INTERNATIONAL CYANIDE MANAGEMENT INSTITUTE

CYANIDE PRODUCTION SUMMARY AUDIT REPORT

Cyanide #1 & #2
Sasol South Africa (Pty) Ltd
Sasolburg, South Africa

6th – 12th October 2024

FOR THE
INTERNATIONAL CYANIDE MANAGEMENT INSTITUTE

Operation General Information

Name of Cyanide Production Facility	Cyanide #1 & #2, Sasol South Africa Ltd
Name of Facility Owner	Sasolburg & Natref Operations, Sasol South Africa Ltd
Name of Facility Operator :	Sasolburg & Natref Operations, Sasol South Africa Ltd
Name of Responsible Manager	Mr Colin Marais
Address	Midland Site, Bergius Street, Sasolburg, 1947
State/Province	Free State
Country	South Africa
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Operation Location Detail and Description

Sasolburg Operations is a division of Sasol South Africa (Pty) Ltd, formerly known as Sasol Chemical Industries (Pty) Ltd. Sasolburg Operations consists of a number of support functions and chemical production facilities, of which the Cyanide plants are one.

The Cyanide plant is a production facility consisting of two operating plants, namely Cyanide 1 & Cyanide 2, located in the North West corner of the Midlands 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.

Sasolburg Operations is responsible for the provision of plant utilities (instrument air, process water, etc.) and specialised services to the various Sasol entities operating or performing functions on the Sasol Sasolburg sites, including the Cyanide plant on the Sasol Midlands Site. The aforementioned services include the following:

- Emergency Services (security, fire station, HAZCHEM, medical centre etc.)
- Environmental Services
- Water and Waste
- Site Logistics
- AIA (Approved Inspection Authority) Inspection Services
- Occupational Health and Safety

Auditor's Finding

This operation is

X **in full compliance**
☐ in substantial compliance
☐ not in compliance

with the International Cyanide Management Code.

Compliance Statement

This operation has not experienced compliance problems during the previous three-year audit cycle.

Auditor Information

Audit Company: Eagle Environmental

Audit Team Leader: Arend Hoogervorst E-mail: arend@eagleenv.co.za

Name of Production Auditor: Richard Durrant

Signature of Auditor: Date: 15 April 2025

Date of Audit: 6th – 12th October 2024

Auditor Attestation

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 verification audit. I further attest that the verification audit was conducted in a professional manner in accordance with the International Cyanide Management Code Verification Protocol for Cyanide Production Operations and using standard and accepted practices for health, safety and environmental audits.

Name of Facility	Signature of Lead Auditor	Date
Cyanide Plants 1 & 2		14th April 2025

Principles and Standards of Practice

Principle 1 | OPERATIONS

Design, construct and operate cyanide production facilities to prevent release of cyanide.

Standard of Practice 1.1

Design and construct cyanide production facilities consistent with sound, accepted engineering practices and quality control/quality assurance procedures.

	X in full compliance with	
The operation is	☐ in substantial compliance **with**	**Standard of Practice 1.1**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The QA/QC (Quality Assurance/Quality Control) documentation was not available, but the fit-for-purpose confirmation has been confirmed through regular Structural Engineer Inspections (Civil Structural Integrity Inspection) Reports.

Flares were installed on Cyanide 1 and 2 to flare off fugitive cyanide emissions that were exceeding air quality licence standards. Flare construction is complete. The Quality Control Plan for Structure S2F Conversion Project – Cyanide Stack to Flare project dated 16 July 2024, signed on 17/9/2024 by NAES (New Age Engineering Solutions) Supervisor, J R Du Plessis. (NAES Quality Control), J van der Berg, and Q F Joubert (Megchem – constructors) was sighted and reviewed. The NAES Structural Test Pack (183 pages), including Shop Fabrication and Field Installation reports, welding procedure specifications and the weld map drawing, materials and consumables log sheets, ArcelorMittal inspection certificate for casting of V beams, Weld Summary Sheet 1 GA drawing GDC_401-000220 SHT 001-007 SHT01, and the magnetic particle test report dated 22/9/2024, were sighted and sampled.

