Cowal Gold Operation

Hazardous Waste and Chemical Management Plan

Evolution Mining Cowal

May 2011

COWAL GOLD MINE

HAZARDOUS WASTE AND CHEMICAL MANAGEMENT PLAN

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PREFACE

This Hazardous Waste and Chemical Management Plan (HWCMP) has been prepared to meet the requirements of Consent Condition 5.7. Where there is any conflict between the provisions of this HWCMP and the applicable statutory requirements (i.e. licences, permits, consents and relevant laws) the statutory requirements are to take precedence.

In accordance with Consent Condition 3.2, this HWCMP is to be revised/updated at least every five years, or as otherwise directed by the Director-General, in consultation with the relevant government authorities.

Relevant current regulatory guidelines and Australian Standards are referenced in this HWCMP to provide guidance to Barrick employees and its contractors. It is the responsibility of Barrick to ascertain whether these guidelines or Australian Standards have been updated since the production of this HWCMP, and to conform with any new versions of these guidelines or standards as required by development consent conditions.

Similarly, it is the responsibility of Barrick to refer to the latest versions of statutory instruments or guidelines that are referenced in this HWCMP, but have not been appended.

TABLE OF CONTENTS

Section			Page
PREFACE			
1	INTRODUCTION		1
	1.1	OBJECTIVES AND SCOPE	5
2	LEGISLATIVE AND APPROVAL REGIME		10
	2.1	LEGISLATION	10
	2.2	STANDARDS AND GUIDELINES	15
		2.2.1 Australian Standards	15
		2.2.2 Other Guidelines	18
3	INTEGRATION OF CGM SAFEGUARDS AND CONTINGENCY PLANS		20
	3.1	PRELIMINARY RISK ASSESSMENT	20
	3.2	SAFEGUARDS AND CONTINGENCY PLANS	21
		3.2.1 Safeguards	22
		3.2.2 Contingency Plans	25
	3.3	SAFEGUARDS AND CONTINGENCY PLANS THAT ADDRESS PRA RECOMMENDATIONS	26
		3.3.1 Risks to the Environment	26
		3.3.2 Risks to Animals	35
		3.3.3 Risks to the Public	36
		3.3.4 Risks to Public Property	36
4	CLASSIFICATION OF HAZARDOUS SUBSTANCES AND DANGEROUS GOODS		37
	4.1	HAZARDOUS SUBSTANCES	37
	4.2	DANGEROUS GOODS	38
	4.3	ENVIRONMENTAL HAZARDS	38
5	CHEMICAL MANAGEMENT		40
	5.1	CGM CHEMICAL REQUIREMENTS	40
		5.1.1 Operational Phase	40
	5.2	CHEMICAL TRANSPORT OVERVIEW	43
	5.3	CHEMICAL HANDLING AND STORAGE OVERVIEW	43
	5.4	CHEMICAL MANAGEMENT STRATEGY	47
		5.4.1 Inventory Register	47
		5.4.2 HSDGR and FOR	47
		5.4.3 Personnel Training	47
		5.4.4 Auditing of Chemical Management	49
6	CONTAMINATED LAND		50
7	WASTE MANAGEMENT		51
	7.1	WASTE CLASSIFICATION	51
	7.2	CGM WASTE PRODUCTION	51
	7.3	WASTE HANDLING, TRANSPORT AND DISPOSAL OVERVIEW	54
		7.3.1 Waste Separation	54
		7.3.2 General Solid (Putrescible/Non-Putrescible) Wastes	55
		7.3.3 Classified Liquid Wastes	56
		7.3.4 Hazardous Waste	56
		7.3.5 Special Wastes	58
		7.3.6 Waste Tracking	58
		7.3.7 Tailings and Waste Rock Disposal	60
	7.4	WASTE MANAGEMENT STRATEGY	60

TABLE OF CONTENTS (Continued)

		7.4.1 Waste Inventory	60
		7.4.2 Waste Management Hierarchy	62
		7.4.3 Waste Recycling Procedure	63
	7.5	PERSONNEL TRAINING	63
	7.6	AUDITING OF WASTE MANAGEMENT	64
8	RESPONSE PROCEDURES IN THE EVENT OF SPILLAGES		65
	8.1	OFF-SITE SPILLS	65
	8.2	ON-SITE SPILLS	65
		8.2.1 Responsibility	65
		8.2.2 Spill Response Procedures	66
9	HAZARDOUS SUBSTANCES AND DANGEROUS GOODS REGISTER		72
	9.1	MAINTENANCE OF THE REGISTER	73
	9.2	MEDICAL/ENVIRONMENTAL SAFETY DATA	73
	9.3	QUANTITIES AND STORAGE LOCATIONS	74
	9.4	SAFETY AND HAZARD MANAGEMENT PROCEDURES	74
	9.5	PERSONNEL TRAINING PROCEDURES	75
	9.6	CONTINGENCY, CLEAN-UP AND DISPOSAL PROCEDURES	75
	9.7	AUDITING AND REVIEW PROCEDURES – HSDGR & FOR	76
10	FUEL AND OIL REGISTER		77
	10.1	MAINTENANCE OF THE REGISTER	77
	10.2	STORAGE METHODS AND FACILITIES	77
	10.3	PUMPING, PIPING, TRANSFER AND SEPARATION PROCEDURES	77
	10.4	FIRE PROTECTION	77
	10.5	SPILL CONTAINMENT AND CLEAN-UP PROCEDURES	77
	10.6	WASTE OIL COLLECTION, TREATMENT AND DISPOSAL	78
11	AUDITING AND REVIEW		79
	11.1	FACILITATION OF AUDIT FUNCTIONS	79
	11.2	COMPLIANCE REPORT AND HAZARD AUDIT	79
	11.3	EXTERNAL AUDITS	80
		11.3.1 Third Party Audit	80
		11.3.2 Independent Monitoring Panel	81
	11.4	INTERNAL REVIEW	81
12	STAKEHOLDER CONSULTATION		82
	12.1	COMMUNITY ENVIRONMENTAL MONITORING AND CONSULTATIVE COMMITTEE	82
13	COMPLAINTS REGISTER		84
	13.1	COMPLAINTS RECORDS FOR EPL 11912	84
14	REPORTING		86
	14.1	ANNUAL ENVIRONMENTAL MANAGEMENT REPORT	86
	14.2	INCIDENT REPORTING	87
	14.3	COMPLIANCE REPORTING	87
15	REFERENCES		88

TABLE OF CONTENTS (Continued)

LIST OF TABLES

Table 1	Other Relevant Plans Required by the Development Consent
Table 2	PRA Recommendations and Management Plans/Studies
Table 3	Fire Suppression Systems Summary
Table 4	Sprinkler Densities and Temperature Ratings of Heads
Table 5	Minimum Personal Protective Equipment and Safety Equipment on Road Vehicles Transporting a Placard Load
Table 6	Fire Extinguishers Required on Road Vehicles Transporting
Table 7	Examples of Environmental Hazards of Typical Consumables Used in Mining
Table 8	List of Chemicals/Consumables
Table 9	Operational Phase Wastes – Classification, Transport, Handling and Disposal
Table 10	Staff Spill Responsibilities
Table 11	Spill Classification Criteria
Table 12	Facilitation of Efficient Audit Functions

LIST OF FIGURES

Figure 1	Regional Location
Figure 2	Chemical Management Strategy
Figure 3	Waste Management Strategy

LIST OF FLOW DIAGRAMS

Flow Diagram 1	Spill Response Notification Procedure
Flow Diagram 2	Minor Spill Response Procedure
Flow Diagram 3	Major Spill Response Procedure

LIST OF ATTACHMENTS

Attachment 1	Acronyms

LIST OF APPENDICES

Appendix A	Waste Classification Guidelines Part 1: Classifying Wastes
Appendix B	Barrick Incident Report Form
Appendix C	Relevant Australian Standards
Appendix D	Relevant Emergency Response Guides - Transport

1 INTRODUCTION

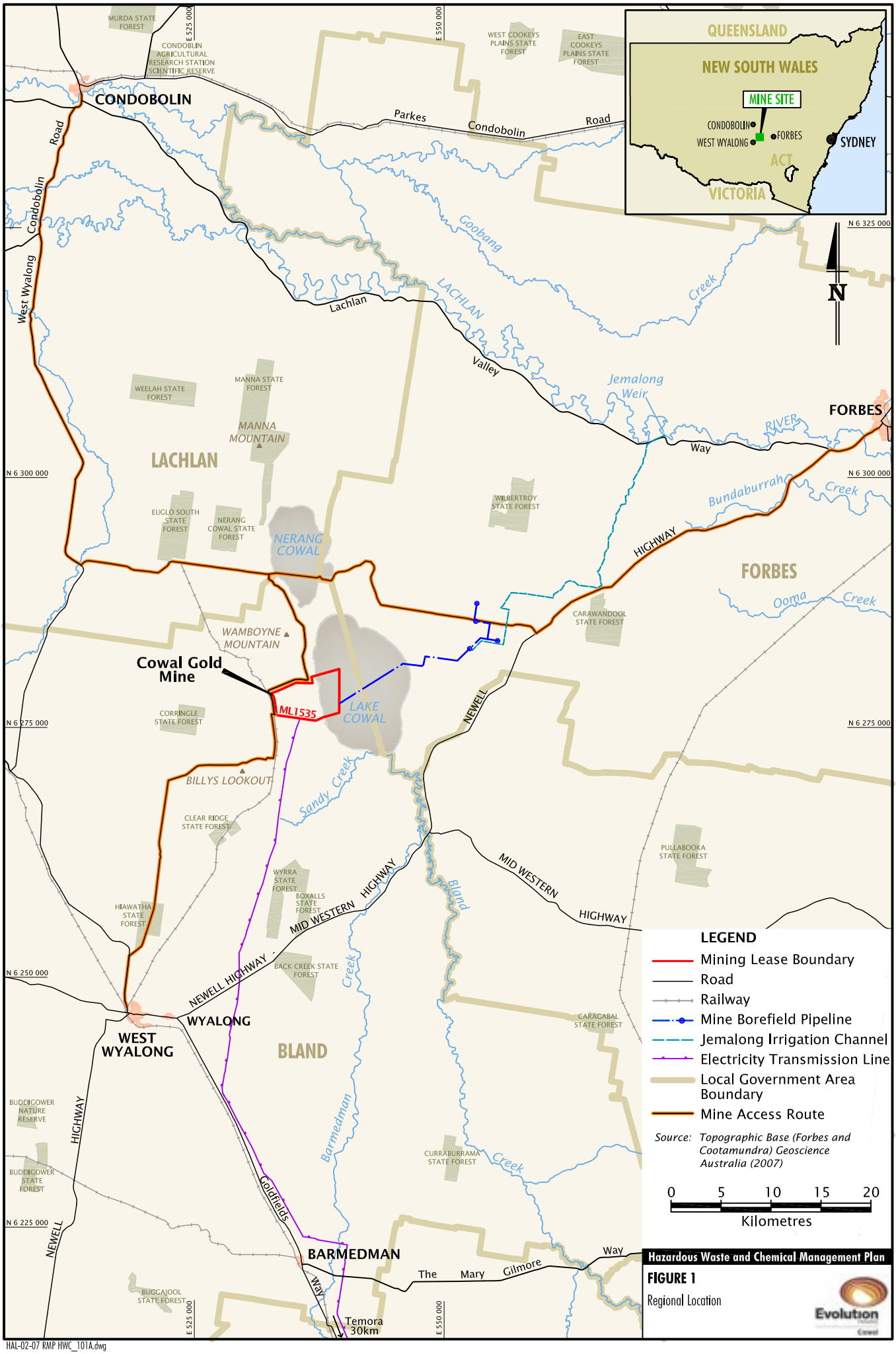
The Cowal Gold Mine (CGM) is located approximately 38 kilometres (km) north-east of West Wyalong, New South Wales (NSW) (Figure 1). The CGM is owned by Barrick (Cowal) Limited (Barrick).

Consent Condition 5.7 requires the preparation of a Hazardous Waste and Chemical Management Plan (HWCMP) as follows:

Consent Condition	
5.7	***Asbestos and Other Hazardous or Toxic Waste Management*** The Applicant shall prior to commencement of construction works prepare a Hazardous Waste and Chemical Management Plan as set out in section 6.4.1 of the EIS in consultation with DECCW and BSC, and to the satisfaction of the Director-General.

Section 6.4.1 of the Cowal Gold Project Environmental Impact Statement (EIS) (North Limited, 1998) and the corresponding sections of this HWCMP that address the requirements of the EIS are provided below:

EIS Section 6.4.1 - Hazardous Waste and Chemical Management Plan	Section
Chemical, reagent and fuel requirements during mineral processing are listed in Section 2.6.12. As discussed in Section 4.1.7, a preliminary risk assessment has been completed (Appendix L) which identifies risks to the public, public property and the environment (both on and off-site). The safeguards and contingency plans discussed in the assessment would be integral to the hazardous waste and chemical management plan. The plan would provide detail on the appropriate transport, handling, disposal and recycling procedures for wastes generated at the Project site as well as appropriate emergency response procedures in the event of spillages. The plan would be in accordance with relevant statutory considerations and Australian Standards.	Sections 2, 7 and 8
The plan would also include the regular maintenance of both a hazardous substances and fuel and oil register. The purpose of these registers would be to facilitate efficient audit functions as well as conform with best practice environmental management.	Sections 9 and 10
The register of hazardous substances and dangerous goods used on-site would comprise the following:	
• *regularly updated medical/environmental safety data in accordance with Section 42 of the Mines Inspection General Rule (1994)*;*	Section 9.2
• *a regularly updated list of the chemicals on-site with details of quantities and storage locations;*	Sections 9.1 and 9.3
• *auditing and review procedures;*	Section 9.7
• *safety and hazard management procedures for potential incidents;*	Section 9.4
• *personnel training procedures; and*	Section 9.5
• *contingency, clean-up and disposal procedures.*	Section 9.6
The fuel and oil register would include:	
• *the types and volumes of fuel and oils;*	Section 10
• *location of storage facilities, storage methods, bunding and secondary containment;*	Section 10.2
• *pumping, piping, transfer and separation procedures;*	Section 10.3
• *fire protection;*	Section 10.4
• *spill containment and clean-up procedures;*	Section 10.5
• *maintenance, testing and audit procedures; and*	Sections 9.7 and 10.1
• *waste oil collection, treatment and disposal procedures.*	Section 10.6
* Now the NSW *Mine Health and Safety Act, 2004.*	


QUEENSLAND
NEW SOUTH WALES
MINE SITE
CONDOBOLIN
WEST WYALONG
FORBES
SYDNEY
ACT
VICTORIA
CONDOBOLIN
WEST WYALONG
FORBES
LACHLAN
BLAND
Cowal Gold Mine
ML1535
LAKE COWAL
NERANG COWAL
WAMBOYNE MOUNTAIN
MANNA MOUNTAIN
BILLYS LOOKOUT
Parkes Road
Condobolin Road
West Wyalong Road
Lachlan Valley Way
Mid Western Highway
Newell Highway
Goldfields Way
The Mary Gilmore Way
Temora 30km
Goobang Creek
Jemalong Weir
LACHLAN RIVER
Bundaburrah Creek
Ooma Creek
Sandy Creek
Bland Creek
Barmedman Creek
MURDA STATE FOREST
CONDOBOLIN AGRICULTURAL RESEARCH STATION SCIENTIFIC RESERVE
WEST COOKEYS PLAINS STATE FOREST
EAST COOKEYS PLAINS STATE FOREST
WEELAH STATE FOREST
MANNA STATE FOREST
EUGLO SOUTH STATE FOREST
NERANG COWAL STATE FOREST
WILBERTROY STATE FOREST
CARAWANDOOL STATE FOREST
CORRINGLE STATE FOREST
CLEAR RIDGE STATE FOREST
WYRRA STATE FOREST
BOXALLS STATE FOREST
HIAWATHA STATE FOREST
BACK CREEK STATE FOREST
PULLABOOKA STATE FOREST
CARACABAL STATE FOREST
CURRABURRAMA STATE FOREST
BUDDIGOWER NATURE RESERVE
BUDDIGOWER STATE FOREST
BUGGAJOOL STATE FOREST
E 525 000
E 550 000
N 6 325 000
N 6 300 000
N 6 275 000
N 6 250 000
N 6 225 000
N
LEGEND
Mining Lease Boundary
Road
Railway
Mine Borefield Pipeline
Jemalong Irrigation Channel
Electricity Transmission Line
Local Government Area Boundary
Mine Access Route
Source: Topographic Base (Forbes and Cootamundra) Geoscience Australia (2007)
0 5 10 15 20
Kilometres
Hazardous Waste and Chemical Management Plan
FIGURE 1
Regional Location
Evolution Mining
HAL-02-07 RMP HWC_101A.dwg

In addition:

- Consent Condition 3.2 describes the requirement for the preparation of environmental management plans. This is addressed in the Preface.
- Consent Condition 3.4(a) requires the preparation of a Flora and Fauna Management Plan (FFMP). This condition is addressed in Section 3.3.2.
- Consent Condition 3.8(b) requires the provision of adequate fire protection works on-site. This condition is addressed in Sections 3.2 and 3.3.1.
- Consent Condition 3.10(A) requires preparation of a Land Management Plan (LMP). The LMP is discussed in Section 5.1.2.
- Consent Condition 4.1/4.2 describes the requirement to prepare a Site Water Management Plan (SWMP). This condition is addressed in Section 3.2.1.
- Consent Condition 4.5 states the requirement that there shall be no disposal of water from the Internal Catchment Drainage System to Lake Cowal under any circumstances. This condition is addressed in Section 3.2.1.
- Consent Condition 5.3(b) requires the preparation of a Cyanide Management Plan. This is addressed in Sections 1.1 and 3.3.2.
- Consent Condition 5.4(a) requires the preparation of several pre-construction studies, including a Fire Safety Study, Hazard and Operability Study (HAZOP) and Final Hazard Analysis. This condition is addressed in Sections 1.1, 3, 11.2 and 14.3.
- Consent Condition 5.4(b) requires the preparation of several pre-commissioning studies. This condition is addressed in Sections 1.1, 3.2.2 and 14.3.
- Consent Condition 5.4(c) sets out requirements for auditing and reporting for the CGM. This condition is addressed in Sections 11.2 and 14.3.
- Consent Condition 5.4(d) describes the requirement for Barrick to maintain a register of accidents, incidents and potential incidents. This condition is addressed in Sections 14.2 and 14.3.
- Consent Condition 5.4(e) describes the requirement for Barrick to undertake a comprehensive hazard audit. This condition is addressed in Sections 11.2 and 14.3.
- Consent Condition 5.4(f) requires Barrick to comply with reasonable requirements of the Director-General in respect of the implementation of any measures arising from the approvals given in respect of conditions 5.4(a) – 5.4(e). This condition is addressed in Section 14.3.
- Consent Condition 5.5 requires the disposal of all solid and putrescible matter to be to the satisfaction of Bland Shire Council (BSC). This condition is addressed in Section 7.3.2.
- Consent Condition 5.6 describes the requirements for the site sewage treatment facility. This condition is addressed in Section 7.3.3.
- Consent Condition 8.2(a) describes the requirement for the water quality monitoring of surface and groundwater. This condition is addressed in Section 7.3.6.
- Consent Condition 8.2(b) details the requirement for the monitoring of cyanide in the tailings stream. This condition is addressed in Sections 3.3 and 7.3.6.
- Consent Condition 8.7 establishes the requirement to set up a Community Environmental Monitoring and Consultative Committee (CEMCC). This condition is addressed in Section 12.1.
- Consent Condition 8.8 requires the completion of an Independent Environmental Audit and establishment of an Independent Monitoring Panel for the CGM. This condition is addressed in Sections 11.3.1 and 11.3.2.

- Consent Condition 9.2 describes the requirement for the Applicant to prepare and submit an Annual Environmental Management Report (AEMR). This condition is addressed in Section 14.1.
- Consent Condition 10 outlines the requirements for receipt and response to community complaints. This condition is addressed in Section 13.
- In accordance with Consent Condition 12.1, the Applicant is obliged to ensure all statutory requirements are fully met.

Conditions of Authority ML 1535

The Department of Mineral Resources (now the NSW Department of Industry and Investment [I&I NSW]) also has requirements that relate to pollution prevention as detailed in the Conditions of Authority of the Mining Lease (ML) 1535. Relevant Conditions of Authority include:

Prevention of Soil Erosion and Pollution

14. Operations must be carried out in a manner that does not cause or aggravate air pollution, water pollution (including sedimentation) or soil contamination or erosion, unless otherwise authorised by a relevant approval, and in accordance with an accepted Mining Operations Plan (MOP). For the purpose of this condition, water shall be taken to include any watercourse, waterbody or groundwaters. The lease holder must observe and perform any instructions given by the Director-General in this regard.

This Condition of Authority is addressed in Sections 3.2.1, 5.3 and 7.3.

Mine Safety Management Plan

24. Prior to the commencement of any construction activities on the lease area and as required by the Director-General the lease holder must prepare a Mine Safety Management Plan to ensure the Mines Inspection General Rule 2000 is adhered to.

This Condition of Authority is addressed in Section 3.2.2.

Annual Environmental Management Report (AEMR)

26.(1) Within 12 months of the commencement of mining operations and thereafter annually or, at such other times as may be allowed by the Director-General, the lease holder must lodge an Annual Environmental Management Report (AEMR) with the Director-General.

(2) The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of:

- *(a) the accepted Mining Operations Plan;*
- *(b) development consent requirements and conditions;*
- *(c) Environment Protection Authority and Department of Land and Water Conservation licences and approvals;*
- *(d) any other statutory environmental requirements;*
- *(e) details of any variations to environmental approvals applicable to the lease area; and*
- *(f) where relevant, progress towards final rehabilitation objectives.*

(3) After considering an AEMR the Director-General may, by notice in writing, direct the lease holder to undertake operations, remedial actions or supplementary studies in the manner and within the period specified in the notice to ensure that operations on the lease area are conducted in accordance with sound mining and environmental practice.

(4) The lease holder shall, as and when directed by the Minister, cooperate with the Director-General to conduct and facilitate review of the AEMR involving other government agencies and the local council.

This Condition of Authority is addressed in Section 14.1.

EPL 11912 Conditions

The Department of Environment, Climate Change and Water (DECCW) has additional requirements that relate to the HWCMP as detailed in Environment Protection Licence (EPL) 11912. These include:

- Waste condition L5 which prohibits the receipt of waste generated outside of the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence. This condition is addressed in Section 7.3.
- Monitoring and recording conditions M4 and M5 which require the licensee to keep a record of all complaints made in relation to pollution arising from a licensed activity and provide a telephone complaints line. This condition is addressed in Section 13.1.1.
- Operating condition O1 which requires licensed activities to be carried out in a competent manner. This condition is addressed in Sections 5.3 and 7.3.
- Operating condition O3 which outlines the bunding requirements for above ground flammable and combustible liquid store storage facilities. This condition is discussed in Section 5.3.
- Reporting condition R2 which by reference to the *Protection of the Environment Operations Act 1997* requires the licensee to notify the EPA of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident. This condition is addressed in Section 8.2.2.

1.1 OBJECTIVES AND SCOPE

The objectives of this HWCMP are to:

(i) fulfil the relevant development consent conditions;

(ii) address the issues identified in Section 6.4.1 of the EIS (North Limited, 1998):
   - incorporate the safeguards and contingency plans discussed in the Preliminary Risk Assessment (PRA);
   - provide details on the appropriate transport, handling, disposal and recycling procedures for wastes generated at the CGM;
   - provide details on the appropriate emergency response procedures in the event of spillages; and
   - comply with the relevant statutory considerations and Australian Standards; and

(iii) provide a description of the Hazardous Substance and Dangerous Goods Register (HSDGR) and Fuel and Oil Register (FOR) and how these will be regularly maintained, operated and will facilitate efficient audit functions and conform with best practice environmental management.

The HWCMP was prepared in consultation with the then EPA (now DECCW) and BSC (BSC, pers. comm., 9 April 2003) and to the satisfaction of the Director-General (approved by the Director-General of Planning on 30 October 2003). The HWCMP was prepared prior to a number of other CGM environmental management plans/studies that also address aspects relating to hazardous waste and chemical management including the:

- Fire Safety Study;
- HAZOP Study;
- Final Hazard Analysis;
- Transport of Hazardous Materials Study (Transport Study);
- Emergency Response Plan;
- Safety Management System; and
- Cyanide Management Plan.

An overview of these plans/studies is provided in Table 1.

Subsequent to the finalisation of the abovementioned plans/studies, the HWCMP has been updated to incorporate the recommendations and findings of these plans/studies relevant to hazardous waste and chemical management.

This revised HWCMP has been prepared in consultation with the DECCW and BSC in accordance with Consent Condition 5.7.

This HWCMP is structured as follows:

Section 1: Outlines the objectives of the HWCMP and details relevant consent conditions.

Section 2: Identifies the legislative approval regime applicable to the HWCMP.

Section 3: Describes the integration of the preliminary risk assessment safeguards and contingency plans.

Section 4: Describes classification of hazardous substances and dangerous goods.

Section 5: Details the management of CGM chemicals.

Section 6: Describes results of contaminated land assessment within ML 1535.

Section 7: Details the management of CGM waste.

Section 8: Describes spill response procedures.

Section 9: Details the HSDGR.

Section 10: Details the FOR.

Section 11: Describes auditing functions and review.

Section 12: Presents stakeholder consultation requirements.

Section 13: Details complaint recording and reporting procedures.

Section 14: Presents reporting requirements.

Table 1
Other Relevant Plans Required by the Development Consent

Plan	CGM Stage	Consent Condition No.	Consent Condition Requirement
Cyanide Management Plan	Pre-commissioning	5.3(b)	*5.3(b) Cyanide management* *The Applicant shall prepare a cyanide management plan for the monitoring and reporting of cyanide use on the site, in consultation with DII (Minerals), DECCW, and OoW, and to the satisfaction of the Director-General, prior to any use of cyanide on the site. The plan shall make provision for, but is not limited to:* *(i) containing cyanide contaminated waters entirely within the mine site;* *(ii) maintaining weak acid dissociable (WAD) cyanide levels at the discharge point to the tailings dams to the levels stated in condition 5.3(a);* *(iii) contingency measures for cyanide reduction.*
		8.2(b)	*8.2(b) Cyanide monitoring* *The Applicant shall prior to any tailings disposal prepare a cyanide monitoring program in consultation with the DECCW and DII (Minerals), and to the satisfaction of the Director-General. The plan shall include, but not be limited to, provision for:* *(i) monitoring of CN_{WAD} levels of the aqueous component of the tailings slurry stream at the discharge point to tailings dams twice daily or as otherwise directed by the Director-General, with any increases above 20mg CN_{WAD}/L to be assessed daily to ensure compliance and reported monthly to the DII (Minerals) and DECCW, unless otherwise agreed by the Director-General. If the CN_{WAD} levels of 30mg/L are exceeded in the liquid at any time, discharge to the tailings dams shall cease until CN_{WAD} levels can be achieved below the levels stated in condition 5.3(a) and such exceedance shall be reported to the DECCW within 24 hours;* *(ii) monitoring CN_{WAD} levels in the decant water of the tailings dams twice daily or as otherwise directed by the Director-General;* *(iii) an on site laboratory for quickly establishing CN_{WAD} levels in the liquid at the discharge point to tailings dams and in the decant ponds for monitoring purposes;* *(iv) on-line monitoring of CN(FREE) at locations where employees are operating;* *(v) establishing a monitoring regime for detection of cyanide movement beneath and adjacent to the tailings impoundments.* *A summary of the cyanide monitoring results shall be provided to the Director-General, DECCW and DII (Minerals) on a three monthly basis, unless otherwise agreed by the Director-General. All results shall be included in the AEMR.*
Fire Safety Study	Following Project Detailed Design	5.4(a)(i)	*This study shall cover all aspects detailed in the Department's Hazardous Industry Planning Advisory Paper No. 2, "Fire Safety Study Guidelines" and the New South Wales Government's "Best Practice Guidelines for Contaminated Water Retention and Treatment Systems". The study shall also be submitted for approval to the New South Wales Fire Brigades.* *The study should, in particular, address the fire related issues associated with the storage and use of Ammonium Nitrate, Sodium Isobutyl Xanthate, and Cyanide.*

Table 1 (Continued)
Other Relevant Plans Required by the Development Consent

Plan	CGM Stage	Consent Condition No.	Consent Condition Requirement
Hazard and Operability Study (HAZOP)	Following Project Detailed Design	5.4(a)(ii)	*The study is to be chaired by an independent qualified person approved by the Director-General prior to the commencement of the study. The study shall be carried out in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 8, "HAZOP Guidelines". The HAZOP shall in particular address the monitoring, control, alarm and shutdown systems associated with xanthate and cyanide process streams.*
Final Hazard Analysis	Following Project Detailed Design	5.4(a)(iii)	*The analysis should be prepared in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 6, "Guidelines for Hazard Analysis".*
Transport of Hazardous Materials Study (Transport Study)	Pre-commissioning	5.4(b)(i)	*The study comprises arrangements covering the transport of hazardous materials including details of routes to be used for the movement of vehicles carrying hazardous materials to or from the proposed development. The study shall be carried out in accordance with the Department's draft "Route Selection" guidelines. Suitable routes identified in the study shall be used except where departures are necessary for local deliveries or emergencies.* *The study should also address (1) the issues associated with spills, cleanup procedures, training of clean-up teams, communication, and liaison with organisations such as the fire brigades, District Emergency Management Coordinator (and Committee), Local Emergency Management Committee(s), and state emergency services; (2) inspection and monitoring procedures for chemicals such as explosives, xanthates and cyanides prior to commencement of a trip, to verify the integrity of the packaging; and (3) measures to be taken to ensure that the temperature of the materials does not rise above safe levels.*
Emergency Response Plan	Pre-commissioning	5.4(b)(ii)	*A comprehensive emergency plan and detailed emergency procedures for the proposed development. This plan shall include detailed procedures for the safety of all people outside of the development who may be at risk from the development. The plan should be in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 1, "Industry Emergency Planning Guidelines", and include procedures for spillage, cleanup, control and protection, and rescue of wildlife during the emergency.*
Safety Management System	Pre-commissioning	5.4.(b)(iii)	*A document setting out a comprehensive safety management system, covering all operations on-site and associated transport activities involving hazardous materials. The document shall clearly specify all safety related procedures, responsibilities and policies, along with details of mechanisms for ensuring adherence to procedures. Records shall be kept on-site and should be available for inspection by the Director-General upon request. The safety management system should be developed in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 9, "Safety Management".*

The following supporting information is appended to this Plan:

Attachment 1	Acronyms (used in this report)
Appendix A:	Waste Classification Guidelines Part 1: Classifying Wastes
Appendix B:	Barrick Incident Report Form
Appendix C:	Relevant Australian Standards
Appendix D:	Relevant Emergency Response Guides - Transport

2 LEGISLATIVE AND APPROVAL REGIME

The following subsections outline legislation and Australian Standards and guidelines that may apply to this HWCMP. In accordance with Section 6.4.1 of the EIS (North Limited, 1998) Barrick will comply with the requirements of this legislation and Australian Standards where applicable.

A system that provides a mechanism by which compliance with this legislation and Australian Standards can be assessed/audited in accordance with Consent Condition 8.8 is described in Section 11.3.1 (Third Party Audit). As described in Section 11.3.1 the audit was and will continue to be conducted by an independent person or team in accordance with AS/NZS IS0 19011:2003 *Guidelines for Quality and/or Environmental Management Systems Auditing* to assess CGM compliance with the requirements of the consent conditions, licenses and approvals.

2.1 LEGISLATION

In accordance with Section 6.4.1 of the EIS (North Limited, 1998), the following sections identify legislative requirements which may be of relevance to chemical and waste management at the CGM.

Pesticides Act 1999 (NSW)

Relevant to this HWCMP it is an offence under the *Pesticides Act 1999* (NSW):

- to possess or use an unregistered pesticide unless the person is authorised to do so by a permit under Part 7 of the Agriculture and Veterinary Chemicals Code 1994 (Agvet Code), and complies with the permit;
- to, without reasonable excuse, keep a registered pesticide in a container that does not have an approved label attached to the container;
- to possess or use a restricted pesticide unless authorised to do so by a certificate of competency or Pesticide Control Order granted or made by the EPA;
- to fail to read an approved label and permit for the pesticide;
- to use pesticide in contravention of any instruction on an approved label for the pesticide; and
- to contravene a pesticide control order or a prevention notice.

