



March 2012

ICMI RECERTIFICATION AUDIT SUMMARY REPORT

Sasol Polymers Cyanide Plants 1 and 2

Submitted to:

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REPORT



Report Number. 12614221-11835-2

Distribution:

1 x copy: Golder Associates Africa (Pty) Ltd
1 x copy: Sasol Polymers
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Table of Contents

1.0 SUMMARY AUDIT REPORT FOR GOLD MINING OPERATIONS	1
2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION	1
3.0 SUMMARY AUDIT REPORT.....	2
Auditors Findings	2
Name of Other Auditors	2
Dates of Audit	2
PRINCIPLE 1 – OPERATIONS	3
PRINCIPLE 2 – WORKER SAFETY	5
PRINCIPLE 3 – MONITORING.....	7
PRINCIPLE 4 – TRAINING.....	8
PRINCIPLE 5 – EMERGENCY RESPONSE	9

TABLES

FIGURES

APPENDICES



1.0 SUMMARY AUDIT REPORT FOR CYANIDE PRODUCTION FACILITY

Name of Cyanide Production Facility: Sasol Polymers Cyanide Plants 1 and 2
Name of Cyanide Production Facility Owner: Sasol Polymers a division of Sasol Chemical Industries Limited
Name of Cyanide Production Facility Operator: Sasol Polymers a division of Sasol Chemical Industries Limited
Name of Responsible Manager: Mr U Naidoo
Address: Sasol Midland Site, Bergius Street, Sasolburg, 1947
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Country: South Africa
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2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION

Sasol Polymers is a division within Sasol Chemicals Industries Ltd and consists of a number of Business Units of which the Chlor Vinyls Business is one. The Mining Reagents Business is a department within the Chemicals Business.

The Mining Reagents Business is a production facility consisting of two operating plants, namely Cyanide 1 & Cyanide 2, located in the North West corner of the Sasol Polymers Midland Site.

The facility specializes in the manufacture of liquid sodium cyanide solution for use in the South African gold mining industry. The production of the final product is accomplished by converting ammonia and natural gas to hydrogen cyanide gas in Shawinigan Reactors then absorbing it in caustic soda to form sodium cyanide. The main raw materials, ammonia, natural gas and caustic soda, are sourced from within Sasol business units.

Sasol Infracem is a division within Sasol Chemicals Industries and is responsible for the provision of plant utilities (instrument air, process water, etc) and specialised services to the various business units on the Midlands site. The Mining Reagents Business has service level agreements with various sections of Sasol Infracem for the provision of the following services:

- - Emergency Services (security, fire station, HAZCHEM, medical centre etc.)
- - Environmental Services
- - Water and Waste
- - Occupational Health and Safety

Sasol Polymers Cyanide Plants 1 and 2
Name of Facility

27 March 2013
Date

March 2012
Report No. 12614221-11835-2

Signature of Lead Auditor

1





3.0 SUMMARY AUDIT REPORT

Auditors Findings

in full compliance with

Sasol Polymers Cyanide Plants 1 and 2 is: in substantial compliance with **The International Cyanide Management Code**

not in compliance with

I attest that that this operation has not experienced compliance problems during the previous three-year audit cycle.

Audit Company: Golder Associates
Audit Team Leader: Ed Perry, Lead Auditor
Email: eperry@golder.com

Name of Other Auditors

Dawie Viljoen, Auditor and Production Technical Specialist

Auditor's Finding

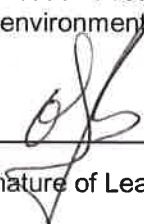
The Certification Production Audit was undertaken over 4 days, between 20 November 2012 and 23 November 2012.

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Verification Audit Team Leader, established by the International Cyanide Management Institute and that all members of the audit team meet the applicable criteria established by the International Cyanide Management Institute for Code Verification Auditors.