Structural Engineer's Reports are scheduled by area monthly throughout the calendar year, covering the whole plant. Sampled (2022) replacement of acid protective floor in the wet floor in the bund at the tanker loading area. Civil Structural Integrity Inspection, Cyanide 2 Wet floor, Support Services: Civil Hub, 02-25-2022, Work Order No 83855952. Signed off by Owen Makola, Civil Team Lead (Vaal University of Technology - National Diploma Engineering: Civil, 23/04/2004) and Elizabeth Chalene Mzaiya - Vaal University of Technology - B Tech Engineering: Civil: Water 15/09/2011. Sampled 2024 Civil Structural Integrity Inspection, Cyanide 2 Wet floor area, Sasolburg and Ekandustria, Civil Hub, 27-02-2024, Work Order No 830000162143. Signed off by Armand Bezuidenhout, Civil Engineer (University of Pretoria - Batchelor of Engineering (Civil Engineering) 04/19/2018). Floor acid

protection work is continuing according to the agreed scheduling and is on schedule.
The Sasol Engineering Data Centre retains copies of all design drawings. This includes both electronic and scanned microfilm drawings being uploaded to the system. The original Design Calculation Documents for Cyanide 2 (Costing 1981)-AECI Technical Department volume, and Cyanide 2 Design 1981 volume, AECI Technical Department were confirmed to be available. Design data are available for Cyanide 2 but not for all of Cyanide 1. The data is incomplete. When work needs to be done on Cyanide 1, competent persons will agree to tests and checks to confirm fit-for-purpose approaches and methodologies. Cyanide 1 started in 1962. Start-up was in August 1964. Cyanide 2 started in 1982/83. Full site documentation/as-built drawings are available from 2000. Drawings prior to 2000 are of varying quality and legibility are available but not necessarily dependable.
The original AECI design documentation and drawings were used to tie in the new flare designs. The design documentation pack for flares was sighted in electronic format. Cyanide 1, built in 1964, did not have all of the original design documentation available. Certain new standards were agreed to by competent persons representing the contractors (Megchem) and Sasol Engineering and Metallurgy Departments.
The cyanide solid store facility is no longer used to store solid cyanide, and the Site will no longer purchase solid cyanide. Thus, the store falls outside of the scope of this audit.
The fit-for-purpose status of the whole plant has been confirmed through regular Structural Integrity Reports. Signed-off documentation was sighted and signed by registered Professional Engineers. On-going structural integrity inspections were confirmed, and inspections were carried out by appropriately qualified Civil and Structural Engineers. The auditors observed during the inspection that the general condition, including steel structures and drains, appears to be in good condition and well maintained, confirming the systems in place are working adequately.
The design drawings include storage of high pH caustic cyanide solutions, as per SANS (South African National Standards) 347: 2010 Pressure and Equipment Regulation. The Polifin Piping Specification used within Sasol (Polifin Piping Specification compiled by Midland Quality Assurance, issued by Midland Standards Committee, October 1994) is used for cyanide equipment. (Polifin was the previous owner and part of the joint venture between Sasol and chemical company, AECI, who originally constructed the Midland Sasol Complex.) Every equipment replacement includes a Bill of Materials, specifying acceptable materials of construction. Any variance to this must be preceded by a change management exercise.
Various interlocks and trips are in place to prevent overfilling, overflowing or any other abnormal releases, as referred to in previous recertification audits. There are systems in place to stop gas flows, stop pumps, release emergency nitrogen into the process, shut down reactors, and use backup power to enable an orderly plant shutdown in case of power outages.
The tanker loading system was improved following recommendations from an incident investigation. (Investigation and corrective actions on the probe in a storage tank after an incident involving a damaged probe at the tanker loading bay.) Additional pressure checks have been put in place to prevent spraying after a failure of the primary venting system. The alarm system was also changed to differentiate fault finding. (This was included in the procedure amendment to the Loading of Road Tankers procedure.)

