Equipment

The underground mining equipment required for the operation comprises the following:

- 3No JS350 Scooptram;
- 2No JS250 Scooptram;
- 3No JDT413 Haulage Truck;
- 2No JDT415 Haulage Truck;
- 3No MJM20B 2-boom Jumbo Drill;
- 3No M5700DTC Tractor;
- 1No Basket Longhole Drill; and
- 6 pcs Ancillary Equipment.

Drillserve Ltd of Camborne, Cornwall, have assessed and reported on the condition of the mining plant and machinery left at the site by NGM (Figure 12.13).

Figure 12.13 Aerial View of the Existing Plant Fleet

The report covers trucks generators, compressors, drill rigs, scooptrams, service vehicles, workshops, stores, diesel storage and distribution system and all aspects of explosives supply and focuses on the condition of the key

mining plant and its suitability for continuous mining operation, particularly in the context of the proposed new mining method.

Drillserve Report

The full Drillserve Report is held at Appendix 12.16.
The main conclusions and recommendations of the report are as follows:

- Almost every piece of diesel plant had brake cleaner (Easystart) near the engine - heater circuits on several of the machines in poor condition;
- Most things work, but have worked hard and tend to have a range of minor problems, with evidence of major repairs;
- Underground garage is good and routine maintenance certainly no worse than average;
- 350m level surface area is in poor condition. Generators and compressors have dials and valves missing, floors very slippery, fuel line randomly connected and buried in snow. Garage semi derelict.
- Stores is a good building and reasonable system but needs upgrade. Several expensive things stored outside;
- Development size will need to be related to the 3.5 Wagner scoops and 20T trucks as these are the youngest, biggest and most viable machines; and
- Air and water supply infrastructure appears intact through-out the mine.

<u>Pinch Points</u>

- Generator reliability;
- Distances underground between the possible areas of development and the U/G garage;
- Single ramp access to most area of the mine including the garage;
- Poor state of personnel transport;
- Age and condition of development Jumbos;
- Need to upgrade to the stores system effectively, understanding practices and rationalising layout;
- No button-bit grinder on site;

- Whilst in general there are good supplies of spares in the stores, there are some shortages in the drill Jumbo stock which will inevitably be replicated in the spares for other machines.
- Some engines and transmissions may have been sent off site as a basis for reconditioning and need tracing – possible exchange units against items already received.

Processing

NGM did not carry out any processing apart from pre-concentration screening of ROM on site. Consequently, considerable quantities of waste were transported to the third party toll mill at substantial cost. In the initial twelve to eighteen months of operation, A&R will utilise gravity processing techniques to carry out pre-screening of ore, together with removal of oversize material, which, commissioned testing indicates, can improve the grade of the fine material. The mining method should also result in less dilution of ROM also resulting in a higher grade ROM product overall. ROM ore produced during this initial period, coinciding with the initial winning of ore from existing stopes and the working of pillars, will be processed using gravity methods

Following this initial production period, during which resource delineation by underground developments will proceed to prove approximately 100,000 tonnes of measured and indicated reserves, mineral process facilities utilising carbon in pulp (CiP) techniques will be installed in the mine by March 2010 (pending approval by BMP) This will allow the ROM ore to be treated to produce dorè utilising crushing, screening, grinding (milling), leaching, and electro-winning techniques.

All the processing activities, together with the processing plant and facilities, will be located in specially excavated underground caverns within the mine itself. No waste material from the process stream, including talings, will be taken outside the mine but will instead be utilised in the mine waste impoundment (backfill) system.

