HAZARD AUDIT REPORT FOR

BARRICK (COWAL) LIMITED,

COWAL GOLD PROJECT, NSW

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Hazard Audit Report for Barrick (Cowal) Limited, Cowal Gold Project

Acknowledgment

The author would like to thank the Barrick (Cowal) Limited staff who were involved with the hazard audit for their willingness to participate.

Disclaimer

Rev	Date	Description	Reviewed By
A	11/4/13	Draft for Comment	Barrick
B	4/5/13	Final Issue	Barrick

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EXECUTIVE SUMMARY

This report constitutes the third hazard audit that has been undertaken for the Barrick (Cowal) Limited Cowal Gold Project, NSW. The report is written in accordance with the Department of Planning and Infrastructure's Hazard Audit Guidelines.

The scope of the audit covers a critical examination of the systems and procedures, which exist in order to operate and maintain the facility for the purpose for which it was designed. This required a review of the Barrick documentation systems at the mine site and records of the mine's operational history since the previous hazard audit.

The following points summarise the results of this hazard audit:

- As with previous hazard audits, the personnel interviewed during this audit showed an adequate appreciation of the hazards associated with the operations and knowledge of the control measures used to reduce the risk of a potential hazardous event;
- Personnel from all levels of management, operation and maintenance displayed a strong, committed approach to safety and environmental protection;
- Generally, design, operation and maintenance activities were found to comply with company and code requirements reviewed during the audit. The safety management systems were generally found to be appropriate for the plant hazards and are well known by the staff involved in the audit;
- Procedures and documents have, generally, been kept up-to-date as well, e.g. the emergency response plan;
- There has been a significant decrease in the number of reported incidents at the site over the last three years compared to the previous three years, i.e. a reduction from approximately 3,000 to 1,820; and
- The recommendations made throughout this hazard audit report are largely designed to further enhance the existing safety management system.

The hazards associated with the facility have been previously identified and are included in various forms of the Barrick safety management system. Being a mining and processing site with explosive, corrosive, oxidising, radioactive, toxic, combustible and flammable materials, large machinery and large civil structures, e.g. tailings dams, there are a number of hazardous events associated with potential losses of containment or control leading to impact to people, the environment, property and/or the business. The hazards associated

with the materials and processes were found to be well known and understood by the Barrick staff involved in the audit.

It is noted that the recommendations made throughout this report are included in an implementation program to monitor improvement progress. This implementation program will require regular review and updating (of actions that have been completed). Also, it will need to be regularly issued to the Department of Planning and Infrastructure until all recommendations are adequately addressed.

The following recommendations were discussed during the audit close-out meeting and are summarised from the report:

Recommendation No. 1	The base around the footings for the magazine storage fence is being eroded. The base requires further support to ultimately prevent the fence from collapsing.
Recommendation No. 2	As per the previous hazard audit, fix the LPG leak as smelt near the LPG bullet heater.
Recommendation No. 3	Fix the damaged earthing strap for the LPG transfer system.
Recommendation No. 4	Determine the reason for the switch in the LPG earthing strap for the LPG transfer system. If this is left in the "Off" position, does it prevent the LPG road tanker from being earthed?
Recommendation No. 5	Separate the incompatible materials in the reagent shed, e.g. avoid storing acid with hypochlorite (risk of chlorine evolution) or acid with sulphates (risk of sulphur dioxide evolution).
Recommendation No. 6	Losses of containment have occurred within various bunds, e.g. caustic, hydrochloric acid and SMBS, that have led to corrosion of the bund floor and other structures such as pipe supports, stairs and elevated platform supports. Maintain all corrosion affected equipment within the chemical storage bunds.
Recommendation No. 7	Given the yellow hydrochloric acid salt deposits on and around the hydrochloric acid tank overflow seal pot, review the causes for these deposits and ensure the water in the seal pot is routinely flushed.
Recommendation No. 8	Provide means to track and audit overrides to ensure these are removed as soon as possible and signed-off in the register.

Recommendation No. 9	Develop a formal preventative maintenance programme to ensure all lanyard trip circuits (and not just the alarm circuit) are routinely tested.
Recommendation No. 10	Confirm that all emergency stop buttons have been tested to ensure the design intent is achieved and develop a formal preventative maintenance programme to ensure all emergency stop buttons are routinely tested.
Recommendation No. 11	Include in the preventative maintenance programme routine testing of the hydrochloric acid tank levels instruments and ensure similar instruments on all other chemical tanks are included in the preventative maintenance system.
Recommendation No. 12	Include in the preventative maintenance programme routine integrity inspections and testing of all chemical tanks.
Recommendation No. 13	The formal risk assessments should be performed by more than one person to ensure input and assessment from the relevant disciplines.
Recommendation No. 14	The formal risk assessments should be on the possible effects of the changed system malfunctioning. Justification for the change and the hazards for making the change are recommended to be done elsewhere (not via the management of change formal risk assessment).
Recommendation No. 15	Provide guidance on how to conduct the formal risk assessments to ensure consistency.
Recommendation No. 16	All management of change actions need to be tracked to ensure they are adequately addressed and signed-off when complete.
Recommendation No. 17	Improve the quality of HAZOP actions to avoid ambiguous entries such as “Commissioning Plan”.
Recommendation No. 18	Confirm that adequate assessment have been done for recommendations 8 and 9 from the second hazard audit.

GLOSSARY

AN	Ammonium Nitrate
AS	Australian Standard
BLEVE	Boiling Liquid Expanding Vapour Explosion
CHESS	Community Health and Environmental Surveillance System
DP&I	Department of Planning and Infrastructure
EPL	Environmental Protection Licence
ERP	Emergency Response Plan
ESH	Environmental, Safety and Health
FHA	Final Hazard Analysis
FSS	Fire Safety Study
GMESH	General Manager Environment, Safety and Health
HAZOP	Hazard and Operability Study
HIPAP	Hazardous Industry Planning Advisory Paper
IBC	Intermediate Bulk Container
JHA	Job Hazard Analysis
JSA	Job Safety Analysis
LPG	Liquefied Petroleum Gas
MSDS	Material Safety Data Sheet
NSWFB	New South Wales Fire Brigade
OEH	Office of Environment and Heritage
PAX	Potassium Amyl Xanthate
PHA	Preliminary Hazard Analysis
P&ID	Piping and Instrumentation Drawing
PPE	Personnel Protective Equipment
PPM	Parts Per Million
PSV	Pressure Safety Valve
PVI	Pressure Vessel Inspection
RIMS	Responsibility Information Management Systems
SMBS	Sodium Metabisulphite
UPS	Uninterruptible Power Supply
VESDA	Very Early Smoke Detection Apparatus

REPORT

1 INTRODUCTION AND SCOPE OF AUDIT

1.1 OBJECTIVES, REQUIREMENTS AND SCOPE

1.1.1 Audit Objectives

This report constitutes the third hazard audit that has been undertaken for Barrick (Cowal) Limited for the Cowal Gold Project.

Condition 5.4(e) of the Cowal Gold Project Development Consent specifies the following requirements for the hazard audit.

> *Twelve months after the commencement of operations of the proposed development or within such further period as the Director-General may agree, the Applicant shall carry out a comprehensive hazard audit of the proposed development and submit a report of the audit to the Director-General.*
>
> *The audit shall be carried out at the Applicant's expense by a duly qualified independent person or team approved by the Director-General prior to commencement of the audit. Further audits shall be carried out every three years or as determined by the Director-General and a report of each audit shall within a month of the audit be submitted to the Director-General. Hazard audits should be carried out in accordance with the Department's Hazardous Industry Planning Advisory Paper (HIPAP) No. 5, "Hazard Audit Guidelines".*

This report details the results of the hazard audit and is written to meet the requirements of HIPAP No. 5 guidelines (Ref 1).

The facility, operations and safety systems were included in this hazard audit.

The fundamental objectives of the hazard audit were:

- To review the significant changes made at the site since the second Hazard Audit (Ref 2);
- To identify areas where improvements to operational and organisational safeguards are required with respect to safety, health and the environment; and
- To recommend appropriate measures to improve safety, health and environmental deficiencies in the areas identified.

The audit was conducted by Dean Shewring from Pinnacle Risk Management. The correspondence granting lead auditor approval is included in Appendix 1. The audit was conducted over two days (April 8 and 9, 2013).

1.1.2 Requirements of the Audit

The audit of the facility included both the hardware and safety management systems. The term "hardware" covers facility and equipment, instrumentation and control systems, protection systems etc. The term "safety management systems" is used to denote people systems and people factors and covers the following items:

- Organisation (formal, emergency, tasks and roles);
- Methods and procedures;
- Knowledge and skills (operator and maintenance employee training, ability to recognise faults and take corrective action); and
- Attitudes towards tasks (reflecting whether the software systems are functioning effectively).

It is essential that the hardware and software aspects complement each other. For example, elaborate control and protection systems may be built into the installation based on rigorous hazard analysis, but without regular inspection and testing, their performance would deteriorate so that they would be ineffective when a demand is placed upon them. The performance of the management system of safety controls is a key element in effective risk management.

1.1.3 Scope of the Audit

The scope of the audit covers a critical examination of the systems and procedures, which exist in order to operate and maintain the facility for the purpose for which it was designed. This requires a review of the documentation systems at the plant and records of the facility's operational history since the previous Hazard Audit. In particular, it requires a review of the degree and frequency with which operating conditions vary from the design intent.