A cause-and-effect diagram covering all emergency trips on equipment was sighted and reviewed. This has been programmed into the Control Room DCS (Digital Control System) system. During periodic planned shutdowns, various sections of the cause-and-effect diagram are tested and checked. No recent shutdowns during the past three years have identified any failures or errors.
A tank interlocking system is in place to prevent overfilling.
Areas are designed with concrete containment to prevent seepage to the subsurface. This was confirmed during the site inspection. Additional acid protection work is being carried out to further prevent any cyanide infiltration. There are weekly bund inspections every Tuesday by the morning shift to check their containment status.
Level indicators (radar and pressure differential) and high-level alarms are used, and they are inspected and maintained by instrument technicians on a PM (Planned Maintenance) basis. Stock tank level indications on the DCS (Distributed Control System) system have high-level alarms. Level indicators are pre-calibrated and do not need subsequent calibration unless required by OEM (original equipment manufacturer) guidance. Breakdown maintenance is used in case of noted variations or DCS warnings on level indicators. There is a tank interlocking system to prevent overfilling. Tanks also have overfill protection valves, which are a new initiative to prevent overfilling.
The road tanker filling process includes three methods of preventing overfilling – a) level contact probe, b) tank atmospheric pressure switch indicating levels in the filling hose, and c) on the vent hose is a switch which indicates liquid carry over to the vents.
All storage tanks are situated within bunds, which are constructed of concrete and maintained. Tank and bund volumes are sized to hold a volume greater than that of the largest tank or container within the containment and any piping draining back to the tank, and with additional capacity for the design storm event. The dam levels are shown on the DCS Delta V control room system, which is equipped with high-level alarms to ensure that the operating capacity remains available. Any overflow from the effluent dams will flow down concreted trenches to the lined environmental control dams.
It was confirmed during the site inspections that all secondary containments are constructed from concrete with suitable surface screed.
All pipelines are bunded or over concrete. Pipelines are included in the Planned Maintenance System and form part of the operational inspections. PMS inspections and process inspections are used as pipeline preventative measures for spill prevention in the cyanide solution pipelines. The pipelines to the FB1701 J & K tanks are installed over a competent secondary containment. The leak-first response philosophy has changed from that of a cascade clamp to that of seal-tight clamps. A temporary online Leak Sealing Register ensures leaks are permanently fixed, preventing pipe clamps from becoming the permanent leak solution.
Tanks are located in an open-air environment and atmospherically vented at their tops. Tanks within the Plant area are all in the wider security area of the Main Sasol Complex, which does not permit public access. There are no incompatible materials stored near the cyanide tanks. The solid cyanide store is no longer used to store solid cyanide, and the Site will no longer purchase solid cyanide. Thus, the store falls outside of the scope of this audit. The store was inspected and deemed clean, and the HCN gas monitor recorded no HCN gas levels. It was confirmed that flushing solutions in the

dissolution plant are less than 0.001 mg/l WAD cyanide (limits of detection), i.e. less than 0.5 mg/l WAD cyanide, and therefore, the dissolution plant is not deemed a Cyanide facility and outside the scope of the recertification audit.

Standard of Practice 1.2

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

	X in full compliance with	
The operation is	☐ in substantial compliance **with**	**Standard of Practice 1.2**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

There are some 331 procedural documents and approximately 59 engineering procedures in place which cover the Cyanide 1 and 2 operations. Any relevant environmental procedures are covered in the higher-level Sasol Complex procedures, which are not under the control of the plant.

The solid cyanide store is no longer used to store solid cyanide. Thus, the store falls outside of the scope of this audit. The Store was inspected and noted to be clean, and an HCN gas monitor recorded no HCN gas levels. The original purpose was to store strategic solid sodium cyanide stocks in case there was a liquid cyanide production breakdown, and the Plant was unable to meet contractual liquid sodium cyanide orders. The solid cyanide would be dissolved in the small emergency dissolution unit. The last cyanide dissolution (92 boxes) occurred between 19 & 30 March 2022. The dissolution unit has been decommissioned, and critical pipe connections have been disconnected. There are no immediate plans to recommission the plant. There are no plans to purchase new solid cyanide briquettes for dissolution in the future.