I attest that this Summary Audit Report accurately describes the findings of the recertification audit. I further attest that the recertification audit was conducted in a professional manner in accordance with the International Cyanide Management Code Verification Protocol for Cyanide Production and using standard and accepted practices for health, safety and environmental audits.

Sasol Polymers Cyanide Plants 1 and 2

Name of Facility

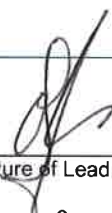


 Signature of Lead Auditor

27 March 2013

Date

Sasol Polymers Cyanide Plants 1 and 2
Name of Facility



 Signature of Lead Auditor

27 March 2013
Date





PRINCIPLE 1 – OPERATIONS

Design, Construct and Operated Cyanide Production Facilities to Prevent Release of Cyanide

Operations Practice 1.1: Design and construct cyanide production facilities consistent with sound, accepted engineering practices and quality control/quality assurance procedures

in full compliance with

The operation is

in substantial compliance with

Operations Practice 1.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Lack of full QA/QC documentation at the certification audit is augmented by Fit for Purpose inspections and reports. Fit for purpose inspections and reports are regularly undertaken by appropriately qualified engineers with the last report being produced in September 2012 resulting in a project plan to repair cracks in the concrete. These reports and visual inspection by the auditors confirm that only compatible materials are used.

There are fully automated systems in place for the safe shutdown of the plant in the event of power outages or equipment failure. All areas where cyanide is managed are on concrete. Stock tank level indicators are on the SCADA system with high level alarms together with the relevant procedures. All secondary containment binds are constructed of concrete and are appropriately sized

Spill prevention measures are provided for all cyanide solution pipelines. Process Safety Management (PMS) inspections and process inspections are used as preventative measures for spill prevention of the cyanide solution pipelines.

Operations Practice 1.2: Develop and implement plans and procedures to operate cyanide production facilities in a manner that prevents accidental releases.

in full compliance with

The operation is

in substantial compliance with

Operations Practice 1.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The facility has a range of procedures and work instructions that cover standard, non-standard and abnormal situations. These procedures identify contingencies related to emergencies at the facility. In addition an operating system is in place to shut down the plant in case of abnormal operations.


Sasol has a Management of Change Procedure, which is used for any changes to equipment, infrastructure or processes. Sasol has a Work Management Process (STAR) to manage work scheduling for maintenance. SAP is still used as the work and task capture system and includes all maintenance schedules.

Process parameters are monitored with process instrumentation controlled through SCADA. This instrumentation is calibrated in accordance with the manufacturer's recommendations or more frequently.

A procedure is in place detailing actions to be followed in the event of a chemical spillage to prevent unauthorized/unregulated discharge to the environment of any cyanide solution or cyanide contaminated

Sasol Polymers Cyanide Plants 1 and 2
Name of Facility

27 March 2013
Date


Signature of Lead Auditor



ICMI CYANIDE PRODUCTION RECERTIFICATION AUDIT - SUMMARY REPORT

water. In addition a water balance is in place to ensure there is sufficient capacity in the Dams to contain any unauthorized/unregulated discharge.

Any cyanide contaminated wastes are taken to an appropriately licensed hazardous landfill in closed containers to prevent any contamination of the environment as detailed in the relevant procedures. Solid cyanide is stored in a dedicated building separate from the production facility. This store is constructed with adequate ventilation, minimises the possibility of water coming into contact with the solid cyanide and is secure from public access.

Sasol only produces liquid sodium cyanide that is transported by a certified ICMI transporter.

Operations Practice 1.3: Inspect cyanide production facilities to ensure their integrity and prevent accidental releases.

in full compliance with

The operation is

in substantial compliance with

Operations Practice 1.3

not in compliance with

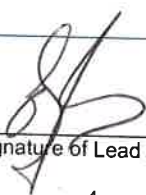
Summarise the basis for this Finding/Deficiencies Identified:

The facility conducts routine inspections of tanks, valves, pipelines, containments and other cyanide production and storage facilities. Statutory Inspections are undertaken by Sasol on-site Statutory Inspection Authority. Planned maintenance inspection records were observe on the SAP system together with hard copies of weekly inspection checklists.