The scope of the audit includes the following topics:

- Plant and process systems;
- Process control;
- Review of operating procedures;
- Process operator training;
- Maintenance procedures;
- Safety training of employees;

- Plant modification control;
- Testing of protection systems;
- Electrical equipment handling;
- Unusual incident reporting;
- Injury/accident reporting;
- Fire protection and training;
- Emergency procedures;
- Safety management systems;
- Security of premises, and;
- Environmental protection.

1.2 METHODOLOGY

1.2.1 Basic Approach

This hazard audit has been conducted in compliance with the Department of Planning and Infrastructure's HIPAP No. 5 (Ref 1).

The remit of the audit was discussed with Barrick personnel prior to the audit. An outline of the scope of the audit was presented prior to the site based audit work. This allowed the requirements of the audit to be canvassed within Barrick which in turn allowed planning for the appropriate people to be available during the audit.

The majority of documents obtained or sighted have been listed in Appendix 2.

In broad terms, the methodology used was that of conducting detailed discussions with key operations, safety, engineering and maintenance personnel. Several site tours were conducted. The equipment and operations associated with the facility were reviewed in detail. Personnel within a "vertical cross-section" of the operation were interviewed.

The approach to the audit is best summarised as follows (Ref 1):

> *"Generally, checklists or scoring schemes should not be used. They are inflexible and do not facilitate evaluation. They do not question the validity of existing systems and tend to ignore interactions between various parts of the facility. They are least satisfactory when the design is new and many hazards have not been encountered before……*

> *In general, a more investigative approach is required. The specific method used to audit the site is left to the discretion of the auditor or audit team leader. The auditor may carry out the audit in different ways to evaluate different aspects of the facility's operations. The various elements of the audit may be performed at different levels of detail, depending on the reason for the audit, the nature of hazards at the facility and the scale of the development."*

This approach is adopted by Pinnacle Risk Management in conducting hazard audits. Depending on the facility and the associated hazards, the depth of auditing of the required areas of operation is determined by the lead auditor both prior to and during the audit. Whilst the guidelines issued by the Department are used in determining the audit scope, the guidelines themselves are not used as a complete checklist. In particular, as this is the third hazard audit, the focus of the reviews was on the changes made to the hardware and safety management systems over the last three years.

1.2.2 Personnel Interviewed

The following personnel were interviewed during the hazard audit:

Garry Pearson	Environmental Manager
Steve Pressler	OHS, Security and Training Manager
Andrew Harland	Processing Superintendent
Jason Opdam	Reliability Maintenance Manager
Robert (Bob) Blain	Processing Manager
Adam Bone	Electrical / Instrumentation Technician
Bejisa Boamah	Senior Maintenance Engineer
Kevin Gillies	Fixed Plant Maintenance Planner

1.2.3 Summary and Conclusions

The following points summarise the results of this hazard audit:

- As with previous hazard audits, the personnel interviewed during this audit showed an adequate appreciation of the hazards associated with the operations and knowledge of the control measures used to reduce the risk of a potential hazardous event;

- Personnel from all levels of management, operation and maintenance displayed a strong, committed approach to safety and environmental protection;

- Generally, design, operation and maintenance activities were found to comply with company and code requirements reviewed during the audit. The safety management systems were generally found to be appropriate for the plant hazards and are well known by the staff involved in the audit;

- Procedures and documents have, generally, been kept up-to-date as well, e.g. the emergency response plan;

- There has been a significant decrease in the number of reported incidents at the site over the last three years compared to the previous three years, i.e. a reduction from approximately 3,000 to 1,820; and

- The recommendations made throughout this hazard audit report are largely designed to further enhance the existing safety management system.

The hazards associated with the facility have been previously identified and are included in various forms of the Barrick safety management system. Being a mining and processing site with explosive, corrosive, oxidising, radioactive, toxic, combustible and flammable materials, large machinery and large civil structures, e.g. tailings dams, there are a number of hazardous events associated with potential losses of containment or control leading to impact to people, the environment, property and/or the business. The hazards associated with the materials and processes were found to be well known and understood by the Barrick staff involved in the audit.

All safety management systems need to be dynamic in nature, i.e. they need constant review and modification if necessary. One of the aims of this audit is to provide assistance in progressing improvements to the existing safety management system. The recommendations made throughout this report are included in a separate implementation program to monitor improvement progress (a copy is included in Appendix 3). This implementation program will require regular review and updating (of actions that have been completed).

2 SITE OVERVIEW

2.1 SITE LOCATION, SURROUNDING LAND USES AND LAYOUT

Descriptions of the site location, surrounding land uses and layout are given in the Final Hazard Analysis (FHA, Ref 3) and the Environmental Impact Statement (Ref 4). These descriptions are not reproduced in this report.

The site location is shown in Figure 1. The site layout is shown in Figure 2 and Figure 3.

Given the distance to the nearest residence (approximately 4 km), it is unlikely that the consequential impacts from a fire, explosion or toxic release are likely to have significant effect (as concluded in the FHA, Ref 3). Also from the FHA, the risk associated with external events, e.g. earthquakes, is low.