Gravity

GBM Ltd have produced a comprehensive study of the gravity processing

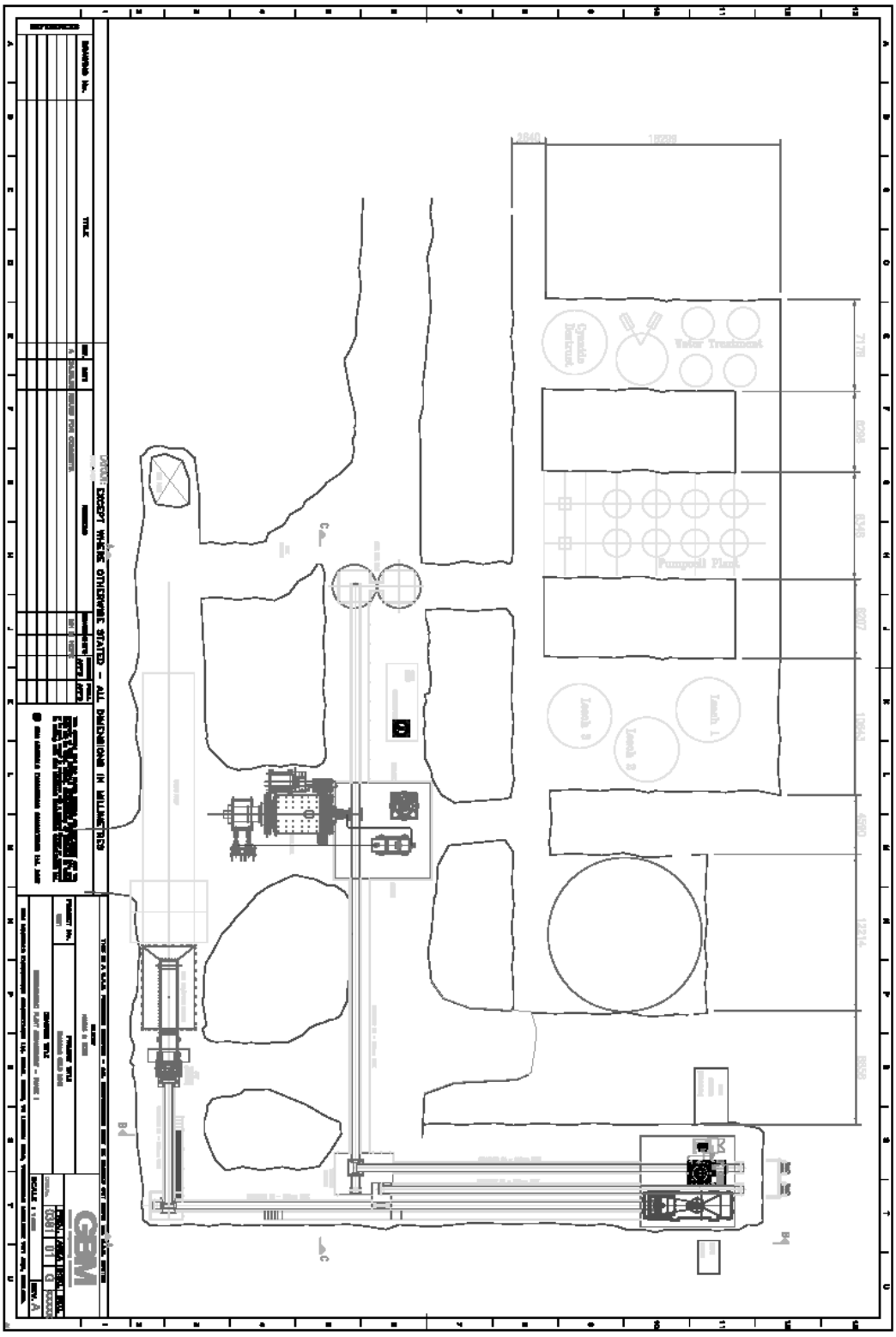

Figure 12.14 General Layout of the Underground Process Area

circuit requirements for NGM dated July 2009. The general layout of the underground process area is shown Fig 12.14. It should be noted that this drawing includes the layout of the CiP and associated systems which will be described in detail in a later Addendum to the EIA.