Risk Base Inspections (RBI) systems use a failure mode analyses and legal requirements as well as daily Plan Do Reviews and weekly Schedule meetings to determine inspections frequencies. Inspection frequencies include weekly, monthly, 3 monthly, yearly and 3 yearly inspections. This is deemed to be adequate. All inspections are documented.

Sasol Polymers Cyanide Plants 1 and 2
Name of Facility

27 March 2013
Date



Signature of Lead Auditor

March 2012
Report No. 12614221-11835-2





PRINCIPLE 2 – WORKER SAFETY

Protect Workers' Health and Safety from Exposure to Cyanide

Worker Safety

Practice 2.1:

Develop and implement procedures to protect plant personnel from exposure to cyanide.

in full compliance with

The operation is

in substantial compliance with

Worker Safety Practice 2.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The plant only produces liquid sodium cyanide, shipped in bulk tankers to the end users. Procedures include the required PPE and pre-work inspections for the work as well as non-routine and emergency situations. The use of standby (Buddy) is included in the specific procedures where a standby is required. Sasol Group 'Procedure for Work Permit includes the requirement for a risk assessment, supported by a specific task risk assessment by the Artisan before they carry out the job to reduce all risks including exposure.

Sasol has a Management of Change Procedure, which is used for any changes to equipment, infrastructure or processes including the potential impacts on worker health and safety. A wide range of meetings, which include a review of health and safety issues allowing for worker input into the development of procedures. This includes: a monthly Chlor Vinyls meeting; monthly Cyanide Plant meetings; Leopard steering committee meetings; SHE committee meetings, monthly safety meetings Wednesday safety afternoon meetings in addition to planned job observations.

Stack monitoring for Cyanide 1 and 2 Plant stacks is undertaken and shown to be below 1 ppm. In addition ten IBRID portable gas monitors are used, no fixed monitors are used. Portable gas monitors are sent in weekly for calibration to the SASOL internal calibration department (manufacturer recommends 6 monthly).

Worker exposures are governed by risk assessments and health risk surveys which influence the writing of procedures and work instructions which include relevant PPE and mitigation controls. The Permit to Work procedure defines the 4 standby (Buddy - Sentry) levels. In addition there is a radio system on site and a number of emergency alarms throughout the site.

Regular medicals are undertaken including pre-operational and exit medicals. Staff are blocked from entering the site at the security gate if not recorded as having had an up to date medical.

Cyanide plant personnel are issued with overalls and work clothing which is returned at the end of the shift to be rinsed (pre-laundered) on the plant from where it is sent to an outsourced contractor for final washing. This laundry is periodically analysed to ensure no cyanide contamination is being sent off site. If visitors or contractors have clothing contaminated, this will be washed in the cyanide laundry. Sasol uses SANS (South African National Standards) standards for PPE signage. There is no smoking, eating and drinking on site except in designated areas and having open flames is strictly forbidden.

Worker Safety

Practice 2.2:

Develop and implement plans and procedures for rapid and effective response to cyanide exposure.

in full compliance with

The operation is

in substantial compliance with

Worker Safety Practice 2.2

not in compliance with

Sasol Polymers Cyanide Plants 1 and 2
Name of Facility

27 March 2013
Date

Signature of Lead Auditor





ICMI CYANIDE PRODUCTION RECERTIFICATION AUDIT - SUMMARY REPORT

Summarise the basis for this Finding/Deficiencies Identified:

Site procedures detail the actions to be undertaken in the event of an emergency to ensure there is a rapid and effective response to a potential cyanide exposure.

