contribution of these or other metals to the environment. Newmont must commit to specific and regular testing to insure that waste rock and discharges do not potentially release these materials. The mine must monitor for these during mine life and in the long-term monitoring.

This is important for all of the mine pits, but appears especially important for the Apensu mine pit area, where antimony, arsenic, barium, and selenium were present in significantly higher-than-average quantities. (ESIA at 4-125).

As discussed above, the proposed mine plan does not adequately provide for a liner for the entire tailings pond. Even if this deficiency is corrected the analysis for tailings dam leakage is still lacking. The ESIA states:

> The tailing storage facility design incorporates a low permeability clay liner on the bottom surface that would restrict movement of tailing slurry water into the subsurface. A synthetic liner would be located at the base of the tailing impoundment area where the supernatant pond would be located to further inhibit seepage. In addition, a cutoff trench would be excavated through alluvium and highly weathered sedimentary rock at the dam site; a seepage collection drain is proposed upstream of the cutoff wall where collected water would be pumped to a sump and then back into the tailing storage facility or to the plant site for recycle. In the unlikely event that seepage from the tailing storage facility gets into the local groundwater system, the water may be affected by elevated concentrations of cyanide, antimony, arsenic, copper, iron, and/or nickel (see Direct and Indirect Effects – Surface Water Quality section above). A closure alternative considered in Chapter 3 consists of water treatment for effluent from the tailing storage facility seepage collection drain for as long as necessary to achieve water quality standards.

(ESIA 2-132). Unless bedrock is relatively shallow below the dam site, the seepage cutoff trench can not insure that a majority of the seepage will be captured (p. 4-132). A more effective approach would be to use a series of pumpback wells, with a series of monitoring wells downgradient of the pumpback wells to insure seepage capture.

d) Water Quantity

The ESIA identifies that [t]he Tano River is a source of potable water for the town of Sunyani and other small towns and villages located within and around the Project area" (ESIA 4-109) but does not appear to fully consider the impact of the mine's water withdrawal on ongoing or future uses. (*See generally* ESIA 109-112). The ESIA further states that:

> 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 pump station and pipeline corridor will be located within the mine lease area as shown on Figure 2-2.

(ESIA 2-23). Water withdrawal for mine activities is discussed primarily in terms of water needed by the mine for its operations. However, water withdrawal should consider the impact of withdrawal on natural resources and non-mine consumptive uses (such as drinking water, agriculture, etc). That Newmont has committed to providing alternate sources of water (ESIA 2-122) does not necessarily address these concerns and does not exempt wasting water or altering natural water cycles. The potential for water pumped from the pit (ESIA 4-123) or sediment pond water (ESIA 4-122) to contribute to natural flows or other uses is uncertain and indefinable at best and unless quantified cannot be relied-upon to calculate water balances.

The water balance of the entire project appears uncertain and insufficient. To ensure adequate natural flows for environmental and existing (non-mine) human activities requires clear description of the existing water flows (surface and ground), reasonable descriptions of proposed uses and sources, and commitment to minimum flows below which the mine will not extract water (surface and ground).

The impact of water withdrawal on natural resources or human uses is not mitigated by the promise to provide alternative sources. The commitment to providing alternate sources ignores water for nonhuman (environmental) uses, such as instream flows for fisheries health. Discussion of water quantity should look at low flows and determine what minimum instream flow is needed to protect aquatic life and other uses, including agriculture and domestic use. Newmont should then commit to not taking water that is below those levels. In this way, water withdrawal will be based on aquatic biology of the specific sources and resources, rather than what Newmont uses in the mine.

e) Water Storage Facilities

In addition to the seismic concerns raised above for the water storage facility's dam, it is unclear whether the emergency spillway and diversions designed/described will protect the tailings pond and other facilities from a major event flowing thru the spillway and then the diversions. The water storage facility will capture approximately 3,000 ha of area, which is approximately half of the catchment area collected in/behind what was originally planned as ECD 4. (NMC's WSF Catchment diagram, July 18, 2005). In the event of a PMF storm, safely transmitting this large a quantity of water is necessary to protect other facilities.