Directors and managers are also liable for the offences of the corporation unless they were not in a position to influence the conduct of the corporation in respect of the contravention or used all due diligence to prevent the contravention.

***Explosives Act 2003* (NSW)**

On 1 September 2005 the NSW *Dangerous Goods Act 1975* and *Dangerous Goods (General) Regulation 1999* were repealed and the *Explosives Act 2003* and the supporting *Explosives Regulation 2005* commenced. The changes mean that explosives and security sensitive dangerous substances are regulated by the *Explosives Act 2003* and the *Explosives Regulation 2005*. The new regulatory framework requires stricter security for explosives and concentrated ammonium nitrate.

The *Explosives Act 2003* regulates the handling and conveyance of explosives and explosive precursors. Under this Act:

- a licence may be required to handle explosives and explosive precursors;
- a person conveying an explosive must at all times take all precautions that are necessary to prevent access to the explosive by persons not lawfully entitled to have access to the explosive; and
- a person must not negligently handle any explosives in such a manner to endanger life, cause injury to any person or damage property.

***Explosives Regulation 2005* (NSW)**

The *Explosives Regulation 2005* is made under the *Explosives Act 2003* and deals with the following:

(a) a register of authorised and prohibited explosives (Part 2);

(b) the classification of explosives (Part 3);

(c) matters relating to licences under the *Explosives Act 2003* including the types of licences, requirements for obtaining licences, certain prescribed licence conditions and certain exemptions from the requirement to have a licence (Part 4);

(d) specific control measures relating to the handling of explosives (Part 5); and

(e) matters of a savings, transitional or administrative nature (Parts 1 and 6).

***Protection of the Environment Operations Act 1997* (NSW)**

This Act creates a number of offences relevant to the management of hazardous waste and chemicals, including:

- the wilful or negligent disposal of waste in a manner that harms or is likely to harm the environment;
- the wilful or negligent causing of a substance to leak, spill or otherwise escape in a manner that harms or is likely to harm the environment;
- the unlawful transporting of waste;
- the offence of polluting waters; and
- the new offence of land pollution.

***Dangerous Goods (Road and Rail Transport) Act 2008* (NSW)**

The purpose of *Dangerous Goods (Road and Rail Transport) Act 2008* (NSW) is to regulate the transport of dangerous goods by road and rail in order to promote public safety and protect property and the environment.

This Act is largely a uniform adoption of the now repealed Commonwealth *Road Transport Reform (Dangerous Goods) Act 1995*. It regulates the transport of dangerous goods (other than explosives) by road and rail in NSW. It enables the making of regulations in relation to all aspects of the transportation of dangerous goods, including importing, loading, consigning, marking and placarding of goods and driving of vehicles. It creates a number of offences, including the offence of failing to ensure, as far as practicable, that dangerous goods are transported in a safe manner.

***Dangerous Goods (Road and Rail Transport) Regulation 2009* (NSW)**

This Regulation largely adopts the regulations of the now repealed Commonwealth *Road Transport Reform (Dangerous Goods) Regulation 1997* in NSW, subject to minor modifications.

Australian Dangerous Goods Code 7th Edition (ADG 7) 2007

Volume 1 of the ADG Code classifies dangerous goods into Classes based on their various properties. Volume 2 of the ADG Code lists the goods that are specified as "dangerous goods". Packaging requirements and standards, design and maintenance of bulk containers for transport and marking and placarding of transport vessels and vehicles are all provided in detail in Volume 1 of the ADG Code.

Under the *Dangerous Goods (Road and Rail Transport) Regulation 2009* (NSW) carriers of dangerous or hazardous loads are required to be appropriately licensed and to conduct all transport procedures in accordance with the provisions of the ADG Code. Documentation requirements, safety equipment and emergency responses and guidelines are also covered in detail.

National Model Regulations for the Control of Workplace Hazardous Substances (National Occupational Health and Safety Commission (NOHSC:1005[1994])

The National Model Regulations apply to all workplaces in which hazardous substances are used or produced, and to all persons with potential exposure to hazardous substances in those workplaces. The two principal components of the regulations are:

- information provisions - which address the delivery of specific information, for example, labels and Material Safety Data Sheets (MSDSs), that the supplier of a workplace hazardous substance has to provide through the employer to employees. These provisions ensure that employee representatives, relevant public authorities and emergency services are also provided with access to relevant information; and
- assessment and control provisions - which require employers to identify hazardous substances in the workplace, make an assessment of those hazards, which arise out of the work activity and then take appropriate control action.

The National Model Regulations require employers to obtain MSDSs for all substances from suppliers and ensure these are readily accessible to employees. Employers must also ensure all substances are labelled properly and must keep and maintain a register for all hazardous substances used or produced in the workplace. The register must contain a list of all hazardous substances used or produced at the workplace and the MSDSs for all hazardous substances for which MSDSs are required by these national model regulations. The model regulations also require employers to provide induction and on-going training to all employees with the potential for exposure to hazardous substances in the workplace. It also provides for health surveillance, record keeping and employees duties to comply with the model regulations.

The National Code of Practice for the Control of Workplace Hazardous Substances [NOHSC:2007(1994)]

The National Code of Practice for the Control of Workplace Hazardous Substances provides a practical guide on how to comply with the National Model Regulations. It contains information on complying with requirements relating to consultation, classification, provision of information, training, assessment, monitoring and record keeping.

Approved Criteria for Classifying Hazardous Substances [NOHSC:1008 (2004b)] 3rd Edition

Approved Criteria for Classifying Hazardous Substances is a national standard for determining whether a substance is a hazardous substance, and to assist in preparing labels and MSDSs. It is based on the classification system used in the European Community.

Hazardous Substance Information System, Version 1.2.2 (NOHSC, 2004a)

The *Hazardous Substance Information System* supersedes the *List of Designated Hazardous Substances* (NOHSC:10005 [1999]), but reflects the information contained within the 1999 edition of that list.

The *Hazardous Substance Information System* contains information on hazardous substances that have been classified in accordance with the *Approved Criteria for Classifying Hazardous Substances* (NOHSC1008 [2004b]) 3rd Edition and/or have National Exposure Standards declared under the NOHSC (now the Australian Safety and Compensation Council) *Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment* (NOHSC:1003 [1995]) or subsequent updates.

The database provides hazardous substance information and exposure standards.

National Code of Practice for the Preparation of Material Safety Data Sheets, Edition 2, (NOHSC; 2011 (2003)

The code of practice provides advice on the preparation of MSDSs, where required by legislation. The code aims to provide consistent health and safety advice to persons who may be exposed to hazardous substances and dangerous goods.

WorkCover NSW, Storage and Handling of Dangerous Goods Code of Practice, 2005

This code of practice provides comprehensive practical guidance on the safe storage and handling of those substances and articles classified as dangerous goods, apart from explosives, infectious substances and radioactive substances. This code of practice outlines control measures focused on physically containing the hazards and risks posed by dangerous goods.

Mine Health and Safety Act 2004 (NSW)

The *Mine Health and Safety Act 2004* (MHS Act) and *Mine Health and Safety Regulation 2007* (MHS Regulation) replace the *Mines Inspection Act 1901* and *Mines Inspection General Rule 2000*, which were repealed on 1 September 2008.

The objects of the MHS Act include:

(a) to assist in securing the objects of the Occupational Health and Safety Act, 2000 at mines (including the object of securing and promoting the health, safety and welfare of persons at work at mines or related places),

(b) to ensure that the particular hazards associated with mines are identified and that risks arising from those hazards are assessed and eliminated or controlled,

(c) to ensure that effective provisions for emergencies are developed and maintained at mines,

(d) to ensure that managers, supervisors and employees are competent, by ensuring that appropriate health and safety competencies are defined and are implemented in the mining and quarrying industry.

Part 5 of the Act places duties on various parties to ensure the health and safety of workers at mines. These duties apply in addition to the duties under the *Occupational Health and Safety Act, 2000*. The relevant duties for the various parties are summarised below:

- operators of mines must:
  - prepare a mine safety management plan (MSMP) for the mine, which complies with the Act and Regulations;
  - ensure that mining is carried out in accordance with the MSMP; and
  - prepare an emergency plan for the mine.
- employees must comply with the MSMP and advise the operator of risks to health and safety;
- persons in management positions and supervisors at mines must comply with the MSMP and advise the operator of risks to health and safety and breaches of the OHSA and MSHA and Regulations; and
- contractors who work at a mine must ensure they and their workers and subcontractors comply with the MSMP and carry out work in compliance with safe work method statements.

Mine Health and Safety Regulation 2007 (NSW)

The MHS Regulation places a duty on mine operators to ensure risk assessments and risk controls are followed and documented for hazards common in mining workplaces.

The MHS Regulation also sets out certain requirements regarding notification and reporting of incidents at workplaces.

***Occupational Health and Safety Act, 2000 (NSW)* (OHS Act)**

The OHS Act imposes strict duties on various categories of persons to ensure the health, safety and welfare at work of all employees and others. The categories of persons subject to the operation of the Act include employers, controllers of work premises and employees.

Duties of Employers

An employer must ensure the health, safety and welfare at work of all the employees of the employer.

That duty extends (without limitation) to the following:

- ensuring that any premises controlled by the employer where the employees work (and the means of access to or exit from the premises) are safe and without risks to health;
- ensuring that any plant or substance provided for use by the employees at work is safe and without risks to health when properly used;
- ensuring that systems of work and the working environment of the employees are safe and without risks to health;
- providing such information, instruction, training and supervision as may be necessary to ensure the employees' health and safety at work; and
- providing adequate facilities for the welfare of the employees at work.

An employer must ensure that people (other than the employees of the employer) are not exposed to risks to their health or safety arising from the conduct of the employer's undertaking while they are at the employer's place of work.

Duties of Controllers of Work Premises

Controllers of work premises, plant or substances must ensure that the premises, plant or substances under their control are safe and without risks to health.

Duties of Employees

An employee must, while at work, take reasonable care for the health and safety of people who are at the employee's place of work and who may be affected by the employee's acts or omissions at work.

An employee must, while at work, co-operate with his or her employer or other person so far as is necessary to enable compliance with any requirement under this Act or the regulations that is imposed in the interests of health, safety and welfare on the employer or any other person.

Waste Avoidance and Resource Recovery Act 2001 (NSW)

The Act:

- promotes waste avoidance and resource recovery;
- repeals and replaces the *Waste Minimisation and Management Act, 1995*;
- creates a new body called Resource NSW to replace the existing Waste Planning and Management Boards and the State Waste Advisory Council;
- establishes a scheme to promote extended producer responsibility in place of industry waste reduction plans; and
- continues the Waste Fund for the purposes of funding relevant programmes and Resource NSW.

2.2 STANDARDS AND GUIDELINES

In accordance with Section 6.4.1 of the EIS (North Limited, 1998), the following sections identify Australian Standards (Appendix C) and guidelines which may be of relevance to chemical and waste management at the CGM.

2.2.1 Australian Standards

Where applicable, Barrick or its contractors will comply with the requirements of the following Australian Standards (AS).

AS 1216-2006: Class Labels for Dangerous Goods

This Standard sets out details of the design and selection of labels appropriate to the classes, categories and subsidiary risks of dangerous goods designated in the ADG Code.

AS 1319:1994 Safety Signs for the Occupational Environment

Any warnings, conditions of entry, emergency directions or other information intended for persons entering a restricted area shall be displayed on signs and notices at each point of access. Signs shall be constructed in accordance with AS 1319:1994 *Safety Signs for the Occupational Environment*.

AS 1345:1995 Identification of the Contents of Pipes and Conduits and Ducts

Australian Standard (AS) 1345:1995 *Identification of the Contents of Pipes and Conduits and Ducts* specifies means of identifying the contents of pipes, conduits, ducts and sheathing used to contain fluids, or for the distribution of electrical or communications services, by the use of colour, words and symbols. It is not intended to apply to buried or normally inaccessible services.

AS 1894:1997 The Storage and Handling of Non-flammable Cryogenic and Refrigerated Liquids

The standard sets out the requirements for the storage and handling of non-flammable liquids at or below -15 c, of Class 2.2 (non-flammable, non-toxic gases), in quantities of at least 50 L water capacity and 50 kilopascals (kPa) (gauge) working pressure, up to and including 200,000 L water capacity. The standard applies to the storage of non-flammable cryogenic and refrigerated liquids in pressure vessels that conform to AS 1210 (Hardbound) Pressure Vessels. The standard applies in locations that are generally industrial or commercial in nature.

AS 1940:2004 The Storage and Handling of Flammable and Combustible Liquids

Relevant storage areas will be constructed and operated in compliance with the requirements of AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids*, where applicable. The standard deals specifically with Class 3 flammable and combustible liquids, however it can be applied to other classes of dangerous goods (i.e. Class 8 corrosive substances).

AS 2030.1:1999 The Verification, Filling, Inspection, Testing and Maintenance of Cylinders for Storage and Transport of Compressed Gases - Cylinders for Compressed Gases other than Acetylene

All gas cylinders between a capacity of 0.1 kilograms (kg) and 3000 kg used at the CGM site will be subject to AS 2030.1:1999 *The Verification, Filling, Inspection, Testing and Maintenance of Cylinders for Storage and Transport of Compressed Gases - Cylinders for Compressed Gases other than Acetylene.*

AS 2187.1:1998 Explosives – Storage, Transport and Use – Storage

The storage of explosives shall be conducted in accordance with the requirements of AS 2187.1:1998 *Explosives – Storage, Transport and Use – Storage*. The standard deals with the location, design, construction and maintenance of explosives magazines.

AS/NZS 2243.10:2004 Safety in Laboratories - Storage of Chemicals

The requirements for the safe keeping of chemicals in packages in laboratories are described in AS/NZS 2243.10:2004 *Safety in Laboratories - Storage of Chemicals*. The standard includes storage of chemicals and opening of packages in a laboratory. This Standard applies to all chemical substances including hazardous substances; non-hazardous substances, such as common salt, sugar and soda ash; dangerous goods as defined in the ADG Code, except for dangerous goods of Class 1; (Explosives), Class 6.2 (Infectious substances) or Class 7 (Radioactive substances); and combustible liquids.

AS 2809.1:2008 Road Tank Vehicles for Dangerous Goods - General Requirements for all Road Tank Vehicles

Any vehicles at the CGM site designed and manufactured specifically as dangerous goods tankers (and any conventional vehicles that are provided with transportable dangerous goods tanks) are subject to AS 2809.1:2008 *Road Tank Vehicles for Dangerous Goods - General Requirements for all Road Tank Vehicles*.

AS 2931:1999 Selection and Use of Emergency Procedure Guides for the Transport of Dangerous Goods

AS 2931:1999 *Selection and Use of Emergency Procedure Guides for the Transport of Dangerous Goods* provides guidance on the selection of the AS 1678 emergency procedure guides (EPGs) (Section 3.3.1) and group text emergency procedure guides (GTEPGs) required when transporting dangerous goods and information on completing and using an EPG.

AS 3780:2008 The Storage and Handling of Corrosive Substances

AS 3780:2008 *Storage and Handling of Corrosive Substances* sets out requirements and recommendations for the safe storage and handling of corrosive substances (substances that meet the Class 8 classification criteria of the ADG Code). The standard also applies to other dangerous goods that are assigned a Class 8 subsidiary risk by the ADG Code.

AS 4326:2008 The Storage and Handling of Oxidising Agents

The storage and handling of oxidising agents such as ammonium nitrate is addressed by AS 4326:2008 *The Storage and Handling of Oxidising Agents*. The standard sets out requirements and precautions for storage, handling, safety and emergency procedures for oxidising agents that may be applicable to the CGM.

AS/NZS 1596:2008 The Storage and Handling of LP Gas

This Australian Standard/New Zealand Standard specifies the requirements for the location, design, construction, commissioning and operation of installations for the storage and handling of Liquefied Petroleum Gas (LPG) including the management of emergencies.

AS/NZS 2906:2001 Fuel Containers - Portable-Plastic and Metal

All portable, petroleum-product fuel containers made of metal or plastic, of nominal capacity up to and including 25 litres (L), intended to be refilled, and of the following types: (a) Containers for the storage and transport of fuel; (b) Fuel tanks for boats on the CGM site will be subject to AS/NZS 2906:2001 *Fuel Containers - Portable-Plastic and Metal.* Containers covered by this standard are suitable for use with leaded, unleaded and super grades of petrol, two-stroke engine fuel, and kerosene and distillate and may therefore be used at the CGM.

AS/NZS 3833:2007 The Storage and Handling of Mixed Classes of Dangerous Goods in Packages and Intermediate Bulk Containers

Any storage of mixed classes of hydrocarbons and chemicals shall be stored in accordance with the requirements of AS/NZS 3833:2007 *The Storage and Handling of Mixed Classes of Dangerous Goods in Packages and Intermediate Bulk Containers*, where applicable.

AS/NZS 4452:1997 The Storage and Handling of Toxic Substances

AS/NZS 4452:1997 *The Storage and Handling of Toxic Substances* sets out requirements and recommendations for the safe storage and handling of toxic substances that are classified as Class 6.1 in the ADG Code and also applies to other dangerous goods that are assigned a Class 6.1 subsidiary risk by the ADG Code, except where they are of Class 2, or where more stringent requirements apply under another relevant Standard or applicable regulation.

Relevant Australian Standards described in this section are listed in Appendix C.

2.2.2 Other Guidelines

Waste Classification Guidelines (DECCW, 2009)

The *Waste Classification Guidelines* (DECCW, 2009) (the Waste Guideline) provides the assessment and classification procedure for special, liquid, hazardous, restricted solid, general solid (putrescible) and general solid (non-putrescible) wastes. Guidance is provided in *Part 1: Classifying Waste* of the Waste Guideline on the waste classification process, including the chemical assessment of waste to determine its classification, where required. The Waste Guideline has been developed to assist waste generators in classifying the wastes they produce to assist those involved in the management, treatment and disposal of waste to ensure the environmental and human health risks associated with the waste are managed appropriately in accordance with the *Protection of the Environment Operations Act, 1997* (PoEO Act) and its associated regulations (DECCW, 2009). Part 1 of the Waste Guideline is provided in Appendix A.

Leading Practice Sustainable Development Program for the Mining Industry - Hazardous Materials Management (Department of Resources, Energy and Tourism [DRET], 2009)

Produced by the Commonwealth Department of Resources, Energy and Tourism as a part of the Leading Practice Sustainable Development Program for the Mining Industry series, this handbook provides guidance on the leading practice for Hazardous Materials Management in the mining industry. The handbook provides guiding principles and leading practices in the handling and storage of hazardous materials through the mine life cycle.

Minerals Industry Safety Handbook (Department of Mineral Resources, 2004])

The Minerals Industry Safety Handbook has been developed by the NSW Government with the contribution and commitment of industry stakeholders and other government mining authorities throughout Australia. The handbook has been produced specifically to assist miners in the metalliferous and extractive industries to attain and maintain a safe and healthy workplace.

Section 4.14 (Hazardous Substances) of the safety handbook is of particular relevance to the management of hazardous substances and dangerous goods, and includes recommendations for the management and handling of cyanide.

Code of Practice for the Safe Use of Pesticides including Herbicides in Non-Agricultural Workplaces (WorkCover NSW, 2006)

The code is a practical guide on how to comply with the relevant legislation relating to the use and storage of pesticides and herbicides in non-agricultural workplaces.

Information Bulletin No. 53 Version 3 – Storage Requirements for Security Sensitive Ammonium Nitrate (Queensland Department of Mines and Energy, 2008)

This guideline provides a useful summary of the requirements set out in AS 4326:2008 *The Storage and Handling of Oxidising Agents* (Appendix C) that are applicable to the storage of ammonium nitrate, appropriate separation distances from explosives stores, fire protection and appropriate signage.

3 INTEGRATION OF CGM SAFEGUARDS AND CONTINGENCY PLANS

3.1 PRELIMINARY RISK ASSESSMENT

A PRA has been completed for the CGM (ANSTO Safety and Reliability, 1997) which identifies risks to the public, public property and the environment (both on and off-site), and the safeguards and contingency plans that will be implemented to minimise risks. The PRA identified the highest risks to the environment, public safety and public property from the CGM as being associated with the following scenarios (*ibid.*):

- spillage of material during transport;
- a major spillage of material from on-site storage tanks coincident with catastrophic bund failure;
- spillage of diesel fuel onto the ground outside the mine site;
- wildlife entering the tailings storages during normal operation due to fence failure;
- birds using the tailings storages when an accidental release of cyanide occurs; and
- release of hazardous material in the event of a fire.

The ANSTO Safety and Reliability (1997) recommendations as detailed in the PRA executive summary are reproduced below:

> *The recommended risk reduction measures are listed below. They are designed to reduce the likelihood or the consequences of incidents that could cause damage.*
>
> *The recommendations relating to transport are:*
>
> - *Preparation of a detailed plan of actions to be taken to mitigate the effects of any spill of toxic material during transport to the miner site. This would include a detailed assessment of the proposed route to be taken by the trucks with prescribed actions to be taken following an accident.*
> - *Preparation of a plan of action to recover material spilt at the mine site.*
> - *Ensure the preparation of detailed emergency response plans by the materials suppliers in consultation with the local emergency services. These plans should aim to reduce the effects of a spill and the number of people remaining near the spill.*
> - *Ensure that the carriers strictly enforce the provisions of the Australian Code for the Transport of Dangerous Goods by Road and Rail.*
> - *Provision of a radio or telephone in truck cabs, to increase the likelihood of prompt notification of an accident.*
> - *Carrying of self-contained breathing apparatus in the cab of those trucks transporting sodium cyanide, to increase the likelihood of prompt response to an accident.*
> - *Carrying of material in such a manner as to minimise, as far as practicable, the amount of material that would be spilt from a truck involved in an accident.*
> - *Packaging of material in a manner to restrict water ingress. This will reduce the consequences of a spill in or near water.*
>
> *The recommendations relating to the tailings storages are:*
>
> - *Systems to monitor cyanide levels in the tailings slurry should be suitably robust, reliable, and well maintained to give a high confidence of promptly detecting inadvertent increase in cyanide levels above the level of concern.*
> - *Tailings storages water should be regularly monitored to ensure that levels are within prescribed limits.*
> - *An effective system be installed and maintained (e.g. manned patrols, hazing devices) to ensure that birds are scared away from the tailings storages if cyanide levels become sufficiently high to warrant concern.*

The recommendations relating to the stored materials are:

- *Storage of the hazardous material in such a manner as to minimise the possibility of fire.*
- *Provision of efficient fire alarm systems.*
- *Provision of efficient fire suppression systems.*

Table 2 presents a summary of the PRA assessment subjects, primary risk components and the relevant CGM environmental management plans and studies in which the PRA recommendations are addressed. Further detail is provided in Section 3.3.

Table 2
PRA Recommendations and Management Plans/Studies

PRA Subject	Primary Risk Component	Plans and Studies which Address the PRA Recommendation	Section of this HWCMP where Addressed
Risks to the Environment	Transport and fire (primarily relating to sodium cyanide)	Transport Study, HAZOP Study, Final Hazard Analysis, Fire Safety Study, Emergency Response Plan and HWCMP	3.3.1 and 8
Risks to Animals	Cyanide levels in tailings and physical entrapment in tailings	Cyanide Management Plan, FFMP, Implementation Plan to Protect Fauna from Interactions with the Tailings Storage Facilities (Implementation Plan) and HWCMP	3.3.2
Risks to the Public	Transport and fire (primarily relating to sodium cyanide)	Transport Study, HAZOP Study, Final Hazard Analysis, Emergency Response Plan and HWCMP	3.3.3 and 8.1
Risks to Public Property	Transport Accident	Transport Study, HAZOP Study, Final Hazard Analysis, Emergency Response Plan and HWCMP	3.3.4 and 8.1

After: ANSTO Safety and Reliability (1997)

The Fire Safety Study, Cyanide Management Plan and Transport Study provide additional details, procedures and measures developed to address the recommendations of the PRA (Section 1.1).

3.2 SAFEGUARDS AND CONTINGENCY PLANS

There are a number of general CGM safeguards that will be implemented. The following summary of these safeguards is extracted from ANSTO Safety and Reliability (1997):

There are a number of aspects of the Cowal Gold Project that act to minimise the impact of the postulated incidents. Some of these involve active response and some are static equipment. The most significant are as follows:

Site Bunding

The site will be bunded to stop any spills or rain run-off leaving the site. Any spills of material on the site will flow to collecting ponds situated within the site. In the event that these ponds are overtopped, spilt material will flow into the mine pit or be entrained in ponds located around the waste rock dump from whence it can be recovered and made safe.

Fire Suppression

Fire suppression systems will be installed in accordance with regulations. The extinguishing media will be appropriate to the particular reagent; thus any sodium cyanide fire will not be extinguished by water.

Emergency Response

Emergency response systems will be in place to respond to transportation accidents.

Further detail on these aspects is provided below.

3.2.1 Safeguards

Bunding/Runoff Containment

The Internal Catchment Drainage System will collect potentially contaminated surface water generated on-site. There will be no disposal of water from the Internal Catchment Drainage System to Lake Cowal under any circumstances, in accordance with Consent Condition 4.5 and Condition of Authority 14.

The process plant area will be bunded and graded such that runoff and any accidental spills of processing water, oils, fuels or reagents will report to a process plant runoff storage (North Limited, 1998). Further discussion of the individual components of the Internal Catchment Drainage System is provided in the SWMP.

Fire Suppression

Table 3 provides CGM fire suppression information.

Table 3
Fire Suppression Systems Summary

General Area	Specific Component	Fire Suppression Systems Summary
Site Fire Water Storage and Distribution	*Fresh/Fire Water Storage Pond*	• A dedicated firewater pond is provided which maintains a minimum of 1,020 cubic metres (m^3) or 3 hours of fire flow at the design flow rate.
	Fresh Water Distribution	• The fresh water distribution system is independent of the firewater distribution system. That is, water in the firewater distribution system will not be used for any purpose other than fire suppression. • The fresh water will be distributed to the process plant and mining facilities from a pumping station located at the firewater pond. The distribution piping will be buried with a minimum cover of 1.0 metre (m). • Pipe material will be High Density Polyethylene (HDPE).
	Fire Water	• There will be one electric motor driven and one diesel engine driven fire pump. The electric motor driven jockey pump will maintain the system pressure under normal conditions. When the system pressure drops one electric motor driven fire pump will automatically start to maintain pressure and deliver the design fire water flow. If the fire water system pressure continues to drop or there is a loss of electricity to the electric pump, the diesel engine driven fire pump will start. Both pumps are rated to deliver 360 cubic metres per hour (m^3/h) at 870 kPa. • Fire hydrants will be installed in the yard area to provide outside protection for the buildings. The hydrants will be spaced such that the maximum spacing will be 60 m and a 6 m length of hose can protect all points of the buildings. Each hydrant will be equipped with two 65 millimetre (mm) outlets. • Pipe material will be HDPE.
Building Fire Protection Design Requirements	*General*	• The fire protection systems described are based on the understanding that the process building structures are non-combustible, and minimal combustible furniture and equipment will be used. • Twenty-four hour watch will be maintained at a pre-determined location such as the Mill Control Room or Security Guardhouse. All automatic fire protection systems will have their own audible alarms at each building or location with visual alarms at the twenty-four hour watch location.
	Piping and Ducting	• An approved firestop material will be installed in all locations where cable tray and ductwork passes through fire rated walls and floors.
	Fire Protection Systems	• Automatic sprinkler protection will be provided at the mine and plant workshops, crushers and mill lubrication oil reservoirs and at the elution heater oil reservoir. • Where practical, whether the area is sprinklered or not, full coverage of all areas with fire hose cabinets will be provided as a minimum, supplemented with portable hand held fire extinguishers. Fire hose cabinets will be located so that all interior areas of the buildings are within reach of a fire hose stream. All buildings will be designed in accordance with Building Code of Australia fire prevention requirements. • In areas open to the atmosphere with partial walls, where the site fire hydrant stations can provide full hose coverage to all areas, no standpipe or sprinklers will be provided. • All sprinkler and fire hose stand pipe systems will be monitored via pressure switches and flow switches and integrated with the main fire alarm system.

Table 3 (Continued)
Fire Suppression Systems Summary

General Area	Specific Component	Fire Suppression Systems Summary
Building Fire Protection Design Requirements (Cont.)	*Fire Protection Systems (Cont.)*	• The sprinkler systems (zones), fire hose stations, manual pull stations and fire detection devices will alarm at a central fire control panel located in the Process Plant's Control Room. • Portable hand held fire extinguishers will be provided throughout all areas and at all exits or as required based on the operations in each area. The final location, capacity, type and number of units will be established with the Project Insurance Underwriters and the client's representative.
	Electrowinning and Gold Room	• Hand held clean gas and/or ABC fire extinguishers will be provided. Elution oil heater is located external to the building, but will have wet sprinkler protection.
	Electrical Rooms	• Ionization type smoke detectors will be provided, supplemented with hand held fire extinguishers.
	Control Rooms	• Provided with fire protection in accordance with Building Code of Australia.
	Laboratory, Offices and Dry Area	• Fire hose coverage will be provided to all areas by external site fire hydrants supplemented by hand held clean gas and/or ABC fire extinguishers. Ionization type smoke detectors will be provided. Internal fire protection provided in accordance with Building Code of Australia.
	Conveyors	• The primary fire protection coverage for all non-critical path above ground conveyors will be from the site hydrant hose stations. • Sprinkler coverage will be provided for all below grade conveyors or conveyors stockpile feed conveyor and grinding plant feed conveyor designed in accordance with Factory Mutual (FM) Loss Prevention Data Sheet 7-11 for conveyors and include the following. • Sprinkler heads will be provided along all sections of underground conveyors and at head, tail and drive pulley areas. • If a fire is detected on a conveyor belt system, the belt will be interlocked with the drive motor and de-energised. If the belt motion is stopped an alarm will be activated. Any activation of the sprinkler system will also cause an alarm to sound. • The fire protection systems will be hydraulically designed for operation of the most remote ten sprinklers, with a minimum residual pressure of 70 kPa at the most remote sprinkler head.
	Reagent Mixing and Storage Area	• Fire protection will be provided by fire hydrant system, supplemented by hand held ABC fire extinguishers.
	Crushing/Grinding	• Fire hose cabinet coverage will be provided, supplemented by hand held portable ABC fire extinguishers.
	Lube Units	• Spot sprinkler coverage will be provided at each Lube unit over 390 L capacity.
	Truckshops	• Fire hose cabinet coverage will be provided, supplemented by hand held portable ABC fire extinguishers. • Wet sprinkler system will be provided over lube areas which are internal to the building and the repair bays.

Fire Sprinkler Densities

Fire sprinkler densities and temperature ratings of sprinkler heads are provided in Table 4.

Table 4
Sprinkler Densities and Temperature Ratings of Heads

General Area Covered	Density (mm/min/m^2)/over m^2	Sprinkler Heads Set for Temperature (^oC)
Electrowinning and Gold Room (Elution Oil Heater Only)	5/144	79
Conveyors	along length of conveyor only if main piping runs along the length of the conveyor	74
Lube Units	spot coverage 10/260	93

Source: Aker Kvaerner Australia, pers. comm., October 2005

Bushfire Management

Bushfire suppression is described in the Bushfire Management Plan (BMP) (Barrick Australia Limited, 2003a). In accordance with Consent Condition 3.8(a) and Section 6.4.4 of the EIS (North Limited, 1998), the on-site fire fighting equipment proposed by Barrick meets the requirements of NSW Rural Fire Service (RFS) and BSC. This will involve:

- the stationing of a well maintained "emergency fire fighting unit"; and
- hydrants, fire hoses and/or washdown hoses in the CGM area which could be used for fire fighting. The details of the locations and specification of this equipment have been reviewed/ finalised as a component of the Fire Safety Study for the CGM in accordance with Consent Condition 5.4(a)(i).

3.2.2 Contingency Plans

In accordance with Consent Condition 5.4(b)(ii) and (iii), an Emergency Response Plan and a Safety Management System have been prepared for the CGM and are described below.

Emergency Response Plan

In accordance with Consent Condition 5.4(b)(ii), a comprehensive Emergency Response Plan and detailed emergency procedures have been completed prior to commissioning of the CGM. The Emergency Response Plan includes procedures for the safety of all people outside the CGM, who may be at risk from the development and includes procedures for spillage, clean-up, control and protection and rescue of wildlife during an emergency.