Figure 1 – Site Location

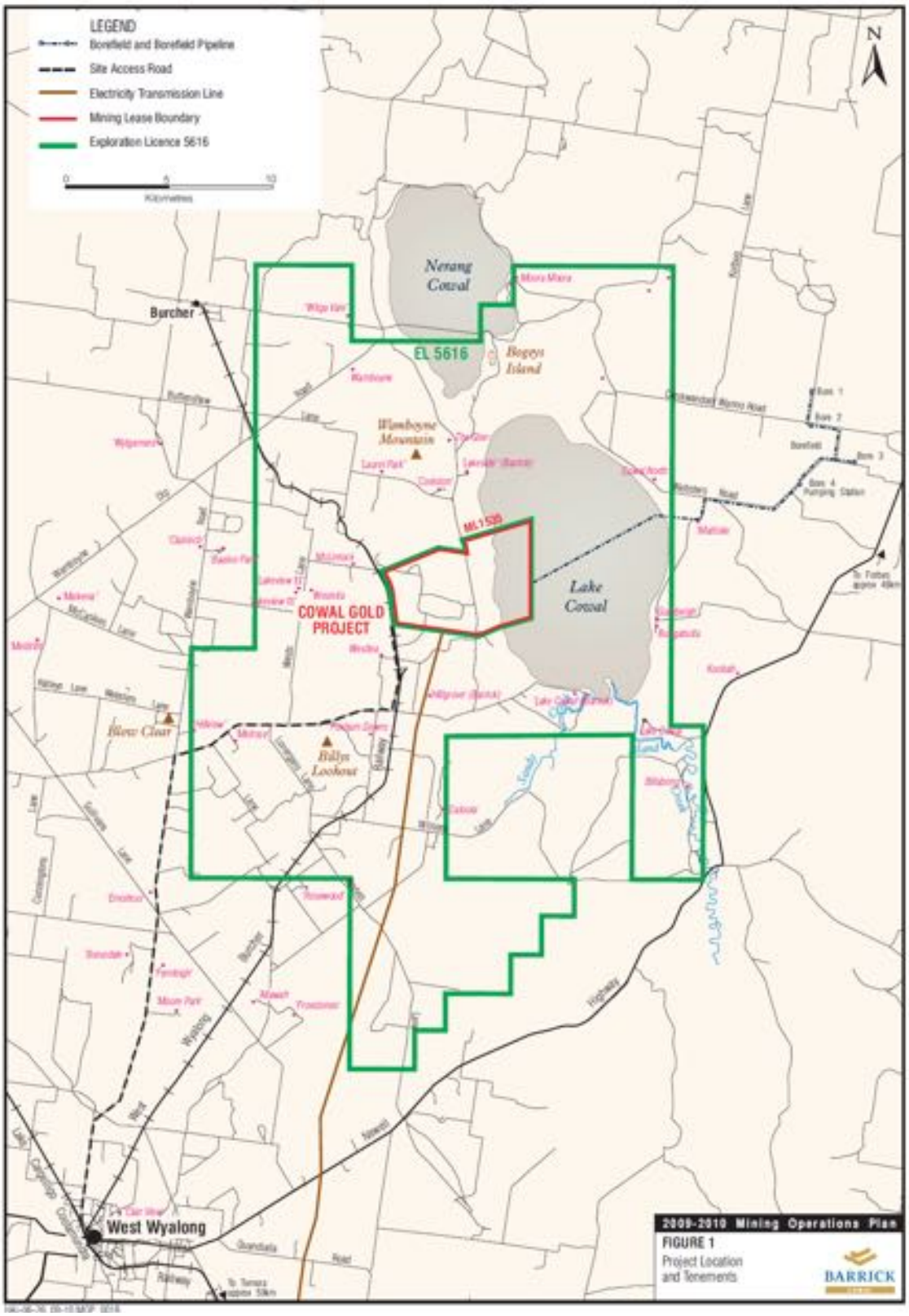


Figure 2 – Site Layout

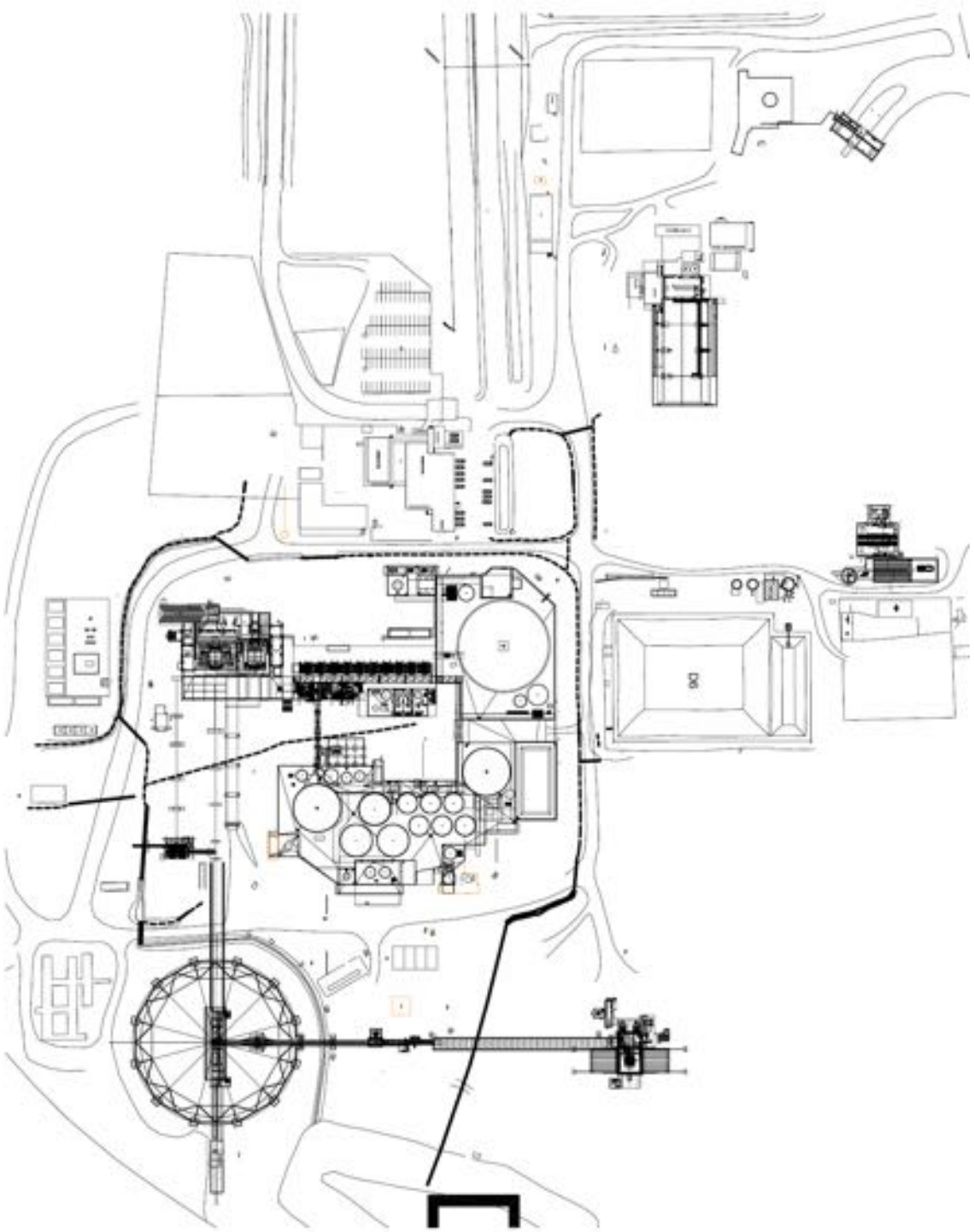
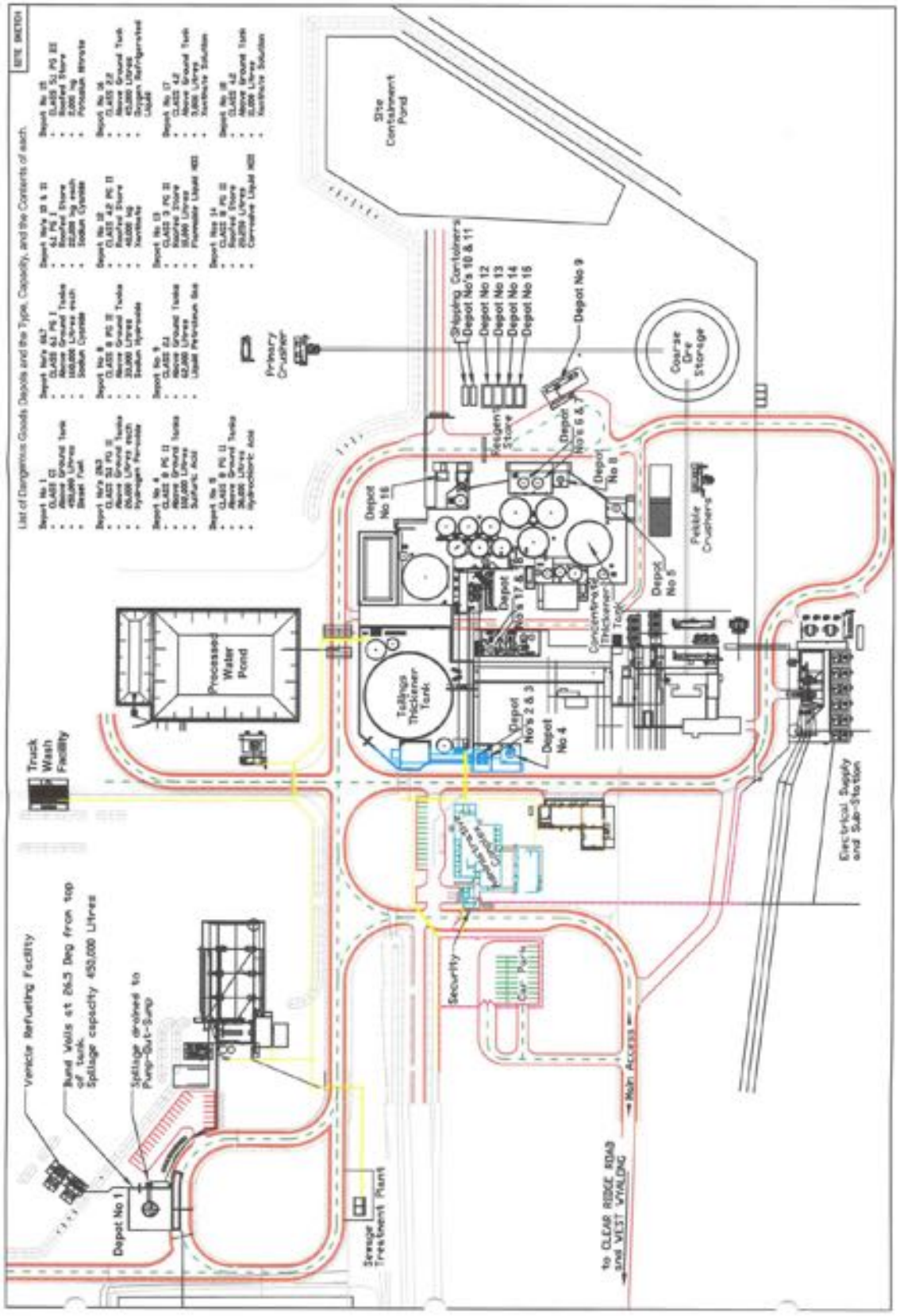


Figure 3 – Processing Plant Layout



There have been no major changes to the facility layout since the previous Hazard Audit although some relatively minor modifications have been performed.

During the audit, the facility layout, building design and construction, site security and utilities were reviewed and inspected. Whilst some of these site areas are discussed in more detail later in this report, no major shortcomings were found in these areas.

There is one main control room for the processing plant. The operators monitor and remotely control the process from this location. As the control room is located at an elevated position near vibrating equipment, some vibrations are transferred to the control room. To date, this has not been a cause for any significant impact.

No events were identified whose risk would be unacceptable with respect to propagation to the control room although it is possible that some events could impact these areas if they occur, e.g. low likelihood events such as a LPG BLEVE (boiling liquid expanding vapour explosion).

Security for the site comprises the following measures:

- The site is fenced (some of which is typical farm fencing). Processing plant areas, e.g. sodium cyanide, and the ammonia nitrate and explosives storage compounds are fully fenced and sign-posted;
- Staffed entrance gate and/or security patrols;
- Closed circuit television cameras at selected locations;
- Regular operational staff inspections;
- Operator vigilance (the site is permanently manned by operational staff);
- Area lighting for night surveillance;
- Electric fences are installed along the north, east and south sides of the mine lease;
- Increased security for the gold room (primarily for prevention of gold theft); and
- Radios are carried by all operational staff and are fitted in vehicles.

There are approximately 300 to 380 people during normal business hours and 30 to 50 people outside of normal hours on the site at any one time.

The security system for the site was observed and found to be operating as intended.

The facility normally operates 7 days per week, 24 hours per day. All personnel gain access via the main gate (either via their security codes or by signing in as

a visitor). As this gate is located away from the plant areas it can be expected to be safe to use for people / vehicle control for most plant emergencies.

During the audit, the reliability of utilities was investigated. The main utility is power. In the event of a power failure, the process is designed to fail safe. Loss of other utilities, e.g. instrument air or hydraulics, will also result in a predetermined, safe shutdown.