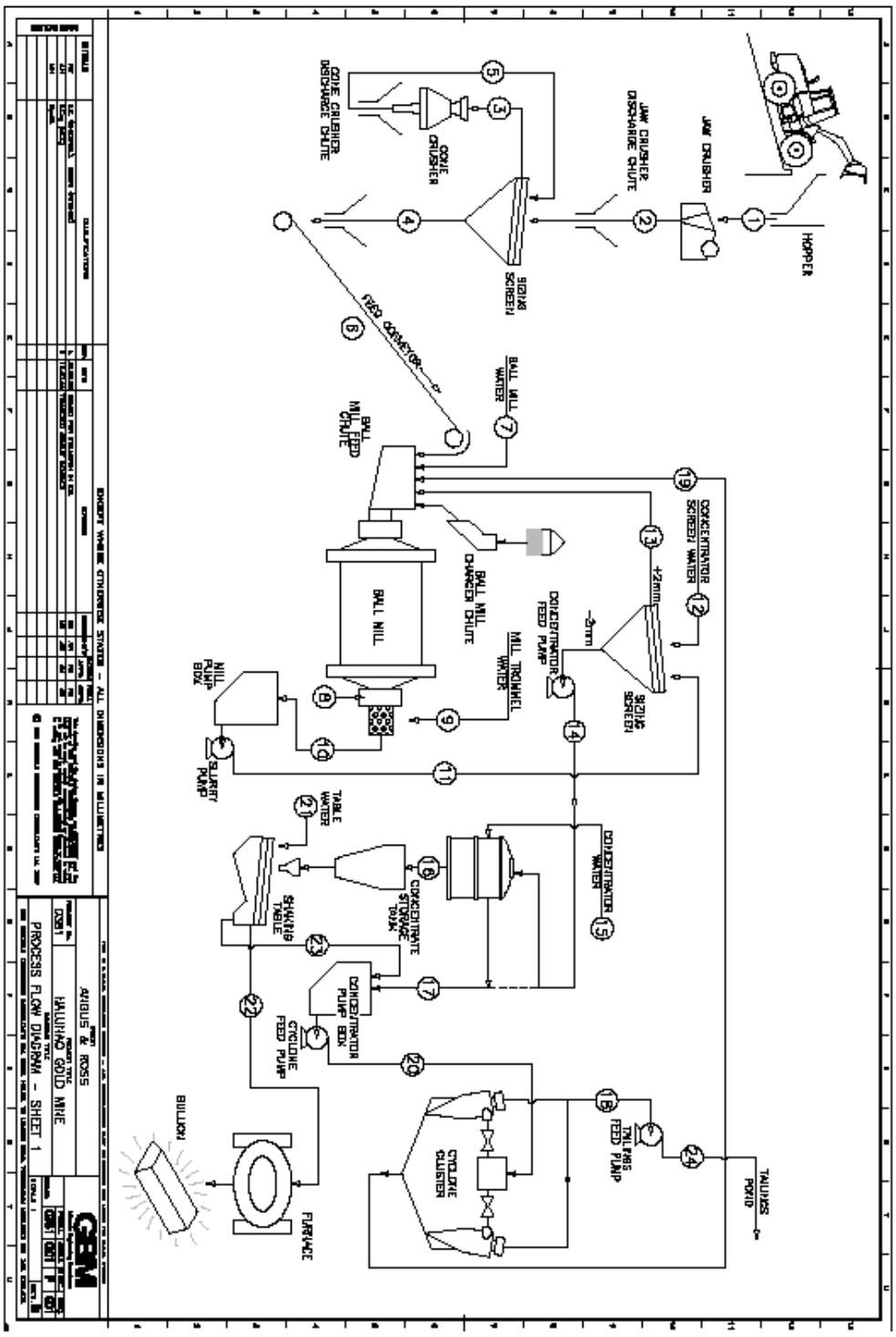

Figure 12.15 – Process Flow Chart

GBM Ltd Report

Crushing & Fine Ore Storage

The crushing circuit is designed to run at a capacity of 11 tph, operating 12 hours per day with 85% availability. Figure 12.15 shows the flow sheet.

Crushing & Fine Ore Storage

There are two options open to this section of the process.