The facility has contingency plans for non-standard operating situations that may present a potential for cyanide exposures or releases in the form of a Sasolburg Operations procedure, Area Emergency Action Plan, Level 1, which is site-based. A second Procedure, the Area Emergency Action Plan for Levels 2 and 3, is area-based (Midland complex), and Level 3 is external to the complex. Also available is a procedure for the safe shutting down of the cyanide 1 plant and a procedure for the safe shutting down of the cyanide 2 plant. All procedures include reference to normal and abnormal activities. The effluent systems have procedures for normal operation and abnormal events. There is a Water and Effluent Service level agreement between Sasol Complex Utilities and Midlands Cyanide Operations, dated August 2022, which governs all management activities for water and effluent systems. Normal activities are no discharge, abnormal activities start when there is a discharge (which may affect permit and licence conditions for the Complex). Also in place are HR Practice Note – Strike Handling on a Sasol Site or Sasol Project Business Practice, undated, and Group Guideline: Emergency Response to an epidemic/pandemic, NO HR MS 019, Rev 3, dated 28 July 2020.

The operation has a MOC (Management of Change) procedure. This procedure is audited by PSM (Process Safety Management - either Sasol or external contractors) and DQS (ISO Auditors) annually. The MOC exercises are signed off by the Safety & Health and Environmental Departments and other specialist disciplines, as appropriate to the proposed project or activity. Scoping of the MOC is initially agreed to by a task group to decide which disciplines and specialist inputs are required in the MOC process. Two MOC exercises were sampled and reviewed, the repositioning of the product drain valve between tank 6 and tank 3 to eliminate the dead leg, and the conversion of the Hydrogen cyanide stacks to a flare system. Both of the MOCs were signed off by safety, health and environmental representatives.

The SAP (multinational software development and consulting corporation) Planned Maintenance System (PMS) software has been used since 2015. Currently in use is the Maintenance PSD module, upgraded in 2015. It is a work and task capture system. Activities include planned inspections, record keeping, and the generation of maintenance orders. The SAP system contains complete equipment asset histories. The SAP system is used to generate maintenance orders, updates, progress, and close-outs on maintenance inspections and work orders. A system, WMS (Work Management System), has been implemented and is in operation. Electronic Plant Condition Management Software (PCMS) system is used for statutory inspections and record keeping. The K2 equipment deviation system administered by reliability engineers is a method of reporting engineering faults or problems that are tracked and analysed by reliability engineers and carried out on tanks and pipelines. Thickness testing is carried out on tanks and pipelines. The results are lodged in the PCMS (Plant Condition Management Software) database. The Sasol AIA (Approved Inspection Authority) will analyse the results and raise reports on the necessary actions and mitigation required.

With regard to process parameters, both Cyanide 1 and 2 are equipped with Delta V control systems. The certification of instruments is done using certified, calibrated instruments to check the operational instruments. Process calibration is done, based on works orders, automatically driven by OEM (original equipment manufacturer) specifications (which may change after experience) and generated in the SAP PMS schedules. External certification is done on the Druck (pressure equipment calibration equipment) equipment and the Gammatrol (radiation-based instrumentation calibration) units. Significant changes to process parameters are subject to a MOC (Management of Change) process. Equipment is calibrated according to a schedule. Alarm and trip testing records were sampled: - Trip and Alarm Test dated 01/07/2022 Check Number 1006103 Test Equipment used AMS Delta V. Design Trip Value 75% Actual Trip value 75% - Alarm Triggered – Yes. Trip and Alarm Test dated 12/06/2024 Check Number 1006307 Test Equipment used Isolation. Design Trip – Digital Input 0 Actual Tripped value 0. Alarm Triggered – Yes. Instrument Calibration Log sheet dated 14/09/2022 Control Number 1029599, Flow Transmitter tested, Fluke Pressure gauge used for test. Before and After calibration, pressures and current were recorded from 0kPa to 25kPa. Instrument Calibration Log sheet dated 17/07/2024 Control Number 1006307. Pressure Transmitter tested Fluke 725ex gauge used for tests. Before and After calibration Pressures, and Current recorded from 0kPA to 20kPa.