The Emergency Response Plan contains, but is not limited to, the following (adapted from Environment Australia, 1997):

- strategies for dealing with emergency situations that might arise at the CGM;
- programmes and procedures designed to prevent or minimise the risk to persons outside the mine site from emergency situations;

- the plan:
  - identifies potential incidents which may require emergency response;
  - provides mechanisms for the warning of emergency situations; and
  - provides adequate resources, personnel and training for dealing with emergency situations;
- evacuation plans and evacuation procedures for use in any emergency situation; and
- procedures for the investigation of and remedial action for emergency situations.

In accordance with Consent Condition 5.4(b)(ii), the Emergency Response Plan also contains procedures for spillage clean-up, control and protection and rescue of wildlife during an emergency.

Safety Management System

A Safety Management System has been prepared for the CGM in accordance with Consent Condition 5.4(b)(iii). The Safety Management System specifies all safety related procedures, responsibilities and policies, along with details of mechanisms for ensuring adherence to procedures.

The Emergency Response Plan and Safety Management System will be reviewed and updated as necessary.

3.3 SAFEGUARDS AND CONTINGENCY PLANS THAT ADDRESS PRA RECOMMENDATIONS

The following subsections provide additional description of safeguards and contingency plans that specifically address the recommendations of the PRA.

3.3.1 Risks to the Environment

CGM environmental risk is dominated by road transport accidents leading to a spillage of the material (ANSTO, 1997). The transport risks dominate as a result of the long distances covered in delivering material to site. The risk of an accident has been determined to be low, the scenario contributing 80% to the total estimated risk is that of a truck transporting sodium cyanide being involved in an accident that results in a spillage of material (ANSTO, 1997).

The highest risks to the Lake Cowal wetland arise from fires allowing hazardous material to leave the site (ANSTO, 1997). The risks are small, however, in comparison to the totality of risks to the environment as a whole (*ibid.*).

Transport

Sodium cyanide transport to the CGM will commence following the completion and implementation of the pre-commissioning studies, including the Cyanide Management Plan (Table 1).

Although the suppliers of the sodium cyanide (and other materials) are responsible for the load until the delivery has occurred (ANSTO, 1997), the development consent recognises that the risks associated with off-site transport of CGM chemical supplies (e.g. sodium cyanide) can be reduced by the preparation of a Transport Study prior to commissioning (Table 1).

The Transport Study was approved by the Director-General for Planning on 9 January 2006. The Transport Study details:

- arrangements covering the transport of hazardous materials including the details of routes to be used for the movement of vehicles carrying hazardous materials to or from the CGM;
- issues associated with spills, cleanup procedures, training of cleanup teams, communication and liaison with organisations such as the fire brigades, District Emergency Management Coordinator (and Committee), Local Emergency Management Committee(s), and state emergency services;
- inspection and monitoring procedures for chemicals prior to commencement of a trip, to verify the integrity of the packaging; and
- measures to be taken to ensure that the temperature of the materials does not rise above safe levels.

Supply Contracts

In drawing up contracts with suppliers and waste contractors, Barrick will include clauses that require the supplier or waste contractor to comply with appropriate legislation and the ADG Code, site safety and/or supplier/contractor emergency response plans. These may vary according to the supplier type, for example:

A contract with a general supplier will include clauses such as:

- The supplier will comply with all legislative requirements and industry guidelines for safe operation of its vehicles.
- The supplier will only engage in the performance of this agreement, personnel who are skilled and experienced in their trades and professions.

A contract with a supplier of fuels and associated services will include clauses such as:

- The supplier shall be responsible for the safety of its personnel on site.
- The supplier shall provide and shall ensure that it's personnel engaged in the supply of fuels and associated services, observe at all times a safe system of work which complies with relevant Acts, Regulations or By-Laws, Rules or Orders and adopts known and accepted safe working practices.
- The supplier shall provide Barrick with a copy of its safety plan and emergency response procedures for the supply of fuels and associated services. The supplier shall comply with these procedures and plans at all times when supplying to Barrick.

A contract with a supplier of cyanide will include clauses such as:

- The supplier will comply with all statutory Acts and Regulations governing the transportation and handling of dangerous goods and with industry best practice in the delivery of sodium cyanide.
- The supplier will employ drivers certified for transport of dangerous goods to ensure sodium cyanide is delivered safely and efficiently to the site.
- The supplier will only engage in the performance of this agreement, personnel who are skilled and experienced in their trades and professions.
- Where the supply of sodium cyanide requires the supplier to enter the site, the supplier and its personnel must comply with the site rules and the Emergency Response Plan.

- The supplier will provide its personnel with a full range of safety equipment. All personnel are required to wear appropriate safety protection in accordance with site rules and management plans.
- The supplier will conduct a safety review of the site cyanide storage each year and advise Barrick of the findings of the review.
- Upon request by Barrick, the supplier shall provide sodium cyanide safety training to the Barrick's site personnel.
- The supplier shall provide MSDS information to site as required.
- The supplier shall provide Barrick with a copy of its emergency response procedures for the supply of cyanide. The supplier shall comply with these procedures at all times when transporting sodium cyanide to the CGM.

A description of the general requirements of the ADG Code with regard to emergency information, safety equipment, procedures during transport and emergencies is provided below. These procedures will be required to be applied by contract suppliers during the transport of dangerous goods in accordance with their ADG Code (and supply contract) requirements. A description of the ADG Code dangerous goods classifications is provided in Section 4.2.

Emergency Information

Emergency Information requirements are set out in Division 2 of Part 11 of the *Dangerous Goods (Road and Rail Transport) Regulations 2009* (NSW) (DG Regulations). The Consignor, Prime Contractor, Rail Operator, Road Vehicle Driver and Train Driver each have duties in respect of emergency information. For example:

> ***Consignor's duty***
>
> *A person must not consign a placard load for transport in or on a vehicle if the person knows, or reasonably ought to know, that the required emergency information for the dangerous goods in the load is not on the vehicle.*
>
> ***Prime contractor's duties***
>
> *A prime contractor must not use a road vehicle to transport a placard load if:*
>
> *(a) the road vehicle is not equipped with an emergency information holder that complies with Chapter 11.2 of the ADG Code; or*
>
> *(b) the required emergency information for the dangerous goods in the load is not in the holder.*
>
> ***Rail operator's duties***
>
> *A rail operator must not transport a placard load in a transport unit on a train if the required emergency information for the dangerous goods in the load is not in the train driver's cab.*
>
> *The above does not apply when a train transporting a placard load is involved in shunting operations and the required emergency information for the dangerous goods in the load is readily available elsewhere in the immediate vicinity of those operations.*
>
> ***Driver's duties***
>
> *A person must not drive a road vehicle transporting a placard load if:*
>
> *(a) the road vehicle is not equipped with an emergency information holder that complies with Chapter 11.2 of the ADG Code; and*
>
> *(b) the required emergency information for the dangerous goods in the load provided by the consignor of the goods, or by the prime contractor for the transport of the goods, is not in the holder.*

The driver of a road vehicle transporting a placard load must ensure that the road vehicle's emergency information holder contains only:

(a) the required emergency information for the dangerous goods in the load; and

(b) the transport documentation for the goods.

The driver of a road vehicle transporting a placard load must produce the required emergency information for the dangerous goods in the load for inspection by an authorised officer, or an officer of an emergency service, if the officer asks the driver to produce the information for inspection.

Train driver's duties

A person must not drive a train that is transporting a placard load if the required emergency information for the dangerous goods in the load is not in the train driver's cab.

A train driver transporting a placard load must produce the required emergency information for the dangerous goods in the load for inspection by an authorised officer or an officer of an emergency service, if the officer asks the driver to produce the information for inspection.

The above does not apply if the train driver transporting dangerous goods is in a depot or yard, or is engaged in shunting operations, and the required emergency information for the goods is readily available elsewhere in the immediate vicinity of the depot, yard or those operations.

Emergency Information is defined as emergency information complying with Chapter 11.2 of the ADG Code or emergency information that is approved by a Competent Authority.

Chapter 11.2 (Division 11.2.1) of the ADG Code states that *emergency information*, in relation to dangerous goods transported on a vehicle, means:

(a) the Dangerous Goods – Initial Emergency Response Guide; or

(b) an emergency procedure guide for the dangerous goods transported on the vehicle and the emergency procedure guide in relation to vehicle fire; or

(c) for use on trains transporting dangerous goods, the rail operator's Dangerous Goods Emergency Instructions for train crews which provides contact numbers for dangerous goods emergencies.

Dangerous Goods – Initial Emergency Response Guide

The *HB 76-2010 Dangerous Goods – Initial Emergency Response Guide* produced by Standards Australia provides emergency response information for dealing with accidents, spills, leaks or fires involving dangerous goods, as well as information on hazards, protective clothing and emergency procedures.

Emergency Procedure Guide

In accordance with the ADG Code, an *emergency procedure guide*, in relation to particular dangerous goods, is a guide outlining procedures to be taken in the event of an emergency involving the goods which is either:

- in the form, or substantially in the form, of an emergency procedure guide for the goods published by Standards Australia; or
- in a form approved by a Competent Authority in relation to goods of that kind.

In accordance with the ADG Code, an *emergency procedure guide*, in relation to vehicle fire, is a guide outlining procedures to be taken in the event of a fire on a road vehicle which is either:

- in the form, or substantially in the form, of the emergency procedure guide for vehicle fire published by Standards Australia; or
- in a form approved by a Competent Authority.

Emergency procedure guides for the transport of dangerous goods are produced by Standards Australia. The following Emergency Procedure Guides are of relevance to the materials transported to the CGM and are also listed in Appendix D:

- HB 76:2010 – *Dangerous Goods – Initial Emergency Response Guide*;
- AS 1678.0.0.001:2004 – Emergency Procedure Guide – Transport - Vehicle Fire;
- AS 1678.3A1:2004 – *Emergency Procedure Guide – Transport - Group Text EPGs for Class 3 Substances - Flammable Liquids;*
- AS 1678.4A1:2004 – *Emergency Procedure Guide – Transport - Group Text Card EPGs for Class 4.1 Substances - Flammable Solids; Substances Liable to Spontaneous Combustion; and Substances that in Contact with Water Emit Flammable Gases;*
- AS 1678.8A1:2004 – *Emergency Procedure Guide – Transport - Group Text EPGs for Class 8 Substances – Corrosive Substances;*
- AS 1678.2.1.001:2003 – *Emergency Procedure Guide – Transport - Liquefied Petroleum Gas;*
- AS 1678.2.2.000:2003 – *Emergency Procedure Guide – Transport - Oxygen, Refrigerated Liquid;*
- AS 1678.5.1.002:1998 – *Emergency Procedure Guide – Transport - Ammonium Nitrate;*
- AS 1678.5.1.005:2003 – *Emergency Procedure Guide – Transport - Hydrogen Peroxide, Aqueous Solution;*
- AS 1678.6.0.002:1998 – *Emergency Procedure Guide – Transport - Sodium Cyanide, Potassium Cyanide;*
- AS 1678.8.0.001:2003 – *Emergency Procedure Guide – Transport - Hydrochloric Acid;*
- AS 1678.10.001:1998 – *Emergency Procedure Guide – Transport - Pesticides; and*
- AS 1678.3.1.001:2003 – *Emergency Procedure Guide – Transport - Petrol (as cargo).*

Safety Equipment

Safety equipment requirements are specified in Chapter 12 of the ADG Code including requirements for personal protective and safety equipment and fire extinguishers. Table 5 sets out guidance as to the minimum requirements for personal protective and safety equipment on road vehicles transporting a placard road in accordance with Section 12.1.3.2 (provided below):

> ***12.1.3.2*** *A road vehicle transporting a placard load of dangerous goods must carry the personal protective equipment and safety equipment specified in Table 12.2 for all the dangerous goods in the load, based on their primary hazards and any subsidiary risks, subject to any conditions incorporated in the table and its explanatory notes.*

This chapter of the ADG Code also includes requirements for road vehicles transporting a placard load of dangerous goods to be equipped with a fire extinguisher or fire extinguishers. Requirements are provided in Table 6. A road vehicle transporting a placard load of dangerous goods must also be equipped with respiratory protection equipment in accordance with Section 12.1.3.5 of the ADG Code.

Table 5
Minimum Personal Protective Equipment and Safety Equipment on Road Vehicles Transporting a Placard Load

Dangerous Goods Class or Subsidiary Risk	Respiratory protection equipment for escape purposes	Gas Tight Goggles or Full Face Shield as Appropriate	Eye-wash kit [d]	Chemically Resistant Gloves or Gauntlets	Thermally Insulated Gloves or Gauntlets	Chemically Resistant Suit or Coveralls	Chemically Resistant Boots	Any electric torch	Electric torch complying with AS/NZS 60079.11 or other recognised Code
2.1 [a]	No	Yes [c]	No	No	Yes	No	No	No	Yes
2.2	No	Yes [c]	No	No	Yes	No	No	Yes	No
2.3	b	Yes	Yes	No	Yes	No	No	Yes	No
3	No	No	Yes	Yes	No	No	No	No	Yes
4	No	No	Yes	Yes	No	No	No	No	Yes
5.1 (solids)	No	No	Yes	Yes	No	No	No	Yes	No
5.1 (liquids)	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No
5.2	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes
6.1	Yes[2]	Yes	Yes	Yes	No	Yes	Yes	Yes	No
6.2	No	No	No	Yes	No	No	No	Yes	No
8	Yes[2]	Yes	Yes	Yes	No	Yes	Yes	Yes	No
9	No	No	Yes	Yes	No [e]	No	No	Yes	No

Source: ADG Code Table 12.2

a) A vehicle transporting unodourised LP Gas must additionally be equipped with a gas detector suitable for detection of LP Gas, in accordance with AS 1596.

b) The minimum requirement is air supplied short term breathing apparatus suitable for escape purposes, except when, even in an emergency, the dangerous goods will not give rise to harmful vapours, gases or dust. Note that where a driver attends to the loading or transfer of goods, Self-Contained Breathing Apparatus (SCBA) with a duration of greater than 15 minutes may be required by other (e.g. health and safety) legislation.

c) Yes, if the goods are in receptacles with a capacity of > 500 L or are cryogenic liquids.

d) Where an eyewash kit is required, it must be of at least 250 mL capacity, filled and ready for use.

e) Yes, if the goods are elevated temperature substances or dry ice.

***Note 1**: Where an item of Personal Protective or Safety Equipment is required based on the primary hazard or subsidiary risk of any item of dangerous goods in the load, that item must be carried, except that where thermally insulated gloves or gauntlets are required and carried, any requirement for chemically resistant gloves or gauntlets may be ignored.*

***Note 2**: Under other legislation, it may be necessary to carry additional Personal Protective Equipment where it is specified for the purpose on the Safety Data Sheet.*

Table 6
Fire Extinguishers Required on Road Vehicles Transporting a Placard Load

Dangerous Goods Being Transported	Minimum Extinguisher Number, Rating and Type
Packaged dangerous goods	One 30B stored dry powder near driver's door
All dangerous goods in bulk	Either: (a) one 60B dry powder type; or (b) two 30B dry powder type; Plus: One 10B dry powder in the cabin.
Flammable goods in tanks, bulk containers and/or placardable units with a total capacity greater than 10,000 kg or L	Either: (a) two 60B dry powder type; or (b) one 80B dry powder type and one 20B foam type; Plus: One 10B dry powder type in the cabin.

Source: ADG Code Table 12.1

Procedures During Transport

Chapter 13 of the ADG Code includes procedures to be followed in the event of a breakdown, general precautions during transport and route selection. If a road vehicle transporting a placard load of dangerous goods (Section 4.2) breaks down the following procedures must be implemented:

13.1.2 *If a road vehicle transporting a placard load of dangerous goods is disabled on a road or street, or has stopped and constitutes a traffic hazard, other road users must be alerted by:*

(a) if:

(i) the battery has not been disconnected to prevent danger and there are flashing hazard lights on the vehicle – turning the lights on and leaving them on while the vehicle is stopped; or

(ii) the battery has not been disconnected to prevent danger and there are no flashing hazard lights on the vehicle – turning the parking lights on and leaving them on while the vehicle is stopped; and

(b) placing a portable warning device on the ground so that it can be best seen by approaching traffic in each of the following locations:

(i) not less than 50 metres or more than 150 metres in front of the vehicle; and

(ii) not less than 50 metres or more than 150 metres behind the rear of the vehicle; and

(iii) beside the vehicle on the side closer to traffic.

General precautions during transport outlined in the ADG Code include parking requirements and unloading the vehicle. The ADG Code specifies the requirements for unloading dangerous goods from a vehicle as follows:

13.1.3.3 *Other than for transfer to another vehicle or to another mode of transport, dangerous goods should not be unloaded from a road vehicle unless:*

(a) the consignee, or a person acting on the consignee's behalf, is present and receives the goods; or

(b) if the driver, prime contractor or consignor has agreed with the consignee for the goods to be unloaded into a secure place – the goods are unloaded into that place.

Transport routes should be pre-planned and pose minimal risk of personal injury or harm to the environment or property during the journey. In addition:

13.1.4.3 *Routes should wherever practicable avoid heavily populated or environmentally sensitive areas, congested crossings, tunnels, narrow streets, alleys, or sites where there may be, a concentration of people.*

Emergencies

Part 14 of the DG Regulations set out the duties of a road vehicle driver, train driver, a rail operator, a prime contractor and consignor in respect of a road and rail vehicles transporting dangerous goods in an emergency, as follows:

General responsibilities of the driver of a road vehicle in an emergency

Clause 147 of the DG Regulations sets out the duties of a driver in the event that a road vehicle is involved in a dangerous situation.

…

(2) The driver of the road vehicle must:

(a) notify the prime contractor, the Competent Authority, and the police or fire service, of the incident as soon as practicable; and

(b) provide any reasonable assistance required by an authorised officer, or an officer of an emergency service, to deal with the situation.

General responsibilities of the driver of a train and rail operator in an emergency

Clause 148 of the DG Regulations sets out duties for drivers and rail operators in the event that a train transporting dangerous goods is involved in a dangerous situation.

…

(2) The driver of the train must:

(a) notify the rail operator and rail infrastructure manager of the incident as soon as practicable; and

(b) provide any reasonable assistance required by an authorised officer, or an officer of an emergency service, to deal with the situation.

(3) On being notified by the train driver of the incident, the rail operator and the rail infrastructure manager must:

(a) notify the police or fire service of the incident as soon as practicable; and

(b) provide any reasonable assistance required by an authorised officer, or an officer of an emergency service, to deal with the situation.

General responsibilities on the Consignor

Part 14 Clause 153 of the DG Regulations sets out the consignor's duties in the event that a vehicle transporting a placard load of dangerous goods by road is involved in an incident resulting in a dangerous situation:

…

(2) As soon as practicable after being asked by an authorised officer or an officer of an emergency service, the consignor of the goods must:

(a) give the officer the information that the officer requires about:

(i) the properties of the dangerous goods being transported; and

(ii) safe methods of handling the goods; and

(iii) safe methods of containing and controlling the goods in a dangerous situation; and

(b) provide the equipment and other resources necessary:

(i) to control the dangerous situation; and

(ii) to contain, control, recover and dispose of dangerous goods that have leaked, spilled or accidentally escaped.

(3) If the prime contractor and the consignor, or the rail operator and the consignor, of the goods are asked to give the same information or provide the same resources for the incident, it is sufficient if the consignor, as the case may be, the prime contractor or the rail operator gives the information or provides the resources.

General responsibilities on the Prime Contractor and Rail Operator

Clause 150 of the DG Regulations requires prime contractors and rail operators to inform the Competent Authority in the event that a vehicle transporting dangerous goods is involved in an incident resulting in a dangerous situation:

…

(2) As soon as practicable after becoming aware of the incident, the prime contractor or the rail operator responsible for the transport of the goods must provide the Competent Authority with the following details about the incident:

(a) where the incident happened,

(b) the time and date of the incident,

(c) the nature of the incident,

(d) the dangerous goods being transported when the incident happened,

(e) any other details that the Competent Authority may require.

(3) Not later than 21 days after the day when the incident happens, the prime contractor or rail operator must give to the Competent Authority a written report about the incident stating the following:

(a) where the incident happened,

(b) the time and date of the incident,

(c) the nature of the incident,

(d) what the driver believes to be the likely cause of the incident,

(e) what the prime contractor or rail operator believes to be the likely cause of the incident,

(f) the dangerous goods being transported when the incident happened,

(g) the measures taken to control any leak, spill or accidental escape of dangerous goods, and any fire or explosion, arising out of the incident,

(h) the measures taken after the incident in relation to the dangerous goods involved in the incident.

Clause 154 of the DG Regulation requires prime contractors and rail operators to provide information and resources in the event that a vehicle transporting a placard load is involved in an incident resulting in a dangerous situation:

…

(2) As soon as practicable after being asked by an authorised officer or an officer of an emergency service, the prime contractor or the rail operator must:

(a) give to the officer the information that the officer requires about the vehicle's construction, properties and equipment; and

(b) provide the equipment and other resources necessary:

(i) to control the dangerous situation; and

(ii) to recover a vehicle involved in the situation or its equipment.

(3) If the prime contractor and the consignor, or the rail operator and the consignor, of the goods are asked to give the same information or provide the same resources for the incident, it is sufficient if the consignor gives the information or provides the resources.

Fire

General provisional fire suppression systems are described in Section 3.2.1. Barrick has completed a Fire Safety Study for the CGM that complies with the requirements of Consent Condition 5.4(a)(i) and addresses the following recommendations of the PRA:

- storage of the hazardous consumable in such a manner as to minimise the possibility of fire;
- provision of efficient fire alarm systems; and
- provision of efficient fire suppression systems.

3.3.2 Risks to Animals

Two scenarios posing risks to animals straying onto the mine site were identified in the PRA (ANSTO, 1997).

Scenario 1

The first scenario arises from birds landing on the tailings dams at a time when cyanide concentrations in the water are high (due to a system failure in the processing area) (ANSTO, 1997).

The control and monitoring of cyanide levels in the tailings storages are addressed by the Cyanide Management Plan in accordance with Consent Conditions 5.3(b) and 8.2(b) (Section 1.1) and are also addressed by the HAZOP study (Table 1).

The Cyanide Management Plan and FFMP also address the following recommendations of the PRA (ANSTO, 1997):

- systems to monitor cyanide levels in the tailings slurry should be suitably robust, reliable, and well maintained to give a high confidence of promptly detecting inadvertent increases in cyanide levels above the level of concern;
- tailings storages water should be regularly monitored to ensure that levels are within prescribed limits; and
- an effective system should be installed and maintained (e.g. manned patrols, hazing devices) to ensure that birds are scared away from the tailings storages if cyanide levels become sufficiently high to warrant concern.

In accordance with Consent Conditions 5.3(b) and 8.2(b), the Cyanide Management Plan includes measures to maintain weak acid dissociable cyanide levels at the discharge point to the tailings dams within prescribed limits.

In accordance with Consent Condition 3.4(a)(v), the FFMP provides mechanisms that have been developed to keep fauna and avifauna away from the tailings storages, methods for monitoring fauna usage of tailings dams and contingency measures for reducing cyanide levels in the tailings dams.

In addition, an Implementation Plan to Protect Fauna from Interactions with the Tailings Storage Facilities has been prepared as a requirement of the EPL. The plan includes: actions to deter fauna visitation to the tailings storage facilities; actions to apply best available technology and practices for monitoring fauna visitation; and actions to apply best available technology and practices for monitoring fauna deaths caused by cyanosis. Further discussion of these mechanisms is provided in the FFMP and the Implementation Plan to Protect Fauna from Interactions with the Tailings Storage Facilities.

Scenario 2

The second scenario identified in the PRA posing a risk to animals arises from stock and wildlife having access to the tailings storages and becoming bogged down in the tailings material (ANSTO, 1997). The FFMP includes methods that have been developed to monitor for this possibility.

In accordance with Consent Condition 3.4(a)(i) the tailings storages will be monitored for daily and seasonal fauna usage, and to determine whether deaths or other effects or incidents are occurring, as described in the FFMP.

Following commissioning of the tailings storages, the perimeter of the storages will be patrolled twice a day to observe and record fauna usage of the storages and whether deaths or other effects or incidents are occurring (North Limited, 1998). One patrol will be conducted after dawn and the other in the late afternoon. A description of the details and observations to be recorded is provided in the FFMP.

In the event that native fauna incidents or deaths are recorded, the Protocol for reporting any deaths or other incidents within ML 1535 will be initiated as described in the FFMP. Further, in the event that any wildlife are found bogged, sick, and/or trapped in the tailings storages, wildlife rescue and rehabilitation procedures will also be initiated as described in the FFMP.

3.3.3 Risks to the Public

Transport scenarios dominate the risks to members of the public. The risk of an accident has been determined to be low, of the transport scenarios, the single biggest contributor is that arising from a spill of sodium cyanide (ANSTO, 1997). The risks to members of the public arising from explosions on-site are considered minimal. The low population density of the area and the distance to the site boundary contribute to low likelihood of either death or injury due to explosion overpressure (*ibid.*).

The Transport Study includes components that address ANSTO (1997) off-site transport related recommendations. The measures outlined in Section 3.3.1 apply for these risks.

3.3.4 Risks to Public Property

The risks to public property arise due to the postulated road transport scenarios. They all arise due to either impact of the transporting vehicle with a property (be it a house or car) or due to an explosion. The measures outlined in Section 3.3.1 apply for these risks.

4 CLASSIFICATION OF HAZARDOUS SUBSTANCES AND DANGEROUS GOODS

4.1 HAZARDOUS SUBSTANCES

The *National Model Regulations for the Control of Workplace Hazardous Substances* [(NOHSC:1005(1994)] are the basis for hazardous substance regulations in Commonwealth, State and Territory jurisdictions. Under the National Model Regulations, manufacturers and importers of substances supplied for use at work are required to determine whether they are hazardous to health before supply. They are also required to produce labels and MSDS for all hazardous substances, with appropriate information about the hazards of these substances.

The basis for determining whether a substance is a hazardous substance is the *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(2004b)] 3rd Edition (the Approved Criteria). Following the publication of the third edition of the Approved Criteria, a *Hazardous Substances Information System* (HSIS) (NOHSC, 2004a) was developed to provide an integrated source of information system on hazardous substances and National Exposure Standards.

The HSIS is an internet database that provides hazard classification information on over 3,500 substances that have been classified in accordance with the Approved Criteria. The HSIS provides an initial reference source for hazardous substance identification and classification. While an entry in the HSIS means the substance is hazardous, the absence of an entry for a substance does not necessarily mean the substance is not hazardous. Application of the Approved Criteria would be required to determine if an unlisted substance is hazardous.

Under the *National Model Regulations for the Control of Workplace Hazardous Substances* [(NOHSC:1005(1994)] a hazardous substance means a substance that:

1. *is included on the List of Designated Hazardous Substances; or*
2. *has been classified as a hazardous substance by the manufacturer or importer in accordance with the Approved Criteria for Classifying Hazardous Substances [NOHSC:1008 (2004b)].*

Appendix 7 of the *National Model Regulations for the Control of Workplace Hazardous Substances* [(NOHSC:1005 (1994)] provides for the classification of substances based on their ecotoxicological properties and indicates the danger to aquatic environments and non-aquatic environments (i.e. toxicity to flora, fauna, soil organisms, bees or substances that may cause long-term adverse health effects in the environment).

The leading practice broader definition of a hazardous substance provides (DRET, 2009):

> *Hazardous substances are materials that can have an adverse effect on human health due to their physical, chemical, and biological properties.* (DRET, 2009)

This definition and the classifications of substances under Appendix 7 of the *National Model Regulations for the Control of Workplace Hazardous Substances* [(NOHSC:1005(1994)] will be considered when compiling the HSDGR (Section 9).

4.2 DANGEROUS GOODS

Chemicals/substances are assigned a dangerous goods classification by the ADG Code. This classification relates to the nature of the hazard that the substance presents. Dangerous goods are classified on the basis of immediate physical or chemical effects, such as fire, explosion, corrosion and poisoning affecting property, the environment or people (DRET, 2009). The classifications and definitions of dangerous goods in accordance with the ADG Code are listed below.

Where appropriate, reference is made to the classifications and definitions of the ADG Code in this document.

Class 1	Explosives 1.1 Substances and articles that have a mass explosion hazard 1.2 Substances and articles that have a projection hazard but not a mass explosion hazard 1.3 Substances and articles that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard 1.4 Substances and articles that present no significant hazard 1.5 Very insensitive substances which have a mass explosion hazard 1.6 Extremely insensitive articles which do not have a mass explosion hazard
Class 2	Gases 2.1 Flammable gases 2.2 Non-flammable, non-toxic gases 2.3 Toxic gases
Class 3	Flammable liquids
Class 4	Flammable solids; substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases 4.1 Flammable solids, self re-active substances and solid desensitised explosives 4.2 Substances liable to spontaneous combustion 4.3 Substances that in contact with water emit flammable gases
Class 5	Oxidising substances and organic peroxides 5.1 Oxidizing substances 5.2 Organic peroxides
Class 6	Toxic and infectious substances 6.1 Toxic substances 6.2 Infectious substances
Class 7	Radioactive material
Class 8	Corrosive substances
Class 9	Miscellaneous dangerous substances and articles

Source: after ADG Code

4.3 ENVIRONMENTAL HAZARDS

The environmental hazards attributable to inappropriate use, disposal or storage of materials, are not always easily discernible, especially with process chemicals and wastes. In these instances, it is best management practice to characterise the potential environmental hazards of these materials by reviewing the relevant MSDS, investigating the component chemicals and compiling environmental hazard information about each (Environment Australia, 1997).

Table 7 provides potential environmental impacts/hazards associated with a selection of typical consumables used in mining. The potential environmental hazards associated with all hazardous substances and dangerous goods to be used during operation at the CGM will be assessed and included as a component of the HSDGR as appropriate (Section 9).

Table 7
Examples of Environmental Hazards of Typical Consumables Used in Mining

Chemical/Substance	Function	Potential Environmental Impact/Hazard
Sulphuric Acid (H_2SO_4)	Acid leaching	Direct kills of aquatic fauna and flora if concentrated acid is spilt; water pH changes can directly affect biota or mobilise heavy metals.
Sodium Hydroxide (Caustic Soda)	pH control in leaching	Direct kills of biota if concentrated; water pH changes with direct or indirect effects.
Sodium Cyanide (NaCN)	Leaching during gold processing	Toxic to animals in comparatively low concentrations; known to cause bird kills in tailings dams.
Ammonium Nitrate	Component of explosives (AnFo)	Fertilizer; can stimulate unwanted aquatic growth leading to eutrophication in waterbodies.
Fuel and lubricants	Powering and lubricating of mobile and fixed equipment; components of some explosives.	Direct kills of biota and smothering of communities in large quantities; bioaccumulation in some organisms; groundwater contamination from unidentified leaks; and fire.

Adapted from Environment Australia (1997) and DRET (2009).

5 CHEMICAL MANAGEMENT

5.1 CGM CHEMICAL REQUIREMENTS

5.1.1 Operational Phase

The management of chemicals, dangerous goods and hazardous substances used at the CGM is conducted by the use of the Chemalert 3 system and other applications. Table 8 indicates the United Nations classification of a number of general chemical/consumables that may be used at the CGM during the operational phase. Table 8 also indicates whether the chemicals/consumables are included on the HSIS (refer to footnote). MSDSs for these and all the chemicals/consumables used at the CGM will be managed within the Chemalert 3 system.