This is more a question of the water transmission system from the emergency spillway than one of the spillway design itself. Presuming the spillway operates as designed in a high or peak flow, the ESIA states that "[w]ater passing through the spillway will be routed via a series of diversions to the Awonsu tributary of the Tano River." (ESIA at 2-58). The ESIA does not provide sufficient information to determine the adequacy of "this series of diversions."

Water originally (pre-mine) flows down what will essentially be the middle of the planned water storage facility's dam. Water tends to flow in the direction/path of least resistance. If there was an overflow event it is unclear that the emergency spillway and related diversions will transmit water to the river instead of following a course that approximates or seeks the natural topography/flow. Flows following the direction of the natural channel would go over, through, or around the tailings pond, Apensu waste rock pile, and/or Apensu pit, among other facilities and features. Failure of the "series of diversions" at other points could impact or cause failure along the planned diversion route to the river to other mine facilities and features.

The "series of diversions" is not adequately described and its ability to conduct/contain a Probable Maximum Precipitation storm event (ESIA 2-23) is unclear. This is especially true in the face of the topography and original/natural streamflows. Newmont should ensure and demonstrate that the maximum flow through the water storage facility's spillway can adequately be diverted/conducted without threatening or impacting other mine features/facilities.

8) Reclamation

The ESIA promises that:

> As various facilities reach the end of their period of use, they will be reclaimed. Reclamation of disturbed areas has been occurring since construction began and will continue throughout operations in disturbed areas no longer essential to exploration, construction or operation. Non-essential disturbed areas may include exploration roads, drill pads, trenches, sumps, or other features. Following reclamation of these areas, resource monitoring as described above will occur.

(ESIA 5-32). As a way of demonstrating Newmont's internal and external commitment to, and success of, contemporaneous reclamation where possible at this mine, Newmont should commit to completing a report of its existing reclamation of exploration roads, pads, trenches, sumps, etc. This will allow all interested parties to determine the extent of existing reclamation and promote contemporaneous reclamation as the mine develops.

The ESIA states that "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...." (ESIA S-32) This plan however is not adequately described in the ESIA, and is not available on Newmont's internet site where the ESIA is available. Reclamation plans are summarized in approximately five pages of Chapter 2 (*See* ESIA 2-55-60). As a result it is impossible to fully evaluate reclamation goals, plans, or features to determine if they are adequate. IFC's Environmental Health and Safety Guidelines for Precious Metal Mining require a comprehensive reclamation plan. Given the limited information made available by Newmont, IFC faces the same limitations as CSP2, and could not possibly evaluate the reclamation plan based on the ESIA.

The ESIA discusses post-mining agriculture. But as discussed above the ESIA does not commit to ensuring that agriculture is a significant post-mining land use or that/how this use will be achieved. Many inhabitants rely on small agricultural farms for subsistence. From the perspective of environmental availability or logistical facilitation, the ESIA fails to fully commit to ensuring that after mining the inhabitants will be able to resume agricultural practices. Agricultural suitability as a post mining land use should at a minimum be considered based on current use, not the theoretical potential for productivity, and plan reclamation to achieve that goal. (See ESIA 4-141). Post mining land use should be based on what is appropriate for or needed in the area, not what is expedient or convenient or inexpensive.

To promote seeding and planting success, the

> Soil in the Project area is characterized with surficial materials (topsoil) better suited to plant growth than subsurface materials (subsoil). Relative to subsoil, topsoil has higher nutrient content, higher ph (less acidic), higher organic carbon content, and exhibits better tilth. In addition to being less suitable with regards to these properties, subsoil often contains lateritic materials that could harden irreversibly upon drying and impede root growth. Only topsoil would be salvaged for the current project.
> Depth of soil salvage is dependant upon topsoil materials available, which varies throughout the surveyed area. . . . Segregation by series would only be undertaken if necessary to preserve soil properties for selective placement in the reclaimed landscape (NGGL 2004). . . .
> Depth of soil in the reclaimed landscape is dependant on the volume of material salvaged and the number of hectares over which the soil is to be replaced. . . .