All bunded areas pump collected solutions into the effluent system. Effluent water and stormwater within the cyanide plant are captured in the lined, concrete containment pits (A, B, C, D) prior to being returned to the plant to be used in the process. If Pit D is full, overflow will pass to the CAP (anecdotal name) Dams. Water from the CAP (A & B) Dams is pumped back to Pit D via a diesel pump and, as a last resort, passed to the discharge from the site via the South Channel. There are systems in place to manage effluent and any discharge from the Complex to the environment. These are managed by both the Plant and the Sasol Complex Effluent Department. The Sasol Complex Environmental Department monitors and measures effluents to ensure standards and controls are complied with.

Cyanide waste is disposed of by contract to the Enviroserv Holfontein hazardous waste disposal landfill site. An Environmental Duty of Care Report conducted by Sasol SHE practitioner (Environmental): Waste on Enviroserv Waste Management (Pty) Ltd dated 02 November 2023 was reviewed. The Report stated no waste-specific non-conformances were observed, and waste handling and transport of waste procedures were excellent. There is a Procedure for the removal of wastes from Sasol One and Sasol Midlands in place. Waste transport documentation is in place. The procedure includes details such as the Waste Manifest, and the Dangerous Goods Declaration. Receipts of waste delivery to Enviroserv Holfontein and Safe Disposal Certificates signed on 18 January 2022, 13 June 2023 and 02 January 2024, were sampled and reviewed. The Cyanide waste register hazard classifies fine soot as 5.1(i) and coarse soot as 3.3(iii). Soot is transported to Holfontein in a membrane (lined) sealed bag because of the potential risk of auto-ignition of soot and high cyanide contents. The coarse soot is sold as a by-product. All waste is transported in a closed container due to the classification status. The Decontamination procedure for the cyanide plant, is used for decontamination of employees, service providers, visitors, and equipment leaving the site for maintenance and disposal. Fine soot cannot be sold because it still contains cyanide. Thus, it is disposed of as hazardous waste at the Holfontein Hazardous Waste landfill.

Sasol does not produce or transport solid cyanide to end users; only liquid sodium cyanide solution is available in dedicated, liquid cyanide bulk tankers. The Bulk tankers are designed, labelled and operated as per South African legal standards for bulk tankers and hazardous substances/dangerous goods transport. The tankers are operated by a Code-compliant third party, Tanker Services, a Division of ILSAG(Pty) Ltd. A DP World Company (Tanker Services). Tanker Services is a certified ICMI transporter and was last recertified on 22 May 2024. SDSs (Safety Data Sheets) for liquid cyanide are on file. The Latest version is dated 09-09-2022 and is reviewed five yearly. (The following review is due in 2027.)

Standard of Practice 1.3

Inspect cyanide production facilities to ensure their integrity and prevent accidental releases.

X in full compliance with

The operation is ☐ in substantial compliance **Standard of Practice 1.3**

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The facility conducts routine inspections of tanks, valves, pipelines, containments and other cyanide production and storage facilities.

Tanks

Thickness tests are conducted by the Sasol AIA (Approved Inspection Authority). A PMS SAP works order is handed to AIA for advanced warning to plan and conduct the tests. Thickness tests are conducted during the 5-year and 10-year tank inspections (samples were sighted). Six monthly Tank Operational inspections that include looking for leaks and corrosion are undertaken. Any deficiencies observed are reported by exception on the shift report log sheet and recorded and submitted on a works order to the Engineering Department. Cyanide 1 tank inspections include Sodium cyanide solution tanks, and Sodium cyanide storage tanks. Cyanide 2 tanks include: - Stock tanks, Sodium cyanide solution tanks, backup scrubber tanks, and filter feed tanks. The following were sampled: -

- Product Storage Tank F. General Condition:004 Severe Deterioration. Finding – The vessel is still fit for service, however the CML (Condition Monitoring Location) to the shell is to be monitored. The Report was dated 04/03/2024.
- Product Storage Tank D. General Condition:01, Fit for Service. A leak was detected on the western side of the 3rd shell strake. Thickness tests carried out: - 6mm. Original thickness 6mm. Report dated 04/21/2023.
- Product Storage Tank E. General Condition:01 Fit for Service. Visual inspection on internal surfaces of floor, shell and roof. Magnetic particle testing on internal floor longitudinal welds and brackets 04/28/2022.
- Tank 7 – 6 monthly, August 2022, W/O No 83963655, August 2024, W/O 830088217483
- Tank 8 – 6 monthly, August 2022, W/O 83963656, August 2024, W/O 830000217484
- Tank F – 6 monthly, August 2022, W/O No 83964304, August 2024, W/O No 830000238464. 10 yearly, April 2023, W/O No 83920016.
- Tank K – 6 Monthly, August 2022, W/O No 83964308, August 2024, W/O 830000238468. 10 yearly, November 2020, W/O No 82356855.