Given the types of hazards on the site with the training programmes implemented and the protective equipment provided, e.g. fire protection response vehicles and medical assistance, there are sufficient people available to either handle most minor to moderate potential hazardous situations. However, large scale events will require assistance from the NSW emergency services as per the emergency response plan.

2.2 PROCESS DESCRIPTION

A detailed description of the process was given in the Final Hazard Analysis (Ref 3). To avoid unnecessary duplication, further information regarding the facility's process description can be found in this Reference and it is not reproduced in this report.

However, as detailed in the FHA, there are two main modes of plant operation. The initial mode is termed "oxide ore"; the second mode is termed "primary ore". The difference is the result of ore changes. The facility is operating in primary ore mode.

2.3 PROPERTIES OF MATERIALS BEING HANDLED / PROCESSED

From the FHA (Ref 3), Table 1 on the following pages lists both the potentially hazardous and non-hazardous materials handled, stored and/or processed at the facility. This includes the Dangerous Goods classes.

Table 1 – Summary of Materials

Name	Dangerous Good Class	FHA Quantity Maximum (te)	Storage Type
Sodium Cyanide	6.1	90	Fixed roof, atmospheric tank
Ammonium Nitrate	5.1	100	Dedicated storage area
Potassium Amyl Xanthate (PAX) (1)	4.2	40	Fixed roof, atmospheric tank
Dry Flocculant	-	17.5	25 x 700 kg bags in reagent shed or 35m^3 silo
Diesel	C1	380 kL	Fixed roof, atmospheric tank
Flotation Promoter	8	10	10 x 1 m^3 IBCs in reagent shed
Hydrochloric Acid	8	42	Fixed roof, atmospheric tank
Sulfamic Acid	8	1	20 kg bags in store
Caustic Soda	8	51	Fixed roof, atmospheric tank
Hydrogen Peroxide	5.1	2.3 74	2 x 1 m^3 IBCs for the Intensive Cyanide Leach Process Fixed roof, atmospheric tank for Caro's Acid
Sulphuric Acid	8	187	Fixed roof, atmospheric tank
Oils and Greases	C2	64	Dedicated storage tanks
Quicklime	8 (3)	200	Closed silo
Flotation Frother	3	10	10 x 1 m^3 IBCs in reagent shed
AN Explosive Emulsion	1	100	Storage tanks (Isotanks)
Borax	-	1	33 kg bags (flux in gold room) in plant warehouse or in gold room
Sodium Carbonate	-	0.3	25 kg bags (flux in gold room) in plant warehouse or in gold room
Activated Carbon	4.2	10	Air tight bags - 1,000 L
LPG	2.1	27	Bullet

Name	Dangerous Good Class	FHA Quantity Maximum (te)	Storage Type
Silica	-	0.3	25 kg bags (flux in gold room) in plant warehouse or in gold room
Oxygen	2.2	45	Cryogenic Tanks
Sodium Metabisulphite (SMBS)	-	60	60 x 1 m^3 bags Fixed roof, atmospheric tank
Copper Sulphate	-	20	20 x 1 m^3 bags Fixed roof, atmospheric tank
Detonator / Detonator Cord		3,800 detonators	Secure storage area
Sodium Nitrate	5.1	500 kg	20 kg bags in plant warehouse

Notes: 1. IBC – intermediate bulk container (1 m^3)

2. Calcium oxide (quicklime) is hazardous for air transport only

In addition to those materials listed in Table 1, there are nucleonic instruments, e.g. density meters, within the process.

Given the materials listed in Table 1, there are a number of potential hazardous events that could lead to fires, explosions and/or toxic or radioactive impact. These events were examined in the Final Hazard Analysis (Ref 3) as part of Development Consent and found to be acceptable based on risk.

Material inventory and usage is monitored via the computer control system. The plant metallurgist reviews the usage for plant optimisation reasons. Usage values are entered into the RIMS (Responsibility Information Management System) computer systems for further corporate review and recording purposes.

Further discussion of the properties of the materials can be found in Reference 3.

3 HAZARD AUDIT OF PLANT OPERATIONS

3.1 PLANT AND EQUIPMENT

The mine operations are conducted as per the requirements of the Mines Inspection Act and the Mines Inspection General Rule 2000.

Several trips into the processing plant and mining areas were made over the two days on site.

This included inspecting the:

- Mining operations (pit, explosives storage and handling and ore transfer);
- Ore crushing and milling;
- Lake Cowal and the mobile drilling rig;
- Processing plant and chemical storage and handling;
- Tailings storage dams; and
- Water storage ponds.

With the exceptions noted throughout this report, the physical condition of the containment systems, plant and equipment appeared sound.

There are no significant changes to the process / equipment since the previous hazard audit.

Checks on major equipment, including pipes, vessels and instruments, indicated appropriate identification by labels and signs. The facility is well laid out. It is noted that the facility was reviewed by the HAZOP technique when built.

As there are a significant number of people at site at any one time then there exists adequate numbers on-site to effectively deal with credible small to moderate emergencies (note that this includes liaison with emergency workers). Potentially larger hazardous events will require assistance from the emergency services as per the site's Emergency Response Plan.

Generally, for the equipment inspected, all items (including control functions) appeared to be operated satisfactorily.

It should be noted that operation outside of the design values for most parts of the process is not possible due to process control (including trips, e.g. low tanks levels for the outlet pumps) and equipment specifications. Much of the process occurs at ambient conditions (typical for many mining processes).

Records of plant performance are kept within the computer control system.

Master Piping and Instrumentation Diagrams (P&IDs) are kept electronically on-site and copies are printed as required. These drawings are updated on an as needs basis.

There are pressure vessels on the site, e.g. elution column and hydraulic receivers, and these will be routinely inspected and tested as per AS 3788 Pressure Equipment – In Service Inspection and AS 3873 Pressure Equipment – Operation and Maintenance. Some PSV (pressure safety valves) test tags were reviewed during the audit and found to be adequately labelled (PSVs are replaced on a basis as determined by a Certified Boiler Inspector).

A review of the site utilities was undertaken. Power has proven to be reliable in supply. Should this service fail then the process fails safe as all drives are stopped.

There is also an emergency power generator on-site. This was reviewed during the audit. The critical power users, e.g. the control system, have their own uninterruptible power supply. A review of the emergency power generator included the testing / maintenance procedure. Importantly, the requirement for ensuring the local switch is placed back into 'remote' at the end of the test work is included in the procedure (i.e. the emergency power generator is not left in 'manual' and hence cannot be started remotely).

For loss of instrument air, the automatic valves close to their predetermined positions as required during detail design and the project's HAZOP study. Loss of hydraulic power, e.g. the mills, also results in a predetermined shutdown. Given the reviews performed, no significant hazardous scenarios were determined for loss of a utility.

Emergency stop / local isolation buttons are located throughout the site. For the stop buttons inspected, they appeared to be suitably located, e.g. the stop buttons for the chemical dosing pumps. Lanyards were also located adjacent to the conveyors.

Discussions with various operations staff showed that they generally had an adequate level of understanding of the hazards involved and what to do in an emergency, and that the plant was operated safely.

During the audit, observations of the operator tasks were performed. This included mine activities (loading of trucks with ore and ore movement) and chemical transfers and handling.

To assist the operators with emergency response, gas monitors, e.g. hydrogen cyanide and sulphur dioxide, have been installed throughout the relevant plant areas.

Observation of an eyewash station showed clean water flowing at a good rate. Safety showers and eyewash stations are tested fortnightly throughout the site and prior to each chemical transfer.

Given the observations made during the facility visits, the following recommendation is made.

Recommendation No. 1 The base around the footings for the magazine storage fence is being eroded. The base requires further support to ultimately prevent the fence from collapsing.

3.2 LOADING AND UNLOADING OPERATIONS

Unloading activities occur within the mining and processing areas and are a two person activity. There are only a few loading operations, e.g. waste products and product gold, at the site and these are typical of facilities such as the Cowal Gold Mine.

In the mining area, trucks are loaded with ore following blasting. Standard mines practices are implemented in the pit and these were observed during the audit. Excavators load ore onto mining trucks for removal from the pit. Ore is loaded into the crusher via the conventional technique of reversing trucks to a predetermined position (reversing stop in-place at the dump hopper) and then raising the tray.

The materials listed in Table 1 are delivered to site in either solid or liquid form. Solids, e.g. PAX or copper sulphate in bulkabags, are moved via forklift to their storage areas.

Bulk liquid chemicals (e.g. hydrochloric acid, sodium hydroxide and LPG) are delivered to the site by road tanker. These chemicals are used within the processing plant. Diesel is used for fuelling the mining vehicle fleet. Bulk liquid unloading operations are performed by site inducted tanker drivers. There are containment systems for the unloading areas should spills occur.

There were no obvious signs of any significant spills in the unloading areas.

There are fire extinguishers installed throughout the processing plant area if required and a safety shower / eyewash station installed (tested fortnightly) near each unloading bay.

All material unloaded / loaded is recorded in the Barrick transport records system.

Off-site transportation takes place via various transport companies. A separate transport study (Ref 5) was conducted on the transport requirements and no unacceptable risks were found.

3.3 STORAGES

There are a number of different storage types on the facility, i.e.:

- Ore and spoil stockpiles;
- Materials listed in Table 1 in tanks and sheds; and
- Tailings storage dams.

