1. PURPOSE AND OBJECTIVES

This Group Technical Standard defines the minimum requirements to eliminate or minimise the risk of fatalities, injuries and incidents arising from the storage, handling, production, transport, recycling and disposal of hazardous materials.

2. SCOPE

This Standard applies to all Anglo American Group managed businesses and operations, including contractors and visitors when involved in controlled activities involving hazardous materials in one or more of their forms (solid, liquid or gas), which may have the potential to lead to harm to people, the environment or community (all stakeholders), either in an incident involving loss of control or in normal, controlled activities (e.g. storage, handling, production, transport, recycling and disposal).

This Standard excludes consumer chemical products (e.g. soaps, printer/copy machine toners, etc.), materials associated with Drill and Blast activities and radioactive materials, the two latter for which specific procedures shall be put in place.

This Standard shall be applied in conjunction with local legislation or applicable national standards of specific countries, regions and/or districts. Where the requirements of such legislation are in conflict with any information or item in this standard (or guideline) or exceed the provisions of this standard, such legislation or national standards shall take precedence.

3. PLANNING AND DESIGN

3.1 The design of all processes where hazardous materials may be encountered shall be risk based and shall incorporate the application of the Hierarchy of Controls.

3.2 The basis of design of a facility or process, whether permanent or temporary, which transports, produces, stores, uses or disposes of hazardous materials shall be reviewed (preferably with the vendor), amended as necessary and documented, utilising a process risk assessment tool such as HAZOP, HAZID, COSHH Essentials, ChemAlert etc. As-built design drawings (e.g. process and instrumentation diagrams, process flow diagrams, layout drawings, isometrics, software upgrades, etc.) shall be updated as a result of these reviews. This shall include a comprehensive consequence analysis study, considering all potential impacts associated with the site specific hazardous materials, which shall be used as an input into the site's Emergency Response Plan (ERP).

3.3 All specifications for the location, design and/or modification of hazardous materials facilities shall be subjected to risk assessment that includes materials selection, site conditions, transport, production, storage, handling, use and disposal. Previous incidents shall be reviewed.

3.4 All facilities which have a significant risk from hazardous materials shall provide a risk-based Emergency Response Plan which shall include, but not be limited to:

- Emergency response procedures appropriate to the hazardous materials and the consequence analysis study;
- Emergency equipment/facilities (e.g. oxygen, antidotes, showers, etc.) on location where hazardous materials are stored or used;
- Means of escape in an emergency situation;
- Clearly marked emergency isolation valves;
- Emergency response teams appropriate to the risk;
- Appropriate use of safe refuge and assembly areas for people;
- Emergency communication plan, including communication with surrounding communities;
- Emergency response equipment for spillage containment, fires, explosions, burns, etc.;
- Appropriate response arrangements with external emergency services (e.g. ambulance, hospitals, fire brigade, medical personnel, etc.);

- Impact minimisation including spill clean-up and dust suppression;
- Recovery procedures and disposal of the hazardous material with safe disposal certification.
- Provisions shall be made for the safe venting, drainage and containment required during normal operations and in emergency situations.

3.5 Labelling shall be in place on all storage vessels, containers and tanks, as per appropriate national or international standards. This labelling shall clearly identify the carried or stored material. Supporting information (e.g. Material Safety Data Sheets (MSDS)) shall also be readily available at the point of use and storage to identify appropriate first aid/spill response procedures.

3.6 Piping containing hazardous materials shall be clearly marked so that the contents and direction of flow can be identified.

3.7 Process control systems shall ensure that the potential for personnel to be exposed to hazardous materials is eliminated, wherever possible, or reduced.

3.8 Automatic plant control systems should be in place in hazardous material facilities to eliminate the need for operator intervention and to maintain operation within the required parameters. Such systems shall incorporate fail-to-safe systems. Where automatic control is not practicable, risk assessment shall be used to identify and implement operational options that reduce the risk.

3.9 Fixed detectors and personal detection devices should be considered as options in the selection of potential risk reduction measures.

4. IMPLEMENTATION AND MANAGEMENT

4.1 The site General Manager's shall put in place a process to implement and manage the Hazardous Materials Management Program. This shall include the formal appointment of a Hazardous Materials Coordinator who is responsible for the management of the program and may include the establishment of a cross functional Hazardous Materials Management Committee.

4.2 The Hazardous Materials Management Program shall include:

4.2.1 A **risk management** component:

- The Risk Assessment shall identify critical activities, which involve hazardous materials and have the potential for immediate or long-term harm and safe operating procedures shall be developed and documented, including transportation, storage, handling, use and disposal of incompatible hazardous materials;
- The risk assessment shall include a risk ranking in terms of hazardous chemicals;
- Safe operating limits for plant and equipment handling hazardous materials which have the potential for immediate or long-term harm, shall be clearly defined, documented and available to operational and maintenance personnel;
- The performance requirements (reliabilities and capacities) of specific equipment and systems shall be specified;
- Provision shall be made for the management of change of equipment and/or processes for transportation, storage handling, use and disposal and shall include specific steps to assess the impact of changes on the risk associated with hazardous materials;
- Any change in chemicals or materials used on a particular site shall trigger the change management process.

4.2.2 An **approval process** to be followed prior:

- To the introduction of any new potentially Hazardous Materials to site;
- As part of the approval process, requirements for storage, safe use procedures (including potential incompatibilities with other chemicals in the area of use and process related safety recommendations or warnings from the manufacturer), appropriate Personal Protective Equipment (PPE), disposal and emergency response for the Hazardous Material in context of its intended use shall be established.