Procedures for the Inspection of atmospheric above-ground storage tanks were sighted. The Inspection procedure includes checking integrity, corrosion, leakage and bunds. Thickness testing records are used to motivate repairs and tank replacements. Reliability engineering will analyse records and make recommendations.

Secondary Containments

SAP planned maintenance visual inspections are done every three years and bund leak tests are done every 2 years for all bunds. The Inspection checklist includes integrity, corrosion, and leakage. The following were sampled and reviewed: -

- Cyanide 1 - Product Storage Bund 3-year visual inspection, 9 December 2022, W/O NO83931720.
- Leak Test for Bund for tanks 7, 8 and 9, done March 2023, W/O no 830000028481.
- Crude Product Area Storage Bund 1-year visual inspection, August 2024, W/O No 830000217549.
- Cyanide 2 – Wet Floor, 1-year Visual inspection, February 2022, W/o no 83855952 and 13 February 2024, W/O no 830000162143
- Storage and Loading Bund 1-year visual inspection, November 2022, W/O no 83898961, 10 March 2024, W/O no 830000169932.

Weekly operational visual inspections are carried out. A works order is made out when deficiencies are noticed. Any work done is recorded in SAP. Weekly visual operational bund inspections are carried out to look for cracks, liquid liquids, handrails, general condition, and drain pump condition. Inspections on 17-04-2022, 06-12-2022, 14-05-2024, and 01-10-2024 were sampled and reviewed.

Pipelines

The PIP (Pipe Inspection Protocol) Department within the corrosion circuit, which includes Cyanide 1 & 2, has a five-year inspection of all pipes. Thickness tests are conducted by the Sasol AIA (Approved Inspection Authority). A PMS (Planned Maintenance System) SAP (proprietary name) works order is handed to AIA for advanced warning to plan and conduct the tests. Thickness testing reports on pipelines have been undertaken since the last recertification audit. The Engineering Reliability Dept sets up a program, and the Engineering Dept carries it out. The Engineering Reliability Department's Deviation Management Dashboard, by Business Unit (including Cyanide 1 and 2), tracking progress on closing out deviations was sighted and reviewed. Weekly operational visual inspections are carried out. A works order is made out when deficiencies are noticed. Any work done is recorded in the SAP PMS system.

Pumps

Many pumps on the plant are paired with a second pump, providing redundant capacity. Pumps are inspected on the SAP PM system on a daily basis for leakage, gland failure, mechanical seal integrity, noise and general condition, bolts, seal levels, seal pressure, oil levels, guards, and cavitations, with space for comments and notification, including job card numbers. The pump checklist was sighted and reviewed. The checklist is carried out by Sasol Rotating Equipment maintenance staff, who pass the information on to plant maintenance, who then convert requirements to job cards and action.

Valves

Safety relief valves are included on the PM system and are inspected 3-yearly. Drop-out valves are included under daily maintenance scheduling, which includes greasing and tightening of valves. Some smaller valves are operated to failure mode, rather than being part of a planned maintenance system.

The facility uses OEM (Original Equipment Manufacturer) recommendations, formal failure mode type analyses, legal requirements, daily Plan Do Reviews, and weekly scheduled meetings to

determine inspection frequencies. SAP reports analyse activities, including breakdowns, which can be used to review inspection frequencies and adequacy or planned maintenance. Reliability Engineers review maintenance frequencies following an analysis and investigation of equipment failure and the causes for the failure. Inspection frequencies could be reviewed depending on the outcome. Critical alarm frequencies are monitored to identify problem causes. This may result in the revision of inspection frequencies. Reliability Engineers report monthly on analysis of breakdown and failure reports and recommend alternatives. The August 2024 Reliability Engineers' Report was reviewed and highlighted mechanical seal leaks for the cyanide area. Shiftly operational inspection frequency is deemed adequate.