(ESIA 4-145, 146). Newmont should commit to salvage soils in two lifts, the first being A and B horizons, presumably the "topsoil" described in the ESIA, and the second being lower series. This will preserve the ESIA's salvage of topsoil, but would also provide additional material from below the topsoil layer (notably, C horizons) that are not necessarily suitable for plant growth but are more weathered and fractured than bedrock or undeveloped rock. This should then be placed as a first lift of replacement cover material upon which the topsoil (A and B horizons) is placed. The net effect is more cover material that will better support plants and more quickly further develop soils than just the A and B horizons placed on top of sand, waste rock, liners, etc.

The topsoil salvage piles will stand unused for years. As a result, as the ESIA acknowledges (ESIA 4-146, 147) the soils quality will degrade during mine operations and the soil value will be reduced from when it was salvaged compared to when it is replaced. To preserve soil integrity (including organic materials, microbes such as mychrrhizae, promote aeration, reduce weed introduction, and reduce erosion, Newmont should commit to establishing nurse crops on the topsoil salvage piles. These plants should be consistent with, and not compete, with the planned postmine revegetation, especially agricultural seeding/planting.

The closure/reclamation figures given in the description of the reclamation and closure plan (Table 2-5 at ESIA 2-59) most probably represent Newmont's internal closure costs, and do not represent the costs to perform these activities if they had to be completed by a third party or the government. Therefore these cost estimates do not protect the government or people from a premature closure of the mine. They reflect the cost to the company, which is less than if the government has to complete the activities, and the money is collected in a phased approach. The adequacy or accuracy of the costs is difficult if not impossible to analyze or critique without access to the MFG 2005 document cited.

The ESIA further states that:

> NGGL would earmark $6.24 (US) per ounce of gold generated over the operational mine life to accrue adequate funds to complete final closure and reclamation of the Ahafo South Project. Approximately $10 million (US) has been budgeted for concurrent reclamation activities during the operations phase of the Project. Estimated production of 6.8 million ounces would provide approximately $42 million (US) for closure and reclamation.

(ESIA 2-59). This suggests that the mine will establish a reclamation fund as gold is produced. Mines, however, incur much/most of their reclamation liability in the first years after opening the mine (pit, tailings pond and dam, and waste rock piles) and if the mine closes or goes bankrupt before mining and reclamation is complete then there probably won't be enough money to close/reclaim the mine. Likewise, as required by IFC's Environmental Health and Safety Guidelines for Precious Metal Mining, if the mine temporarily suspends activities there would need to be funds to maintain operations and activities that protect human health and the environment, such as pumpback operations, water treatment, monitoring, etc.

The need to protect human health and the environment separate from the mine's operators, combined with the high costs to maintain or reclaim the mine, support requiring a bond or similar financial surety so that if Newmont or its subsidiaries is not available or willing to complete adequate reclamation then another entity has funds to do the necessary work.

Further, the cost to an agency to perform reclamation at a mine site is usually 30-50 percent higher than the cost to the original operator. This is because of costs for mobilization, overhead (regulators issuing contracts), contractor profit, etc. Beyond these obvious deficiencies, it is difficult to critique the proposed reclamation costs because the reader does not have the referenced reclamation plan and reclamation cost documents (MFG 2005).

Having some of the royalty payments remain in the province is a good idea (*See* ESIA 4-32). However the ESIA fails to adequately consider the financial ramifications to the area after the mine closes. By analogy, the mine plan should consider the impacts of building a school (which is good) but failing to determine how to pay teachers after the mine closes. There should be a detailed analysis of mine impacts and sustainable development for the locally impacted people.

MONITORING

Monitoring and discharge reports, including reporting on contamination of surface and ground water, should be made publicly available in a timely manner. There is no excuse for the mine not immediately notifying the public of leaks, contamination, etc. This is essential for trust and to develop a working relationship with the public. The Ahafo South mine is being constructed in a greenfield area - that is, an area new to mining.

Therefore, as IFC's Summary of Project Information seeks, to shed Ghana's negative mining history and past image, and to protect human health and the environment, it is essential for Newmont to actively engage the public not only in mine benefits but mine impacts as they happen.