Table 8
General List of Chemicals/Consumables

Chemical/Consumable	Classification
Sodium Cyanide (NaCN) – Solid**	UN Number* : 1689 Hazchem Code*: 2X Dangerous Goods Class*: 6.1 (Toxic)
Sodium Cyanide – Solution**	UN Number* : 1935 Hazchem Code*: 2X Dangerous Goods Class*: 6.1 (Toxic)
Hydrogen Cyanide Gas** (Decomposition product of sodium cyanide)	UN Number* : 1051 Hazchem Code*: 2WE Dangerous Goods Class*: 6.1 (Toxic), 2.1 (Flammable Gas)
Ammonium Nitrate	UN Number*: 1942 Hazchem Code*: 1[Y]. Dangerous Goods Class*: 5.1 (Oxidising Agent)
Ammonium Nitrate Emulsion (EP Coal)	UN Number*: 3375 Hazchem Code*: 1[Y]E. Dangerous Goods Class*: 5.1 (Oxidising Agent)
Magnafloc 155Flocculant (Floerger™ FA920SH)**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Aerofloat 238 Promotor	UN Number*: 1719 Hazchem Code*: 2R Dangerous Goods Class*: 8 (Corrosive)
Hydrochloric Acid** (HCl)	UN Number*: 1789 Hazchem Code*: 2R Dangerous Goods Class*: 8 (Corrosive)
Sulfamic Acid** (NH_2SO_3H)	UN Number*: 2967 Hazchem Code*: 2Z Dangerous Goods Class*: 8 (Corrosive)
Caustic Soda** (NaOH)	UN Number*: 1824 Hazchem Code*: 2R Dangerous Goods Class*: 8 (Corrosive)
Hydrogen Peroxide** (H_2O_2)	UN Number*: 2015 Hazchem Code*: 2PE Dangerous Goods Class*: 5.1 (Oxidising Agent), 8 (Corrosive)
Sulphuric Acid** (H_2SO_4)	UN Number*: 1830 Hazchem Code*: 2P Dangerous Goods Class*: 8 (Corrosive)
Hydrated Lime** (Calcium Hydroxide)	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated

Table 8 (Continued)
General List of Chemicals/Consumables

Chemical/Consumable	Classification
Interfroth 50H	UN Number*: 1993 Hazchem Code*: 3(Y), Dangerous Goods Class*: 3
Sodium Borate Decahydrate	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Sodium Carbonate**($NaCO_3$ – Soda ash)	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Sodium Metabisulphite	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Activated Carbon	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Liquefied Petroleum Gas (LPG)**	UN Number*: 1075 Hazchem Code*: 2WE Dangerous Goods Class*: 2.1
Silica Sand**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Petrol**	UN Number*: 1203 Hazchem Code*: 3(Y)E Dangerous Goods Class*: 3
Albida Grease HDX 2**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Alvania Grease EP (LF) 00**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Corena Oil AS 46**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Donax CFD 60**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Donax TC 10W**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Donax TC 30**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Donax TC 50**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Malleus Grease GL 500**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Protectacool 50**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Rimula MV 15W-40 (CI-4)**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Spirax A 80W-90**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated

Table 8 (Continued)
General List of Chemicals/Consumables

Chemical/Consumable	Classification
Albida Grease EP 2**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Tellus Oil T 100**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Diesel**	UN Number*: None allocated Hazchem Code*: None allocated Dangerous Goods Class*: None allocated
Liquid Oxygen	UN Number*: 1073 Hazchem Code*: 2PE Dangerous Goods Class*: 2.2
Detonators - Exel	UN Number*: 0360 Hazchem Code*: E Dangerous Goods Class*: 1.1 B (Explosive)
Exel Millisecond Connectors	UN Number*: 0360 Hazchem Code*: E Dangerous Goods Class*: 1.1 B (Explosive)
Exel Lead-in Line	UN Number*: 0360 Hazchem Code*: E Dangerous Goods Class*: 1.1 B (Explosive)
Pentex (Primer)	UN Number*: 0042 Hazchem Code*: E Dangerous Goods Class*: 1.1 D (Explosive)
Potassium Amyl Xanthate***	UN Number*: 3342 Hazchem Code*: 1(Y) Dangerous Goods Class*: 4.2
Acetylene**	UN Number*: 1001 Hazchem Code*: 2(S)E Dangerous Goods Class*: 2.1
Sodium Nitrate	UN Number*: 1498 Hazchem Code*: 1(Z) Dangerous Goods Class*: 5.1

Adapted from North Limited (1998)

* MSDS Information

** Substances included on the Hazardous Substance Information System.

*** Potassium Amyl Xanthate will be stored on site in the designated reagent storage area.

Note: Minor quantities of other substances including various paints and laboratory gases will also be used on site.

As/when new chemicals/consumables are brought to site for use at the CGM, the MSDS information will be assessed to determine whether the chemical/consumable poses an environmental hazard in accordance with the chemical management strategy (Section 5.4). The new chemical/consumable will be recorded in the Inventory Register (Section 5.4.1). Fuels and oils recorded in the Inventory Register will also be included in the FOR (Section 10). If the chemical/consumable is assessed as being either a hazardous substance or dangerous good, the chemical consumable will be added to the HSDGR (Section 10). New chemicals/consumables brought to site for use at the CGM will be managed in accordance with the relevant legislation, MSDS and Australian Standards using the Chemalert 3 system.

In addition to the chemicals/consumables listed in Table 8, the CGM will also involve the use of small quantities of biodegradable herbicides, pesticides and fertilisers for land management practices. Pesticide and herbicide storage, handling and use will be in compliance with the *Pesticide Act, 1999* and the NSW WorkCover (2006) *Safe Use of Pesticides including Herbicides in Non-Agricultural Workplaces Code of Practice* and is addressed in the LMP (Barrick Australia Limited, 2003b).

5.2 CHEMICAL TRANSPORT OVERVIEW

In accordance with Consent Condition 5.4(b)(i), a Transport Study has been undertaken at the pre-commissioning stage of the CGM. As stated in Section 3.3.1, the Transport Study addresses arrangements for the transport of hazardous materials including routes to be used for the movement of vehicles carrying hazardous materials to or from the CGM in accordance with the Department of Urban Affairs and Planning's (1995) *Draft Route Selection: Guidelines for Land Use and Environmental Safety Planning for Hazardous Materials - Road Transport Considerations* (DUAP, 1995) (Draft Route Selection Guidelines).

The Transport Study also addresses:

- issues associated with spills, clean-up procedures, training of clean-up teams, communication and liaison with organisations such as NSW fire brigades, District Emergency Management Coordinator (and Committee), Local Emergency Management Committee(s) and state emergency services;
- inspection and monitoring procedures for chemicals prior to the commencement of a trip, to verify the integrity of the packaging; and
- measures to be taken to ensure that the temperature of the materials does not rise above safe levels.

Eight hazardous materials were subject to the Transport Study, namely: sodium cyanide, hydrochloric acid, sulphuric acid, caustic soda, hydrogen peroxide, LPG, ammonium nitrate and ammonium nitrate emulsion. Barrick has been granted permission to defer the inclusion of flotation reagents (used in the processing of primary ore [e.g. xanthates]) in the Transport Study until the sources, suppliers and transportation route for these goods are known.

The Transport Study also addresses the relevant recommendations of the PRA as described in Section 3.1.

5.3 CHEMICAL HANDLING AND STORAGE OVERVIEW

The majority of chemicals/consumables will be stored and handled within bunded storage areas located in the process plant area. A runoff collection drain (secondary collection) will be installed around the perimeter of the process plant and will drain to the process plant contained water storage (contained water storage, D5). An outline of this system is provided in Section 4.2.2 of the EIS (North Limited, 1998) and is detailed in the SWMP.

Any other consumable storage areas (e.g. explosive storages) outside the process plant area will also be bunded and have secondary collection drains if required by relevant Australian Standards.

In accordance with the Condition of Authority 14, the handling, storage and use of consumables will be carried out in accordance with the requirements of the MSDS and in a manner that does not cause or aggravate air pollution or water pollution (including sedimentation or soil contamination or erosion). Further, EPL operating condition O1 requires licensed activities to be carried out in a competent manner. This includes the processing, handling, movement and storage of materials and substances used to carry out the activity.

All storage facilities will be designed with the protection of the environment as well as health and safety in mind and, as much as possible, incorporate engineering protection (Environment Australia, 1997). Safety features that will be incorporated into the design of the reagent storage areas include (North Limited, 1998):

- installation of ventilation systems in areas where dispensing and mixing of chemicals occurs;
- installation of drain valves and pipework to facilitate the removal of rainwater from bunded areas;
- provision of portable pumps within the processing area for use in pumping any chemical spills within bunded areas back to the storage tanks or emergency holding tanks;
- provision of appropriate fire protection facilities compatible with the volatility and flammable properties of the stored reagents/chemicals; and
- provision of eyewash and emergency showers for process plant workers to be used for immediate wash down should an accident occur.

Liquids

Liquid processing consumables and other potentially hazardous consumables will be stored in either drums or tanks and will be located in bunded areas to contain any fires/spills. The design, construction and operation of storage areas for these liquid chemicals (particularly for flammable and combustible liquids), will be in compliance with AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* (Appendix C) (North Limited, 1998) and in accordance with EPL operating condition O3 which requires all above ground storage facilities containing flammable and combustible liquids to be bunded in accordance with the abovementioned Standard.

Corrosive liquids such as sulphuric acid will be stored in accordance with AS 3780:2008 *The Storage and Handling of Corrosive Substances* (Appendix C). Oxidising liquids such as hydrogen peroxide will be stored and handled in accordance with AS 4326:2008 *The Storage and Handling of Oxidizing Agents* (Appendix D).

Portable plastic and metal fuel containers used at the CGM (up to 25 L) will comply with the requirements of AS/NZS 2906:2001 *Fuel Containers – Portable – Plastics and Metal* (Appendix C) which details the requirements for such storage vessels.

Solids

Solid chemicals/substances will be stored at the CGM in bunded bulk storage bins and/or weatherproof buildings (North Limited, 1998).

Regularly programmed inspections of storage area bunding and other spill control and collection systems will be undertaken in accordance with the CGM maintenance programme. Such inspections ensure the continued integrity of the bunding and containment and indicate when any corrective measures are needed (Environment Australia, 1997). Corrective measures may include replacement or repair of perished/damaged bund linings, removal of debris, weed control or management of contained and potentially contaminated water.

Mixed Dangerous Goods

Dangerous goods stored as mixed classes will be stored in accordance with AS/NZS 3833:2007 *The Storage and Handling of Mixed Classes of Dangerous Goods in Packages and Intermediate Bulk Containers* (Appendix C), and the requirements of WorkCover and I&I NSW where applicable. The standard sets out the requirements and recommendations for the safe storage and handling of mixed classes of dangerous goods. Section 6 of the standard sets out requirements for the separation of and segregation within stores containing more than one class of dangerous goods and the minimum separation distances of stores containing mixed classes of dangerous goods to protected places (i.e. a workshop, office store or building where people are employed) and other applicable requirements.

Laboratory chemicals will be stored and handled in accordance with AS/NZS 2243.10:2004 *Safety in Laboratories - Storage of Chemicals* (Appendix C) where applicable.

Sodium Cyanide

Sodium cyanide will be stored and handled in accordance with the requirements of the Cyanide Management Plan (Table 1), the Minerals Industry Safety Handbook (DMR, 2002) and AS/NZS 4452:1997 *The Storage and Handling of Toxic Substances* (Appendix C) and the relevant MSDS. Section 5 of AS/NZS 4452:1997 *The Storage and Handling of Toxic Substances* (Appendix C) sets out the requirements for storage and handling of toxic substances in bulk, including:

- design and construction requirements for containers;
- requirements for portable and fixed tanks;
- bunds and compounds;
- locations of bulk containers; and
- filling of bulk containers.

In addition the standard provides requirements for operational and personnel safety, emergency management, fire protection and waste storage and disposal.

Explosives, Ammonium Nitrate, Ammonium Nitrate Emulsion and Potassium Amyl Xanthate

On 1 September 2005 the NSW *Dangerous Goods Act 1975* and *Dangerous Goods (General) Regulation, 1999* were repealed and the *Explosives Act, 2003* and the supporting *Explosives Regulation, 2005* commenced. The changes mean that explosives and security sensitive dangerous substances are regulated by the *Explosives Act, 2003* and the *Explosives Regulation, 2005*. The new regulatory framework requires stricter security for explosives and security sensitive dangerous substances. Under the *Explosives Regulation, 2005*:

- a licence to store explosives and security sensitive dangerous substances will be required (Clause 22);
- a blasting explosives user's licence will be required (Clause 24);
- an unsupervised handling licence will be required for anyone assisting an explosives user (Clause 27); and
- a licence to use security sensitive dangerous substances will also be required (Clause 26).

The design and construction of the explosive magazine will be assessed by the DII (Mineral Resources) for compliance with AS 2187.1:1998 *Explosives – Storage, Transport and Use – Storage* (Appendix C) in accordance with Clause 80(1)(c) of the *Explosives Regulation, 2005.*

The stores for explosives, ammonium nitrate and ammonium nitrate emulsion will be located on the mine site. The location of the explosives plant will be, at the closest point, 500 m from roads and other places where people are routinely present (North Limited, 1998).

Ammonium nitrate and ammonium nitrate emulsion will be transported to site in trucks. Once at site and when required, ammonium nitrate will be combined with diesel to produce ammonium nitrate fuel oil (AnFo) for use in blasting. The storage of ammonium nitrate and ammonium nitrate emulsion will be constructed and operated in accordance with AS 4326:2008 *The Storage and Handling of Oxidising Agents* (Appendix C).

Storage facilities for AnFo consist of separate emulsion tanks and a steel portal frame shed constructed of iron cladding on a concrete slab base. The storage shed will typically have a storage capacity of approximately 300 tonnes (t) (North Limited, 1998). As per the requirements and guidelines of AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* (Appendix C) all explosive storage facilities and structures will be bunded to 120% of the largest vessel capacity (North Limited, 1998).

Storage of the high explosives (accessories and primers) and detonators will be in a purpose-built building with concrete brick cladding, concrete roof and timber floor in accordance with Section 2 of AS 2187.1:1998 *Explosives- Storage, Transport and Use- Storage* (Appendix C). The facility will have a storage capacity of up to 20 t and will be earth bunded (North Limited, 1998).

Storage of Potassium Amyl Xanthate (PAX) at the CGM will be limited to a maximum of 40 boxes at the designated reagent storage area. Due to the limited storage facilities for PAX at the CGM, PAX will be transported to the CGM via trucks from a licensed dangerous goods storage depot located in Dubbo.

The bulk mixing facilities and explosives magazines will be located at a point that will be the furthest away from any public road, residence or work place as is practicable. Lightning protection for the magazine will also be provided (North Limited, 1998).

Gas Storage

LPG, liquid oxygen and compressed oxygen (O_2) will be stored separately near the process plant.

Where appropriate LPG facilities will be installed and operated in accordance with AS/NZS 1596:2008 *The Storage and Handling of LP Gas* (Appendix C) which details the requirements for the location, design, construction, commissioning and operation of LPG storages.

Liquid oxygen will be stored in a facility installed and operated in accordance with AS 1894:1997 *The Storage and Handling of Non-Flammable Cryogenic and Refrigerated Liquids* (Appendix C) which sets out the requirements for storage and handling of non-flammable liquids at or below -15^{o}C. The standard includes information on storage vessels, operation and personal safety, emergency management and fire protection.

AS 2030.1:2009 *Gas Cylinders – General Requirements* (Appendix C) also specifies requirements for the design, verification and manufacture of all gas cylinders for the storage and transport of compressed, dissolved and liquefied gases, of water capacity ranging from 0.1 kg to 3,000 kg.

Signage

All chemical storage areas will be provided with appropriate signage in accordance with AS 1319:1994 *Safety Signs for the Occupational Environment* (Appendix C). These signs will be displayed at each point of access in accordance with AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* (Appendix C). General signage requirements for restricted areas (where flammable and combustible liquids are stored and handled) as required by AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* (Appendix C) will be installed.

Every installation in which dangerous goods are kept shall be placarded in accordance with the Safe Work Australia *Guidance Note for Placarding Stores for Dangerous Goods and Specified Hazardous Substances* (NOHSC:3009 [1990]).

Section 7 of AS 1345:1995 *Identification of the Contents of Pipes, Conduits and Ducts* (Appendix C) provides guidance for the marking of piping by the use of colours, words and symbols and will be applied where applicable to liquid storage facilities.

5.4 CHEMICAL MANAGEMENT STRATEGY

Based on the principles detailed in the Leading Practice Sustainable Development Program for the Mining Industry *Hazardous Materials Management* handbook (DRET, 2009), Barrick employees and contractors will adopt a Chemical Management Strategy (Figure 2). This strategy allows for the management of each chemical used at the CGM.

A discussion of the primary components of the Chemical Management Strategy is provided in the following sub-sections.

5.4.1 Inventory Register

In accordance with best practice and the Chemical Management Strategy, all raw materials/ consumables brought on-site for use at the CGM will be recorded in an Inventory Register (North Limited, 1998) which will be updated and available for inspection by the appropriate authorities. MSDSs for all chemicals will also be included in the Inventory Register. CGM uses Chemalert 3 for the management of MSDSs of chemicals/consumables on-site.

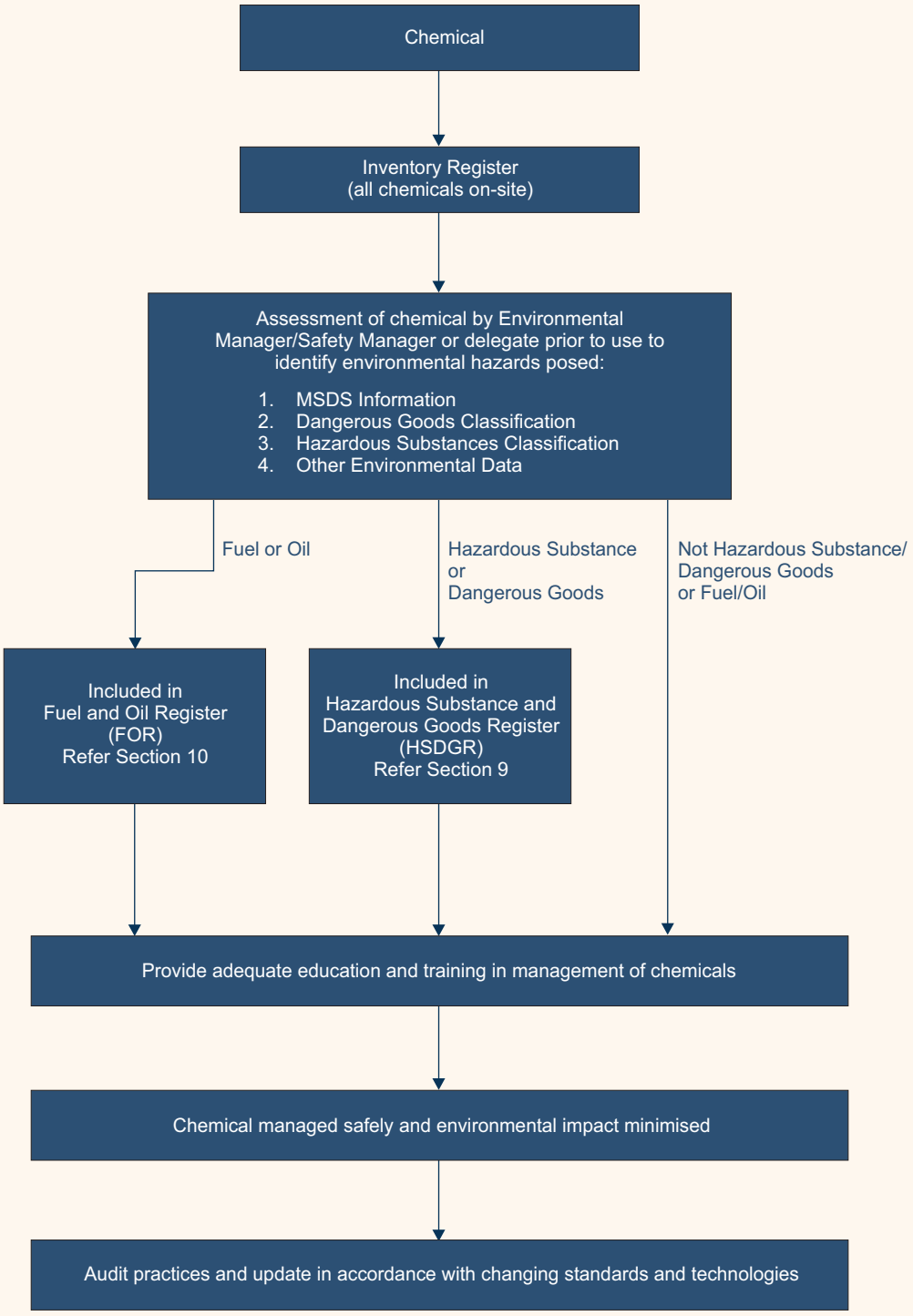
5.4.2 HSDGR and FOR

In accordance with Section 6.4.1 of the EIS (North Limited, 1998) and the Chemical Management Strategy, chemicals recorded on the Inventory Register that are designated as hazardous substances and/or dangerous goods and/or fuels and oils will also be included in the HSDGR (Section 9) and the FOR (Section 10).

5.4.3 Personnel Training

Most if not all activities associated with hazardous consumables will require the intervention or interaction of workers and management. Therefore it is important the workforce knows not only the occupational health and safety implications of the materials but also the potential environmental impacts and what design measures and operating procedures aim to minimise or prevent these impacts (Environment Australia, 1997).

Chemical Management Strategy



Source: Leading Practice Sustainable Development Program for the Mining Industry - Hazardous Materials Management, 2009

Hazardous Waste and Chemical Management Plan

FIGURE 2

Chemical Management Strategy

In accordance with Section 6.4.1 of the EIS (North Limited, 1998) and the Chemical Management Strategy, all Barrick employees and contractors will be trained in the appropriate use of chemicals in their tasks and duties. Training will include:

- hazardous chemical/substance awareness;
- Job Hazard Analysis preparation and use;
- use of MSDS information;
- measures to prevent accidental release;
- potential environmental impacts;
- use and maintenance of Personal Protective Equipment (PPE);
- emergency spill response and containment; and
- clean-up techniques.

Education and training programmes will be used to instruct employees and contractors on the appropriate use of chemicals. The programme will also be used to distribute information on the occupational health and safety implications and potential environmental impacts of these consumables.

The education and training programmes will be provided during both the construction and operational phases and will include but will not necessarily be limited to:

- induction of all company employees, contractors and first time visitors;
- training in the Job Hazard Analysis for the use of each chemical for those personnel whose work involves its use;
- specific emergency response training to suit individual work requirements; and
- ongoing refresher training programmes for key employees and contractors to improve skills and competencies as necessary.

Training will also include reinforcement by refresher courses, short 'toolbox' discussions and/or routine discussion with supervisors (adapted from DRET, 2009). Records of all staff induction and environmental training will be kept to assist in the identification of personnel who require 'refresher' training.

Operators moving or using any reagents will be trained in the requirements of the material (North Limited, 1998) such as PPE, handling procedures and spill clean-up procedures in accordance with the HSDGR (Sections 9.5 and 9.6).

5.4.4 Auditing of Chemical Management

During the operational phase, the CGM will be subject to periodic audit and review (refer Section 11). During the audit and review process CGM chemical management practices and procedures will be assessed against the Chemical Management Strategy and this HWCMP. Audit results will be used to identify improvements that can be made to the site Chemical Management Strategy, procedures and this HWCMP if appropriate.

Auditing is further discussed in Section 11.

6 CONTAMINATED LAND

An area of historic contamination (i.e. a disused sheep dip area) was identified within ML 1535, in the southern waste emplacement footprint area. The primary contaminant identified within the contaminated soil of the disused sheep dip area in the area was arsenic. It is proposed that the sheep dip area would be left *in-situ* and buried beneath approximately 30 m of waste rock and the base drainage control zone of the southern waste emplacement.

Barrick commissioned Coffey Environmental Pty Ltd (Coffey Environment) to review a contamination assessment and proposed remedial strategy for the disused sheep dip area in July 2008.

In their review, Coffey Environment (2008) concluded that:

> *…following implementation of a remedial strategy based on containment of arsenic contaminated soil beneath the planned southern waste emplacement, the contamination in the sheep spray area would not pose a significant risk of harm to human health or any other aspect of the environment* (Coffey Environment, 2008).

7 WASTE MANAGEMENT

7.1 WASTE CLASSIFICATION

Waste is classified by the DECCW using six waste classes, *viz*.:

- special waste;
- liquid waste;
- hazardous waste;
- restricted solid waste;
- general solid waste (putrescible); and
- general solid waste (non-putrescible).

These wastes are described in Part 1 of the Waste Guideline (DECCW, 2009) (Appendix A).

In accordance with the Waste Guideline (DECCW, 2009), it is the primary responsibility of the generator of waste to classify waste properly, assess its properties and determine appropriate avenues for the handling, transportation and disposal of the waste. Part 1 of the Waste Guideline is attached as Appendix A and will be used to classify mine wastes in accordance with the Waste Management Strategy (Section 7.4).

Wastes that are identified as hazardous substances or dangerous goods will be included in the HSDGR. As/when new wastes are produced on site and are identified as being a hazardous substance or dangerous good, the waste will be added to the HSDGR (Section 9). These wastes will be handled in accordance with the Waste Guideline (DECCW, 2009) and relevant legislation. The waste inventory will also be updated to reflect any significant changes in waste production that occur on-site (Section 7.4.1).

7.2 CGM WASTE PRODUCTION

The type and quantity of waste produced is likely to include:

- domestic waste;
- sewage effluent;
- waste hydrocarbons including lubricating oils, hydraulic oils, degreasing fluids, distillate and petroleum fuels (North Limited, 1998);
- vehicle batteries and tyres;
- general construction waste; and
- spent spill recovery/clean-up materials.

Table 9 provides a summary of waste types which may be generated during operational phases (excluding waste rock and tailings).

Table 9
Operational Phase Wastes – Classification, Transport, Handling and Disposal

Waste	Operation	Waste Classification	Major Source	Handling	Transport/Disposal
Office and packaging waste	✓	General solid waste (non-putrescible)	General office activities.	Waste collected on-site.	Removal from site for recycling or disposal on-site in waste rock emplacements only.
Scrap metal	✓	General solid waste (non-putrescible)	Construction site waste and process plant building waste.	Waste will be segregated and held on-site in designated areas. Removed by Contractor.	Removal from site for recycling or disposal on-site in waste rock emplacements only.
Used lead acid batteries	✓	Hazardous	Earthmoving fleet.	Used batteries will be stored in a bunded area. Up to 10 t of waste batteries can be safely stored on-site. Periodically removed from site by a Licensed Contractor to a recycling plant.	Recycling by licensed contractor or disposed of at a DECCW licensed waste facility, if necessary.
Degreasing fluids, distillate and petroleum fluids	✓	Hazardous	Earthmoving fleet and process plant.	Used and flammable petroleum liquid wastes stored in dedicated storage vessel(s). Removed by Licensed Contractor.	Removal from site by licensed contractor to a DECCW licensed facility for recycling/disposal.
Lubricating oils and hydraulic oils	✓	Liquid	Earthmoving fleet and process plant.	Used and waste oils stored in dedicated storage vessel(s) prior to removal.	Removal from site by licensed contractor to a DECCW licensed facility for recycling/disposal.
Used/rejected tyres	✓	Special	Earthmoving fleet.	Tyres will be disposed regularly (quarterly) to prevent build up.	Disposal on-site in waste rock emplacements only.
Used oil/fuel filters	✓	Hazardous	Earthmoving fleet and process plant.	Filters stored in dedicated bins prior to removal.	Removed by licensed contractor for recycling at DECCW licensed waste facility.
Drained/crushed oil/fuel filters	✓	General solid waste (non-putrescible)	Earthmoving fleet and process plant.	Filters stored in dedicated bins prior to disposal.	Removed by licensed contractor for recycling at DECCW licensed waste facility.
Used absorbents – no free liquid	✓	General solid waste (non-putrescible)	Spills associated with maintenance of earthmoving fleet.	Absorbents with no free liquid stored in dedicated bins prior to disposal.	Removed by licensed contractor for recycling at DECCW licensed waste facility.
Used absorbents –free liquid	✓	Hazardous	Spills associated with maintenance of earthmoving fleet.	Clearly marked to avoid mixing of incompatible substances. Transferred to clearly labelled drums or similar containers.	Removed by licensed contractor for disposal at a DECCW licensed facility.
Domestic waste	✓	General solid waste (putrescible)	Personnel meals brought to site and other general domestic activities.	Domestic solid waste held in specific storage containers.	Removed from site for disposal to BSC landfill or disposal on-site in waste rock emplacements.
Pesticide/ herbicide containers (water based)	✓	General solid waste (non-putrescible)	Rehabilitation/weed control.	Containers washed/triple rinsed and wash fluids will be applied over the area just treated.	Recycled as part of the Drum Muster Programme where practicable or disposed on-site in waste rock emplacements only.

Table 9 (Continued)
Operational Phase Wastes – Classification, Transport, Handling and Disposal

Waste	Operation	Waste Classification	Major Source	Handling	Transport/Disposal
Pesticide/ herbicide containers (solvent based)	✓	Hazardous	Rehabilitation/weed control.	Store securely. Re-use containers where possible or return to suppliers. If cleaned and washed by a solvent, re-use the washed liquid for the next application.	Recycle cleaned containers. These may be disposed of as solid waste as a last resort.
Used/empty bulk chemical containers	✓	Hazardous	Processing reagents.	Store securely. Bulk chemical containers will be returned to the supplier, where practicable.	Removed by supplier vehicle at time of next delivery, or removal from site by licensed contractor to a DECCW licensed facility for disposal.
Liquid waste from sewage system	✓	Liquid	Human waste.	Contents of septic systems pumped out as required (currently). Treated effluent from site sewage treatment facility disposed of via above ground pipeline to tailings storage . Solids from site sewage treatment facility – Blivelt BL3000 pumped out as required via licensed contractor.	West Wyalong Wastewater Treatment Facility and tailings storage.
Laboratory wastes	✓	Hazardous	Laboratory analysis of ore and tailings.	Diluted with water and milled by placement onto ore feed belt.	Tailings storage.
Oversized trash screen waste	✓	General solid waste (putrescible)	Ore processing.	Stored securely.	Disposal on-site in waste emplacements. Following disposal, the waste will immediately be covered by 500 millimetres of waste rock material.
Hydrocarbon-impacted material	✓	General solid waste (putrescible)	Minor spills.	Treated in Bioremediation Facility.	Disposal on-site in waste emplacements.

After: North Limited (1998); BSC, pers. comm. (9 April 2003)

7.3 WASTE HANDLING, TRANSPORT AND DISPOSAL OVERVIEW

In accordance with the Condition of Authority 14, the handling and storage of waste will be carried out in a manner that does not cause or aggravate air pollution or water pollution (including sedimentation or soil contamination or erosion). Waste will be handled and stored in bunded areas where appropriate (e.g. hydrocarbon wastes) and within the Internal Catchment Drainage System.

Consent Condition 4.1/4.2 requires measures to prevent the quality of water in Lake Cowal or any surface waters being degraded below the relevant Australian and New Zealand Environment Conservation Council (ANZECC) water quality classification prior to construction due to construction and/or operation of the mine. To minimise potential surface water and groundwater impacts the wastes listed in Table 9 (excluding sewage) will be stored and handled within designated and/or bunded storage areas located in the vicinity of the process plant. A runoff collection drain (secondary collection) will be installed around the perimeter of the process plant and will drain to the process plant contained water storage (contained water storage D6).

EPL operating condition O1 requires licensed activities to be carried out in a competent manner. This includes the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

EPL waste limit condition L5 permits general solid waste (putrescible) to be disposed of at the premises (Section 7.3.2). This waste has been classified as per the Waste Guideline (DECCW, 2009). It also permits general solid waste (non-putrescible) (classified as per the Waste Guideline) to be disposed at the premises, including hydrocarbon-impacted material that has been treated in a designated Bioremediation Facility to be constructed at the mine.

The Bioremediation Facility includes a number of treatment areas/cells, perimeter drainage and a runoff collection sump. Appropriate environmental and safety controls will be implemented as part of the facility procedures. Such controls will include the installation of a surface cover to control any potential emissions from the top of the facility (if required), and signage to explain operational procedures.

Operational phase waste types, methods of transport, handling and disposal options are presented in Table 9.

Waste handling, transport and disposal methods are described below. Hazardous waste materials such as contaminated absorbent materials produced on-site will be recorded in the HSDGR. Suitable storage and handling procedures will be detailed in the HSDGR (Section 9).

7.3.1 Waste Separation

In accordance with the Waste Guideline (DECCW, 2009) waste streams will be kept separate where practicable to improve waste handling and classification, minimise costs associated with disposal and improve environmental outcomes. For example:

- classified wastes (e.g. hazardous wastes) will not be mixed with non-classified wastes;
- where practicable, recyclable wastes will be separated out from other wastes; and
- some wastes have lower disposal costs and where practicable these wastes will be identified and kept separate from other waste types to reduce costs.

7.3.2 General Solid (Putrescible/Non-Putrescible) Wastes

Oversized Trash Screen Waste

Oversized trash screen waste (general solid [putrescible] waste) produced during ore processing will be collected and disposed within the waste rock emplacements. Following disposal, the waste will immediately be covered by 500 millimetres of waste rock material. This waste stream has been classified as general solid (putrescible) waste and is comprised primarily of fragments of plastic-constructed explosive detonation devices generated within the milling circuit of the process plant.

Hydrocarbon-impacted Material

Hydrocarbon-impacted material (general solid [putrescible] waste) recovered from minor site-generated spillage accidents will be treated in a designated Bioremediation Facility, prior to on-site disposal within the waste rock emplacements.