Showers, low-pressure eye wash stations and non-acidic fire extinguishers are located at strategic locations throughout the plant. They are tested and inspected on a regular basis through operational shift inspections covering fire extinguishers, eye wash bottles and boxes, fire hydrants, utility points and safety showers. In addition the site Fire Station inspects B/A sets, fire extinguishers, fire hoses, fire boxes and DCP extinguishers.

First aid boxes, oxygen, resuscitators, antidote and medical treatment kit are available. Potable water is available. Operational shift inspections cover cyanide antidote, oxygen, emergency BA sets, first aid boxes, cyanide antidote fridge and poisoning alarms.

The cyanide first aid protocol is available in the Clinic emergency room and with the cyanide emergency treatment kit in the control room. MSDS are available in plant files and displayed on notice boards in the appropriate sections on the plant as well as being available on the intranet.

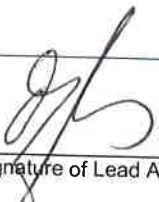
Pipes containing cyanide are identified with their contents and the direction of flow and all tanks are labelled appropriately. The plant has a procedure for the decontamination of employees, contractors and visitors leaving the areas with the potential for skin exposure to cyanide.

First aid is provided when required. In an emergency situation an ambulance is provided by the on-site Clinic to take the person to the Clinic. The Clinic is serviced by registered nurses and Doctors. Outside normal operating hours of the Clinic patients are transported to Vaal Park Hospital. A mutual aid agreement between SASOL and Vaal Park hospital is in place.

Mock drills are undertaken on a regular basis at all levels (plant, site and community level). The reports for these mock drills detail observations, recommended actions, responsible people and comments with the target date for the actions. A site procedure is used to conduct all incident investigations.

Sasol Polymers Cyanide Plants 1 and 2
Name of Facility

March 2012
Report No. 12614221-11835-2


Signature of Lead Auditor

27 March 2013
Date





PRINCIPLE 3 – MONITORING

Ensure that Process Controls are Protective of the Environment.

Monitoring Practice 3.1: Conduct environmental monitoring to confirm that planned or unplanned releases of cyanide do not result in adverse impacts.

in full compliance with

The operation is

in substantial compliance with

Monitoring Practice 3.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

It is possible for the plant to have a direct discharge to surface water. This does not normally occur as effluent water and storm water within the cyanide plant is captured in the on-site Dams prior to being returned to the plant to be used in the process. Water from the wider site is discharge to surface water. Monitoring of this discharge is through continuous on-line monitoring, 4 hourly samples, daily samples and monthly samples. There have been no exceedances of 0.5 mg/l WAD cyanide.

Webb's Dam is downstream of the site and most likely to be nearest surface water connection to groundwater under the site (although this has not been established). Monthly monitoring showed one exceedance at the inlet to Webbs Dam on of 0.03 mg/l total cyanide. All subsequent results have been below 0.022mg/l WAD cyanide at both the inlet and outlet of Webb's Dam.

There is no numerical standard for WAD cyanide or any other species of cyanide in groundwater, therefore there are no compliance points. Currently the site monitors for cyanide in groundwater up and downgradient of the site. Surface water monitoring is only downgradient of the site as upgradient flows are low and intermittent and not from a significant water course.

HCN emissions from the two stacks at the plant are limited to 15ppm with a trigger warning at 6ppm. Monitoring results are less than 1 ppm HCN.

Frequency of monitoring is deemed to be adequate.

Sasol Polymers Cyanide Plants 1 and 2
Name of Facility

March 2012
Report No. 12614221-11835-2


Signature of Lead Auditor

27 March 2013
Date





PRINCIPLE 4 – TRAINING

Train Workers and Emergency Response Personnel to Manage Cyanide in a Safe and Environmentally Protective Manner

Training Practice 4.1: Train employees to operate the plant in a manner that minimizes the potential for cyanide exposures and releases.