The ESIA commits that:

> Groundwater monitoring wells will be installed downgradient of the tailing storage facility and waste rock dumps, and sampled at a frequency and duration per approval of Ghana EPA.

(ESIA 5-25; Table 5-3). Shallow and deep groundwater monitoring wells should be installed in several locations downgradient of (1) the tailings dam, (2) each waste rock dump, (3) each pit, and (4) the processing plants and anywhere chemicals are stored or used. The ESIA states that

> If any chemicals used for mine processing (i.e., sodium cyanide, lime, caustic, hydrochloric acid, activated carbon, and flocculants) are accidentally released in sufficient quantities to the environment, they could infiltrate and impact shallow groundwater.

(ESIA 4-134). Adequate monitoring is the only way to determine spills and their impacts. Unknown leaks, or leaks that employees fail to report or attempt to hide will remain undiscovered and their contamination will continue or disperse unless monitoring is in place to detect them. Adequate monitoring before, during, and following mining also protects the company, because it allows all involved to determine what is background and what is mine related.

Actual monitoring points for all monitoring must be clearly identified in terms of location and times of sampling. Moreover, monitoring points must be representative and be close to the discharge, to prevent long mixing zones that may become essentially sacrifice zones.

Contaminant release and incident reporting structures (such as Newmont's 5-Star) must include that environmental data and reports are available to the public. There should be full transparency and Newmont should commit to informing the public and government about any unplanned or unpermitted release as soon as it becomes known - not just during the regular document/reporting cycle. Annual or even quarterly reports do not adequately address the public's right to know about problems at the mine. The ESIA notes that "... lenders may require annual IFC should require contemporaneous reporting to the public of leaks, spills, and all similar releases. In this manner, Newmont and lenders will most likely ensure not only quick responses to such releases, but also better operating procedures and care - and public trust.

ESIA REPORTS, DATA, AND REFERENCES

It is appropriate that all reports and data relied upon or cited in the ESIA should be made available on Newmont's internet site, just as the ESIA was made available. Looking to the future, when analysis begins for the Ahafo North project, and during EIS, ESIA, and similar document review, all reports and relied-upon material should be made available to the public on the internet.

As discussed above, many reports, data, and references that are not currently available to the public are necessary to properly evaluate the ESIA and mine. The following items, taken from the ESIA are among the most important and are hereby requested from Newmont as a starting point.

Bucknam, C. H. 2002. Newmont Standard ARD Waste Rock Evaluation Methods. Newmont Metallurgical Services. Englewood, Colorado.

Knight Piésold Pty Limited. 2003. Ahafo Project, Feasibility Study Update. Tailings Management, Raw Water Supply, Sediment Control, and Access Roads. Volume 1 of 4. PE301-00015/6. West Perth, WA 6005 Australia. November. 2004. Addendum to the EIS – Water Abstraction from the Tano River. Ahafo Gold Project. Memorandum from Richard Galloway. 14 July 2004.

Lycopodium Pty. Limited. 2003. Ahafo Project Feasibility Study. Prepared for newmont Ghana Gold Ltd. December (sic).

_____2003b. Internal Memorandum to: M. Hubbard/Perth, from S. Acar/Inverness, June 6, 2003. Subject: Awonsu (Kenyase East) NCV Calculations.

_____2003c. Internal Memorandum to: M. Hubbard/Perth, from S. Acar/Inverness, June 13, 2003. Subject: Apensu (Kenyase Central) NCV Calculations.

_____2003d. Internal Memorandum to: M. Hubbard/Perth, from S. Acar/Inverness, July 23, 2003. Subject: Subika (Area E) NCV Calculations.

_____2003e. Internal Memorandum to: M. Hubbard/Perth, from S. Acar/Inverness, October 29, 2003. Subject: Amama (Bosumkese) NCV Calculations.

_____2004b. Newmont Internal Document: Ahafo Area E Metallurgical Study of 70 Composites. October 22, 2004. Plato Malozemoff Technical Facility, Newmont Metallurigical Services, Englewood, Colorado.

_____2004a. Ahafo Project (South) Environmental Impact Statement. Prepared for Newmont Ghana Gold Limited. September (sic).