The product, gold, is refined and stored in a high security building (not inspected due to security restrictions).

Ore and mine spoil is stored as per typical mining practices. Dust is minimised as much as possible, e.g. water spraying in the Pit with saline water, use of emulsified bitumen on non-Pit light vehicle roads (eliminates water maintenance) and revegetation of earthen walls. A separate report has been commissioned by Barrick to determine the dust impact on the surrounding area and it was found that little impact was occurring outside of the mining lease.

The sodium cyanide mixing and storage area was found to be in good condition at the time of the audit.

Solid flotation reagents such as PAX were inspected within the flotation reagents shed. There were no obvious signs of spills in this area at the time of the audit. All the PAX wooden boxes inspected were in a sound condition. During rain events, it is possible that water can enter the PAX storage area (water is not compatible with PAX; there is the potential for heat generation and subsequent fires). Historically, little rain has been reported to have entered the reagents shed and when there is sufficient quantity, it is pumped out. Provided the sealed plastic bags containing the PAX remain intact then PAX degradation from any potential water ingress is unlikely.

The explosives and detonators are stored in separate fenced compounds away from the mining and processing plant areas (as per standard mining practice). Signage is included on the fencing. This area was inspected during the audit with no significant issues found other than Recommendation 1 of this report.

Liquid chemical storages are all bunded, including the diesel.

Tank levels are determined by instrumentation. There are high level instruments to help prevent tank overflow. There were no obvious signs of tank overflows at the time of the audit.

There is a computer based materials inventory system that details information such as the amounts of materials stored on the facility. This information is regularly backed-up.

The tank and roadway layout affords enough space for operation and access in an emergency.

At the time of this audit, a separate review on bund integrity was being performed. For example, significant corrosion has occurred in the sulphuric acid bund floor which is planned to be fixed. Recommendation 6 below may be covered by this separate bund review and subsequent bund maintenance.

The northern tailings dam has an existing seepage issue to the toe dam. This has been reported to the authorities and is currently being assessed for corrective actions. Assessments performed by Barrick indicate that the safety factor for bund wall integrity has not been compromised by this seepage of filtered water.

Given the above observations, the following recommendation is made:

Recommendation No. 2	As per the previous hazard audit, fix the LPG leak as smelt near the LPG bullet heater.
Recommendation No. 3	Fix the damaged earthing strap for the LPG transfer system.
Recommendation No. 4	Determine the reason for the switch in the LPG earthing strap for the LPG transfer system. If this is left in the "Off" position, does it prevent the LPG road tanker from being earthed?
Recommendation No. 5	Separate the incompatible materials in the reagent shed, e.g. avoid storing acid with hypochlorite (risk of chlorine evolution) or acid with sulphates (risk of sulphur dioxide evolution).
Recommendation No. 6	Losses of containment have occurred within various bunds, e.g. caustic, hydrochloric acid and SMBS, that have led to corrosion of the bund floor and other structures such as pipe supports, stairs and elevated platform supports. Maintain all corrosion affected equipment within the chemical storage bunds.
Recommendation No. 7	Given the yellow hydrochloric acid salt deposits on and around the hydrochloric acid tank overflow seal pot, review the causes for these deposits and ensure the water in the seal pot is routinely flushed.

3.4 PROCESS CONTROL

The operations for the crusher, the processing plant, the gold room and the tailings pumping system are monitored and controlled by a modern computer control system (Yokogawa Centum CS 3000). Process control is performed via clearly represented screens at the operator interface terminals in the control room. The operators at this location have overall control of setpoints, task requirements etc.

Additional operators are available for outside tasks. There are at least two people per shift who have adequate training and experience to operate the control system for the plant.

The mining operations are manually controlled as per typical mining practices, e.g. the placement of different coloured cones within the pit to indicate where entry is not permitted due to explosives use.

The processing plant control room has a number of features including the computer control system displays, camera output, emergency buttons, e.g. siren, radios and documentation (both electronic and hard copy, e.g. MSDS manual).

The computer control systems operations include setpoints (e.g. dosing chemical pumped flows), trips, interlocks, valve opening / closing, machine run / fault indications etc. A history of control operations, process alarms etc are available via trending and printouts. To supplement the computing systems, process monitoring is also performed by operator walk-arounds. All alarms are prioritised to avoid alarm flooding.

The computer control system has so far proven reliable when called upon to control operations.

For backup power supply in an emergency, there is an UPS for the computer control system. As mentioned previously, the facility also has an emergency powered generator. Manual control of the plant is also possible via the computer control system. Critical trips, e.g. the emergency stops, are hard-wired.

If any overrides are required, e.g. for maintenance, their installation and removal are controlled by the control room operators. These were reviewed during this audit. Whilst it appeared that no critical protective systems had overrides in-place, there were overrides dating back to 2006. Other overrides were known to be removed but not closed-out in the override register.

Recommendation No. 8 Provide means to track and audit overrides to ensure these are removed as soon as possible and signed-off in the register.

A specific area of the process that was reviewed during the audit was the cyanide levels in the tailings. Typically, the cyanide concentration to the tailings dams is approximately 5 ppm. As per the Development Consent requirements, cyanide in the tailings should not exceed 20 ppm for 10% of the year and should never exceed 30 ppm. The reviewed plant history shows that the plant is complying with these criteria.

Failure of any part or all of the computer control system will mean the process stops and immediate attention by the operators is given. No unsafe failure modes were identified during the audit.

3.5 FIRE SAFETY

The fire prevention, detection and protection systems were previously reviewed in the Fire Safety Study (FSS) for the facility (Ref 6). The facility's fire protection equipment is detailed and assessed in this study and concluded to be adequate for the nature of fire hazards associated with the operations. Generally, the review performed during this audit indicated that the fire protection equipment has been installed and maintained as per the requirements of the original plant design intent.

The main fire or explosion hazards for this facility are a release of LPG, hydraulic oil, heating oil or diesel, oxygen enhanced combustion, general building type fires, vehicle fires, electrical fires, oxidising agent, e.g. ammonium nitrate or hydrogen peroxide, with a combustible material such as wood, activated carbon fires, PAX decomposition products, e.g. carbon disulphide, conveyor fires, transformer explosions / fires, explosives / detonators misfires and grass fires.

Fire water to the facility is from the Lachlan River Regulated Water Source, Bland Creek Paleochannel groundwater production bores or other on-site process or stormwater water dams. The fire water is stored in a 9 megalitre pond (dam) which is constantly overflowing to an adjacent dam (D6). It is pumped via an electric or diesel pump. These pumps are tested weekly to check the reliability. A smaller jockey pump is installed for small flow demands.

An annual flow test is performed on the fire water pumps (insurance requirement). The last three annual flow tests were reviewed during this audit. The pumps have been found to continue to provide acceptable flow / head. Also reviewed during this audit was testing of the pressure switches that initiate the fire water pumps. These are tested by lowering the pressure to check the setpoint for pump start, i.e. the entire loop is tested.

The facility is ringed with dual hydrants. Fire extinguishers (powder chemical) and hose reels are also located throughout the plant. Predetermined equipment, e.g. hydraulic drives, have fixed spray systems. Several fire extinguisher test tags were inspected and found to be in-test. Several hose cabinets were inspected and the hoses were found to be present and in good condition.

In addition to the above fire protection equipment, the site also has two fire trucks and spill response trailers near the main gate. In the event of a large fire, assistance from the emergency services can also be provided (as per the site's emergency response plan).

To help prevent potential sources of ignition, any hot work is controlled by a Hot Work Permit.

All fire protection equipment inspected was in accessible areas. The facility's fire protection equipment is maintained by specialist subcontractors (to the requirements of AS 1851, "Maintenance of Fire Protection Equipment"). Test tags were in-place for the equipment checked during the audit.

Fire training for site personnel is performed and includes extinguisher use.

Appropriate staff members are also First Aid trained. First Aid facilities exist on the facility. Random checks of these showed that the necessary equipment was available.

As mentioned above, hydrogen cyanide gas monitors are installed to detect any gas releases (hydrogen cyanide is both toxic and flammable).

Contaminated fire water will flow to either to the processing plant bunded areas or to ground. As shown in the FSS (Ref 6), the risk associated with contaminated fire water is low.

There is a VESDA (Very Early Smoke Detection Apparatus) installed in the High Voltage switchroom. This system is maintained by an external contractor.

3.6 ENVIRONMENTAL PROTECTION

Environmental systems to reduce or eliminate contamination of air, soil, surface water and groundwater systems were evaluated.

The facility has a number of Environmental Management Plans and Monitoring Programmes as required by the Development Consent. Following this hazard audit, a separate environmental compliance audit is to be conducted.

Generally, the equipment and systems aimed at protecting the environment appeared appropriate to the types of materials handled at the facility, with staff showing a good understanding of the relevant environmental issues. A number of projects are progressing or have been performed with the aim of lowering environmental risk, e.g. resealing of the bunded areas and revegetation of the Lake Cowal containment walls (e.g. erosion control) and production of an environmental Aspects and Impacts Register in November 2009.

Environmental records are kept in both electronic and hard copy forms by the Environmental Manager. Any environmental incidents, including wildlife fatalities, are recorded in the Barrick incident reporting system.

Licensing:

The site has an Environmental Protection Licence 11912 as issued by the NSW Office of Environment and Heritage (OEH). This licence was discussed with the Environmental Manager during the audit. There are no significant issues arising from the last three years of operation of the facility with respect to compliance with the licence requirements.