[X] in full compliance with

The operation is

[] in substantial compliance with

Training Practice 4.1

[] not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Workers are trained to understand the hazards of cyanide and refresher training is conducted periodically. Plant specific induction training is conducted annually for employees and 6 monthly for contractors. Training includes induction training, plant specific training, special skills training, and work instructions including hazards associated with the respective task. Personal Protective Equipment training is presented in a cyanide specific module that is part of the induction training. Every works instruction indicates what PPE is required.

After theoretical training an employee is given an assessment test. Practical training in the plant is checked by the training officer and the appropriate shift manager. Shift managers will monitor progress and return an employee for additional training, if necessary. Planned job observations (PJO) are used to check worker competency

A Training Matrix has been developed which describes each job (from Trainee to Shift Manager) and the training and qualifications required to progress through the various jobs. Training is provided by suitably qualified trainers with the Training Officer being a qualified Assessor - Chemical, Oil and Allied Industries Training Board, has a diploma in Trainer Development, a diploma in Production & Supervision and has over 30 years' service working in the chemicals sector.

Training Practice 4.2: Train employees to respond to cyanide exposures and releases.

[X] in full compliance with

The operation is

[] in substantial compliance with

Training Practice 4.2

[] not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The plant has specific procedures to be followed in the event of a cyanide release is. Employees are trained on these procedures during the induction training. The training is checked during the mock drills. Learning points from mock drills are communicated via training and via special instructions.

Feedback (post mortem) meetings are held after an emergency exercise and recommendations are made. The post mortem reports, including recommendations, are fed back to the Training Department. Training records are held throughout the working life of employee with full records covering trainer, courses attended, dates, performance and test results.

Signature of Lead Auditor





PRINCIPLE 5 – EMERGENCY RESPONSE

Protect Communities and the Environment through the Development of Emergency Response Strategies and Capabilities.

Emergency Response

Practice 5.1:

Prepare detailed emergency response plans for potential cyanide releases.

in full compliance with

The operation is

in substantial compliance with

Emergency Response Practice 5.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Plant and site wide procedures detail the activities to be undertaken in the event of an emergency. The potential failure scenarios are detailed in these procedures together with Credible Scenarios document in addition to procedures for the safe shutting down of the plant. The cyanide emergency response plan would be triggered if the poisoning alarms were activated. Activation could also be via an incident being reported to the Shift Manager or any supervisor. Emergency response plans can be escalated from a Level 1 (within the Plant) to a Level 2 (within the wider site) emergency via the senior operator in the control room or by the Emergency Action Controller.

The overtopping of ponds and tanks are identified in the plant water balance. These documents describe specific response actions such as the evacuation of site personnel and potentially affected communities, the use of cyanide antidotes, first aid measures for cyanide exposure, and the control of release at their source.

The procedure detailing action to be followed in the event of a chemical spillage details what containment assessment and mitigation should be undertaken. The procedure for the reporting, investigating and recording of environmental incidents is used to investigate incidents to prevent future releases.

Emergency Response

Practice 5.2:

Involve site personnel and stakeholders in the planning process.

in full compliance with

The operation is

in substantial compliance with

Emergency Response Practice 5.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Drafts of procedures the form the Emergency Plan are circulated to all site companies and the relevant municipalities. Sasol road shows are held nationally and internationally. In addition the Fezile Dabi district council disaster management meeting is held to discuss emergency plans. School visits are on-going. A leaflet that highlights the risks and the actions to be taken in an emergency is distributed to local communities on an on-going basis. The 71st Sasolburg community working group was held on the 3 May 2012. This is held every 6 months. A community visit presentation is planned for 5 December 2012. During emergency exercises, external agencies such as Fire Brigade, Ambulances and Paramedics, Vaal Park Hospital, South African Police Service and traffic authorities are involved and participate in post mortem discussions. There is also regular involvement in the Sasolburg Community Working Group, Taaiboschspruit Forum, Inter-company Working Group, and National Association of Clean Air.