It was confirmed that operational inspections are documented. The Tanker Loading Log sheets covering twice daily checks were sighted. The log includes product pumps (are they leaking? Condition? Noises? Condition of the two loading bays?) The log sheets for October 2022 and September 2024 were sampled and reviewed. The Foreman's logbook, which was sighted, incorporates reports from the Foreman and the panel operator (control room operator). Foremen carry out over-inspections on the reporting and check on corrective actions where necessary. In order to ensure levels of training and experience, Sasol has a 3-year learner foreman development plan to train Foremen. Weekly dam inspections include checking linings, ensure free from sludge, ensuring dam levels are correct, ensuring no dam leaks, checking gratings, checking trenches are clean leading into dams, and checking roadways are free of obstacles and are in good condition. Sample inspections from January 2022 and July 2024 were reviewed. Monthly poison alarm inspections check the operation of all 39 alarms against activation in the control room with the correct location. Sample inspections dated 1 April 2022 and 4 October 2024 were checked. 6 monthly Visual tank inspections covering the same as the PMS checklist, for FB 1403 (Filter feed tank) were sighted for 27th January 2022 and 25th January 2024. Maintenance records and statutory inspections are kept in SAP and are available.
The foremen will undertake check inspections on a monthly basis, but these are not documented.
A KUE (Key Undesirable Events) individual Critical Control Checklist was carried out up to 2024, after which documents were combined and customised to events, e.g. loss containment, and release of HCN gas (sighted June 2022 and August 2024), release of Ammonia (sighted June 2022 and August 2024), and underground wells check (sighted June 2022 and August 2024). Service level agreements (SLA) are in place (sighted June 2022 and August 2024), including annual flushing and sucking of stormwater lines (sighted June 2022 and August 2024). All inspections are documented and include the date of the inspection, the name of the inspector, and any observed deficiencies. The inspection reports and records were sampled. The IMS system also identifies specific items to be observed and includes the date of the inspection, the name of the inspector, and any observations.
The IMS (Integrated Management System) Inspection Monitoring System generates inspection requirements and frequencies for foremen and SHE representatives. Inspections can be delegated to the Foreman's reports. Results are loaded on the system, and any inspections not completed are followed with email reminders, scaled up to higher positions, if inspections are not completed timeously.

Principle 2 | WORKER SAFETY

Protect workers' health and safety from exposure to cyanide.

Standard of Practice 2.1

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

	X in full compliance with	
The operation is	☐ in substantial compliance **with**	**Standard of Practice 2.1**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The operation has procedures in place to minimise worker exposure to cyanide during normal and abnormal conditions for Cyanide 1 & 2. Emergency scenarios are identified in the Sasol-required PHA (Process Hazard Analysis) and the MHI (Major Hazard Installations) legal requirements and are used as a basis for emergency exercise scenario generation.

No contaminated equipment leaves the site. The Decontamination procedure for the cyanide plant is used for decontamination of employees, service providers, visitors, and equipment leaving the site for maintenance and disposal. All maintenance is undertaken using the permit-to-work system. A Maintenance Work Instruction for breaking into lines and the swinging of Goggle plates includes PPE, hazards, emergency conditions and abnormal conditions, as well as protective measures, actions and responses and any special requirements, was sighted and sampled. With regard to permits: completed hard copies of Permits are kept for 3 months. Copies are kept for 3 years in the case of an incident occurring during the maintenance. The following permits were sampled and reviewed: – No 2022/05739POL, to enter and redo brickwork inside the reactor in Cyanide 1, dated 21st July 2022, and No. PTW2024/03510, to strip pump from a motor, solo run the motor and do pump alignment, dated 28th February 2024. All maintenance staff also go through cyanide induction training.