Stormwater, Effluent and Spill Management:

There have been no discharges of stormwater and/or contained liquid wastes to any area outside the internal catchment drainage system. Stormwater and contained liquid wastes are reclaimed back into the process via bund sump pumps. The main process liquid effluent is the tailings flow and this is

monitored for cyanide concentration as discussed above in Section 3.4. Water is recycled as much as possible, e.g. thickener overflow stream, as water is not in plentiful supply at this location.

The integrity of the tailings bund walls are independently checked and reported. Regular inspections of the tailings walls and dams are performed by a number of people, e.g. multiple daily patrols by processing and environmental personnel and sampling visits by laboratory personnel. This includes wildlife inspections. Seepage through the northern tailings facility wall is discussed in Section 3.3.

Dosing chemical transfer areas from road tankers etc are paved. Any diesel spills at the vehicle filling bay are pumped to an oil / water separator. Waste oils or absorbents with oil are disposed of via licensed contractors.

Absorbent material and spill response kits and trailers are available at the facility. Operating personnel were aware of appropriate spill management requirements when interviewed. One spill response container was inspected during the audit and found to contain the stated items.

There is a surface water sampling programme which includes sampling Lake Cowal waters. There are groundwater monitoring observation bore holes across the site. These are sampled quarterly. There are no known groundwater problems associated with the facility.

Given the containment designs for environmental protection, the designs do not pose unacceptable environmental risks provided the requirements of the safety management system are maintained.

Solid Waste:

Solid wastes include:

- General, non-hazardous wastes (disposed of via the Bland Shire Council Waste Management facility or on-site waste rock dumps as per varied EPL);
- Special waste – used haul truck tyres landfilled on-site as per varied EPL;
- On-site bioremediation and disposal of small quantities of hydrocarbons spilt to ground as per varied EPL;
- Used batteries (disposed of via a licensed recycler); and
- Drums with contaminated material (disposed of via a licensed contractor) and empty drums (returned to some suppliers).

The site is now asbestos free.

There were no new hazardous solid wastes identified during the hazard audit or any known issues with the disposal of the above wastes.

Gaseous and Dust Emissions:

The main atmospheric emission is dust. Dust emissions are reduced by techniques such as water sprays (water spray trucks are used in the mining operations) and road sealing programmes with emulsified bitumen (e.g. Petro Tac). There are some local gaseous emissions, e.g. hydrogen cyanide from the leach tanks, but the levels must be kept low due to safety concerns.

There are no recommendations made for this area of review.

4 HAZARD AUDIT OF MANAGEMENT SYSTEMS

The Barrick overall approach to safety management includes the following components:

- Barrick Vision and Values;
- Safety, health and environmental Policies;
- Safety, health and environmental Standards; and
- Safety, health, environmental and community relations Management Systems.

Procedures, forms and checklists reside in the safety management system.

The established procedures include:

- Training;
- Operating instructions;
- Permits to work;
- Contractor management;
- Management of change;
- Emergency response;
- Incident recording; and
- Maintenance.

The Barrick Safety Management System, including the Emergency Response Plan, was submitted to the Department of Planning for approval prior to startup as per the Development Consent.

Auditing of the compliance with the company requirements is mostly achieved by the following means:

1. Internal audits, e.g. yearly corporate safety, hygiene and environmental audits;
2. General Manager's ESH (Environmental, Safety and Health) meeting (monthly);
3. Quarterly region environmental, health and safety governance meetings where key performance indicators are reviewed (also known as CHESS compliance - Community Health and Environmental Surveillance System);

4. Daily walk-arounds, e.g. by the Superintendents, Managers and Mine Manager;

5. Plant monthly inspections, e.g. Planned General Inspections and Formal Risk Assessments;

6. Spot checks, e.g. permits reviews; and

7. External audits such as hazard audits.

Supervisory Workplace Inspections are also performed. There is a target number of 400 per month.

The General Manager has responsibility for overall safety and environmental protection for the site.

As part of his role to the commitment of occupational health, safety and environmental best practice, the General Manager's activities include:

- Ensuring compliance with the safety and environmental management system's requirements, e.g. managers spend at least 30% of their time in the field;
- Review of safety and environment incidents reports;
- Chairing of the GMESH (General Manager Environmental, Safety and Health) committee;
- Monitoring of the operations via daily walk-arounds;
- Involvement with Barrick corporate meetings / reviews; and
- Quarterly CHESS meetings.

Barrick have implemented a behavioural safety programme at the site which is a programme for identifying and preventing unsafe behaviours. Supervisors and managers have a predetermined minimum number of Supervisory Workplace Inspections as part of the objectives. This includes checks on live permits.

4.1 PLANT PROCEDURES, RECORDS AND OTHER DOCUMENTATION

4.1.1 Materials Handling

Material inventory data is logged via the computer control system and alarms are utilised to alert operators when to replenish low stocks. Delivery records are kept for future use if required. Contractors responsible for various areas, e.g. liquid oxygen, will supply dosing chemicals etc when needed.

The handling of ore, slurry and chemicals, including explosives, have been previously discussed (Sections 3.1 to 3.3). There are no further recommendations made for this area of plant operation.

4.1.2 Operating Procedures

Operating procedures for the facility were written during the commissioning period by a specialist company. There are more than 400 operating procedures for the processing plant and more than 80 for the environmental section.

The standard operating procedures (SOPs) are available to site personnel in both electronic and hard copy form. The operators also have electronic access to Chem Alert information (material safety data sheets) and incident reporting (if required).

Operations such as startup and controlled or emergency shutdowns are included in the procedures. The Barrick Supervisor for Process Training and Safety now has responsibility for further procedure development and updating.

The procedures include the hazards associated with the particular activity and actions to be taken, e.g. chemical spill. Also included in the procedures are useful photographs, e.g. where to take the sample, and computer control system screen outputs. Exclusion zones are used for potentially hazardous operations, e.g. barricading and signage for sodium cyanide transfers from a road tanker.

The relevant Superintendents approve all changes to the operating procedures. Operations personnel are included in the review process for modified procedures.

Assessment of how well the requirements of the procedures are known by the process operators is included in the operator training program (see Section 4.2).

Activities that do not have written procedures are reviewed for hazards by conducting a JHA (job hazard analysis) when the field level risk assessment (FLRA) identifies an unacceptable task risk in a likely real-time situation.

New operators are constantly supervised until appropriate training has been received (see Section 4.2).

This area of the safety management system was previously found to be developing strongly. There are no known major changes to the operating procedures (other than routine updates). No recommendations are made for this area of plant operation.

4.1.3 Maintenance Procedures, Permits, Testing and Records

Maintenance programs and test records are kept in both soft and hard copy form. Maintenance requirements are stored within a computing system (Oracle). Maintenance activities include both scheduled and unscheduled work (i.e. preventative and corrective maintenance).

The reviewed maintenance frequencies used / planned are typical of common industry practice (e.g. the hydrogen cyanide analysers are tested every month).

Preventative maintenance programs typically detail the maintenance and inspection requirements, including the maintenance frequencies, for the following generic equipment items:

1. Vessels, tanks, machines (e.g. crusher and mills), conveyors, vehicles and other large equipment items;

2. Pipes;

3. Control valves and emergency isolation valves;

4. Pressure safety valves (yearly visual inspections performed); and

5. Instruments, i.e. pressure, temperature, flow, level, analysis and other, e.g. vibration and position switches.

Corrective maintenance can be initiated by anyone (i.e. a work request is generated). Priorities are assigned to each task. For maintenance tasks, work permits are produced and supplied to the personnel performing the work. Permits are generated as required, e.g. hot work permit.

All preventative maintenance tasks are assigned a task number. When a preventative maintenance task is required, a work request is produced and this is reviewed by both the mechanical and electrical supervisors as well as operational staff. Again, a priority is assigned. Weekly forecasts for preventative maintenance are generated by the Oracle system. Test frequencies are performance based.

On completion of the job, the work is closed out within the maintenance system. Checks on the work orders include:

- Morning tool box / pre-start meetings;

- Management by walking around; and

- Schedule maintenance planning meetings every Tuesday and Thursday.

The results of the maintenance activities, e.g. calibrations, tests etc, are recorded.

Maintenance manuals (including vendor manuals) are kept by the Maintenance Superintendent.

Trained external contractors are used to perform selected maintenance activities, e.g. fire protection systems maintenance and oxygen system maintenance. Contractors are chosen based on experience in the same field and the suitability to perform the required tasks.

Barrick have a permit to work system. This includes practices for lock out, tag out of process and electrical systems to make the work area safe. Permits include hot work, excavation, crane / man-cage, High Voltage, isolation and confined space entry. Any special precautions, e.g. hazard mitigation, are included on the work permit. JHAs and formal or field level risk assessments are performed for non-routine tasks for hazard identification. Higher risk areas are reviewed by the relevant Superintendents. Tool box / pre-start talks are held to clarify work scope and minimise the likelihood of incidents.

Line or equipment venting and isolation are performed by the operators prior to handover for the maintenance to begin. Isolation requirements are included in the work permit. Maintenance personnel also approve the permits to perform the work.

Should replacement parts be required for maintenance, materials of construction are determined by existing supplier information, by details of installed parts (which is included on the order forms when required), pipe specifications on the P&IDs or by supplier recommendations.