Option 1

Run of mine gold bearing ore is collected from the stockpile underneath the ore pass by an ore haulage truck. The ore is driven up an earth ramp and dumped onto the Locotrack LT1315. The Locotrack unit will be fitted with a jaw crusher to reduce the initial feedstock down to a p80 of 51mm. The Locotrack LT1315 will discharge using its own discharge conveyor into the feed hopper of the Locotrack LT2011E.

The LT2011E is fitted with a cone crusher to reduce the 51mm feedstock down to a p80 of 12mm, suitable to feed the ball mill. The fine ore will be transferred via belt conveyor CV005 into the fine ore bins.

Option 2

Run of mine (ROM) gold bearing ore is collected from the stockpile underneath the ore pass by a 5 tonne ore haulage truck. The ore is driven up an earth ramp and dumped into the ROM bin. Apron feeders underneath the ROM bin extract and feed the ore into the jaw crusher. The jaw crusher with a closed side setting of 60 mm reduces the rock size to a p80 of 51 mm. The crushed ore discharged from the jaw crusher feeds on to conveyors CV001 and CV002 to be sent to a secondary crushing and screening station. Fines from the apron feeders will be collected on the tail end of these conveyors. Conveyor CV002 will discharge on to a vibrating screen. The oversize from the screen (> 12.5 mm) will feed into a cone crusher to reduce the ore size to a p80 of 15 mm. The crushed ore is conveyed via conveyor CV003 back on to conveyor CV002 and on to the vibrating screen for sizing.

The undersize from the vibrating screen has a p80 of 7.5 mm and is of a uniform size for feeding the ball mill. The fine ore will be transferred via belt conveyor CV005 into the fine ore bins.

A chute at the top of these two bins will evenly distribute the ore to each bin. The combined storage volume of the fine ore bins is 115 m^3. With a bulk density of 1.7 t/m^3 (a void space of 40%) this equates to a storage capacity of 200 t or 40 hours of mill operation.
The noise levels around the crushing circuit will be typical of this sort of workplace and standard hearing protection will be worn by operators.
The dust generated by the primary and secondary crushing plants will be collected by a central reverse jet bag filter, via ductwork running from each plant. The dust will be fed back onto the belt conveyors.

Grinding & Sizing

The milling circuit is designed to operate at 5 tph, operating 24 hours per day with 90% availability.

The fine ore is fed using two vibrating feeders onto a single conveyor to be transferred to the ball mill. The ore is discharged into a chute and mixed with process water. The reduction begins inside the 7' x 9' ball mill. The grinding of ore between the balls and the mill liners reduces the ore in size from 7.5 mm to less than 150 µm. Adjustments to the flow rate of water added, ball loading, tonnage and re-circulating load are made to maximise the mill throughput. The ball storage area, ball bucket and ball feed chute are all designed to allow easy access and for operation and maintenance.

The mill overflow slurry discharges into the attached rotating trommel screen. This screen allows slurry to pass through at a specific size and returns coarse material to the mill. As the balls are reduced in size they are dislodged by the addition of fresh larger balls and pass out through the trommel screen and into a scats bin.

The slurry that passes through the trommel screen is collected in a chute and directed to the ball mill pump box. The pump box is designed to prevent to settling and collection of particles in the bottom that can cause the pump to stall on motor overload. A duty and standby pump will selectively pump the slurry from the pump box on to the sizing screen. All slurry pipes are designed to ensure turbulent flow that prevents settling from occurring.

The vibrating screen is installed above the height of the ball mill to allow the screen oversize to be gravity laundered back to the ball mill feed chute. The screen slot size is set to prevent all particles larger than 2 mm entering the gravity concentrator. The minus 2 mm particles passing the screen deck report to the undersize launder and on to the concentrator feed pump box. Spray bars mounted above the screen deliver process water on to the screen to further assist the undersize particles to pass through the screen deck. The undersize from the screen is collected in a pump box prior to pumping across to the concentrator/gold room plant.

