Improving community interaction after tailings pipeline failure

This case study describes a tailings breakout incident at Morila Gold Mine (MGM), the mine's response to it and the engagement with local stakeholders in the process. Out of the lessons learned, a review of the emergency plan was performed using the guidelines from the APELL programme as a basis.

Morila Gold Mine description

The Morila Gold Mine is located approximately 11 kilometres south of Sanso village and 175 kilometres west of Sikasso, the capital of the southern region of Mali. Shareholders are AngloGold Ashanti (40%), Rand Gold Resources (40%) and the Government of Mali (20%).

The mine is located in a rural environment. The nearest four villages are Morila (2 kilometres), Sanso (5 kilometres), Fingola (6 kilometres) and Domba (11 kilometres). The total population of these villages is about 6000. The villages consists of small concentrations of houses, and the main economic activity is subsistence agriculture. The watercourses (Fadia, Diaratou and Koba) around the mine property are seasonal and dry up from January to June.

The oxide and sulphide ore is extracted by surface mining methods. It is processed in a carbon-in-leach (CIL) gold plant. The plant includes two mills (ball & SAG), cyclones and trash screens, a leach regeneration circuit, acid washing and elution circuits, reagent holding tanks, electrowinning process, smelt house/gold recovery room, reagent mixing area, a plant control room, engineering workshop and a chemical laboratory. The barren material (variously referred to as waste rock or mine development rock) is stockpiled in a single waste rock stockpile that is constructed to facilitate concurrent reclamation.

The gold plant is part of the extensive infrastructure that currently supports the Morila Gold Mine. Within the vicinity of the gold mine there is also a diesel-run power station, training centre, bus terminal, main office, security office, a lightvehicle workshop, change house with ablution facilities and stores (including fuel storage facilities). Water is pumped from the Bagoe River through a pipeline to a dam (Raw Water Dam) that supplies a secondary storage reservoir (Raw Water Pond) in the vicinity of the gold plant.

Emergency planning at MGM

Emergency planning at MGM has been carried out by first preparing a list of potential events that also details their possible impact on the environment. Potential incidents were identified from experience and knowledge of gold mining operations with conventional CIL plants. Potential impacts were also assessed on the basis of site-specific environment conditions at Morila (air, water, land, geology, vegetation, fauna, land uses, climate and geographic location/available infrastructure).

This list, which is called an Aspects Register or an Impacts Register, is usually kept up to date by ensuring that all planned activities and their associated impacts are adequately characterized.

The list at MGM consists of a number of potential incidents, but the most significant potential major accidents are considered to be:

- tailing storage facility (TSF) main wall rupture (tailing spillage);
- major spill from bulk diesel storage tanks; and
- cyanide and other highly corrosive chemical spillage.

Based on this list, MGM has developed an Emergency Management Plan by combining the Spill Prevention, Control and Countermeasure Plan and the Fire Prevention Plan. This document is aimed at mitigating or overcoming potential major incidents. The involvement of the local administrative and traditional authorities was deemed critical to improve the communication channels between the community and the mine.

All incidents labelled Category 1 automatically trigger the involvement of local stakeholders in the process. Category 1 is defined as follows:

- The impacts have extended onto publicly accessible land and have the potential to adversely affect surrounding communities, livestock or wildlife;
- The event will generate negative public (or media) attention;
- The damage caused or the remediation cost is in excess of US$500,000

Case study

Morila experienced a tailings spillage on 16 March 2003 when a weld in the tailings pipeline split open, causing the slime to run off the mine property onto public land. The volume of spilled material has been estimated at 2082 cubic metres, of which more than 96% was contained in catchment paddocks and trenches on mine property. The remaining 69 cubic metres of spillage affected an area of 1.5 hectares outside the mine property.

A factor that contributed to the significant scale of the incident was the control room's inability to immediately identify the pipeline breach andcease pumping. As "open ending" was taking place at the Tailings Storage Facility, no pressure drop was detected in the control room (which would have been detected if cycloning had been taking place). Subsequent investigation showed that the scheduled regular pipeline inspection patrols did not take place, which led to the spillage continuing undetected for an estimated four hours.

A further contributing factor to the extent of impact was that the secondary containment paddocks were not optimally engineered for spill containment, and some tailings overflowed into a perpendicularly adjacent storm water channel instead of into laterally adjacent containment paddocks.

As soon as the incident was reported, the Morila emergency plan was initiated. At the time of the incident, the local authorities – including the Sous Prefet, gendarmes and Mayor – were

informed. A delegation from the mine, including the General Manager, went personally to find the Sous Prefet on the evening of the incident in order to explain to him the situation and the measures that had been taken to contain the incident and prevent any further impact on the local people and environment.

During the evening of the incident, a vehicle was sent to Sikasso (the Regional capital) to fetch the Regional Officers in charge of mining and environment. As soon as they arrived the following day, they met the Sanso civil servants involved in the investigations. Then they conducted their own independent investigation of the incident site, with the assistance of the mine personnel when requested.

When that was completed, they met the community leaders and gave them feedback on their findings. They assured them that the mine undertook all the appropriate actions and that there was no persistent danger for people, animals or the environment. In the afternoon, a meeting was organized with the Sous Prefet, the community leaders and the mine. Morila mine management reported openly the cause of the incident and the remedial actions undertaken.

Once again, the Regional Officers confirmed that Morila took all the appropriate actions and that there was no further danger for people and animals. They also said they would report their findings directly to the government.

The community leaders understood the circumstances and expressed their recognition for all the effort Morila undertook to deal with the incident openly and professionally by involving the authorities. In addition to the remedial actions taken to neutralize the incident and prevent any similar occurrence in the future, Morila mine paid compensation to the community for livestock losses.

The incident has been an opportunity for the community and the mine to improve their relationship through open honest dialogue and is a good example of turning a negative incident into a more positive situation.

Lessons learned

Following this incident, MGM has proactively conducted an extensive series of investigations and reviews. Table 2 presents a summary of the lessons learned, as compared to the APELL guidelines.