Office and Packaging Wastes

Office and packaging wastes (general solid [non-putrescible] waste) will be separated on-site into suitable groups for recycling where practicable (e.g. clean office paper, cardboard, aluminium cans, etc.). Where recycling is not practicable, these wastes will be disposed on-site in the waste rock emplacements.

Scrap Metal

Where practicable, scrap metal (general solid [non-putrescible] waste) will be separated by metal type (e.g. steel, aluminium) and collected for recycling. If recycling is not practicable, these wastes will be disposed on-site in the waste emplacements or transported to BSC landfill.

Domestic Waste

In accordance with Condition L5.2 of EPL 11912, all domestic waste (general solid [putrescible] waste) will be disposed on-site in the waste rock emplacements or transported to BSC landfill.

Empty Pesticide/Herbicide Containers

Pesticide and herbicide containers from which residues have been removed by washing can be disposed as general solid (non-putrescible) waste on-site in the waste rock emplacements. However, these containers will be recycled as part of the national drum muster programme, where practicable.

Drained and Crushed Oil/Fuel Filters

Drained and crushed oil/fuel filters will be removed from site by a licensed contractor for recycling at a DECCW licensed waste facility.. Drained and crushed oil/fuel filters removed from the site will be tracked in accordance with the *Protection of the Environment (Waste) Regulation 2005* (Section 7.3.6).

Absorbent Materials (No Free Liquid)

Used oil absorbents with no free liquids (solid [non-putrescible] waste) will be removed from site by a licensed contractor for recycling at a DECCW licensed waste facility. Used oil absorbents with no free liquids (solid [non-putrescible] waste) will also be tracked in accordance with the *Protection of the Environment (Waste) Regulation 2005* (Section 7.3.6).

7.3.3 Classified Liquid Wastes

Sewage

The site is served by a number of septic systems that are approved by the BSC. The systems are pumped out as required and the contents are taken to the West Wyalong Wastewater Treatment Facility for disposal.

Since early commissioning in 2006 the site is served by a site sewage treatment facility – Blivet model BL3000 (waste water capacity of 57,500 L/day), this satisfied the requirements of BSC, DECCW and Department of Health, in accordance with Consent Condition 5.6. The site sewage system comprises of a purpose built unit with a design capacity of up to 575 people.

Treated effluent (liquid waste) will be pumped from the sewage treatment facility to the tailings storages (North Limited, 1998). Solids will be pumped out as required by licensed contractors from the sewage treatment facility and taken to the West Wyalong Wastewater Treatment Facility for disposal.

Lubricating Oils and Hydraulic Oils

Waste oils are classified as liquid waste (Table 9) and will be stored on-site in a dedicated bunded storage facility that complies with the requirements of AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* (Appendix C) or stored temporarily in pods in the bunded area of the waste handling area. Waste oils will be periodically removed by a licensed transport contractor to a DECCW licensed facility for recycling.

Liquid Waste Transport

Barrick will utilise licensed transporters for the transport of liquid wastes classified as hazardous should this be required. Waste transporters are responsible for the ensuring that their transport licenses allow them to carry the particular liquid waste, and for transporting the liquid waste to an appropriately licensed facility.

The transporters must also carry (for wastes listed under *Protection of the Environment Operations (Waste) Regulation 2005* and not exempted) duly completed waste transport certificates for the consigned waste and provide a copy of this certificate to the waste facility to which the load is delivered (Section 7.3.6).

7.3.4 Hazardous Waste

Degreasing Fluids, Distillate and Petroleum Fluids

Used and flammable petroleum liquid wastes are classified as hazardous waste (Table 9) and will be stored on-site in a dedicated bunded storage facility that complies with the requirements of AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* (Appendix C) or stored temporarily in pods in the bunded area of the waste handling area. These wastes will be periodically removed by a licensed transport contractor to a DECCW licensed facility for recycling or disposal.

Laboratory Wastes

Laboratory wastes (hazardous waste) will be produced as a result of laboratory analysis of ore and tailings. These wastes will be diluted with water and ultimately disposed of in the tailings storages.

Hazardous Waste Transport

Barrick will utilise licensed transporters for the transport of wastes classified as hazardous wastes should this be required. Waste transporters are responsible for the ensuring that their transport licenses allow them to carry the particular waste, and for transporting the waste to an appropriately licensed facility.

The transporters must also carry (for wastes listed under *Protection of the Environment (Waste) Regulation 2005* and not exempted) duly completed waste transport certificates for the consigned waste and provide a copy of this certificate to the waste facility to which the load is delivered (Section 7.3.6).

Absorbents (Free Liquid)

Spent spill/clean-up materials (e.g. absorbent mats) (hazardous waste) will be clearly marked to avoid mixing of incompatible substances. Prior to removal the materials will be transferred to clearly labelled drums or similar containers. Disposal options will depend on the nature and amount of material, however, these materials will be removed periodically by a licensed contractor for disposal at a licensed facility.

Lead Acid Batteries

Lead acid batteries are classified as hazardous waste and are a tracked waste stream in accordance with the *Protection of the Environment (Waste) Regulation 2005* (Section 7.3.6). Where practicable, lead acid batteries will be stored in a bunded area and periodically removed for recycling by a DECCW approved facility/contractor. A maximum of 20 t of used/waste lead acid batteries will be stored on-site.

Used Oil/Fuel Filters

If not drained and crushed, used oil and fuel filters are classified as hazardous waste and must be tracked (Section 7.3.6) and treated by a licensed waste facility for disposal. Where practicable, these filters will be drained and crushed to allow them to be disposed as general solid (non-putrescible) waste (Section 7.3.2). Oil/fuel drained from these filters will be disposed as waste oils (Section 7.3.3).

Bulk Chemical Containers

Bulk chemical containers would be classified as hazardous waste under the Waste Guideline (DECCW, 2009) (Appendix A) and will require removal by a licensed contractor to a DECCW licensed facility for recycling and/or disposal in accordance with the label requirements. However, these containers will be returned to the supplier wherever practicable for re-use.

Unwashed Pesticide/Herbicide Containers

If pesticide and herbicide containers have not been washed, they may be classified as hazardous waste and will require removal by a licensed contractor to a DECCW licensed facility for recycling and/or disposal in accordance with label requirements.

As described in Section 7.3.2, these containers will be rinsed and recycled via the national drum muster programme where practicable.

7.3.5 Special Wastes

Used Tyres

Used tyres (special waste) generated on-site will be disposed of on-site in the waste rock emplacements. Interstate disposal will be a DECCW tracked waste. Tyres sent to Western Australia for repair, are returned to the CGM whether repairs are possible or not achieved. Alternative uses will be via consultation with the Environmental Manager (including DECCW involvement) and indemnity of release.

Fluorescent Light Globes/Tubes

Fluorescent light globes/tubes and compact fluorescent light globes/tubes are a tracked waste stream in accordance with the *Protection of the Environment (Waste) Regulation 2005* (Section 7.3.6) and will be disposed of off-site at a DECCW licensed waste facility.

7.3.6 Waste Tracking

Under the PoEO Act, waste tracking requirements apply to certain types of waste. They are subject to special monitoring and reporting requirements by the DECCW.

On 1 July 2006, the amended *Protection of the Environment (Waste) Regulation 2005* (the Regulation) came into effect. The Regulation lists the types of wastes that must be tracked, which are based on the list in the National Environment Protection Measure (NEPM), which covers the transport of controlled waste between Australian States and Territories.

Tracking Requirements

Any business or organisation that handles waste must comply with the NSW waste tracking requirements. Waste tracking involves obtaining prior approval for the waste to be transported and completing required documentation each time such waste is transported.

Under the tracking system a business or organisation that generates or stores waste must assess and classify its waste (Section 7.1) and when it consigns waste listed under the Regulation from its premises it must follow some basic tracking requirements.

Barrick must ensure that the waste is not transported from one place to another place unless the consignor:

- holds a consignment authorisation in respect of the waste, and
- has obtained a waste transport certificate for the waste and has certified that any part of the certificate that is required to be completed by the consignor has been completed accurately, and
- has given the waste transport certificate to the transporter of the waste, and
- has ensured that the transporter is licensed (if required by or under the Act) to transport the waste, and
- has ensured that the waste facility to which the waste is to be transported is legally able to accept waste of the type concerned.

Barrick must retain a copy of the consignment authorisation for a period of not less than four years after the day on which the consignment authorisation is obtained by consignor for auditing purposes. Barrick must also retain a copy of each waste transport certificate for a period of not less than four years after the day on which the certificate was given by the consignor to the transporter of the waste.

Exception Reporting

Under the PoEO Act and the Regulation, certain irregularities in waste movements must be reported. Waste generators, waste transporters and waste facilities must notify the DECCW of any exception or irregularity within the waste tracking system. Making these exception reports to the DECCW is mandatory.

Irregularities that Barrick will report to the DECCW if they should occur include:

- waste that is rejected by the waste facility;
- refusal by the transporter to transport waste;
- waste that does not arrive at the waste facility;
- failure to receive written confirmation of receipt of waste from a facility or an authorised contractor;
- misrepresentation of waste;
- spillage of waste that occurs during transit; and
- waste that is transported without a waste data form.

Tracking Exemptions

Some wastes that have established re-use, recycling or reprocessing options are exempt from tracking requirements. In the case of an exemption a consignment authorisation and transport certificate are not required. However, the transporter of the exempt waste must prepare a written record or receipt containing the following details:

- the name and address of the transporter;
- the transporter's EPL number- if the transporter is required to be licensed under the PoEO Act;
- the registration number of the vehicle used to transport the waste,
- the type and quantity of the waste transported;
- the date on which the waste is delivered to the receiver,
- the name and address of the receiver; and
- the date on which the record was made.

The transporter must give a copy of this information to the receiver on delivery. The transporter must retain a copy of this receipt for at least three years for auditing purposes and make the record available for inspection by an authorised officer on request.

The following exemptions apply:

1. Non-hazardous waste hydrocarbon oil destined for recycling, reprocessing, or re-use (including as a fuel). Waste lubricating oil that is classified as liquid waste that is destined for a premises lawfully permitted to be used as a waste facility for the oil does not require consignment authorisation or a transport certificate.
2. Waste batteries destined for recycling. Waste batteries that are classified as hazardous or industrial waste and that are designed for recycling at licensed premises do not require consignment authorisation or a transport certificate.

7.3.7 Tailings and Waste Rock Disposal

Approximately 99 million tonnes (Mt) of tailings and 161 Mt of waste rock will be produced over the life of the mine. These materials will be managed to the satisfaction of regulatory authorities such as I&I NSW through the Mining, Rehabilitation and Environmental Management Process (MREMP).

Tailings

The tailings will be pumped at approximately 55% solids to the northern and southern tailings storages. The pipeline will run at ground level, through culvert road crossings and within a bunded corridor. Tailings will be deposited in two storages located approximately 3.5 km west of the Lake Cowal shoreline (North Limited, 1998).

Management and monitoring of the tailing storages is covered in the EIS (North Limited, 1998) and by the Cyanide Management Plan.

Waste Rock

Waste rock would be placed in a continuous waste emplacement surrounding the open pit consisting of three areas (North Limited, 1998):

- northern waste emplacement;
- southern waste emplacement; and
- perimeter waste emplacement.

Management of the waste emplacements is set out in the EIS (North Limited, 1998).

Monitoring associated with the waste emplacements and tailings storages is detailed in a number of management plans including the Surface Water, Groundwater, Meteorological and Biological Monitoring Programme – Mine Operations (Barrick, 2009), Monitoring Programme for Detection of Movement of Lake Protection Bund, Water Storage and Tailings Structures and Pit/Void Walls (Barrick Australia Limited, 2003c) and Cyanide Management Plan (Barrick Australia Limited, 2005b).

7.4 WASTE MANAGEMENT STRATEGY

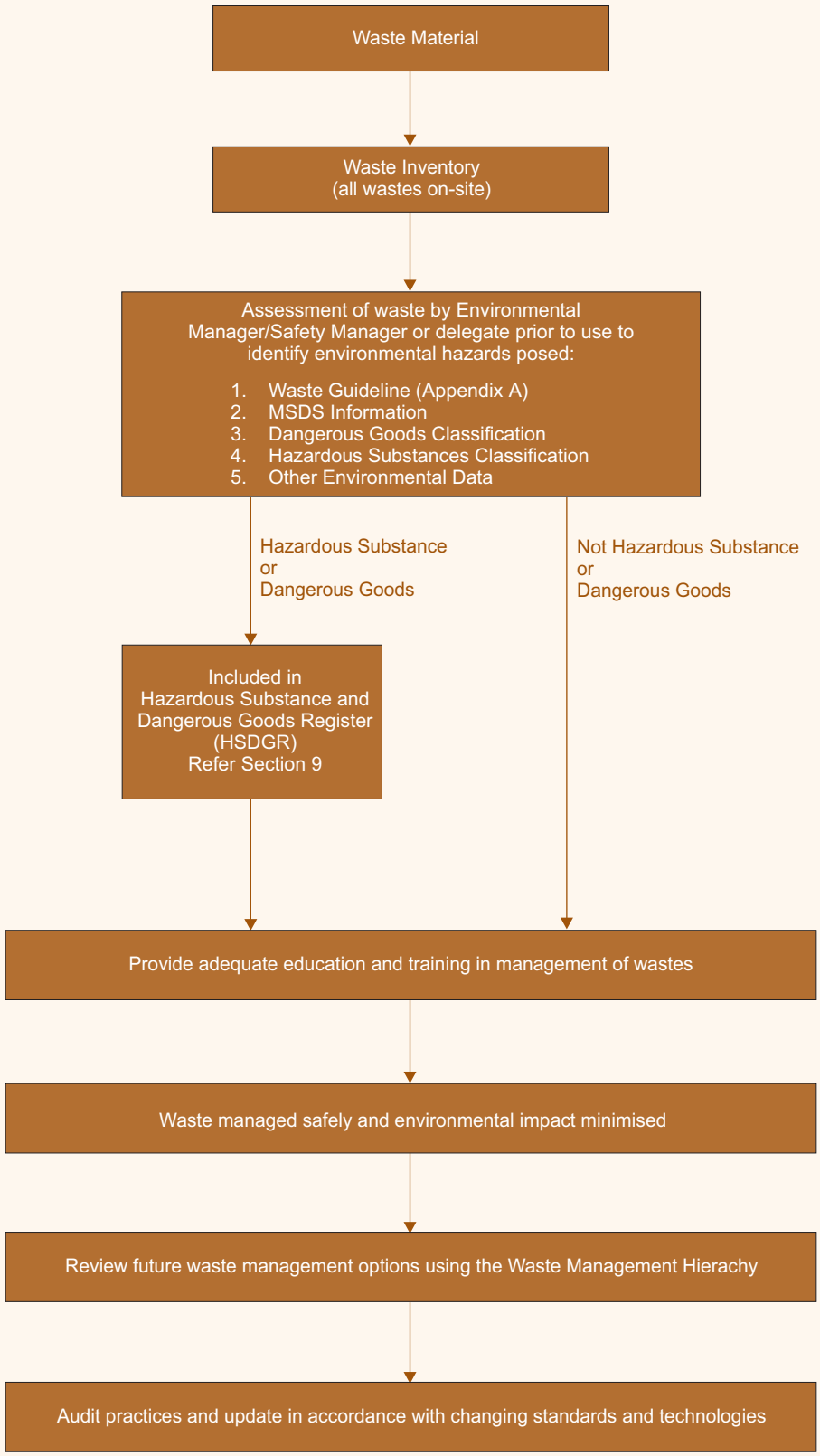
Based on the principles detailed in the Commonwealth DRET's (2009) Leading Practice Sustainable Development Program for the Mining Industry *Hazardous Materials Management* handbook, Barrick employees and contractors will be encouraged to adopt the relevant components of the Waste Management Strategy (Figure 3).

The Waste Management Strategy is described in the following sub-sections.

7.4.1 Waste Inventory

An inventory of the waste types generated and the potential environmental hazards/impacts associated with each waste has been compiled. The waste inventory will be updated by the Departmental Manager (or delegate) to reflect any significant changes in waste production that occur at the site. CGM uses Chemalert 3 to manage requests, approvals and MSDSs for quantities of substances/chemicals used or stored in areas of operations.

Waste Management Strategy



Source: Leading Practice Sustainable Development Program for the Mining Industry - Hazardous Materials Management, 2009

Hazardous Waste and Chemical Management Plan

FIGURE 3

Waste Management Strategy

7.4.2 Waste Management Hierarchy

In line with leading practice environmental management practices, Barrick will implement the following waste management hierarchy from the National Waste Minimisation and Recycling Strategy (CEPA, 1992):

1. ***Avoidance*** – where possible, reduce the amount of waste generated at the site via:
   - bulk purchasing of consumables;
   - standardising size and type of materials purchased;
   - accurate stocktaking and prediction of operation requirements for each chemical;
   - minimising the use of disposable products;
   - consideration of waste generation during process design; and
   - regular maintenance of equipment.

2. ***Re-use*** – where practicable, re-use waste products without substantially changing their form by, for example:
   - recycling suitable waste waters (i.e. contained water storage system);
   - re-filling printer cartridges;
   - mulching of vegetative wastes;
   - returning chemical containers to supplier; and
   - including in contracts a requirement for suppliers to take back used/waste materials (e.g. used tyres).

3. ***Recycling*** – where practicable, treat waste that is no longer usable in its present form and using it to produce new products *viz.*:
   - segregation and storage of scrap metal, oil, plastics, aluminium cans, glass and paper for periodic removal to an off-site recycling facility.

4. ***Energy Recovery from Waste*** – where practicable, adopt management practices that recover and use energy generated from waste including:
   - off-site burning of waste oil; and
   - off-site high temperature incineration of workshop wastes.

5. Treatment and/or Disposal – where practicable, adopt management practices that reduce the potential for environmental harm by disposing of waste, or treating and disposing of waste. Such measures could include:

   - treating waste waters (cyanide destruction in accordance with the Cyanide Management Plan);
   - composting/vermiculture;
   - biotreatment of contaminated soils;
   - blending or mixing waste; and
   - disposal to inert and putrescible landfills.

Depending on the type and scale of spill, contaminated soil will be treated in-situ, where possible (North Limited, 1998) or removed and disposed in the waste rock emplacements following treatment in the Bioremediation Facility (if required).

Disposal of materials will be considered only after other options of reduction, reuse and recycling have been considered.

7.4.3 Waste Recycling Procedure

As outlined in the waste management hierarchy (Section 7.4.2) the priority will be to re-use or recycle materials where possible.

Figure 3 and Section 7.4 outline a waste management strategy which includes recycling initiatives. Table 9 lists potential recyclable wastes from the CGM during the operations phase, such as office and packaging waste. Where possible, it is proposed that these wastes be segregated and sent to an appropriate recycling facility.

Before disposing of general wastes to landfill, the following recycling procedure will be implemented:

- consider recycling that may be possible on-site (e.g. secondary use of used office paper, cardboard and newspapers, reuse of clean containers for storage of inert goods, mulching pallets for rehabilitation);
- where possible, require consumable suppliers to collect and recycle packaging material (e.g. bulky boxes and pods);
- consider recycling or reuse options that may require an off-site component (e.g. returning printer cartridges to the supplier for refilling and reuse); and
- consider commercial and non-commercial/charity off-site recycling services that may be available (e.g. aluminium can and glass bottle recycling services).

7.5 PERSONNEL TRAINING

Education and training programmes will be used to instruct employees and contractors on the management of waste. The education and training programmes will be provided during both the construction and operational phases. All Barrick employees, contractors and first time visitors will undertake induction training, this will include:

- waste awareness;
- occupational health and safety implications of waste materials;
- measures to prevent accidental release;
- design measures and operating procedures aimed to minimise or prevent impacts; and
- spill response contingency/containment procedures (Section 8).

In addition, site education and awareness training for individual work environments will include where relevant:

- specific emergency response training to suit individual work requirements; and
- ongoing refresher training programmes for key employees and contractors to improve skills and competencies as necessary (e.g. employee environmental awareness handbook and site notices).

Training will also include regular reinforcement, by refresher courses, short 'toolbox' discussions and/or routine discussion with supervisors (adapted from DRET, 2009). Records of all staff induction and environmental training will be kept to assist in the identification of personnel who require 'refresher' training.

7.6 AUDITING OF WASTE MANAGEMENT

The CGM will be subject to periodic audit and review (refer Section 11). During the audit and review process, the operational phase waste management practices and procedures may be assessed against this HWCMP and current best management practices. Audit results will be used to identify improvements that can be made to the site waste management system using the waste management hierarchy (Section 7.4.2).

8 RESPONSE PROCEDURES IN THE EVENT OF SPILLAGES

The following sub-sections summarise spill response and preparedness procedures that have been developed for the CGM. These procedures will be regularly updated to reflect changes that occur on-site and apply to spills of chemicals/consumables and of wastes (refer Tables 8 and 9).

The following subsections describe management of off-site and on-site spills.

8.1 OFF-SITE SPILLS

In the event of a dangerous goods spill, the driver, prime contractor or rail operator and consignor are required to respond to the emergency and liaise with organisations/emergency services in accordance with the ADG Code and DG Regulations. Clean up procedures would be under the control of the attending emergency services (e.g. Fire and Rescue NSW or NSW Police). A description of the general requirements of the ADG Code and DG Regulations with regard to emergency information, safety equipment, procedures during transport and emergencies is provided in Section 3.3.

8.2 ON-SITE SPILLS

8.2.1 Responsibility

Table 10 summarises staff responsibilities with regard to on-site spill response:

Table 10
Staff Spill Responsibilities

Staff Member	Responsibility
General Manager	• Ensuring that spill response plans and procedures are in place.
Departmental Managers	• Implementing the spill response procedure within their department and with contractors under their control; • Arranging for equipment to be available and maintained to control, contain and clean-up minor and major spills; • Organising employee training in minor and major spill response; • Organising availability of MSDSs for every product stored and/or handled by their employees; and • Replenishing spill response trailers/kits immediately following a spill clean-up.
Environmental Manager	• Organising minor and major spill response training; • Reporting major and emergency spills to the regulatory authorities; • Reporting major and emergency spills to Barrick corporate Environmental staff; and • Advising on clean-up methods, waste disposal and site rehabilitation.
Stores Supervisor	• Maintaining stocks of hydrocarbon and chemical absorbent materials sufficient to restock at least one spill response trailer/kit.
Safety Manager	• Updating the Emergency Response Plan and maintaining the preparedness of the Emergency Response Team.
Spill Observer	• Taking action to control and contain the spill if safe to do so; • Notifying the responsible department that a spill has occurred; and • Initiating an Incident Report form.
Emergency Response Team (members of Barrick and contractor's management staff)	• Assess the situation; • Identify stakeholders potentially affected; • Develop an emergency response action plan; • Identify priority actions in the emergency action plan; • Implement action in the emergency action plan; • Monitor the effectiveness of the actions implemented; and • Develop a recovery plan to resume operations as soon as possible.

8.2.2 Spill Response Procedures

Spill Notification

Internal spill notification procedures are illustrated on Flow Diagram 1. The requirement for notification of Departmental Managers, Environmental Manager or Safety Co-ordinator will be determined by the spill classification.

The DECCW will be notified of any spills that have the potential to cause material harm to the environment as described in Section 147 of the POEO Act, and in accordance with requirements of reporting condition R2 of EPL 11912.

Spill Classification

Classifying the severity of a spill is dependent on three variables:

Volume	the amount spilled.
Substance	the product spilled.
Location	where spilled (the physical environment).

The site classification for minor, major and emergency spills is provided in Table 11.

Table 11
Spill Classification Criteria

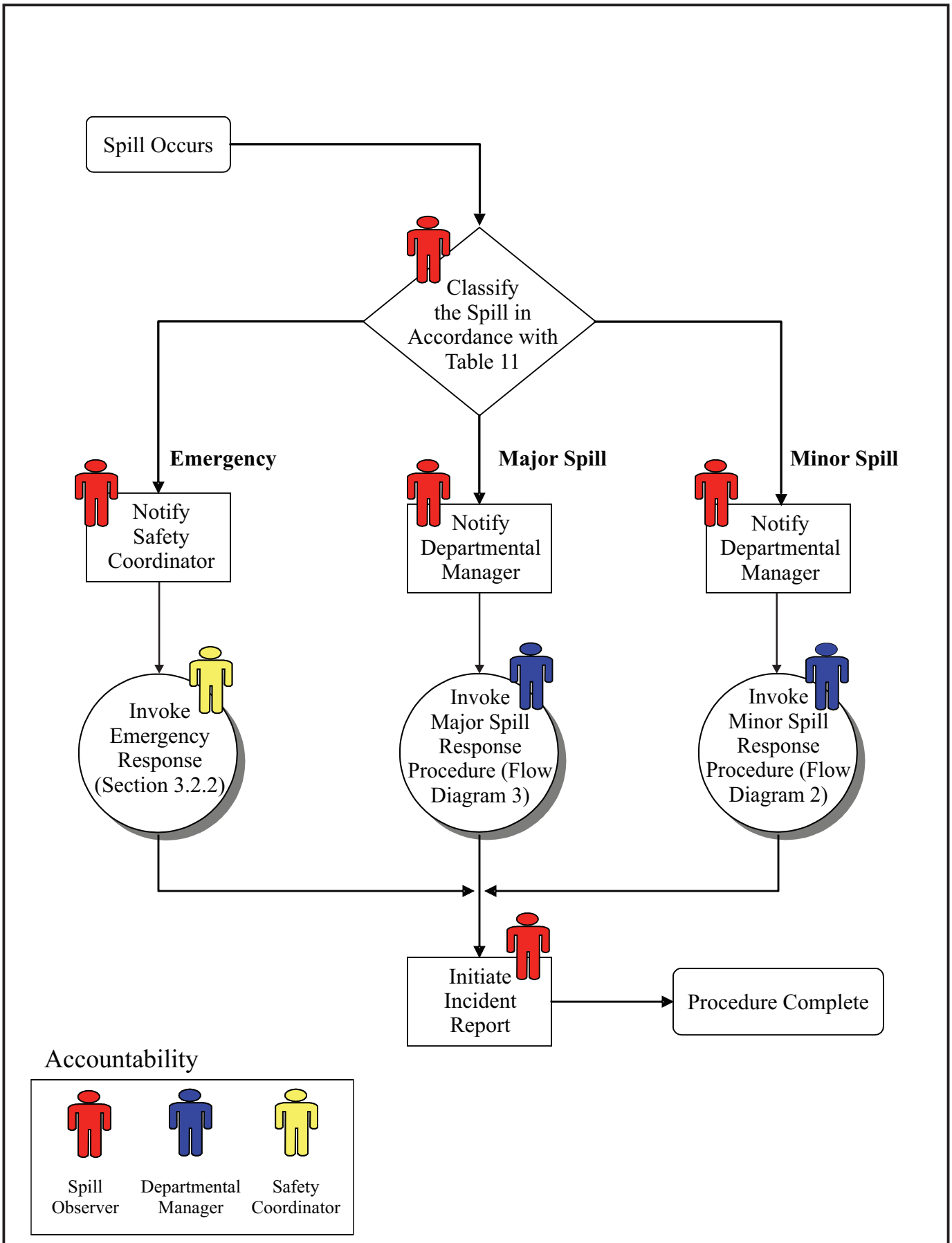
Substance	Environmental Incident		
	Minor	**Major**	**Emergency**
Hydrocarbon Spill	Any spill that cannot impact on the lake, the borefield or a watercourse.	Any spill that has the potential to impact on the lake, the borefield or a watercourse where the volume spilled is less than 205 L.	Any spill that has the potential to impact on the lake, the borefield or a watercourse where the volume spilled is greater than 205 L.
Chemical Spill	Any substance that cannot impact on the lake, the borefield or a watercourse and can be contained and cleaned up with resources readily available at the spill site.	Any substance that has the potential to impact on the lake, the borefield or a watercourse but can be contained at the location of the spill and cleaned up with resources readily available on-site.	Any substance that has the potential to impact on the lake, the borefield or a watercourse that cannot be contained at the location of the spill or requires a specialist response to effect a clean-up.
ACTION:	Invoke Minor Spill Response Procedure (Flow Diagram 2)	Invoke Major Spill Response Procedure (Flow Diagram 3)	Invoke Emergency Response Plan (Section 3.2.2)

Source: Barrick Gold - Spill Response and Preparedness

Spill Response Procedures

Health and Safety Considerations

It is fundamental to any response procedure that the first person/s on the scene evaluate the safety of the site and determine how and when to proceed. The health and safety of the response team must remain the prime focus throughout the incident above that of any victim, item of equipment, or the environment. Suitable PPE must be worn in accordance with relevant MSDSs and the HSDGR if applicable. General staff training and Emergency Response Team training will include these requirements.



Source: Barrick Gold - Spill Response & Preparedness

Hazardous Waste and Chemical Management Plan

FLOW DIAGRAM 1

Spill Response Notification Procedure

Spill Categories

In accordance with Table 11, spills are classified as minor, major or emergency. Spill response procedures for minor and major spills are illustrated on Flow Diagrams 2 and 3. Emergency spills will be subject to the same general response procedures as for a minor or major spill, however, the spill response will be managed from the Emergency Response Centre by the Emergency Response Team to provide managerial level (including Barrick and Contractor management staff) control and management of the spill response in accordance with the procedures detailed in the Emergency Response Plan (Section 3.2.2).

Control, Contain and Clean-up

The methods available to contain a spill depend largely on the location of the spill, the equipment and material immediately at hand. Specific control, containment and clean-up procedures relevant to materials listed in the HSDGR and FOR will be provided in these registers (Sections 9.6 and 10.5). The importance of containment cannot be over emphasised. The effort will be put into ensuring that the spilled product is trapped and prevented from causing further contamination.

The "3C" approach is applicable to all categories of spill.

- **CONTROL the flow**

  In the case of ruptured pipes and lines, upstream valves will be closed. Where bulk tanks have been damaged all feeds into the tank will be stopped. Split or weeping drums will be rolled or turned so that openings are above the level of the liquid inside.

- **CONTAIN the material**

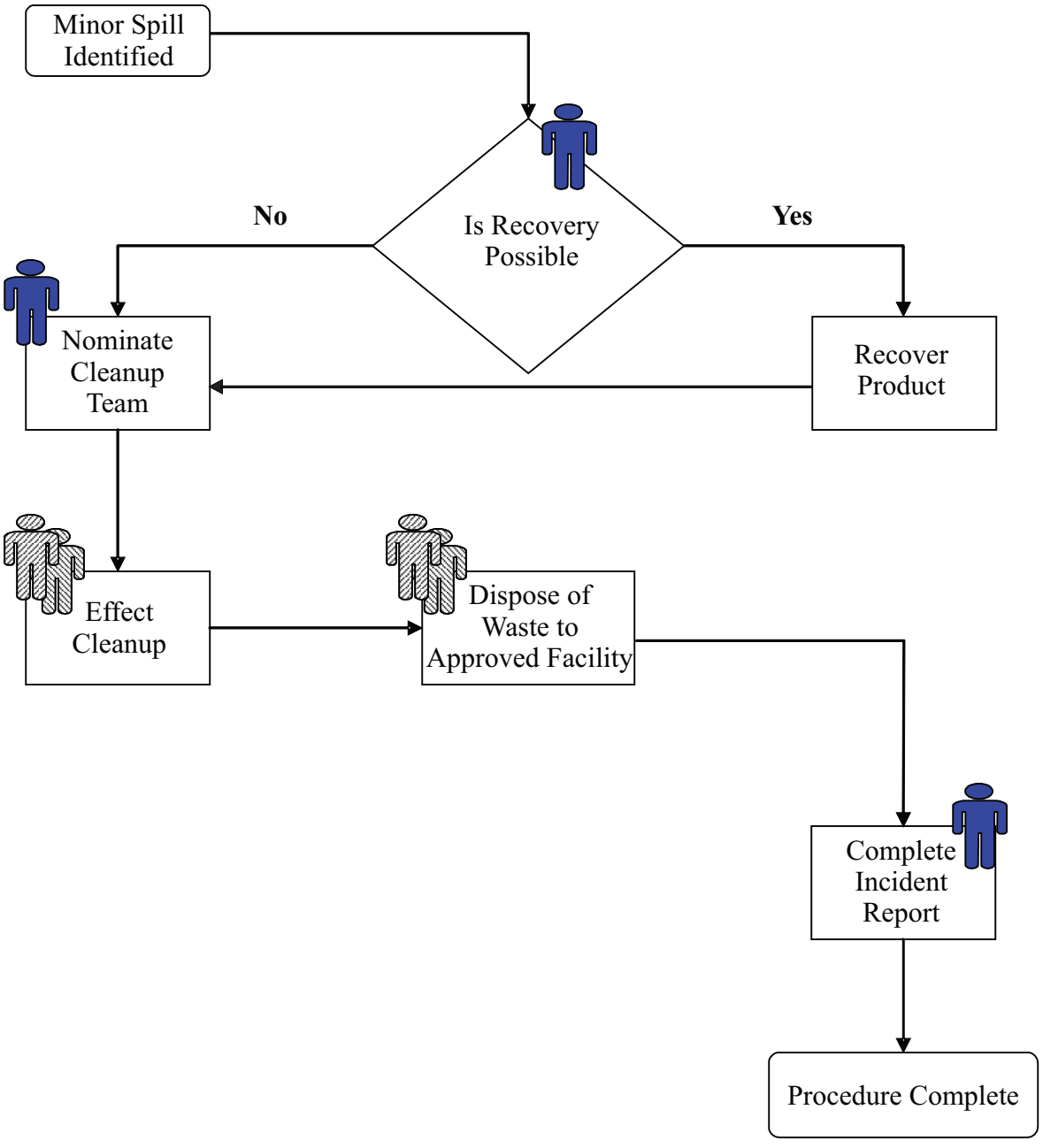
  Material can be contained by constructing barriers of earth, timber, pipe, etc. Hydrocarbon spills on water can be contained by installing a floating boom.