As discussed with the Maintenance Manager, there are no major changes to the maintenance systems over the last three years.

During the audit, however, lanyard, emergency stop buttons, gas detectors (cyanide and sulphur dioxide), tank integrity and tank level instrument testing was reviewed. The following recommendations are made from these reviews:

Recommendation No. 9	Develop a formal preventative maintenance programme to ensure all lanyard trip circuits (and not just the alarm circuit) are routinely tested.
Recommendation No. 10	Confirm that all emergency stop buttons have been tested to ensure the design intent is achieved and develop a formal preventative maintenance programme to ensure all emergency stop buttons are routinely tested.
Recommendation No. 11	Include in the preventative maintenance programme routine testing of the hydrochloric acid tank levels instruments and ensure similar instruments on all other chemical tanks are included in the preventative maintenance system.
Recommendation No. 12	Include in the preventative maintenance programme routine integrity inspections and testing of all chemical tanks.

4.1.4 Plant Modification

All process changes, as defined within the management of change procedure, are reviewed via an electronic, change management system. There is a new change management system at the site with similarities to the previous system as reviewed during the last hazard audit. The process for change management is summarised as follows:

- Requests for change can be initiated by anyone. The changes can be temporary, permanent or emergency requirements;
- An electronic form is submitted to predetermined people for review, e.g. production, technical and maintenance staff;
- An evaluation is performed;
- Action items are sent to the appropriate people;
- Final approval is given by the nominated senior personnel depending on the modification scope / size;
- The change is completed as per the maintenance procedural requirements; and
- Field checks are performed including a final pre-startup review and then the modification is closed-out.

Larger, more complex and potentially hazardous changes are reviewed via the HAZOP technique.

For smaller, less potentially hazardous changes, a Formal Risk Assessment is performed as per the requirements of the management of change procedure.

The master plant drawings are stored electronically. These are revised on an as needs basis depending on the details of the modification.

The following recommendations are made from the management of change system review:

Recommendation No. 13	The formal risk assessments should be performed by more than one person to ensure input and assessment from the relevant disciplines.
Recommendation No. 14	The formal risk assessments should be on the possible effects of the changed system malfunctioning. Justification for the change and the hazards for making the change are recommended to be done elsewhere (not via the management of change formal risk assessment).
Recommendation No. 15	Provide guidance on how to conduct the formal risk assessments to ensure consistency.

Recommendation No. 16	All management of change actions need to be tracked to ensure they are adequately addressed and signed-off when complete.
Recommendation No. 17	Improve the quality of HAZOP actions to avoid ambiguous entries such as “Commissioning Plan”.

4.2 OPERATOR TRAINING

Elements of the training practices have been discussed throughout this report. A summarised description of operator and safety training is given below.

Operators and maintainers in the Processing Plant and Mining Department receive training via a number of means. These include:

- Induction training which includes hazards awareness as well as specific awareness training, e.g. hazards of hydrogen cyanide;
- Basic training and assessment in equipment, plant operation and computer systems from Barrick supervisors, e.g. spill response;
- External courses, e.g. Orica safety and operability course on sodium cyanide; and
- Tool box / pre-start talks, plant meetings etc.

The site training programme has been developed by an external company and is reviewed and updated by Barrick personnel.

On successful completion of defined training requirements that are based on the operating procedures, the new operators are graded to a "1" level. Further training and assessment is performed as required by the Barrick training system until the operators reach grade 4 (the highest grade possible, i.e. competent in all processing plant operations). Non-trained personnel are not permitted to perform the relevant operations by themselves.

Training procedures and records are kept by the Barrick training supervisor in both hard copy and electronic form. Competency and understanding tests are included as part of the training programme. Each employees training needs and what has been completed is included within the training system.

Safety training includes:

- Site induction for all employees, contractors and non-escorted visitors;
- Processing plant induction;
- Lock-Out Tag-Out procedures (Level 1 for all people, Level 3 for permit issuers);
- Fire protection;
- Confined space rescue;
- First Aid (all shift employees);
- Open air breathing apparatus;

- Dedicated training on specific hazards, e.g. sodium cyanide; and
- Job Hazard Analyses / Field Level Risk Assessments.

Again, records are kept for each employee. Contractors are included in the safety training. Reviews are performed, e.g. on permits, to ensure compliance.

At all times, there are people on-site trained in first aid, fire fighting and confined space rescue.

Monthly refresher training lists are produced which show people's training needs. These lists are sent to the Mine Manager for review.

In summary, appreciation of the inherent hazards of the plant, equipment and materials is achieved via:

- General and plant area inductions and training programs;
- Tool box talks;
- MSDSs reviews for new materials;
- Operating procedures training;
- Permits to work; and
- Job Hazard Analyses and formal or field level risk assessments.

There have been no major changes to the training programmes at the site and hence there are no recommendations from this area of the audit.

4.3 EMERGENCY PLANNING

An emergency response plan (ERP) exists for the entire site. It is routinely updated (latest revision is December 2012). Copies are distributed to selected personnel. The ERP was reviewed and found to contain the requirements of the Department of Planning's HIPAP No. 1, "Industrial Emergency Planning Guidelines" that are relevant to this site. This document has been reviewed and approved by the Department of Planning.

The ERP includes events such as fires, explosions, bomb threats, natural events and spills. Off-site impacts are also included. Contact numbers, e.g. police, ambulance, fire brigade and industrial neighbours, are given.

As the site is large, there are a number of emergency assembly areas. Hence, there are options available for assembly if an assembly point is unsafe, e.g. fire nearby. Barrick have developed a system for accounting for personnel at each emergency assembly area. The emergency operations centre is located in the Administration Conference Room.

The person with overall control, the "Emergency Services Coordinator", is located in the emergency operations centre. Within each area, there are

nominated incident controllers for handling specific emergency response actions, e.g. the senior operator in the control room for the processing plant. These people are identified via a tabard. Control is handed over to the Fire and Rescue NSW / Rural Fire Brigade should they be required to attend.

All emergency response officers and members of the emergency response team are trained by the Rural Fire Service.

Given the site layout, there is adequate site access / egress for emergency vehicles via the main gate and perimeter road.

Emergency situations are noted via an audible alarm.

Emergency drills are routinely performed to practice the emergency response requirements, e.g. man-down in the cyanide area. The ERP is updated as a result of the learnings from all simulated exercises. One corporate level crisis emergency simulation is performed each year as well as four local emergency simulations.

First aid can be supplied by a number of means, e.g. shift personnel trained in First Aid as well as any of the Emergency Response Officers.

There are First Aid boxes / emergency PPE boxes located throughout the facility. Random checks performed during the audit showed that the necessary equipment was available in the inspected boxes.

For the last three years of operation, there have been no major emergency events.

5 SITE HISTORY

5.1 INCIDENT HISTORY

Hazardous situations, near misses or incidents are reported within the incident reporting system within RIMS (Responsible Information Management System). Environmental impacts are also included.

All incident entries are reviewed in the morning managers' meetings.

All employees are trained in how to use the incident recording system.

When an incident occurs, the following basic steps are taken:

- A supervisor assesses the scale of the incident;
- Verbal reporting to the relevant Superintendent is performed;
- The incident is reported, i.e. entered into RIMS;
- The incident is graded, e.g. type of hazard, the hazard potential, injury or environmental;
- An incident report is produced and investigated;
- Incident investigation includes root cause analysis (TapRoot methodology used);
- Actions from the incident investigation are entered into RIMS with responsible people assigned to each action; and
- Managers ensure that each investigation is adequately closed out.

The incident reports for the past three years of operation were reviewed and/or discussed during the audit. There were approximately 1,820 records. This compares favourably with the 3,000 recorded incidents from the previous three years. This shows a continued high level of reporting vigilance. The incidents reported were mostly of minor nature. Examples include:

- Wildlife injuries;
- Vehicle accidents;
- Injuries;
- Equipment failures;
- Near misses, e.g. valves left in the wrong position;
- Procedural failures; and

- Losses of containment.

Whilst there were incidents of a recurring type, e.g. losses of containment of oil and diesel, these have been addressed with a lowering of the frequency rate.

The more significant incidents were reviewed (there were 176 of these). Events included pipe failures, chemical spills and equipment failure following deadheading of a pump. No adverse off-site impact was recorded for any of these events.

Statutory reporting, e.g. to the Department of Primary Industries - Mineral Resources, is also performed as required.

5.2 PREVIOUS STUDIES

Since the second hazard audit, there have been no changes to the facility that required further Hazard Studies. Correspondingly, there are no recommendations from recent statutory Hazard Studies to be reviewed (the recommendations from the original facility Hazard Studies were reviewed during the first hazard audit).

The 11 recommendations made in the second hazard audit report (Ref 2) were reviewed during this audit.

Barrick are currently reviewing documentation to confirm that recommendations 8 and 9 from the second hazard audit have been adequately addressed. Recommendation 6 from the second hazard audit, i.e. fix the LPG leak at the bullet, requires further attention as gas can be smelt at the same location. See recommendation number 3 in this report.

Recommendation No. 18 Confirm that adequate assessment have been done for recommendations 8 and 9 from the second hazard audit.