The grinding and sizing area has zero emissions. The ball mill has rubber liners to reduce the noise levels in the area and therefore these are well below the acceptable limit with approved workplace hearing protection. A gantry crane is installed above the ball mill to assist with materials handling including movements of consumables such as spare liners and mill balls, as well as lifting maintenance to pumps and motors.

Concentrator, Gold Extraction & Smelting

The concentrator will be designed to run in time with the milling circuit and therefore operates 24 hours per day with 90% availability.

The undersize slurry from the sizing screen is pumped to the concentrator. Inside the concentrator the slurry is subject to a gravitational field, via a spinning rotor bowl. The free gold, being the densest material, is layered then trapped in the riffles of the upper zone of the rotor bowl. An automated system detects when the bed has built to a sufficient grade, when it stops the rotation momentarily to wash the concentrate from under the rotor baffles and out the concentrate launder and into the concentrate storage tank. The solids concentration out of the concentrator is approximately 80%. A small amount of process water is required to carry out this automated operation. The concentrator tails pass over the top of the rotor bowl, where they flow down the inside of the unit, out through a discharge pipe and into a pump box to be classified.

The shaking table operates for about 4 hours daily and is fed from the concentrator product storage hopper. From the hopper, the gravity concentrate is washed down a feed launder to the distribution box from which it flows on to the riffled end of concentrating table, while small streams of water from a perforated pipe flow onto the table along the whole length of the top. The tables operates at about 200 strokes per minute and, since it is set at a slight inclination toward the bottom edge, the low specific gravity particles are washed over the riffles down to the tailings launder along the bottom edge. The high specific gravity materials such as gold and sulphides are caught in the riffles and are propelled by the shaking motion of the table towards the product discharge end of the table. The riffles stop short of the discharge lip and there is plain area of the table where heavy particles continue to be gently washed and subjected to shaking and bumping motion of the table. The effect is to form bands of minerals with coarse gold uppermost then a mixed band of fine gold and coarse sulphides/metallic iron from the grinding media. Cutters are positioned to yield a gold concentrate and a middling product, which may be re-tabled. The gold collected off the end of the table is dried and mixed with fluxing material for smelting in the bullion furnace. The table tails is laundered into a pump box to be classified.
On completion of the smelting process, a sample is taken for assaying before the gold bullion is poured into a series of water cooled crucibles. Any adhering slag is removed from the bullion bars, which are then numbered and weighed before shipment to a refinery. The bars assay 90+% gold, at a theoretical rate of up to 50 oz per day.

The bullion furnace will include a vent stack to extract any moisture or fumes from the smelting process out of the gold room. The emissions from this process are typical of this operation and are not harmful to personal in close vicinity. Appropriate ear protection will be employed in the gold room during gold pouring. All mechanical equipment will have appropriate barriers to protect operations personnel.

Classifying & Tails

The cyclone cluster is designed to run in time with the milling circuit and therefore operates 24 hours per day with 90% availability.

The concentrate tails and shaking table tails collects in the cyclone feed pump box and is pumped to one of two 10" hydro-cyclones. The hydro-cyclone classifies the material according to size by the action of centrifugal forces. The feed slurry enters the upper end of the cyclone body at a tangential angle so that the slurry is forced to flow in a circular motion. By way of centrifugal force the heavier coarse particles are forced to the outer edge of the cyclone. The lighter fine particles rise to the centre of the cyclone slurry flow forced by the action of the heavier coarse particles. The lighter fine particles, along with the water, rise up inside the cyclone vortex finder to be collected as cyclone overflow with an estimated particle size of 80% minus 125 micron. The cyclone underflow slurry empties into a cyclone underflow diversion box where it is directed by gravity to the ball mill feed chute.

The cyclone overflow feeds to the tailings holding pond via pump box and pump to be stored until the CIP circuit is commissioned.

The operation of the classifying circuit produces zero emissions or operational hazards. The storage of tailings is dealt with independently of the processing plant.