Sasol Polymers Cyanide Plants 1 and 2
Name of Facility

27 March 2013
Date

Signature of Lead Auditor



ICMI CYANIDE PRODUCTION RECERTIFICATION AUDIT - SUMMARY REPORT

Emergency Response

Practice 5.3:

Designate appropriate personnel and commit necessary equipment and resources for emergency response.

in full compliance with

The operation is

in substantial compliance with

Emergency Response Practice 5.3

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Shift Managers are the primary emergency response coordinator as detailed in emergency procedures. This authorises the Shift Manager to commit whatever resources are necessary to manage the emergency.

Central SASOL emergency services team receives specialised training as detailed in the training matrix. The procedure for the inspection and replenishment of emergency response equipment includes a list of emergency response equipment on the plant.

The roles and responsibilities for outside responders are part of the Sasol Midlands site Emergency procedures. A leaflet is distributed to the local communities to describe the communities' role in case of an emergency that spreads beyond the Sasol Midlands site.

During emergency exercises, external agencies such as Fire Brigade, ambulances, site clinic, Vaal Park Hospital, South African Police Service and traffic authorities are involved and participate in post mortem discussions as appropriate..

Emergency Response

Practice 5.4:

Develop procedures for internal and external emergency notification and reporting.

in full compliance with

The operation is

in substantial compliance with

Emergency Response Practice 5.5

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The Corporate Affairs member of the Works Emergency Team is responsible for managing external communication and information flow as per the Group's incident communication guidelines. There are 4 named persons within the guidelines who are the primary contact persons.

These named people are the primary contacts who will liaise with the surrounding communities as detailed in the relevant procedure. The primary method of communication with the surrounding communities in the event of an emergency is through the radio stations as detailed in the leaflet distributed to the community.

Emergency Response

Practice 5.5:

Incorporate into response plans and remediation measures monitoring elements that account for additional hazards of using cyanide treatment chemicals.

in full compliance with

The operation is


in substantial compliance with

Emergency Response Practice 5.2

not in compliance with

Sasol Polymers Cyanide Plants 1 and 2
Name of Facility

27 March 2013
Date


Signature of Lead Auditor





ICMI CYANIDE PRODUCTION RECERTIFICATION AUDIT - SUMMARY REPORT

Summarise the basis for this Finding/Deficiencies Identified:

Specific, appropriate remediation measures, such as recovery or neutralization of solutions or solids, decontamination of soils or other contaminated media and management and/or disposal of spill clean-up debris is described in the procedure for clean-up, remediation and waste disposal associated with Cyanide incidents and the procedure for the handling and transportation of dangerous goods. It is stated in the procedures that no attempt should be made to neutralise or complex sodium cyanide that has entered a water course.

The need for environmental monitoring to identify the extent and effects of a release, including sampling methodologies are included in the relevant procedures.

Emergency Response

Practice 5.6: Periodically evaluate response procedures and capabilities and revise them as needed.

in full compliance with

The operation is in substantial compliance with **Emergency Response Practice 5.6**

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The plant emergency response plan expires at the end of March 2014 and therefore will be reviewed prior to this. The Works Emergency Action Plan and Area Emergency Action Plan require that they are reviewed at least every 3 years or after any significant changes, or after a major significant incident.

Mock emergency drills are undertaken on a regular basis as detailed in the relevant procedures, which detail the preparation requirements and post mortem discussions of the mock drills. Actions identified from mock drills are placed on the Deviation Management System together with individuals identified to undertake the action.

GOLDER ASSOCIATES AFRICA (PTY) LTD.

Ed Perry
Lead Auditor

Marie Schlechter
Reviewer

Reg. No. 2002/007104/07

Directors: SAP Browns, L Greyling, RA Heath, FR Sutherland

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Sasol Polymers Cyanide Plants 1 and 2
Name of Facility

27 March 2013
Date

March 2012
Report No. 12614221-11835-2

Signature of Lead Auditor

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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