4.2.3 A **Hazardous Material Register** of all chemical products approved for use at the site to include the following information:

- Name, synonym(s) and Chemical Formula;
- Materials Safety Data Sheet (MSDS) with the following criteria:
  - MSDS may not be older than 5 years;
  - Shall be manufacturer specific with a local supplier / manufacturer contact;
  - MSDS shall be a 16 point standard;
- Where a mixture of hazardous chemicals are used, the percentages (approx.) of each constituent shall be given so that the hazard of the chemical can be classified;
- Minimum and maximum inventory;
- Storage requirements and precautions; and
- Location and physical properties of the materials when they are in use.

4.2.4 Reference the **Site Maintenance** procedure:

- To make special provision to identify and document maintenance, inspection, testing schedules and procedures for critical equipment associated with hazardous materials; and
- A permit-to-work system, in line with the definition in the Isolation / Safeguarding Standard, shall be in place to ensure proper decontamination of plant and equipment, isolation, use of the correct personal protective equipment, and any special requirements or precautions (e.g. requirements for testing, venting, clearing of piping or when using naked flames) where the occupational exposure limits (i.e. short term, time weighted average or ceiling limits) and /or lower explosive limit to a hazardous material could be exceeded.

4.2.5 Minimum requirements of a Hazardous Materials Training Program:

- Potential sources of exposure to Hazardous Materials;
- Potential risk to health caused by exposure;
- Control measures in use to protect employees against exposures;
- Safe working procedures regarding the use, handling, storage and labelling of the hazardous material at the workplace;
- Procedures to be followed in the event of spillages, leakages, or any similar emergency situation which could take place by accident; and
- MSDS training shall be conducted by supervisors and records kept for audit purposes.

4.2.6 Reference to the **Occupational Exposure** to Hazardous Materials Procedure:

- Monitoring systems for hazardous materials shall be in place to ensure that the status of operation is understood and shown clearly at all times. These systems shall include the procedure for a documented hand-over between shifts that records any relevant information/changes in operating status;
- A system, if required based on the outcomes of a risk assessment approach, shall be in place to control and monitor access to areas where hazardous materials are stored and handled. This shall also identify process areas where hazardous materials may be released under certain operational circumstances (e.g. vent opening during process upset, infrequent discharge points) and what restrictions are placed on access to those areas;
- A system shall be in place to monitor and document short and long-term exposure (e.g. Occupational Exposure Limits, OELs, Time Weighted Average Exposures, TWAs, Acute and short Term Exposure Limits, STEL, Medical surveillance and biological sampling etc.) of personnel to hazardous materials, which have the potential for long-term harm.

4.2.7 Reference to an **Emergency Response Plan** for incidents involving hazardous materials shall be in place reviewed, tested and documented. These shall include external support services such as local ambulance, hospitals and surrounding communities, as appropriate to the risk.

4.2.8 The Hazardous Materials Management Program shall confirm that following procedures, related to the **Transportations of Hazardous Materials**, shall be in place to protect communities and the environment during the transportation of hazardous materials:

- Clear lines of responsibility for safety, security, release prevention, training and emergency response in written agreements shall be in place with producers, distributors and transporters;
- Hazardous material transporters shall implement appropriate emergency response plans and capabilities, and employ adequate measures for hazardous material management;
- Where required, a hazardous material manifest and supporting documentation shall be completed and shipped with the hazardous material. This documentation shall comply with local legislation.

5. PERFORMANCE MONITORING

5.1 The site shall have a Planned Inspection and Monitoring Program in place. As part of this program, sites shall evaluate the following minimum requirements of the Hazardous Materials Management Plan related to:

5.1.1 The site shall have a Hazardous Materials Management monitoring process in place to check that each area of the site is reviewed at least annually to include the following minimum requirements:

- No outside chemicals have been brought in that are not approved;
- The information on the chemical inventory is accurate;
- Transfer (secondary container) labels are clearly marked and visible;
- MSDSs are readily available for each chemical found on the audit;
- Mechanical and automatic chemical feed systems are operating properly and preventive maintenance is being performed on critical safety features of the system; and
- Incompatible chemicals are properly separated.

5.1.2 Critical Task Inspections outlined in the risk assessment section of this standard shall be included in the site's PTO program, and shall include the following:

- Planned Task Observations (PTOs) shall be conducted by the supervisors and records kept;
- Labelling accuracy; and
- Engage employees on the effectiveness and availability of the required PPE.

5.2 The Hazardous Materials Coordinator of the site shall lead an annual program self-assessment to evaluate implementation effectiveness, including:

- Facilitate and encourage regular VFL Tours which should include observations to verify the appropriate and correct use of chemicals;
- Completion of the Hazardous Materials Management self-assessment – using the site bowtie;
- Regulatory Compliance;
- Investigation reports of any chemical incidents;
- Hazardous Materials Management PTO documentation;
- Annual chemical control audit results; and
- Training completion.

APPENDIX A: REFERENCED DOCUMENTS

Document Number	Previous Number(s)	Title
AA TS 000 001	New Document	Master List of Definitions

APPENDIX B: RECORD OF AMENDMENTS

Issue 0 : New document based on AA AFRS 3 (T. Hanmer, January 2011).

Version 1 : Revised Standard criteria and new template format applied. (Leslie Bryson, Lenelle Thomsen, Nanette Schutte, Max Pelser, Gavin Blewett, Liandi Viljoen, Lloyd Nelson, Francesco Raveggi, Cas Badenhorst, Nick Barlow, Renier Swart, Ludovic Le Cam, Johannes van Staden, November 2016).