- **CLEAN UP the site**

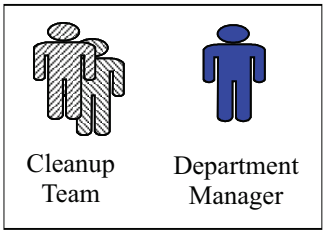
  The deployment of equipment to recover product, remove the contaminated soil and rehabilitate the site will be the prime focus. The severity and location of a spill will determine the equipment needed to clean up the spill. Types of equipment include recovery pumps, trucks, front-end loaders, bobcats and graders. Spill control trailers/kits contain a variety of absorbent booms, pads and granules, as well as basic PPE, brooms and shovels.

  Clean-up of any spills that involve contamination of a natural watercourse or aquifer will be conducted in accordance with the requirements of the DECCW and NSW Office of Water (OoW). As described in Section 3.2, the site will be bunded, with potentially contaminated waters reporting to the Internal Catchment Drainage System, to minimise the possibility of this ever occurring.

Spill response guidance (including generic PPE requirements and clean-up details) is available in the Chemalert 3 MSDS management system, based on the manufacturers MSDS'.



Accountability

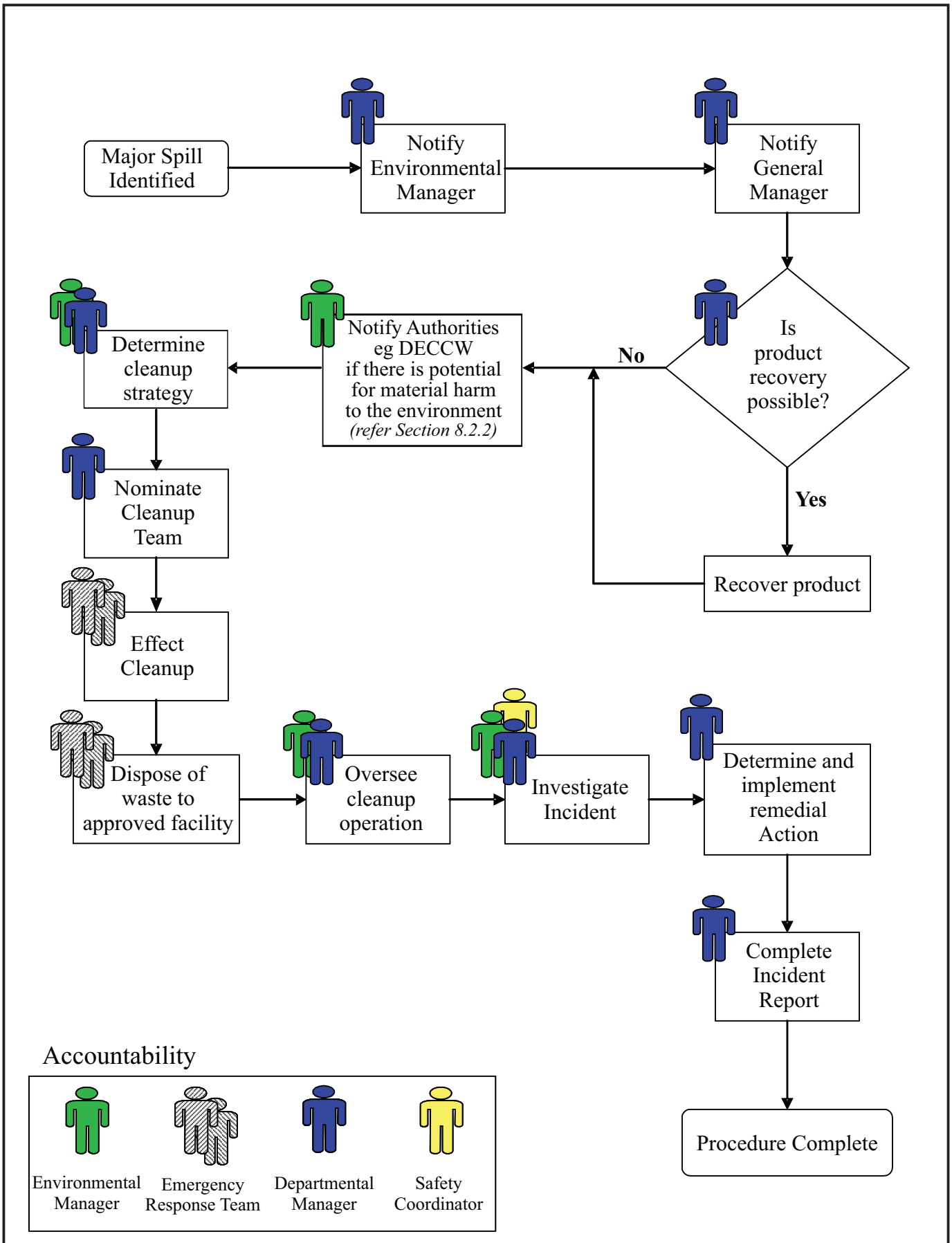


Source: Barrick Gold - Spill Response & Preparedness

Hazardous Waste and Chemical Management Plan

FLOW DIAGRAM 2

Minor Spill Response Procedure



Source: Barrick Gold - Spill Response & Preparedness

Hazardous Waste and Chemical Management Plan

FLOW DIAGRAM 3

Major Spill Response Procedure

Clean-Up Materials and Equipment

Suitable absorbent materials, spill cleanup materials and equipment will be maintained in chemical and waste storage, handling and use areas for containing, neutralising or decontaminating spills.

A list of equipment to be stored is provided in AS/NZS 3833:2007 *The Storage and Handling of Mixed Classes of Dangerous Goods in Packages and Intermediate Bulk Containers* (Appendix C):

- adequate quantities of absorbent material (e.g. sand, fullers earth or suitable proprietary substances);
- chemical wheelie bin spill response kits for use on chemical spills;
- hydrocarbon wheelie bin spill response kits for use on fuel/oil spills;
- sodium carbonate for use on acidic spills;
- a sufficient number of resealable waste-recovery containers (e.g. drums made of materials compatible with the substances being kept and appropriately marked as being for emergency use only);
- portable pumps and decanting equipment; and
- shovels, bags, PPE.

This list will be augmented as appropriate according to the materials stored in the relevant area. Neutralising, compatible and incompatible materials are generally listed in the relevant material MSDS.

Notification of Emergency Services and/or Regulatory Authorities

Emergency Services notification and notification of regulatory authorities are described in the Emergency Response Plan.

In accordance with the Emergency Response Plan, emergency services will be called to the site immediately once an emergency is declared as a Level A emergency. When the emergency services (e.g. Fire and Rescue NSW, Police, Ambulance, Rural Fire Service or State Emergency Service) arrive on site, the Emergency Controller should hand over responsibility for directing emergency operations to the emergency services. Accordingly, the external Emergency Services Controller should become the overriding authority. When hand over is made, the Emergency Controller will liaise closely with the external Emergency Services Controller, providing advice and directing company personnel as required. In the event of a Level A emergency, the attending emergency services would liaise with other organisations/authorities as appropriate (e.g. the District Emergency Management Co-ordinator [and Committee], Local Emergency Management Committee[s] and other emergency services).

If emergency response includes actions for nearby residential areas, the Emergency Controller will liaise with the Police attending the emergency and provide information to allow the Police to decide upon the appropriate actions.

Incident notification and reporting requirements are described in Section 14.2.

9 HAZARDOUS SUBSTANCES AND DANGEROUS GOODS REGISTER

A HSDGR has been developed for the CGM as required by Section 6.4.1, of the EIS (North Limited, 1998) (Section 1). All hazardous substances or dangerous goods used, stored or produced on-site will be recorded in the HSDGR. The purpose of the register is to facilitate efficient audit functions as well as conform to leading practice environmental and safety management. The management of chemicals, dangerous goods and hazardous substances is conducted by the use of Chemalert 3 and other applications.

During the operational phase, HSDGR will include intermediate processing materials in the process plant that may require management in the event of a plant failure or shutdown.

In accordance with the Clauses 167(1) and 174ZW of the OHS Regulation, Barrick will keep and maintain the HSDGR. The HSDGR, Chemalert 3 and other applications will be maintained to include (where applicable) the following for each substance:

(a) the MSDS provided by the supplier of the substance;

(b) the common name or trade name of the substance (Section 9.2);

(c) the formal chemical names of the components of the substance (Section 9.2);

(d) copies of the risk assessments carried out for the substance (Section 9.2);

(e) toxicological information (Section 9.2);

(f) safe handling information (Section 9.2);

(g) information concerning the health effects (Section 9.2);

(h) first aid treatment information (Section 9.2); and

(i) a response plan, indicating an appropriate means for dealing with a dangerous incident such as spillage or poisoning in relation to the substance (Section 9.6).

The applicable Job Hazard Analysis for the use of chemicals and substances will be stored in site user records management system.

Chemalert 3 and other applications will also include:

- the United Nations Number, if applicable, to assist in information searches about the material (Section 9.2);
- the dangerous goods class to indicate particular precautions needed, especially for mixed storages (Section 9.2);
- applicable storage and process areas (Section 9.3);
- typical quantities maintained on-site (Section 9.3);
- details of the primary manufacturer and suppliers of relevant consumables (Section 9.3);
- location plan of site identifying operational and storage areas for the material shown (Section 9.3); and
- relevant handling, storage and disposal training requirements (Section 9.5).

9.1 MAINTENANCE OF THE REGISTER

The Safety Manager (or delegate) will be responsible for regularly maintaining and updating the HSDGR and Chemalert 3. In the event that a new chemical/substance or waste is relevant to site, it will be listed on the Inventory Register or waste inventory, the Environmental Manager and Safety Manager (or delegate) will assess MSDS information, hazardous substances (Section 4.1) and dangerous goods classifications (Section 4.2) and other available environmental data to determine whether the material is hazardous or dangerous and whether special handling and storage requirements are needed. All chemicals and hydrocarbons are required to be registered in Chemalert 3 prior to use on site. The Chemalert 3 database contains sufficient supporting information on the requirements for handling, storage location, quantities stored and spill response.

In addition, when a significant change to the supplier, consumption rate, storage facilities/location, relevant staff, or use of a relevant material occurs at site, the HSDGR will also be updated.

9.2 MEDICAL/ENVIRONMENTAL SAFETY DATA

Suppliers and manufacturers of hazardous substances are obliged to provide current MSDS information with their product under Clauses 151 and 155 of the NSW *Occupational Health and Safety Regulation 2001* (OHS Regulation), respectively. Suppliers and manufacturers of dangerous goods are also required to provide current MSDS information with their product in accordance with Clauses 174K and 174M of the OHS Regulation.

In accordance with Clause 150(2) of the OHS Regulation, a MSDS for a hazardous substance:

(a1) must be in English, and

(a2) must contain the date on which it was last reviewed or, if it has not been reviewed, the date of its preparation, and

(a) must clearly identify each hazardous substance to which it relates, and

(b) must set out the following information in relation to a hazardous substance to which it relates:

(i) its recommended uses,

(ii) its chemical and physical properties,

(iii) information relating to each of its ingredients, to the extent required by subclause (3),

(iv) any relevant health-hazard information,

(v) information concerning the precautions to be followed in relation to its safe use and handling, and

(c) must set out the name, and Australian address and telephone numbers (including an emergency number), of the manufacturer.

In accordance with Clause 174J(2) of the OHS Regulation, a MSDS for a dangerous good must:

(a) be in English, and

(b) contain the date on which it was last reviewed or, if it has not been reviewed, the date of its preparation, and

(c) clearly identify the dangerous goods to which it relates, and

(d) set out the following information in relation to the dangerous goods to which it relates:

(i) their recommended uses,

(ii) their chemical and physical properties,

(iii) any relevant health-hazard or physical-hazard information,

(iv) information concerning the precautions to be followed in relation to their safe storage and handling,

(v) if applicable, the proper shipping name, UN Number, Class, Subsidiary Risk and Packing Group,

(vi) in the case of goods too dangerous to be transported, the name of the goods as specified in Appendix 5 to the ADG Code,

(vii) in the case of C1 combustible liquids, the appropriate classification under AS 1940, and

(e) set out the name, and Australian address and telephone numbers (including an emergency number), of the manufacturer.

Relevant and up-to-date MSDSs for each substance will be included in the HSDGR and the Chemalert 3 system in accordance with the OHS Regulation.

In addition to the above requirements for MSDSs, each MSDS included in the HSDGR and Chemalert 3 system will contain first aid treatment information.

As required by Clause 168 of the OHS Regulation, Barrick will record an assessment of the risks to health created by work that involves possible exposure to hazardous substances. Barrick will use Planned General Inspections, Job Hazard Analysis, Standard Operating Procedures, Field Level Risk Assessment, Emergency Procedures and training sessions to manage and record risk management of hazardous substance exposure created by work with these substances.

9.3 QUANTITIES AND STORAGE LOCATIONS

The Chemalert 3 system (and other applications) will contain details of the quantity and storage location of hazardous substances used at the CGM. Information provided will include:

- chemical classification (i.e. hazardous/dangerous goods classification – Section 4);
- maximum quantity stored in operational areas;
- a storage location plan for site storage areas;
- storage conditions (e.g. open/vented enclosure); and
- emergency suppliers details are available in Chemalert 3 stock management programme.

9.4 SAFETY AND HAZARD MANAGEMENT PROCEDURES

A number of safeguards will be implemented at the CGM to minimise the potential for incidents involving hazardous substances and dangerous goods (Section 3). The HSDGR will contain safety and hazard management procedures to minimise the potential for incidents and reduce the severity of incidents should one occur (e.g. undertake liquid transfer operations within a bunded area).

9.5 PERSONNEL TRAINING PROCEDURES

Barrick employees and contractors will receive relevant training in the use of substances in their routine tasks. Procedures will include but not limited to the following:

- appropriate use/handling of hazardous chemicals/consumables and wastes;
- MSDS interpretation and use;
- Job Hazard Analysis interpretation and use;
- measures to prevent accidental release;
- use of PPE;
- spill containment and incident reporting; and
- applicable clean-up techniques.

Training and inductions for employees with responsibility for particular operational areas and routine activities involving storage and handling hazardous substances, dangerous goods and hydrocarbons will be recorded in the Responsibility Information Management System (RIMS) training database or similar Department training matrix. Administrative employees will initiate and maintain requests for chemical and hydrocarbon use in various operational areas via Chemalert 3 and RIMS.

9.6 CONTINGENCY, CLEAN-UP AND DISPOSAL PROCEDURES

The register will contain detailed contingency, clean-up and disposal procedures for each substance recorded in the HSDGR. General spill response procedures are discussed in Section 8.2.

General management and response procedures include (AS/NZS 3833:2007 *The Storage and Handling of Mixed Classes of Dangerous Goods in Packages and Intermediate Bulk Containers* – Appendix C):

- Every endeavour shall be made to prevent leaks and spills and to control them if they do occur. Clean-up action shall be initiated immediately. Leaked or spilled dangerous goods shall be kept and disposed of in accordance with AS/NZS 3833:2007 *The Storage and Handling of Mixed Classes of Dangerous Goods in Packages and Intermediate Bulk Containers* (Appendix C).
- In order to deal with leaks and spills, clean-up equipment, chemicals for neutralising or decontaminating spills and absorbent materials shall be maintained at every premises on which dangerous goods are kept or handled. Where practicable, sufficient neutraliser will be kept available to treat the contents of the largest container stored.

A typical list of materials and equipment to deal with leaks and spills and requirements for storage of spilled dangerous goods and subsequent disposal is provided in AS/NZS 3833:2007 *The Storage and Handling of Mixed Classes of Dangerous Goods in Packages and Intermediate Bulk Containers* (Appendix C).

9.7 AUDITING AND REVIEW PROCEDURES – HSDGR & FOR

Cowal Gold internal audits and inspections will review onsite standard operating procedures for the following:

- maintenance of a risk based audit schedule with defined responsibilities and frequency;
- timely implementation of audit findings; and
- review following audits to confirm successful implementation of audit recommendations.

These procedures will be implemented by the Environmental Manager and Safety Manager in accordance with general environmental auditing practices (e.g. AS/NZS ISO 19011:2003 *Guidelines for Quality and/or Environmental Management Systems Auditing*).

The Environmental Manager and Safety Manager (or delegate) will also complete an annual review of the HSDGR. The annual review will involve:

- completeness check of hazardous substances and dangerous goods across the site to confirm inclusion on the Register;
- confirmation that MSDS information held in inventories and registers is current and available at points of storage and use;
- reconciliation of storage locations and storage quantities against Register data; and
- assessment of site operations against MSDS requirements for storage, handling and transfer operations.

The annual review of the HSDGR will be undertaken in conjunction with the annual review of the FOR (Section 10).

10 FUEL AND OIL REGISTER

A FOR has been developed for the CGM as required by Section 6.4.1, of the EIS (North Limited, 1998) (Section 1). The FOR is a subset of the Chemalert 3 chemical management system. The type and volume of all fuels and oils used and stored on-site will be available in the FOR report. The Environmental Manager (or delegate) will assess MSDS information and will be responsible for maintaining and updating the register. The purpose of the register is to facilitate audit functions and conform to best practice environmental management.

10.1 MAINTENANCE OF THE REGISTER

The Environmental Manager (or delegate) will be responsible for regularly maintaining the Chemalert 3 system (and other applications) and updating the FOR. In the event that a new fuel or oil is brought to site, it will be recorded in the Inventory Register, the Safety Manager and Environmental Manager (or delegate) will assess MSDS information and other available environmental data to determine whether special handling and storage requirements are needed for inclusion in the FOR. Where applicable, fuels and oils may also be included in the HSDGR.

10.2 STORAGE METHODS AND FACILITIES

The FOR subset of the Chemalert 3 system will describe the brands and volumes of fuel and oils used at the CGM. In addition, the register will also detail the location of storage facilities (main bulk stores and mobile or satellite storages) and methods of storage (vessel drum/tank construction) and compliance with relevant standards (AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids*) (Appendix C). Where applicable, the FOR will also contain maintenance measures for storage facilities including draining of bunded areas and regular maintenance of drains and piping.

Fuel storage and handling areas will be located within the Internal Catchment Drainage System (Section 3).

10.3 PUMPING, PIPING, TRANSFER AND SEPARATION PROCEDURES

The Chemalert 3 system and other applications will provide information and procedures for the pumping, piping, transfer and separation of fuel and oils during the construction and operation phases. Procedures and protocols will also be provided for the draining of bunded areas and dealing with spills contained within the bunded area.

10.4 FIRE PROTECTION

Barrick's Maintenance and Emergency Response applications detail the fire protection measures and equipment for the fuel facilities and areas where hydrocarbons will be stored and used. The CGM fire protection system is provided in Section 3.2.1.

10.5 SPILL CONTAINMENT AND CLEAN-UP PROCEDURES

Procedures will be developed for spill containment and clean-up for both bulk and temporary fuel and oil storage locations. General spill response procedures are discussed in Section 8.

The procedures will include, but not be limited to, the following:

- principal containment measures (permanent/temporary bunding);
- site drainage and measures for controlling runoff;
- spill trailer/kit location and use;
- incident reporting requirements; and
- procedures for the disposal/recycling of used clean-up materials.

10.6 WASTE OIL COLLECTION, TREATMENT AND DISPOSAL

The collection and disposal of waste oil will be managed through the Total Waste Management Contract Service Agreement using DECCW licensed companies, vehicles and facilities for the following:

- identification of on-site waste oil storage locations;
- requirements for the storage of waste oil (quantities and labelling);
- contact details of the licensed waste contractor(s) (authorised to remove waste oil from the CGM);
- required documentation for disposal of waste oils;
- reporting requirements; and
- contact details for:
  - emergency services;
  - MSDS stored in Chemalert 3; and
  - advice on the disposal of unknown hydrocarbons.

11 AUDITING AND REVIEW

11.1 FACILITATION OF AUDIT FUNCTIONS

As described in Section 6.4.1 of the EIS (North Limited, 1998) one of the purposes of the HSDGR and FOR is to facilitate efficient audit functions.

AS/NZS ISO 19011:2003 *Guidelines for Quality and/or Environmental Management Systems Auditing* provides guidelines for environmental auditing and general principles, including the requirement for suitable audit criteria. Audit criteria include (AS/NZS ISO 19011:2003 *Guidelines for Quality and/or Environmental Management Systems Auditing*):

> *applicable policies, procedures, standards, laws and regulations, management system requirements, contractual requirements or industry/business sector codes of conduct.*

The HWCMP and associated strategies, inventories and registers will facilitate efficient audit functions by providing audit criteria as described in Table 12.

Table 12
Facilitation of Efficient Audit Functions

Component	Facilitation of Efficient Audit Functions
Inventory Register	• Chemalert 3 is the central and complete list of all consumables/chemicals on-site that can be included in the audit protocol as an area to be examined for completeness (inclusion of all relevant materials). • Provides the starting point for examination of consumables/chemicals in the HSDGR and FOR.
Chemical Management Strategy	• A criteria against which site chemical management activities can be assessed for compliance with the strategy.
Waste Inventory	• JR Richards and Barrick maintain a DECCW – Trade Waste tracking system that lists all wastes produced on-site that can be included in the audit protocol as an area to be examined for completeness (inclusion of all relevant materials). • Provides the starting point for examination of wastes in the HSDGR.
Waste Management Strategy	• Criteria against which site waste management activities can be assessed for compliance with the strategy.
HSDGR and FOR	• Chemalert 3 contains all hazardous substances, dangerous goods and fuel and/or oils approved for use on-site (including applicable wastes) that can be included in the audit protocol as an area to be examined for completeness (inclusion of all relevant materials). • Provides a description of the requirements for management of each hazardous substance and dangerous good that can be audited for: – Completeness (including manufacturers and Chemalert 3's MSDSs); and – compliance of site activities to the management requirements for each hazardous substance and dangerous good in the HSDGR and FOR.

11.2 COMPLIANCE REPORT AND HAZARD AUDIT

In accordance with Consent Condition 5.4(c), Barrick submitted to the Director-General for Planning, a compliance report detailing compliance with conditions 5.4(a) and 5.4(b) (Table 1).

In accordance with Consent Condition 5.4(e), 12 months after the commencement of operations Barrick carried out a comprehensive hazard audit of the CGM and submitted a report of the audit to the Director-General. A subsequent hazard audit was conducted in April 2010.

The hazard audits conducted 12 months after the commencement of operations and during April 2010 were carried out at Barrick's expense by a duly qualified independent person or team approved by the Director-General for Planning prior to commencement of the audit.

In accordance with Consent Condition 5.4(e) further audits shall be carried out every three years or as determined by the Director-General and a report of each audit will be submitted to the Director-General within a month of the audit. Hazard audits will be carried out in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 5, *Hazard Audit Guidelines*. Consent Condition 5.4(e) is reproduced below:

(e) 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 No. 5, "Hazard Audit Guidelines".

11.3 EXTERNAL AUDITS

External audits are required by the Development Consent. The following sections describe relevant CGM auditing procedures in accordance with Consent Conditions 8.8(a) and (b).

11.3.1 Third Party Audit

An Independent Environmental Audit was conducted during April 2010 in accordance with Consent Condition 8.8 which included hazardous waste and chemical related issues. The condition is reproduced below:

8.8 Third Party Monitoring/Auditing

(a) An Independent Environmental Audit shall be completed:

- *six monthly during construction;*
- *12 months after commencement of ore processing;*
- *then every three years thereafter until decommissioning of the mine and ore processing operations respectively, or as otherwise directed by the Director-General.*

The Applicant shall conduct an environmental audit of the mining and infrastructure areas of the development in accordance with ISO 14010 - Guidelines and General Principles for Environmental Auditing, and ISO 14011 - Procedures for Environmental Auditing (or the current versions), and in accordance with any specifications required by the Director-General. Copies of the report shall be submitted by the Applicant to the Director-General, BSC, DECCW, OoW, DII (Minerals) and CEMCC within two weeks of the report's completion for comment.

(i) The audit shall:

a. assess compliance with the requirements of this consent, licences and approvals;

b. in the event of any non-compliance, report on the effectiveness of the environmental management of the mine as it may relate to the area of non-compliance;

c. be carried out at the Applicant's expense; and

d. be conducted by a duly qualified independent person or team approved by the Director-General in consultation with BSC and CEMCC.

(ii) The Director-General may, after considering any submission made by the relevant government agencies, BSC and CEMCC on the report, notify the Applicant of any requirements with regard to any recommendations in the report. The Applicant shall comply with those reasonable requirements within such time as the Director-General may require.

This Environmental Monitoring/Auditing provides a mechanism by which compliance of the CGM management of wastes and chemicals with the legislation and Australian Standards listed in Section 2 can be assessed/audited.

11.3.2 Independent Monitoring Panel

In accordance with Consent Condition 8.8(b):

(i) The Applicant shall at its own cost establish an Independent Monitoring Panel prior to commencement of construction. The Applicant shall contribute $30,000 per annum for the functioning of the Panel, unless otherwise agreed by the Director-General. The annual payment shall be indexed according to the Consumer Price Index (CPI) at the time of payment. The first payment shall be paid by the date of commencement of construction and annually thereafter. Selection of the Panel representatives shall be agreed by the Director-General in consultation with relevant government agencies and the CEMCC. The Panel shall at least comprise two duly qualified independent environmental scientists and a representative of the Director-General.

(ii) The panel shall:

a. provide an overview of the independent audits required by condition 8.9 above;

b. regularly review all environmental monitoring procedures undertaken by the Applicant, and monitoring results; and

c. provide an Annual State of the Environment Report for Lake Cowal with particular reference to the on-going interaction between the mine and the Lake and any requirements of the Director-General. The first report shall be prepared one year after commencement of construction. The report shall be prepared annually thereafter unless otherwise directed by the Director-General. Copies of the report shall be provided to those parties which receive the AEMR (condition 9.2) and shall be made publicly available at Bland Shire Council within two weeks of the report's completion.

11.4 INTERNAL REVIEW

In accordance with Consent Condition 3.2, the HWCMP will be revised/updated at least every five years, or as otherwise directed by the Director-General for Planning, in consultation with the relevant government authorities.

As described in Section 9.7 the HSDGR and FOR subsets of the Chemalert 3 chemical management system will be subject to periodic internal review and auditing. These reviews will provide feedback and recommend any improvements that can be made to the operation and content of the Chemalert 3 system and the HSDGR and FOR subsets.

12 STAKEHOLDER CONSULTATION

12.1 COMMUNITY ENVIRONMENTAL MONITORING AND CONSULTATIVE COMMITTEE

A CEMCC has been set up for the CGM in accordance with Consent Condition 8.7. The condition is reproduced below:

8.7 Community Consultative Committee

Community Environmental Monitoring and Consultative Committee (CEMCC)

The Applicant shall:

(i) establish a Community Environmental Monitoring and Consultative Committee and ensure that the first meeting is held before the commencement of construction works. Selection of representatives shall be agreed by the Director-General and the appointment of an independent Chairperson shall be to the satisfaction of the Director-General in consultation with the Applicant and BSC. The Committee shall comprise two (2) representatives of the Applicant (including the Environmental Officer), one (1) representative of BSC, one (1) representative of the Lake Cowal Environmental Trust (but not a Trust representative of the Applicant), four community representatives (including one member of the Lake Cowal Landholders Association), to monitor compliance with conditions of this consent and other matters relevant to the operation of the mine during the term of the consent.

Representatives from relevant government agencies (including DUAP) may be invited to attend meetings as required by the Chairperson. The Committee may make comments and recommendations about the implementation of the development and environmental management plans. The Applicant shall ensure that the Committee has access to the necessary plans for such purposes. The Applicant shall consider the recommendations and comments of the Committee and provide a response to the Committee and Director-General.

(ii) The Applicant shall, at its own expense:

- *a) nominate two (2) representatives to attend all meetings of the Committee;*
- *b) provide to the Committee regular information on the progress of work and monitoring results;*
- *c) promptly provide to the Committee such other information as the Chair of the Committee may reasonably request concerning the environmental performance of the development;*
- *d) provide access for site inspections by the Committee;*
- *e) provide meeting facilities for the Committee, and take minutes of Committee meetings. These minutes shall be available for public inspection at BSC within 14 days of the meeting.*

(iii) The Applicant shall establish a trust fund to be managed by the Chair of the Committee to facilitate the functioning of the Committee, and pay $2000 per annum to the fund for the duration of gold processing operations. The annual payment shall be indexed according to the Consumer Price Index (CPI) at the time of payment. The first payment shall be made by the date of the first Committee meeting. The Applicant shall also contribute to the Trust Fund reasonable funds for payment of the independent Chairperson, to the satisfaction of the Director-General.

(ix) At least four years prior to mine closure the Applicant shall, in consultation with CEMCC, identify and discuss post mining issues, particularly in relation to reduced employment and consequent impacts on West Wyalong, and develop a mine workforce phaseout plan. This plan shall be reviewed and updated in consultation with the CEMCC at the commencement of the final year of mine operations.

(x) The Applicant shall, in consultation with the CEMCC, develop appropriate strategies to support activities which promote special interest tourism related to the co-existence of mining and the Lake Cowal environment.

The CEMCC comprises representatives of BSC, Forbes Shire Council, Lake Cowal Environmental Foundation, Wiradjuri Condobolin Corporation, Lachlan Shire Council, two Barrick representatives and four community representatives including one from the Lake Cowal Landholders Association.

The CEMCC provides an opportunity for members of the community to attend CEMCC meetings to discuss specific issues relevant to them, including any concerns relating to the management of hazardous wastes and chemicals. This will be achieved by landholders making a request to the CEMCC regarding a particular issue, or by the landowner registering a complaint in the complaints register. Landowners who register complaints will be invited to join in discussion of the issue at the next CEMCC meeting.

Items of discussion at these meetings will include mine progress, reporting on environmental monitoring, complaints, rehabilitation activities, transport route changes and any environmental assessments undertaken.

13 COMPLAINTS REGISTER

A process for the handling of complaints is provided below in accordance with the requirements of the Development Consent and to facilitate prompt and comprehensive responses to any community concerns.

A complaints register will be maintained by the Environmental Manager in accordance with Consent Condition 10.1(a). The condition is reproduced below:

> ***10.1 Community Consultation (including Aboriginal community)***
>
> *(a) Complaints*
>
> *The Environmental Officer (refer condition 3.1) shall be responsible:*
>
> *(i) for receiving complaints with respect to construction works and mine operations on a dedicated and publicly advertised telephone line, 24 hours per day 7 days per week, entering complaints or comments in an up to date log book, and ensuring that a response is provided to the complainant within 24 hours; and*
>
> *(ii) providing a report of complaints received every six months throughout the life of the project to the Director-General, BSC, DECCW, DII (Minerals), and CEMCC, or as otherwise agreed by the Director-General. A summary of this report shall be included in the AEMR (condition 9.2(a)).*

Information recorded in the complaints register with respect to each complaint will include:

- date of complaint;
- name, address and telephone number of complainant;
- nature of complaint; and
- response action taken to date.