The 5No drawings associated with the Gravity Process circuit are held as Appendices as detailed below.

Appendix 12.17	Process Flow Diagram
Appendix 12.18	Process Flow Diagram Sheet 2
Appendix 12.19	Underground Plant Arrangement Phase 1
Appendix 12.20	Elevation A-A and B-B
Appendix 12.21	Elevation C-C

<u>Carbon in Pulp and Associated Process Route</u>

As noted previously, Angus & Ross intend to provide only the gravity process plant for the initial 6 months of operations. No details of the CiP route and associated process systems will be given in this EIA. It is intended that an Addendum to the EIA will be prepared and submitted to BMP in mid October 2009 which will describe in detail that process route and deal with all the

issues raised. As soon as that Addendum is approved by BMP works to install the necessary plant will be commenced. The excavation of the caverns to contain the full plant – ie both the gravity and CiP routes - the plant will be opened and completed during the early phase of operations.

Processing outside the Mine

No mineral processing will take place outside the mine.

Waste Rock and Process Waste

Gravity processed material (fine tailings) derived from the ROM ore in the initial stages of the project will be removed in the gravity grinding and concentration process. This waste material will be put to temporary store within the mine for later re-treatment through the CiP circuit. With the provision of the full process plant, due to the increase in ore production planned for that phase, waste tailings rock will be generated even given that the proposed new mining method will give rise to less dilution. All waste rock tailings produced will be replaced into the mine workings as a rockfill/tailings material so that no waste rock or tailings will be placed to permanent dump externally above surface. It will not be necessary to provide or operate a Tailings Management Facility (TMF) or tailings dam.

All waste rock produced by the mining process and indeed from the process stream, including tailings, will be utilised in the system of backfilling the stopes. No waste "rock" of any sort will be removed from the mine.

Provision of Power

All power for the mine, camp, harbour area and telecommunications station will initially be supplied by the existing diesel-powered generators. The present total installed power left by Crew amounts to about 1.7MW (1700kVA). This comparatively modest power provision will need to be increased to power the new process and doré plants. Generators are presently located at 4 places:

- mine entrance (350m level);
- mine camp;

- harbour; and
- telecommunications station (1.5km away from the camp).

The mine generators produce electricity at 60Hz, 600/115V while the generators serving the camp and the other facilities operate at 50 Hz, 400/220V.

- Mine Generators

  Of the three generators at this location, normally two are operating with the third held as backup. The generators are located in sea-containers placed just outside the mine entrance at the 350m level adjacent to the mine compressors and heaters. All the generators and other plant at this place are poorly set up and poorly located. Historic and expensive fuel spillages have remained untreated during the Crew operations despite requests from BMP.

- Camp Generators

  The two generators at this location stand in the open air with one generator operating and the other held as backup. These generators are poorly set up and poorly located.

- Harbour Generators

  This installation comprises two generators which are only run during ship loading operations and require only minor upgrade. The generators are not needed for supplies unloading and will not be required for the continuing operations. The containerised ANFO mixing plant which is also located at the harbour at present but 2which will be relocated to the mine, has its own small on-board generator.

- Telecommunications Station Generators

  The telecommunication station, located 1.5km away from the camp and in fair condition is powered by two generators - one operating with the other held as backup - placed in a 6m container. The station also

has a battery backup which will last up to two days. The adjacent fuel tank lasts for about a month and is easy to re-fuel as the tele-station is next to the road to the harbour.

Planned Changes to the Power Generation System

- Mine and Camp

  As noted above the present locations and set up of the camp and mine generators and compressors are extremely unsatisfactory and inadequate. A&R intend to make early changes to the generator complement and location and to clean up the oil spillage pollution which has been identified at the 350m surface level. It is intended to site all the mine and camp generators at the former mine workshop near the camp which will become the power station.. The generation capacity will be increased by 1MW and at the same time all generators will be replaced. A new $20m^3$ capacity double skinned fuel tank will be sited by the new power station with appropriate emergency bunding. As noted above the harbour generators will no longer be required.