6 CONCLUSIONS

The following points summarise the results of this hazard audit:

- As with previous hazard audits, the personnel interviewed during this audit showed an adequate appreciation of the hazards associated with the operations and knowledge of the control measures used to reduce the risk of a potential hazardous event;
- Personnel from all levels of management, operation and maintenance displayed a strong, committed approach to safety and environmental protection;
- Generally, design, operation and maintenance activities were found to comply with company and code requirements reviewed during the audit. The safety management systems were generally found to be appropriate for the plant hazards and are well known by the staff involved in the audit;
- Procedures and documents have, generally, been kept up-to-date as well, e.g. the emergency response plan;
- There has been a significant decrease in the number of reported incidents at the site over the last three years compared to the previous three years, i.e. a reduction from approximately 3,000 to 1,820; and
- The recommendations made throughout this hazard audit report are largely designed to further enhance the existing safety management system.

The hazards associated with the facility have been previously identified and are included in various forms of the Barrick safety management system. Being a mining and processing site with explosive, corrosive, oxidising, radioactive, toxic, combustible and flammable materials, large machinery and large civil structures, e.g. tailings dams, there are a number of hazardous events associated with potential losses of containment or control leading to impact to people, the environment, property and/or the business. The hazards associated with the materials and processes were found to be well known and understood by the Barrick staff involved in the audit.

Appendix 1

Department of Planning and Infrastructure Approval Correspondence

Hazard Audit Report for Barrick (Cowal) Limited,

Cowal Gold Project

Appendix 1 – Department of Planning and Infrastructure Approval Correspondence.

Dean Shewring

From: "Kane Winwood" <Kane.Winwood@planning.nsw.gov.au>
Date: Wednesday, 20 February 2013 11:31 AM
To: <deanshewring@optusnet.com.au>
Cc: "David Kitto" <David.Kitto@planning.nsw.gov.au>; <GPearson@barrick.com>; "Lilia Donkova" <Lilia.Donkova@planning.nsw.gov.au>
Subject: Cowal Hazard Audit

Dean,

The Department has considered Barrick's request for you to undertake the next Hazard Audit of the Cowal Gold Mine, and I can advise that the Director-General has approved your appointment in accordance with condition 5.4 (e) of the development consent.

Regards,

Kane Winwood
Team Leader, Mining Projects
as nominee of the Director-General

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Appendix 2

Documents Obtained or Sighted

Hazard Audit Report for Barrick (Cowal) Limited,

Cowal Gold Project

Appendix 2 – Selected Documents Obtained or Sighted.

Document Name / Type
Emergency Response Plan
MSDS Manuals and Locally Mounted MSDS's
Safety Management System
Cowal Gold Mine Modification Procedure
Cowal Gold Mine Formal Risk Assessments
2010 – 2013 Incident Records
Responsibility Information Management System (RIMS)
Emergency Power Generator Testing Procedure
Fire Water Pumps Testing Procedure
Overrides Register
Various HAZOP records for studies over the last three years
Fire Water Pump Flow Capacity Test Results for the last three years
Authorisation for Expenditure for the Plant Structural Integrity Upgrade Programme

Appendix 3

Recommendations Implementation Program

Hazard Audit Report for Barrick (Cowal) Limited,

Cowal Gold Project

Appendix 3 – Recommendations Implementation Program.

Hazard Audit Actions Progress Report
Barrick (Cowal) Limit
Cowal Gold Project
West Wyalong, NSW

Title: DP&I Barrick Hazard Audit (April 2013) Action Plan
Owner: Garry Pearson, Environmental Manager
Revision: 1 **Date:** 11 April 2013

Item No.	Hazard Audit Recommendation	Action Taken	Responsibility	Completion Date
1	The base around the footings for the magazine storage fence is being eroded. The base requires further support to ultimately prevent the fence from collapsing	Raised Service Order for placement of medium sized crushed waste rock to be placed on exposed clay toes of security fence perimeter.	Env Manager	Completed 19 April 2013
2	As per the previous hazard audit, fix the LPG leak as smelt near the LPG bullet heater	Assess nasally detectable leak from n-west quadrant of large horizontal flange near ground level on the west side of the bullet.	Maintenance Supt	June 2013
3	Fix the damaged earthing strap for the LPG transfer system	Check routing options and repair.	Maintenance Supt	June 2013
4	Determine the reason for the switch in the LPG earthing strap for the LPG transfer system. If this is left in the “Off” position, does it prevent the LPG road tanker from being earthed?	Assess, re-engineer as required.	Maintenance Supt	June 2013

Item No.	Hazard Audit Recommendation	Action Taken	Responsibility	Completion Date
5	Separate the incompatible materials in the reagent shed, e.g. avoid storing acid with hypochlorite (risk of chlorine evolution) or acid with sulphates (risk of sulphur dioxide evolution)	Address the error that occurred during accommodation of the delivery of a pallet of FeSO4 spill response reagent (since internal inspection walk through of month prior).	Processing Supt	Completed 12 April 2013
6	Losses of containment have occurred within various bunds, e.g. caustic, hydrochloric acid and SMBS, that have led to corrosion of the bund floor and other structures such as pipe supports, stairs and elevated platform supports. Maintain all corrosion affected equipment within the chemical storage bunds	Assess, plan, implement engineering repairs and controls. Include inspection in PGIs, WPIs, internal audit schedule, etc.	Processing Supt	August 2013
7	Given the yellow hydrochloric acid salt deposits on and around the hydrochloric acid tank overflow seal pot, review the causes for these deposits and ensure the water in the seal pot is routinely flushed	Clean-up, re-fresh the water. Implement routine seal pot flushing. Include in PGIs, WPIs, internal audit schedule, operator training, etc.	Processing Supt	Completed 12 April 2013
8	Provide means to track and audit overrides to ensure these are removed as soon as possible and signed-off in the register	Register review cycle implemented. ?? Employee assigned in Oracle. ??	Maintenance Supt	August 2013

Item No.	Hazard Audit Recommendation	Action Taken	Responsibility	Completion Date
9	Develop a formal preventative maintenance programme to ensure all lanyard trip circuits (and not just the alarm circuit) are routinely tested	Employee assign in Oracle – Shutdowns. ??	Maintenance Supt	August 2013
10	Confirm that all emergency stop buttons have been tested to ensure the design intent is achieved and develop a formal preventative maintenance programme to ensure all emergency stop buttons are routinely tested	Employee assign in Oracle – Shutdowns. ??	Maintenance Supt	August 2013
11	Include in the preventative maintenance programme routine testing of the hydrochloric acid tank levels instruments and ensure similar instruments on all other chemical tanks are included in the preventative maintenance system	Check whether this is already a task in Oracle. Review Oracle history to ensure records exist. Change steel flange (rust down side of tank). Hazop – fixed ladder versus EWP.	Maintenance Supt	August 2013
12	Include in the preventative maintenance programme routine integrity inspections and testing of all chemical tanks	NDT, internal inspections, etc in Oracle. ?? Decision on FRP (HCl tank), duty of 10-15 year regarding Cowal replacement policy.	Maintenance Supt	August 2013

Item No.	Hazard Audit Recommendation	Action Taken	Responsibility	Completion Date
13	The formal risk assessments should be performed by more than one person to ensure input and assessment from the relevant disciplines	Review of MoC – FRA process. Review of FRA training materials.	Senior Maintenance Engineer	August 2013
14	The formal risk assessments should be on the possible effects of the changed system malfunctioning. Justification for the change and the hazards for making the change are recommended to be done elsewhere (not via the management of change formal risk assessment)	Review of MoC – FRA process. Review of FRA training materials.	Senior Maintenance Engineer	August 2013
15	Provide guidance on how to conduct the formal risk assessments to ensure consistency	Review of MoC – FRA process. Review of FRA training materials.	Senior Maintenance Engineer	August 2013
16	All management of change actions need to be tracked to ensure they are adequately addressed and signed-off when complete	Review of MoC – FRA process. Review of FRA training materials.	Senior Maintenance Engineer	August 2013
17	Improve the quality of HAZOP actions to avoid ambiguous entries such as “Commissioning Plan”	Review of Cowal Hazop process. Review of Hazop training materials.	Senior Maintenance Engineer	August 2013

Item No.	Hazard Audit Recommendation	Action Taken	Responsibility	Completion Date
18	Confirm that adequate assessment have been done for recommendations 8 and 9 from the second hazard audit	8 (2010): Include in the preventative maintenance system a replacement policy for bursting discs. 9 (2010): Determine suitable means to control sources of ignition within the defined Hazardous Areas on the site (for example, the radios used at site are not intrinsically safe).	Maintenance Superintendent Processing Supt	June 2013 June 2013

7 REFERENCES

1 Department of Planning NSW, *Hazardous Industry Planning Advisory Paper No. 5: Hazard Audit Guidelines;* NSW Government, Sydney

2 Pinnacle Risk Management Pty Ltd, *Hazard Audit Report for Barrick Australia Limited, Cowal Gold Project, NSW, 5* August 2010

3 Pinnacle Risk Management Pty Ltd, *Final Hazards Analysis, Cowal Gold Project, NSW, Barrick Australia Ltd,* May 2006

4 North Limited, *Cowal Gold Project, Environmental Impact Statement*, 13 March 1998

5 Barrick Australia Ltd, *Transport of Hazardous Materials Study*, 2005

6 Pinnacle Risk Management Pty Ltd, *Fire Safety Study, Cowal Gold Project, NSW, Barrick Gold of Australia Ltd,* Dec 2004