A community complaints line was established on 9 December 2003 and operates 24 hours per day. On 12 and 16 December 2003, Barrick notified the public of the complaints line telephone number and how to make a complaint. Complaints and/or concerns can be made by dialling (02) 6975 3454 where an operator advises the caller that they have reached the CGM Complaints Line. The operator requests the caller's name, the nature of their complaint/concern, and a phone number where the caller can be reached. The information is logged along with the date and time that the call was made. A record of each call is immediately forwarded to the CGM Environmental Department. Upon receiving a complaint and/or concern the Environmental Manager or delegate prepares a response. The caller is contacted within 24 hours of the complaint being made, and notified of any action taken or proposed by Barrick.

13.1 COMPLAINTS RECORDS FOR EPL 11912

Condition M4 of EPL 11912 requires Barrick to maintain a record of all complaints made in relation to pollution arising from any activity to which EPL 11912 applies. The record will include details of the following:

- the date and time of the complaint;
- the method by which the complaint was made;

- any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- the nature of the complaint;
- the action taken by Barrick in relation to the complaint, including any follow-up contact with the complainant; and
- if no action was taken by Barrick, the reasons why no action was taken.

The record of a complaint will be kept for at least four years after the complaint was made. The record will be available for inspection by the DECCW.

Under EPL 11912, Barrick operates during operating hours, a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant. The number of the complaints line is (02) 6975 3454. The community complaints line was established on 9 December 2003 and operates 24 hours per day. On 12 and 16 December 2003, Barrick notified the public of the complaints line telephone number and how to make a complaint (see above at Section 13).

14 REPORTING

14.1 ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

An AEMR will be prepared in accordance with the requirements of Condition of Authority 26 and Consent Condition 9.2 and submitted to the Director-General for Mineral Resources and the Director-General for Planning, respectively. Consent Condition 9.2 is reproduced below:

9.2 Environmental Reporting

Annual Environmental Management Report (AEMR)

(i) The Applicant shall, throughout the life of the mine and for a period of at least five years after the completion of ore processing operations, prepare and submit an Annual Environmental Management Report (AEMR) to the Director-General. The AEMR shall review the performance of the mine against the environmental management plans (refer condition 3.2), Mining Operations Plan (refer condition 2.1), the conditions of this consent, and other licences and approvals relating to the mine. To enable ready comparison with EIS predictions, diagrams and tables, the report shall include, but not be limited to, the following matters:

- *a) an annual compliance audit of the performance of the project against conditions of this consent and statutory approvals;*
- *b) a review of the effectiveness of the environmental management of the mine in terms of DECCW, OoW, DII (Minerals), DII (Fisheries), and BSC requirements;*
- *c) results of all environmental monitoring required under this consent or other approvals, which includes interpretation and discussion by a suitably qualified person;*
- *d) from results of fauna monitoring, records of any fauna deaths due to mine operations;*
- *e) a listing of any variations obtained to approvals applicable to the subject area during the previous year;*
- *f) the outcome of the water budget for the year and the quantity of water used from water storages and Bland Creek palaeochannel borefield;*
- *g) rehabilitation report;*
- *h) environmental management targets and strategies for the next year.*

(ii) In preparing the AEMR, the Applicant shall:

- *a) consult with the Director-General during preparation of each report for any additional requirements;*
- *b) comply with any requirements of the Director-General or other relevant government agency; and*
- *c) ensure that the first report is completed and submitted within twelve (12) months of this consent, or at a date determined by the Director-General in consultation with DII (Minerals).*

(iii) The Applicant shall ensure that copies of each AEMR are submitted at the same time to the Director-General, DECCW, OoW, DII (Minerals), DSC, DII (Fisheries), the BSC and CEMCC, and be available for public information at the BSC within 14 days of submission to these authorities.

The AEMR will report any major or emergency spills that occur during the reporting period, as well as remedial measures that have been implemented to reduce the risk of recurrence.

The AEMR will be made available to the Department of Planning (DoP), OoW, DECCW, DII (Minerals), DII (Fisheries), BSC, DSC, the CEMCC and any other interested stakeholders on request.

14.2 INCIDENT REPORTING

In accordance with Consent Condition 5.4(d), *within 24 hours or the next working day of any incident or potential incident with actual or potential significant off-site impacts on people, or the biophysical environment (including wildlife), a report shall be supplied to the Director-General outlining the basic facts and mitigation measures undertaken at the time. A further detailed report shall be prepared and submitted following investigations of the causes and identification of necessary additional preventative measures. The report must be submitted to the Director-General no later than 14 days after the incident or potential accident* and include the following information:

- location of the incident;
- person's name and contact number who discovered the incident;
- the best estimate of the time the incident occurred;
- the time the person reporting the incident and/or the organisation/company they represent became aware of the incident;
- a description of the incident;
- the suspected cause of the incident;
- the environmental harm or environmental nuisance caused, threatened or suspected to be caused by the incident; and
- actions taken to prevent further similar incidents and mitigate any environmental harm or environmental nuisance caused by the incident.

In accordance with Consent Condition 5.4(d), Barrick *will maintain a register of such accidents, incidents, and potential incidents. The register shall be made available for inspection at any time by the independent hazard auditor and the Director-General.*

In accordance with EPL 11912, Barrick will notify the DECCW of incidents causing or threatening material harm to the environment as soon as practicable. Barrick will provide written details of the notification to the DECCW within seven days of the date on which the incident occurred.

Barrick will maintain a record of/and report on any unauthorised release of hazardous waste or chemicals to the environment. An example of the Barrick Incident Report Form is provided in Appendix B. The form should be completed when recording incidents occurring at the site.

14.3 COMPLIANCE REPORTING

In accordance with Consent Condition 5.4(c), Barrick will submit to the Director-General, a compliance report detailing compliance with conditions 5.4(a) and 5.4(b) including:

(i) dates of study submission, approval, commencement of construction and commissioning;
(ii) actions taken or proposed, to implement recommendations made in studies; and
(iii) responses to each requirement imposed by the Director-General under condition 5.4(f).

In accordance with Consent Condition 5.4(f), the Applicant shall comply with all reasonable requirements of the Director-General in respect of the implementation of any measures arising from the approvals given in respect of conditions 5.4(a) – 5.4(e), within such time as the Director-General may agree.

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ATTACHMENT 1

ACRONYMS

LIST OF ACRONYMS

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail
AEMR	Annual Environmental Management Report
Agvet Code	Agriculture and Veterinary Chemicals Code
AnFo	Ammonium Nitrate and Fuel Oil
AS	Australian Standard
BMP	Bushfire Management Plan
BSC	Bland Shire Council
CEMCC	Community Environmental Monitoring and Consultative Committee
DECCW	Department of Environment, Climate Change and Water
DoP	Department of Planning
EIS	Environmental Impact Statement
EPGs	Emergency Procedure Guides
EPL	Environmental Protection Licence
FFMP	Flora and Fauna Management Plan
FOR	Fuel and Oil Register
GTEPGs	Group Text Emergency Procedure Guides
HAZOP	Hazard and Operability Study
HDPE	High Density Polyethylene
HSDGR	Hazardous Substance and Dangerous Goods Register
HSIS	Hazardous Substance Information System
HWCMP	Hazardous Waste and Chemical Management Plan
I&I NSW	NSW Industry and Investment
kPa	Kilopascals
LPG	Liquefied Petroleum Gas
LMP	Land Management Plan
ML	Mining Lease
MOP	Mining Operations Plan
MREMP	Mining, Rehabilitation and Environmental Management Process
MSDS	Materials Safety Data Sheet
NOHSC	National Occupational Health and Safety Commission
NSW	New South Wales
NZS	New Zealand Standard
OHS Act	*Occupational Health and Safety Act, 2000*
PAX	Potassium Amyl Xanthate
POEO Act	*Protection of the Environment Operations Act, 1997*
PPE	Personal Protective Equipment
PRA	Preliminary Risk Assessment
RFS	Rural Fire Service
SCBA	Self-Contained Breathing Apparatus
SWMP	Site Water Management Plan

APPENDIX A

WASTE CLASSIFICATION GUIDELINES PART 1: CLASSIFYING WASTES (DECCW, 2009)

Waste Classification Guidelines

Part 1:
Classifying Waste

Department of
Environment, Climate Change and Water NSW

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Contents

Introduction **1**

Who should use this guide? 1

How to use this guide 1

Other DECCW guidance on managing waste 2

General classification principles 2

What to do once a waste has been classified 3

Step 1: Is the waste 'special waste'? **4**

Clinical and related waste 4

Asbestos waste 5

Waste tyres 5

Step 2: Is the waste 'liquid waste'? **6**

Step 3: Is the waste 'pre-classified'? **7**

Hazardous waste 7

Restricted solid waste 7

General solid waste (putrescible) 7

General solid waste (non-putrescible) 8

Step 4: Does the waste possess hazardous characteristics? **11**

Step 5: Determining a waste's classification using chemical assessment **12**

Measurable properties of waste 12

Test methods for determining SCC and TCLP 12

Classifying a waste using the SCC test 13

Classifying a waste using both the SCC test and TCLP 13

Step 6: Is the waste putrescible? **23**

Appendix I: Chemical assessment **24**

Sampling and analytical methods 24

Precision in chemical analyses 24

Who can do the chemical analysis and leaching tests? 24

Frequency of testing 25

Which contaminants should be tested for? 25

References **26**

Note: *The Environment Protection Authority (EPA) is a statutory body with specific powers under environment protection legislation, including the regulation of waste. The EPA is part of the Department of Environment, Climate Change and Water, which carries out these waste regulation activities on its behalf.*

Introduction

Classifying wastes into groups that pose similar risks to the environment and human health facilitates their management and appropriate disposal.

Six waste classes are used:

- special waste
- liquid waste
- hazardous waste
- restricted solid waste
- general solid waste (putrescible)
- general solid waste (non-putrescible).

Who should use this guide?

This guide should be used by waste generators to classify the wastes they produce.

Waste classification helps those involved in the management and treatment of waste for disposal to ensure the environmental and human health risks associated with it are managed appropriately and in accordance with the *Protection of the Environment Operations Act 1997* (the POEO Act) and its associated regulations.

Generators of waste may need to further classify their waste to meet waste tracking or dangerous goods storage and transport requirements.

Under the POEO Act, it is an offence to supply false or misleading information to another person, including information about the type, classification, characteristics, composition or quantity of the waste, among other things. Significant penalties apply (s.144AA).

How to use this guide

This guide explains the six basic steps for classifying your waste. These steps are briefly outlined below. A full explanation of each is provided later in this document.

Step 1: Establish if the waste should be classified as special waste. If the waste is special waste due to its contamination with asbestos (i.e. classified as asbestos waste), continue to classify the waste in accordance with the steps below.

Step 2: If not special waste (other than asbestos waste), establish whether the waste should be classified as liquid waste.

Step 3: If not special waste (other than asbestos waste) or liquid waste, establish whether the waste is of a type that has been 'pre-classified'. To simplify the classification process, the Environment Protection Authority (EPA) has pre-classified a number of commonly generated wastes as either hazardous, restricted solid or general solid waste (putrescible) or general solid waste (non-putrescible).

Step 4: If the waste is not special waste (other than asbestos waste), liquid waste or pre-classified, establish if it has certain hazardous characteristics and can therefore be classified as hazardous waste.

Step 5: If the waste does not possess hazardous characteristics, it needs to be chemically assessed to determine whether it is hazardous, restricted solid or general solid waste (putrescible and non-putrescible). If the waste is not chemically assessed, you must manage the waste as if it were hazardous waste.

Step 6: If the waste is chemically assessed as general solid waste, a further assessment is available to determine whether the waste is putrescible or non-putrescible. The assessment determines whether the waste is capable of significant biological transformation. If you do not wish to undertake this assessment, you must manage the waste as if it were general solid waste (putrescible).

In using this guide to classify waste, it should be noted that:

- the steps for waste classification must be applied in the order presented
- once a waste's class has been established under a particular step, do not go to the next step (unless the waste is asbestos waste).

Note: Air pollution from gaseous emissions is regulated under Part 5.4 of the POEO Act. The occupier of any premises dealing with waste must also comply with these laws.

Other DECCW guidance on managing waste

This guide assists waste generators in classifying waste to ensure it is appropriately managed, transported and disposed of. It forms part of the *Waste Classification Guidelines* issued by the Department of Environment, Climate Change and Water (DECCW). Other guidance materials that may also assist in managing waste are available from DECCW's website at www.environment.nsw.gov.au/waste/envguidlns/index.htm.

General classification principles

The following principles must be applied at all times when using the step-by-step waste classification process.

- Where practicable, it is desirable to separate a mixture of wastes before classifying them separately. For example, if waste tyres (special waste) are mixed with lead-acid batteries (hazardous waste), it would be desirable to separate the wastes so only the hazardous component needs to be managed as hazardous waste.
- If it is not possible to separate wastes, the whole waste must be classified according to the highest class of waste. For example, if clinical and related waste (special waste) is thoroughly mixed with municipal waste (general solid waste (putrescible)), the whole waste stream must be managed as special waste.
- If asbestos is mixed with other waste to form asbestos waste, the waste must continue to be assessed in accordance with these guidelines to enable the disposal of the asbestos waste at an appropriate waste facility. Asbestos waste must then be managed to meet the management and disposal requirements of both asbestos *and* the other class of waste with which it is mixed (if any).
- If liquid waste is mixed with hazardous or solid waste and retains the characteristics of liquid waste specified in Step 2, the waste remains liquid waste.

- Two or more classes of waste must not be mixed in order to reduce the concentration of chemical contaminants. Dilution of contaminants is not an acceptable waste management option.

What to do once a waste has been classified

Once a waste has been properly classified, appropriate management options for it can be considered, as required under the POEO Act and its associated regulations. DECCW's website has further guidance on managing specific wastes: visit www.environment.nsw.gov.au/waste/wastetypes.htm

A waste generator may also seek an immobilisation approval from DECCW for a waste stream or particular waste type. A waste may be able to be immobilised so that it can be safely disposed of in an appropriate landfill. Further guidance on immobilisation approvals is available from DECCW's website at www.environment.nsw.gov.au/waste/immobilisation.htm.

Step 1: Is the waste 'special waste'?

'Special waste' is a class of waste that has unique regulatory requirements. The potential environmental impacts of special waste need to be managed to minimise the risk of harm to the environment and human health.

Special waste means any of the following:

- clinical and related waste
- asbestos waste
- waste tyres.

Generators of special waste (except asbestos mixed with other waste – see below) do not need to make any further assessment of their waste if it falls within the definitions of special wastes below.

Note: Where asbestos is mixed with other waste to form asbestos waste, the generator must continue to assess the waste in accordance with the remainder of the steps in this guide. Asbestos waste can only be disposed of at a waste facility that can lawfully receive asbestos *and* the other class of waste with which it is mixed (if any).

The EPA may classify additional wastes as special waste from time to time by a notice published in the *NSW Government Gazette.* All currently gazetted special wastes are listed on DECCW's website at www.environment.nsw.gov.au/waste/wastetypes.htm.

Clinical and related waste

Clinical and related waste means:

- clinical waste, or
- cytotoxic waste, or
- pharmaceutical, drug or medicine waste, or
- sharps waste.

Clinical waste means any waste resulting from medical, nursing, dental, pharmaceutical, skin penetration or other related clinical activity, being waste that has the potential to cause injury, infection or offence, and includes waste containing any of the following:

- human tissue (other than hair, teeth and nails)
- bulk body fluids or blood
- visibly blood-stained body fluids, materials or equipment
- laboratory specimens or cultures
- animal tissue, carcasses or other waste from animals used for medical research

but does not include any such waste that has been treated by a method approved in writing by the Director-General of the Department of Health.

Cytotoxic waste means any substance contaminated with any residues or preparations that contain materials that are toxic to cells principally through their action on cell reproduction.

Pharmaceutical, drug or medicine waste means waste that has been generated by activities carried out for business or other commercial purposes and that consists of pharmaceutical or other chemical substances specified in the Poisons List made under section 8 of the *Poisons and Therapeutic Goods Act 1966.*

It does not include pharmaceutical, drug or medicine waste generated in the home.

Sharps waste means any waste collected from designated sharps waste containers used in the course of business, commercial or community service activities, being waste resulting from the use of sharps for any of the following purposes:

- human health care by health professionals and other health care providers
- medical research or work on cadavers
- veterinary care or veterinary research
- skin penetration or the injection of drugs or other substances for medical or non-medical reasons

but does not include waste that has been treated on the site where it was generated, and to a standard specified in an EPA gazettal notice.

Sharps means those things:

- that have sharp points or edges capable of cutting, piercing or penetrating the skin (such as needles, syringes with needles or surgical instruments), and
- that are designed for the purpose of cutting, piercing or penetrating the skin, and
- that have the potential to cause injury or infection.

Asbestos waste

Asbestos means the fibrous form of those mineral silicates that belong to the serpentine or amphibole groups of rock-forming minerals, including actinolite, amosite (brown asbestos), anthophyllite, chrysotile (white asbestos), crocidolite (blue asbestos) and tremolite.

Asbestos waste means any waste that contains asbestos.

Waste tyres

Waste tyres means used, rejected or unwanted tyres, including shredded tyres or tyre pieces.

Note: Waste tyres must be tracked when transported interstate but not when transported within NSW.

Step 2: Is the waste 'liquid waste'?

If you have established that the waste is not special waste, decide whether it is 'liquid waste'.

Liquid waste means any waste that:

- has an angle of repose of less than 5 degrees above horizontal, or
- becomes free-flowing at or below 60 degrees Celsius or when it is transported, or
- is generally not capable of being picked up by a spade or shovel.

If the waste meets the criteria outlined above, there is no need for any further assessment.

If the waste does not satisfy any of these criteria, move to Step 3 to classify the waste.

The waste generator may choose to separate the waste into the liquid and solid fractions so that only the solid fraction needs to be further classified in accordance with the following steps.

The EPA may classify additional wastes as liquid waste from time to time by a notice published in the *NSW Government Gazette.* All currently gazetted liquid wastes are listed on DECCW's website at www.environment.nsw.gov.au/waste/wastetypes.htm.

Step 3: Is the waste 'pre-classified'?

If the waste is neither special nor liquid waste, establish whether the waste has already been classified by the EPA. Some commonly generated wastes have been pre-classified as hazardous waste, general solid waste (putrescible) or general solid waste (non-putrescible). Wastes that have been classified by the EPA cannot be reclassified by any other party.

The following wastes have already been classified by the EPA.

Hazardous waste

The following wastes have been pre-classified by the EPA as 'hazardous waste':

- containers, having previously contained a substance of Class 1, 3, 4, 5 or 8 within the meaning of the *Transport of Dangerous Goods Code*, or a substance to which Division 6.1 of the *Transport of Dangerous Goods Code* applies, from which residues have not been removed by washing or vacuuming
- coal tar or coal tar pitch waste (being the tarry residue from the heating, processing or burning of coal or coke) comprising of more than 1% (by weight) of coal tar or coal tar pitch waste
- lead-acid or nickel-cadmium batteries (being waste generated or separately collected by activities carried out for business, commercial or community services purposes)
- lead paint waste arising otherwise than from residential premises or educational or child care institutions
- any mixture of the wastes referred to above.

The EPA may pre-classify additional wastes as hazardous waste from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted hazardous wastes are listed on DECCW's website at www.environment.nsw.gov.au/waste/wastetypes.htm.

Restricted solid waste

Currently, no wastes have been pre-classified by the EPA as 'restricted solid waste'. Restricted solid waste therefore only includes wastes assessed and classified as such in accordance with the procedures in Step 5 of this guide.

However the EPA may classify waste as restricted solid waste from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted restricted wastes will be listed on DECCW's website at www.environment.nsw.gov.au/waste/wastetypes.htm.

General solid waste (putrescible)

The following wastes have been pre-classified by the EPA as 'general solid waste (putrescible)':

- household waste that contains putrescible organics
- waste from litter bins collected by or on behalf of local councils
- manure and night soil
- disposable nappies, incontinence pads or sanitary napkins
- food waste

- animal waste
- grit or screenings from sewage treatment systems that have been dewatered so that the grit or screenings do not contain free liquids
- any mixture of the wastes referred to above.

In assessing whether waste has been pre-classified as general solid waste (putrescible), the following definitions apply:

Animal waste includes dead animals and animal parts and any mixture of dead animals and animal parts.

Food waste means waste from the manufacture, preparation, sale or consumption of food but does not include grease-trap waste.

Manure includes any mixture of manure and biodegradable animal bedding, such as straw.

Wastes may be classified as general solid waste (putrescible) by the EPA from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted general solid wastes (putrescible) are listed on DECCW's website at www.environment.nsw.gov.au/waste/wastetypes.htm

General solid waste (non-putrescible)

The following wastes have been pre-classified as 'general solid waste (non-putrescible)':

- glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal
- paper or cardboard
- household waste from municipal clean-up that does not contain food waste
- waste collected by, or on behalf of, local councils from street sweepings
- grit, sediment, litter and gross pollutants collected in, and removed from, stormwater treatment devices and/or stormwater management systems that have been dewatered so that they do not contain free liquids
- grit and screenings from potable water and water reticulation plants that have been dewatered so that they do not contain free liquids
- garden waste
- wood waste
- waste contaminated with lead (including lead paint waste) from residential premises or educational or child care institutions
- containers, previously containing dangerous goods, from which residues have been removed by washing or vacuuming
- drained oil filters (mechanically crushed), rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and do not contain free liquids
- drained motor oil containers that do not contain free liquids
- non-putrescible vegetative waste from agriculture, silviculture or horticulture
- building cavity dust waste removed from residential premises or educational or child care institutions, being waste that is packaged securely to prevent dust emissions and direct contact

- synthetic fibre waste (from materials such as fibreglass, polyesters and other plastics) being waste that is packaged securely to prevent dust emissions, but excluding asbestos waste
- virgin excavated natural material
- building and demolition waste
- asphalt waste (including asphalt resulting from road construction and waterproofing works)
- biosolids categorised as unrestricted use, or restricted use 1, 2 or 3, in accordance with the criteria set out in the *Biosolids Guidelines* (EPA 2000)
- cured concrete waste from a batch plant
- fully cured and set thermosetting polymers and fibre-reinforcing resins
- fully cured and dried residues of resins, glues, paints, coatings and inks
- any mixture of the wastes referred to above.

In assessing whether waste has been pre-classified as general solid waste (non-putrescible), the following definitions apply:

Building and demolition waste means unsegregated material (other than material containing asbestos waste) that results from:

- the demolition, erection, construction, refurbishment or alteration of buildings other than:
  - chemical works, or
  - mineral processing works, or
  - container reconditioning works, or
  - waste treatment facilities, or
- the construction, replacement, repair or alteration of infrastructure development such as roads, tunnels, sewage, water, electricity, telecommunications and airports,

and includes materials such as:

> bricks, concrete, paper, plastics, glass and metal, and timber, including unsegregated timber, that may contain timber treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP)

but does not include excavated soil (for example, soil excavated to level off a site prior to construction or to enable foundations to be laid or infrastructure to be constructed).

Garden waste means waste that consists of branches, grass, leaves, plants, loppings, tree trunks, tree stumps and similar materials, and includes any mixture of those materials.

Virgin excavated natural material means natural material (such as clay, gravel, sand, soil or rock fines):

- that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities, and
- that does not contain sulfidic ores or soils, or any other waste,

and includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the *NSW Government Gazette*.

Wood waste means sawdust, timber offcuts, wooden crates, wooden packaging, wooden pallets, wood shavings and similar materials, and includes any mixture of those materials, but does not include wood treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP).

Additional wastes may be classified as general solid waste (non-putrescible) by the EPA from time to time by a notice published in the *NSW Government Gazette*. All currently gazetted general solid wastes (non-putrescible) are listed on DECCW's website at www.environment.nsw.gov.au/waste/wastetypes.htm.

Step 4: Does the waste possess hazardous characteristics?

Waste must be classified as 'hazardous waste' if it is a dangerous good under any of the following classes or divisions of the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission 2008):

- Class 1: Explosives
- Class 2: Gases (compressed, liquefied or dissolved under pressure)
- Division 4.1: Flammable solids (excluding garden waste, natural organic fibrous material and wood waste, and all physical forms of carbon such as activated carbon and graphite)
- Division 4.2: Substances liable to spontaneous combustion (excluding garden waste, natural organic fibrous material and wood waste, and all physical forms of carbon such as activated carbon and graphite)
- Division 4.3: Substances which when in contact with water emit flammable gases
- Class 5: Oxidising agents and organic peroxides
- Division 6.1: Toxic substances
- Class 8: Corrosive substances.

For further information on the test methods to establish whether the waste exhibits any of the above characteristics, please refer to the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission 2008).

Step 5: Determining a waste's classification using chemical assessment

Waste generators should chemically assess their waste to determine its classification where:

- the waste is not special waste, liquid waste, a waste pre-classified by the EPA or a waste possessing hazardous characteristics, and
- the composition of the waste is not known.

Chemical assessment may not be necessary where the waste generator knows the processes which produced the waste and the maximum possible levels of contaminants it contains. The generator must be certain that the waste can be classified without SCC and/or TCLP testing (see below). In these cases, the generator must ensure that the reasons for not undertaking the chemical assessment are documented and records of the decision retained for three years.

Where waste generators are unsure of the appropriate sampling or analytical methods for a particular waste, they are strongly encouraged to seek expert help, either from a laboratory that specialises in waste analysis or someone specialising in waste management issues, or both.

The chemical assessment process is based around the waste's potential to release chemical contaminants into the environment through contact with liquids, mainly water, which leads to the production of leachates.

Information on sampling and analytical methods is provided in Appendix I.

Where a waste generator does not wish to undertake this chemical assessment, the waste must be managed as if it were hazardous waste, which cannot be disposed of and must be treated.

Measurable properties of waste

The two measurable properties of chemical contaminants used to classify waste are:

- the specific contaminant concentration (SCC) of any chemical contaminant in the waste, expressed as milligrams per kilogram (mg/kg)
- the leachable concentration of any chemical contaminant using the toxicity characteristics leaching procedure (TCLP), expressed as milligrams per litre (mg/L).

Test methods for determining SCC and TCLP

The reference test methods for determining both the SCC and TCLP values are as described in the United States Environmental Protection Agency's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (USEPA 1986) and Updates I, II, IIIA, IIIB, IVA and IVB, available at www.epa.gov/epaoswer/hazwaste/test/sw846.htm.

The following procedures for leachate preparation are recommended:

- *AS 4439.1–1999: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Preliminary Assessment* (Australian Standard 1999b)
- *AS 4439.3–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Bottle Leaching Procedure* (Australian Standard 1997a)
- *AS 4439.2–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Zero Headspace Procedure* (Australian Standard 1997b).

The standard pH for the leaching solutions used must be either 4.93 ± 0.05 if the pH of the waste sample is less than 5.0, or 2.88 ± 0.05 if the pH of the waste sample is greater than 5.0.

To determine the pH of the waste sample, use the test method specified in Clause 7.5 (Selection of Leaching Fluid) of *AS 4439.3–1997* (above).

In some instances the EPA may permit the use of leachates with a pH different from those specified above. EPA authorisation to use an alternative must be sought in writing and will only be provided with adequate justification for the proposed variation. An example might be the testing of a non-putrescible waste for disposal into a monofill or monocell which it can be shown will not be penetrated by acidic leachate or groundwater. For further assistance, contact DECCW's Waste Management Section.

Classifying a waste using the SCC test

The first test that should be used to chemically assess waste is the specific contaminant concentration (SCC) test.

The SCC test acts as an initial screening test for the classification of a waste. Based on SCC alone, the test value for each contaminant must be less than or equal to the contaminant threshold (CT) value specified for that contaminant in Table 1 for it to fall into the following classes:

- general solid waste ≤ CT1
- restricted solid waste ≤ CT2.

If a waste's SCC test value exceeds the contaminant threshold value set for general solid waste (CT1), further assessment using the TCLP test may be used.

Where the contaminant threshold value set for restricted solid waste (CT2) is exceeded, a TCLP test is necessary to determine the leachable concentration and class of waste.

Note: For waste assessment and classification, it is recommended that the sample mean, the sample standard deviation and the 95% upper confidence limit (UCL) of the mean concentration is calculated for each contaminant to ensure that the 95% UCL for the mean concentration is less than or equal to the CT limit value specified for that contaminant.

Classifying a waste using both the SCC test and TCLP

To establish the waste's classification using both SCC and TCLP, the test values for each chemical contaminant must be compared with the threshold values set in Table 2.

Classification	SCC value	TCLP value
General solid waste	≤ SCC1	≤ TCLP1
Restricted solid waste	≤ SCC2	≤ TCLP2
Hazardous waste	> SCC2	> TCLP2

If any of the SCC or TCLP threshold values specified in Table 2 are exceeded for general solid waste, the waste must be classified as restricted solid waste. If any of the SCC or TCLP threshold values specified in Table 2 are exceeded for restricted solid waste, the waste must be classified as hazardous waste. Detailed interpretative guidance regarding the use of both SCC and TCLP values to establish a waste's classification is provided in Table 3.

It is important to note that wherever an EPA approval has been given for the immobilisation of the contaminant(s), the waste can be classified according to its TCLP test results alone.

Note: For waste assessment and classification, it is recommended that the sample mean, the sample standard deviation and the 95% UCL of the mean concentration is calculated for each contaminant to ensure that the 95% UCL for the mean concentration is less than or equal to the SCC or TCLP limit value specified for that contaminant.

Table 1: Contaminant threshold values (CT1 & CT2) for classifying waste by chemical assessment without the leaching (TCLP) test

For disposal requirements for organic and inorganic chemical contaminants not listed below, contact DECCW. Aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have not been listed with values in this table and need not be tested for.

	Maximum values of *specific contaminant concentration* (SCC) for classification without TCLP		
	General solid waste[1]	**Restricted solid waste**	
Contaminant	**CT1 (mg/kg)**	**CT2 (mg/kg)**	**CAS Registry Number**
Arsenic	100	400	
Benzene	10	40	71-43-2
Benzo(a)pyrene[2]	0.8	3.2	50-32-8
Beryllium	20	80	
Cadmium	20	80	
Carbon tetrachloride	10	40	56-23-5
Chlorobenzene	2000	8000	108-90-7
Chloroform	120	480	67-66-3
Chlorpyrifos	4	16	2921-88-2
Chromium (VI)[3]	100	400	
m-Cresol	4000	16000	108-39-4
o-Cresol	4000	16000	95-48-7
p-Cresol	4000	16000	106-44-5
Cresol (total)	4000	16000	1319-77-3
Cyanide (amenable)[4]	70	280	
Cyanide (total)	320	1280	
2,4-D	200	800	94-75-7
1,2-Dichlorobenzene	86	344	95-50-1
1,4-Dichlorobenzene	150	600	106-46-7
1,2-Dichloroethane	10	40	107-06-2
1,1-Dichloroethylene	14	56	75-35-4
Dichloromethane	172	688	75-09-2
2,4-Dinitrotoluene	2.6	10.4	121-14-2
Endosulfan[5]	60	240	See below[5]
Ethylbenzene	600	2400	100-41-4
Fluoride	3000	12000	
Fluroxypyr	40	160	69377-81-7

Contaminant	Maximum values of *specific contaminant concentration* (SCC) for classification without TCLP		CAS Registry Number
	General solid waste[1]	Restricted solid waste	
	CT1 (mg/kg)	CT2 (mg/kg)	
Lead	100	400	
Mercury	4	16	
Methyl ethyl ketone	4000	16000	78-93-3
Moderately harmful pesticides[6] (total)	N/A[7]	N/A[7]	See below[6]
Molybdenum	100	400	
Nickel	40	160	
Nitrobenzene	40	160	98-95-3
C6-C9 petroleum hydrocarbons	N/A[7]	N/A[7]	
C10-C36 petroleum hydrocarbons	N/A[7]	N/A[7]	
Phenol (non-halogenated)	288	1152	108-95-2
Picloram	60	240	1918-02-1
Plasticiser compounds[8]	20	80	See below[8]
Polychlorinated biphenyls	N/A[7]	N/A[7]	1336-36-3
Polycyclic aromatic hydrocarbons (total)	N/A[7]	N/A[7]	
Scheduled chemicals	N/A[7]	N/A[7]	
Selenium	20	80	
Silver	100	400	
Styrene (vinyl benzene)	60	240	100-42-5
Tebuconazole	128	512	107534-96-3
1,2,3,4-Tetrachlorobenzene	10	40	634-66-2
1,1,1,2-Tetrachloroethane	200	800	630-20-6
1,1,2,2-Tetrachloroethane	26	104	79-34-5
Tetrachloroethylene	14	56	127-18-4
Toluene	288	1152	108-88-3
1,1,1-Trichloroethane	600	2400	71-55-6
1,1,2-Trichloroethane	24	96	79-00-5
Trichloroethylene	10	40	79-01-6
2,4,5-Trichlorophenol	8000	32000	95-95-4
2,4,6-Trichlorophenol	40	160	88-06-2

	Maximum values of *specific contaminant concentration* (SCC) for classification without TCLP		
	General solid waste[1]	Restricted solid waste	
Contaminant	CT1 (mg/kg)	CT2 (mg/kg)	CAS Registry Number
Triclopyr	40	160	55335-06-3
Vinyl chloride	4	16	75-01-4
Xylenes (total)	1000	4000	1330-20-7

Notes

1. Values are the same for both general solid waste (putrescible) and general solid waste (non-putrescible).

2. There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.

3. These limits apply to chromium in the +6 oxidation state only.

4. Analysis for cyanide (amenable) is the established method for assessing potentially leachable cyanide. DECCW may consider other methods if it can be demonstrated that these methods yield the same information.

5. Endosulfan (CAS Registry Number 115-29-7) means the total of Endosulfan I (CAS Registry Number 959-98-8), Endosulfan II (CAS Registry Number 891-86-1) and Endosulfan sulfate (CAS Registry Number 1031-07-8).

6. The following moderately harmful pesticides (CAS Registry Number) are to be included in the total values specified:

   Atrazine (1912-24-9), Azoxystrobin (131860-33-8), Bifenthrin (82657-04-3), Brodifacoum (56073-10-0), Carboxin (5234-68-4), Copper naphthenate (1338-02-9), Cyfluthrin (68359-37-5), Cyhalothrin (68085-85-8), Cypermethrin (52315-07-08), Deltamethrin (52918-63-5), Dichlofluanid (1085-98-9), Dichlorvos (62-73-7), Difenoconazole (119446-68-3), Dimethoate (60-51-5), Diquat dibromide (85-00-7), Emamectin benzoate (137515-75-4 & 155569-91-8), Ethion (563-12-2), Fenthion (55-38-9), Fenitrothion (122-14-5), Fipronil (120068-37-3), Fluazifop-P-butyl (79241-46-6), Fludioxonil (131341-86-1), Glyphosate (1071-83-6), Imidacloprid (138261-41-3), Indoxacarb (173584-44-6), Malathion (Maldison) (121-75-5), Metalaxyl (57837-19-1), Metalaxyl-M (70630-17-0), Methidathion (950-37-8), 3-Methyl-4-chlorophenol (59-50-7), Methyl chlorpyrifos (5598-13-0), N-Methyl pyrrolidone (872-50-4), 2-octylthiazol-3-one (26530-20-1), Oxyfluorfen (42874-03-3), Paraquat dichloride (1910-42-5), Parathion methyl (298-00-0), Permethrin (52645-53-1), Profenofos (41198-08-7), Prometryn (7287-19-6), Propargite (2312-35-8), Pentachloronitrobenzene (Quintozene) (82-68-8), Simazine (122-34-9), Thiabendazole (148-79-8),Thiamethoxam (153719-23-4), Thiodicarb (59669-26-0) and Thiram (137-26-8).

7. N/A means not applicable, because these contaminants are only assessed using SCC - see Table 2 for SCC criteria.

8. Plasticiser compounds means the total of di-2-ethyl hexyl phthalate (CAS Registry Number 117-81-7) and di-2-ethyl hexyl adipate (CAS Registry Number 103-23-1) contained within a waste.

Table 2: Leachable concentration (TCLP) and specific contaminant concentration (SCC) values for classifying waste by chemical assessment

For disposal requirements for organic and inorganic chemical contaminants not listed below, contact DECCW. Aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have not been listed with values in this table and need not be tested for.

	Maximum values for *leachable concentration* and *specific contaminant concentration* when used together				
	General solid waste[1]		Restricted solid waste		
Contaminant	Leachable concentration TCLP1 (mg/L)	Specific contaminant concentration SCC1 (mg/kg)	Leachable concentration TCLP2 (mg/L)	Specific contaminant concentration SCC2 (mg/kg)	CAS Registry Number
Arsenic	5.0[2]	500	20	2000	
Benzene	0.5[2]	18	2	72	71-43-2
Benzo(a)pyrene[3]	0.04[4]	10	0.16	23	50-32-8
Beryllium	1.0[5]	100	4	400	
Cadmium	1.0[2]	100	4	400	
Carbon tetrachloride	0.5[2]	18	2	72	56-23-5
Chlorobenzene	100[2]	3600	400	14400	108-90-7
Chloroform	6[2]	216	24	864	67-66-3
Chlorpyrifos	0.2	7.5	0.8	30	2921-88-2
Chromium (VI)[6]	5[2]	1900	20	7600	
m-Cresol	200[2]	7200	800	28800	108-39-4
o-Cresol	200[2]	7200	800	28800	95-48-7
p-Cresol	200[2]	7200	800	28800	106-44-5
Cresol (total)	200[2]	7200	800	28800	1319-77-3
Cyanide (amenable)[7, 8]	3.5[7]	300	14	1200	
Cyanide (total)[7]	16[7]	5900	64	23600	
2,4-D	10[2]	360	40	1440	94-75-7
1,2-Dichlorobenzene	4.3[2]	155	17.2	620	95-50-1
1,4-Dichlorobenzene	7.5[2]	270	30	1080	106-46-7
1,2-Dichloroethane	0.5[2]	18	2	72	107-06-2
1,1-Dichloro-ethylene	0.7[2]	25	2.8	100	75-35-4
Dichloromethane	8.6[2]	310	34.4	1240	75-09-2

Contaminant	Maximum values for *leachable concentration* and *specific contaminant concentration* when used together				CAS Registry Number
	General solid waste[1]		Restricted solid waste		
	Leachable concentration	Specific contaminant concentration	Leachable concentration	Specific contaminant concentration	
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	
2,4-Dinitrotoluene	0.13[2]	4.68	0.52	18.7	121-14-2
Endosulfan[9]	3	108	12	432	See below[9]
Ethylbenzene	30[10]	1080	120	4320	100-41-4
Fluoride	150[10]	10000	600	40000	
Fluroxypyr	2	75	8	300	69377-81-7
Lead	5[2]	1500	20	6000	
Mercury	0.2[2]	50	0.8	200	
Methyl ethyl ketone	200[2]	7200	800	28800	78-93-3
Moderately harmful pesticides[11](total)	N/A[12]	250	N/A[12]	1000	See below[11]
Molybdenum	5[10]	1000	20	4000	
Nickel	2[10]	1050	8	4200	
Nitrobenzene	2[2]	72	8	288	98-95-3
C6-C9 petroleum hydrocarbons[13]	N/A[12]	650	N/A[12]	2600	
C10-C36 petroleum hydrocarbons[13]	N/A[12]	10000	N/A[12]	40000	
Phenol (non-halogenated)	14.4[14]	518	57.6	2073	108-95-2
Picloram	3	110	12	440	1918-02-1
Plasticiser compounds[15]	1	600	4	2400	See below[15]
Polychlorinated biphenyls[12]	N/A[12]	< 50	N/A[12]	< 50	1336-36-3
Polycyclic aromatic hydrocarbons (total)[16]	N/A[12]	200	N/A[12]	800	
Scheduled chemicals[17]	N/A[12]	< 50	N/A[12]	< 50	See below[17]
Selenium	1[2]	50	4	200	

	Maximum values for *leachable concentration* and *specific contaminant concentration* when used together				
	General solid waste[1]		Restricted solid waste		
Contaminant	Leachable concentration TCLP1 (mg/L)	Specific contaminant concentration SCC1 (mg/kg)	Leachable concentration TCLP2 (mg/L)	Specific contaminant concentration SCC2 (mg/kg)	CAS Registry Number
Silver	5.0[2]	180	20	720	
Styrene (vinyl benzene)	3[10]	108	12	432	100-42-5
Tebuconazole	6.4	230	25.6	920	107534-96-3
1,2,3,4-Tetrachloro-benzene	0.5	18	2	72	634-66-2
1,1,1,2-Tetrachloro-ethane	10[2]	360	40	1440	630-20-6
1,1,2,2-Tetrachloro-ethane	1.3[2]	46.8	5.2	187.2	79-34-5
Tetrachloro-ethylene	0.7[2]	25.2	2.8	100.8	127-18-4
Toluene	14.4[14]	518	57.6	2073	108-88-3
1,1,1-Trichloroethane	30[2]	1080	120	4320	71-55-6
1,1,2-Trichloroethane	1.2[2]	43.2	4.8	172.8	79-00-5
Trichloroethylene	0.5[2]	18	2	72	79-01-6
2,4,5-Trichlorophenol	400[2]	14400	1600	57600	95-95-4
2,4,6-Trichlorophenol	2[2]	72	8	288	88-06-2
Triclopyr	2	75	8	300	55335-06-3
Vinyl chloride	0.2[2]	7.2	0.8	28.8	75-01-4
Xylenes (total)	50[18]	1800	200	7200	1330-20-7

Notes

1. Values are the same for general solid waste (putrescible) and general solid waste (non-putrescible).

2. See *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule* (USEPA 1990) for TCLP levels.

3. There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.

4. Calculated from *Hazardous Waste: Identification and Listing – Proposed Rule* (USEPA 1995)

5. Calculated from 'Beryllium' in *The Health Risk Assessment and Management of Contaminated Sites* (DiMarco & Buckett 1996)

6. These limits apply to chromium in the +6 oxidation state only.

7. Taken from the *Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil: Proposed Rule* (USEPA 1993)

8. Analysis for cyanide (amenable) is the established method used to assess the potentially leachable cyanide. DECCW may consider other methods if it can be demonstrated that these methods yield the same information.

9. Endosulfan (CAS Registry Number 115-29-7) means the total of Endosulfan I (CAS Registry Number 959-98-8), Endosulfan II (CAS Registry Number 891-86-1) and Endosulfan sulfate (CAS Registry Number 1031-07-8).

10. Calculated from *Australian Drinking Water Guidelines* (NHMRC 1994)

11. The following moderately harmful pesticides (CAS Registry Number) are to be included in the total values specified:

    Atrazine (1912-24-9), Azoxystrobin (131860-33-8), Bifenthrin (82657-04-3), Brodifacoum (56073-10-0), Carboxin (5234-68-4), Copper naphthenate (1338-02-9), Cyfluthrin (68359-37-5), Cyhalothrin (68085-85-8), Cypermethrin (52315-07-08), Deltamethrin (52918-63-5), Dichlofluanid (1085-98-9), Dichlorvos (62-73-7), Difenoconazole (119446-68-3), Dimethoate (60-51-5), Diquat dibromide (85-00-7), Emamectin benzoate (137515-75-4 & 155569-91-8), Ethion (563-12-2), Fenthion (55-38-9), Fenitrothion (122-14-5), Fipronil (120068-37-3), Fluazifop-P-butyl (79241-46-6), Fludioxonil (131341-86-1), Glyphosate (1071-83-6), Imidacloprid (138261-41-3), Indoxacarb (173584-44-6), Malathion (Maldison) (121-75-5), Metalaxyl (57837-19-1), Metalaxyl-M (70630-17-0), Methidathion (950-37-8), 3-Methyl-4-chlorophenol (59-50-7), Methyl chlorpyrifos (5598-13-0), N-Methyl pyrrolidone (872-50-4), 2-octylthiazol-3-one (26530-20-1), Oxyfluorfen (42874-03-3), Paraquat dichloride (1910-42-5), Parathion methyl (298-00-0), Permethrin (52645-53-1), Profenofos (41198-08-7), Prometryn (7287-19-6), Propargite (2312-35-8), Pentachloronitrobenzene (Quintozene) (82-68-8), Simazine (122-34-9), Thiabendazole (148-79-8),Thiamethoxam (153719-23-4), Thiodicarb (59669-26-0) and Thiram (137-26-8).

12. No TCLP analysis is required. Moderately harmful pesticides, petroleum hydrocarbons, polychlorinated biphenyls, polycyclic aromatic hydrocarbons and scheduled chemicals are assessed using SCC1 and SCC2.

13. Approximate range of petroleum hydrocarbon fractions: petrol C6-C9, kerosene C10-C18, diesel C12-C18, and lubricating oils above C18. Laboratory results are reported as four different fractions: C6-C9, C10-C14, C15-C28 and C29-C36. The results of total petroleum hydrocarbons (C10-C36) analyses are reported as a sum of the relevant three fractions. Please note that hydrocarbons are defined as molecules that only contain carbon and hydrogen atoms. Prior to TPH (C10-C36) analysis, cleanup may be necessary to remove non-petroleum hydrocarbon compounds. Where the presence of other materials that will interfere with the analysis may be present, such as oils and fats from food sources, you are advised to treat the extract that has been solvent exchanged to hexane with silica gel as described in *USEPA Method 1664A* (USEPA 1999).

14. Proposed level for phenol and toluene in *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule* (USEPA 1990)

15. Plasticiser compounds means the total of di-2-ethyl hexyl phthalate (CAS Registry Number 117-81-7) and di-2-ethyl hexyl adipate (CAS Registry Number 103-23-1) contained within a waste.

16. The following polycyclic aromatic hydrocarbons (CAS number) are assessed as the total concentration of 16 USEPA Priority Pollutant PAHs, as follows:

Polycyclic aromatic hydrocarbons (total)			
PAH name	**CAS Registry Number**	**PAH name**	**CAS Registry Number**
Acenaphthene	83-32-9	Chrysene	218-01-9
Acenaphthylene	208-96-8	Dibenzo(a,h)anthracene	53-70-3
Anthracene	120-12-7	Fluoranthene	206-44-0
Benzo(a)anthracene	56-55-3	Fluorene	86-73-7
Benzo(a)pyrene	50-32-8	Indeno(1,2,3-cd)pyrene	193-39-5
Benzo(b)fluoranthene	205-99-2	Naphthalene	91-20-3
Benzo(ghi)perylene	191-24-2	Phenanthrene	85-01-8
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0

17. The following Scheduled Chemicals (CAS Registry Number) are to be included in the total values specified:

Aldrin (309-00-2), Alpha-BHC (319-84-6), Beta-BHC (319-85-7), Gamma-BHC (Lindane) (58-89-9), Delta-BHC (319-86-8), Chlordane (57-74-9), DDD (72-54-8), DDE (72-55-9), DDT (50-29-3), Dieldrin (60-57-1), Endrin (72-20-8), Endrin aldehyde (7421-93-4), Heptachlor (76-44-8), Heptachlor epoxide (1024-57-3), Hexachlorobenzene (118-74-1), Hexachlorophene (70-30-4), Isodrin (465-73-6), Pentachlorobenzene (608-93-5), Pentachloronitrobenzene (82-68-8), Pentachlorophenol (87-86-5), 1,2,4,5-Tetrachlorobenzene (95-94-3), 2,3,4,6 Tetrachlorophenol (58-90-2), 1,2,4-Trichlorobenzene (120-82-1), 2,4,5-Trichlorophenoxyacetic acid, salts and esters (93-76-5).

18. Calculated from *Guidelines for Drinking Water Quality* (WHO 1993)

Table 3: Summary of criteria for chemical assessment to determine waste classification

Waste classification[1]	Criteria[2] for classification by chemical assessment (any of the alternative options given)	Comments
General solid waste	1. SCC test values ≤ CT1	TCLP test not required
	2. TCLP test values ≤ TCLP1 and SCC test values ≤ SCC1	
	3. TCLP test values ≤ TCLP1 and SCC test values > SCC1 and DECCW approves immobilisation[3]	Without DECCW approval of immobilisation, classify as restricted solid or hazardous (as applicable)
Restricted solid waste	1. SCC test values ≤ CT2	TCLP test not required
	2. TCLP1 < TCLP test values ≤ TCLP2 and SCC test values ≤ SCC2	
	3.TCLP test values ≤ TCLP2 and SCC1 < SCC test values ≤ SCC2	
	4. TCLP1 < TCLP test values ≤ TCLP2 and SCC test values > SCC2 and DECCW approves immobilisation[3]	Without DECCW approval of immobilisation, classify as hazardous
Hazardous waste	1. TCLP test values > TCLP 2	
	2. TCLP test values ≤ TCLP2 and SCC test values > SCC2 and no DECCW approval for immobilisation	

Notes:

1. See also the general waste classification principles on page 2 for other criteria that must be satisfied before the waste can be classified.
2. These criteria apply to each toxic and ecotoxic contaminant present in the waste (see Tables 1 and 2).
3. In certain cases DECCW will consider specific conditions, such as segregation of the waste from all other types of waste in a monofill or monocell in order to achieve a greater margin of safety against a possible failure of the immobilisation in the future. Information about the construction and operation of a monofill/monocell is available in the *Draft Environmental Guidelines for Industrial Waste Landfilling* (EPA 1998).

Step 6: Is the waste putrescible?

Where chemical assessment of a waste results in classification of the waste as general solid waste, further assessment may be undertaken to determine whether the waste can be classified as 'general solid waste (putrescible)' or 'general solid waste (non-putrescible)'.

General solid waste may only be classified as non-putrescible if:

- it does not readily decay under standard conditions, does not emit offensive odours and does not attract vermin or other vectors (such as flies, birds and rodents), or
- has a specific oxygen uptake of less than 1.5 milligrams O_2 per hour per gram of total organic solids at 20 degrees Celsius, or
- is such that, during composting (for the purpose of stabilisation), the mass of volatile solids in the organic waste has been reduced by at least 38%, or
- has been treated by composting for at least 14 days, during which time the temperature of the organic waste must have been greater than 40 degrees Celsius and the average temperature greater than 45 degrees Celsius, or
- in the case of biologically treated putrescible wastes, the temperature of the organics fraction does not exceed a self-heating temperature of 40 degrees Celsius, when tested in accordance with the test method in Appendix K of *AS 4454–2003: Composts, Soils, Conditioners and Mulches* (Australian Standard 2003a), or
- has been subjected to and has met the requirements of alternative tests approved by the EPA from time to time by notice published in the *NSW Government Gazette* and published on DECCW's website.

Non-putrescible materials typically do not:

- readily decay under standard conditions
- emit offensive odours
- attract vermin or other vectors (such as flies, birds and rodents).

Wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forestry and crop materials, and natural fibrous organic and vegetative materials.

Note: Output from Alternative Waste Technology facilities (AWTs) that requires disposal must be assessed in accordance with the above to determine its putrescibility.

Where a waste generator does not wish to undertake further assessment of the waste in accordance with this step, the waste must be classified as 'general solid waste (putrescible)'.

Appendix 1: Chemical assessment

Sampling and analytical methods

Sampling identifies the average levels of contaminants in the waste being assessed. While the following is provided as a guide, it is not possible to recommend sampling methods for all waste types. Appropriate sampling depends on how consistent any tested property is throughout a batch of waste. It is the waste generator's responsibility to ensure that the sampling and analytical methods used are appropriate for the contaminants they are testing for.

Where the property being tested for is highly consistent throughout the waste, sampling is relatively straightforward and useful guidance can be found in the following Australian Standards:

- *AS 1199.0–2003: Sampling Procedures for Inspection by Attributes – Introduction to the ISO2859 Attribute Sampling System* (Australian Standard 2003b)
- *AS 1141.0–1999: Methods for Sampling and Testing Aggregates* (Australian Standard 1999a) is useful for sampling wastes such as aggregates, foundry sand, furnace slag or mining waste.

It is more difficult to accurately sample waste that consists of many different types of waste materials or has chemical contaminants that are not distributed evenly throughout the batch. In such situations, keeping different waste types separate, or separating portions of waste that contain high levels of contaminants from the rest, can be of great benefit.

If unsure of the appropriate sampling or analytical methods for a particular waste, waste generators are strongly encouraged to seek expert help, either from a laboratory that specialises in waste analysis or an appropriately qualified person specialising in such waste management issues, or both. Since most incorrect chemical assessments of waste are due to poor sampling, it is essential that the sampling regime and analytical method used ensure the results are representative of all components and their variability in the waste.

Precision in chemical analyses

It is important that the test methods and instruments used in analysing a waste are capable of measuring the concentration of each chemical contaminant with enough confidence to assure correct classification.

It is recommended that the upper limit of the combined confidence interval of sampling and analysis (at a probability of 95%) is used for comparison with the maximum values specified in Tables 1 and 2. This approach should give the assessor confidence that a correct classification has been made.

Who can do the chemical analysis and leaching tests?

It is strongly recommended that analytical laboratories accredited by the National Association of Testing Authorities (NATA) are used to perform these analyses and tests. If accredited laboratories are not available locally, contact DECCW's Waste Management Section for advice.

Frequency of testing

There may be situations in which frequent testing of the waste for an initial period establishes that the characteristics of the waste are consistent enough to give the waste generator confidence to reduce the frequency of testing.

On the other hand, some waste streams may show such large variations in properties that every load of waste would need to be tested before classification.

It is the responsibility of the waste generator to ensure that frequency of testing provides representative samples for all contaminants in that waste.

Which contaminants should be tested for?

Tables 1 and 2 in this guidance note list the chemical contaminants that are used in the classification of wastes. If a waste contains chemical contaminants that are not in these tables, contact DECCW's Waste Management Section for advice.

References

Australian Standard 1997a, *AS 4439.3–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Bottle Leaching Procedure*, Standards Australia, Sydney

Australian Standard 1997b, *AS 4439.2–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Zero Headspace Procedure*, Standards Australia, Sydney

Australian Standard 1999a, *AS 1141.0–1999: Methods for Sampling and Testing Aggregate*, Standards Australia, Sydney

Australian Standard 1999b, *AS 4439.1–1999: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Preliminary Assessment*, Standards Australia, Sydney

Australian Standard 2003a, *AS 4454–2003: Composts, Soils, Conditioners and Mulches*, Standards Australia Sydney

Australian Standard 2003b, *AS 1199.0–2003: Sampling Procedures for Inspection by Attributes – Introduction to the ISO2859 Attribute Sampling System*, Standards Australia Sydney

DiMarco, P and Buckett, KJ 1996, 'Beryllium' in A Langley, B Markey and H Hill (eds), *The Health Risk Assessment and Management of Contaminated Sites*, Proceedings of the Third National Workshop on the Health Risk Assessment and Management of Contaminated Sites, Contaminated Sites Monograph Series No. 5, South Australian Health Commission, Adelaide

EPA 1998, *Draft Environmental Guidelines for Industrial Waste Landfilling*, NSW Environment Protection Authority, Sydney

EPA 2000, *Environmental Guidelines: Use and Disposal of Biosolids Products*, NSW Environment Protection Authority, Sydney

National Transport Commission 2008, *Australian Code for the Transport of Dangerous Goods by Road and Rail*, 7th edition, Melbourne

NHMRC 1994, *Australian Drinking Water Guidelines*, National Health and Medical Research Council, Canberra

USEPA 1986, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW–846, Third Edition, 1986 and Updates I, II, IIIA, IIIB, IVA and IVB, Office of Solid Waste and Emergency Response, United States Environmental Protection Agency, available at www.epa.gov/epaoswer/hazwaste/test/sw846.htm

USEPA 1990, *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule*, United States Environmental Protection Agency, Federal Register, Vol. 55, No. 61, Washington DC

USEPA 1993, *Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil – Proposed Rule*, United States Environmental Protection Agency, Federal Register, Vol. 58, No. 176, 48103–48106, Washington DC

USEPA 1995, *Hazardous Waste: Identification and Listing – Proposed Rule,* United States Environmental Protection Agency, Federal Register, Vol. 60, No. 245, 66445, Washington DC

USEPA 1999, *USEPA Method 1664A: n-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated n-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry*, Revision A, United States Environmental Protection Agency, Washington DC

WHO 1993, *Guidelines for Drinking Water Quality*, World Health Organisation, Geneva

APPENDIX B

BARRICK INCIDENT REPORT FORM

Incident Number: 5997
RIMS Number

Cowal Gold Mine Incident Report

(Use ball point pen only & complete in block letters)

BARRICK

PART A: INITIAL REPORT

1. Type (Tick box)

- ☐ Hazard *(part A mandatory)*
- ☐ Near Miss *(part A mandatory)*
  - ☐ High Potential (to be reported to Regional VP and EHS Manager within 24 hrs)
- ☐ Injury or illness *(part A & C mandatory)*
  - ☐ Fatality ☐ LTI ☐ RWI ☐ MTI ☐ MI
- ☐ Environment *(part A & B mandatory)*
- ☐ Community Contact *(part A mandatory)*
- ☐ Production Loss *(part A mandatory)*
- ☐ Property Damage *(part A mandatory)* *Estimated Cost of Loss or Damage* $ .....
- ☐ Other (specify) *(part A mandatory)*
- ☐ Theft *(part A mandatory)* *Estimated Cost of Theft* $ .....

2. Event Timing	Date of event (dd/mm/yy) / /	Time of event (24hr clock) :	Date of Report (dd/mm/yy) / /	Time of Report (24hr clock) :

3. Reported By	Surname	First Name(s)	Signature	Telephone

4. Location	Location	Work Area

5. Person Involved	Surname	First Name	Employee Number	Gender (M/F)
	Department	Occupation		
	☐ Full Time ☐ Part Time ☐ Casual	☐ Direct Employee ☐ Contractor ☐ Other	Company Name: Specify:	

6. Shift Details	Type: ☐ Day ☐ Night	Length: ☐ 10hrs ☐ 12hrs ☐ Other (specify):	Roster Type: (ie. 2 weeks on / 1 week off)	Days into Roster (ie. Day 3)	Shift Start Time (24hr clock) : hrs

7. Equipment or Property Involved	

8. Witnesses (Attach Statements as required)	Name	Name	Name	Name

9. Brief Description (Attach sketch if required)

Brief description of what happened, injuries or any equipment / environmental damage sustained, what the person was doing at the time (attach extra pages as necessary).

10. Risk Assessment	Consequence:	Likelihood:	Risk Rating:
	Further investigation required: ☐ Incident Report Form ☐ TapRoot		

11. Immediate Actions Taken

PART B: ENVIRONMENTAL DETAILS

12. Details	☐ Spillage or release	Type	From	To
	Duration	Volume	Area	
	☐ Wildlife Mortality ☐ Noise	☐ Vegetation Damage ☐ Dust	☐ Community / Archeological ☐ Vibration	☐ Regulator ☐ Other (specify)

13. Further Details and Comments

PART C: FIRST AID TREATMENT *(if more than one person injured/ill, complete Part C for each)*

14. Injury / Illness Type (tick box)

☐ Abrasions ☐ Crush ☐ Electric Shock ☐ Laceration ☐ Sprain
☐ Asphyxia ☐ Dislocation ☐ Fracture ☐ Loss of Consciousness ☐ Strain
☐ Bruising ☐ Effects of Chemicals ☐ Illness (specify) ☐ Nausea ☐ Other (specify)
☐ Burns ☐ Effects of Exposure ☐ Puncture Wound

	Left	Right
☐ Skull/Head		
☐ Face		
☐ Ear →	☐	☐
☐ Eye →	☐	☐
☐ Neck		
☐ Back →	Lower ☐	Upper ☐
☐ Shoulder		
☐ Upper Arm →		
☐ Lower Arm →		
☐ Wrist →		
☐ Hand →		
☐ Finger/Thumb → Finger No.		
☐ Hip →		
☐ Upper Leg →		
☐ Lower Leg →		
☐ Ankle →		
☐ Foot →		
☐ Toes → Toe No.		
☐ Chest		
☐ Abdomen		
☐ Groin		
☐ Other (specify)		

15. First Aid Treatment Provided

Record any observations and treatment provided, as well as any advice given to the patient.

16. Outcome

☐ Return to normal duties ☐ Returned to alternate duties (Notification to Return to Work Coordinator Required)
☐ Referred for doctor/hospital/medical treatment (Notification to Return to Work Coordinator Required) ☐ Follow-up first aid treatment required

Record the alternate duties that patient will return to and/or outline the follow-up first aid treatment required.

17. First Aid Provider

Name: | Signature: | Date: (dd/mm/yy) / /

PART D: INVESTIGATION (To be completed for all incidents that are not classified as a TapRoot)

18. Investigation Team

Name | Name | Name | Name

19. Investigation Outcomes

Causal Factors	Root Causes	Rec'n No

20. Remedial Actions

Brief description of what actions have been undertaken to reduce or mitigate the Root Causes of the event.

	Description of Action	Responsibility	Timing
No.			
No.			
No.			
No.			
No.			
No.			

21. Predicted Final Risk

Consequence: | Likelihood: | Risk Rating:

PART E: MANAGEMENT REVIEW

22. Supervisor Signature

Name: | Signature: | Date: (dd/mm/yy) / /

23. Dept Manager Signature

Name: | Signature: | Date: (dd/mm/yy) / /

PART F: NOTIFICATION & RECORDING *(to be completed by Department Head only)*

24. Notifiable to a Government Agency or Corporate Office

☐ No ☐ Yes *
↓
Inform Department Head & General Manager prior to notification

Agency Name:
Notified By:

Time reported (24 hour clock) :
Date reported (dd/mm/yy) / /

Notes:

PART G: RIMS ENTRY

25. Data entered into RIMS

Name: | Signature: | Date: (dd/mm/yy) / /

**Note: Regulatory notifications for Environmental incidents can only be reported by the Environmental Manager or General Manager.*

APPENDIX C

RELEVANT AUSTRALIAN STANDARDS

AS 1216:2006 *Class Labels for Dangerous Goods*

AS 1319:1994 *Safety Signs for the Occupational Environment*

AS 1345:1995 *Identification of the Contents of Pipes, Conduits and Ducts*

AS 1894:1997 *The Storage and Handling of Non-Flammable Cryogenic and Refrigerated Liquids*

AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids*

AS 2030.1:1999 *The Verification, Filling, Inspection, Testing and Maintenance of Cylinders for Storage and Transport of Compressed Gases - Cylinders for Compressed Gases other than Acetylene*

AS 2187.1:1998 *Explosives – Storage, Transport and Use - Storage*

AS/NZS 2243.10:2004 *Safety in Laboratories - Storage of Chemicals*

AS 2809.1:2008 *Road Tank Vehicles for Dangerous Goods - General Requirements for all Road Tank Vehicles*

AS 2931:1999 *Selection and Use of Emergency Procedure Guides for the Transport of Dangerous Goods*

AS 3780:2008 *The Storage and Handling of Corrosive Substances*

AS 4326:2008 *The Storage and Handling of Oxidizing Agents*

AS/NZS 1596:2008 *The Storage and Handling of LP Gas*

AS/NZS 2906:2001 *Fuel Containers – Portable – Plastics and Metal*

AS/NZS 3833:2007 *The Storage and Handling of Mixed Classes of Dangerous Goods in Packages and Intermediate Bulk Containers*

AS/NZS 4452:1997 *The Storage and Handling of Toxic Substances*

APPENDIX D

RELEVANT EMERGENCY RESPONSE GUIDES – TRANSPORT

HB 76:2010 *Dangerous Goods – Initial Emergency Response Guide*

AS 1678.0.0.001:2004 *Emergency Procedure Guide – Transport - Vehicle Fire*

AS 1678.3A1:2004 *Emergency Procedure Guide – Transport - Group Text EPGs for Class 3 Substances - Flammable Liquids*

AS 1678.4A1:2004 *Emergency Procedure Guide – Transport - Group Text Card EPGs for Class 4.1 Substances - Flammable Solids; Substances Liable to Spontaneous Combustion; and Substances that in Contact with Water Emit Flammable Gases*

AS 1678.8A1:2004 *Emergency Procedure Guide – Transport - Group Text EPGs for Class 8 Substances – Corrosive Substances*

AS 1678.2.1.001:2003 *Emergency Procedure Guide – Transport - Liquefied Petroleum Gas*

AS 1678.2.2.000:2003 *Emergency Procedure Guide – Transport - Oxygen Refrigerated Liquid*

AS 1678.5.1.002:1998 *Emergency Procedure Guide – Transport - Ammonium Nitrate*

AS 1678.5.1.005:2003 *Emergency Procedure Guide – Transport - Hydrogen Peroxide or Hydrogen Peroxide, Aqueous Solution*

AS 1678.6.0.002:1998 *Emergency Procedure Guide – Transport - Sodium Cyanide, Potassium Cyanide*

AS 1678.8.0.001:2003 *Emergency Procedure Guide – Transport - Hydrochloric Acid*

AS 1678.10.001:1998 *Emergency Procedure Guide – Transport - Pesticides*

AS 1678.3.1.001:2003 *Emergency Procedure Guide – Transport – Petrol (as cargo)*