The operation solicits and considers worker input in developing and evaluating health and safety procedures. Procedures are updated and circulated electronically to all staff on the plant who have the opportunity to comment appropriately. All staff on the plant have access to email. Dedicated monthly SHE (Safety, Health & Environment) meetings are an important communication method. A meeting in September 2024 highlighted an issue regarding additional mobile steps required for female staff to access platforms of varying heights. SHE Representatives raise issues at the SHE Representatives meetings with management. At a High-level SHE Committee meeting dated 3rd April 2024, the issue regarding PPE requirements for caustic offloading was raised; a request for a reduction in PPE was made, but the request was refused. Daily Assurance ("Toolbox") meetings also acted as a communication option. Minutes of a meeting dated 21st June 2024 were reviewed, where

the issue of gas testing at the beginning and end of the shift to ensure gas levels were acceptable after an incident where a flume cupboard extraction fan was not working.

Health Risk Assessments on chemical and biological exposure and ergonomic exposure are carried out at least every three years. The last review was conducted in October 2022, and the finalised accepted Report was released on 27 June 2023. The Report included hazardous chemical exposure, such as HCN gas, carbon soot, and ammonia. The Coke plant requires dust masks for carbon soot. No need for change in current controls was identified.

Internal technical and third-party monitoring of stack gaseous emissions to demonstrate compliance with the Atmospheric Emissions Licence (AEL) permit conditions (specifies monitoring of HCN, H2, N2, O2 and CH4) is undertaken. HCN emissions are limited to 15 ppm derived from the National Environmental Management: Air Quality Act (with a trigger warning at 6 ppm). The operation's Atmospheric Emissions License (AEL) No. FDDM-MET-2013-24-R1 requires third-party compliance sampling on an annual basis, and process sampling is conducted twice daily and analysed internally to confirm operations are working within AEL limits.

The Cyanide Plant consists of two cyanide trains; Cyanide 1 consists of two streams, while Cyanide 2 consists of 3 streams. Both Cyanide 1 and Cyanide 2 have their own absorption/scrubbing system and stack.

According to the Report, "Non-compliance on the Cyanide Plant on the Sasol Midland Site", dated 14 March 2022, by B Stinton, R Van Zyl and J Roopchand, Elevated emission concentrations were detected during third-party sampling in September 2020 and February 2021, leading to plant shutdowns and investigations. Internal samples did not show elevated levels, suggesting discrepancies between internal and third-party results.

Internal Sampling and Analysis: Calibration gas confirmed internal system accuracy, but discrepancies persisted due to different analytical methods. Software changes and a new GC method were adopted to improve accuracy.

Operations: Inspections revealed blockages and deviations in absorbers, which were addressed. Despite corrective measures, occasional elevated emissions were still detected.

Third-party Sampling and Analysis: Deviations in sampling methodology and absorbent concentrations led to inaccurate results. Efforts to align internal and third-party methods are ongoing.

Dispersion Modelling: An Atmospheric Impact Report (Atmospheric Impact report: Cyanide Plant at the Sasol Sasolburg Operations, by AIRSHED Planning professionals, M Steyn and T Bird, No. 22SAA06E, Rev 1, dated September 2023) concluded that the non-compliance had a low impact on the surrounding environment.

To summarise a memorandum from Sasol Group Technology, dated 22 October 2024:

Background and Compliance Issues: The Cyanide plant at the Midlands site produces off-gases containing hydrogen and nitrogen, with potential impurities like Hydrogen Cyanide (HCN). The plant has struggled to meet the emission limit of <0.5mg/Nm3 for HCN as per the Sasolburg Air Emissions License (AEL).

Decision to Convert Stacks to Flares: Due to ongoing compliance challenges, the decision was made to convert the stacks to flares to burn off any fugitive emissions from the absorption systems. John Zink Hamworthy Combustion supplied the flare tips, with an estimated destruction efficiency of >98% for HCN.

Flare Evaluation for HCN Destruction: To ensure 100% destruction of HCN, the properties of the flare flame, particularly the temperature, were investigated. The adiabatic flame temperature was estimated using ASPEN HYSYS (a chemical process simulator currently developed by AspenTech (used to mathematically model chemical processes, from unit operations to full chemical plants and refineries.) for the normal operation vent gas composition.

Adiabatic Flame Temperature Estimates: The estimated flame temperatures for pure compounds ((company name) hydrogen and methane) and gas mixtures were compared with literature values, showing satisfactory agreement. The normal operation gas mixture had an estimated flame temperature of 2000°C, while the high flaring case was 2170°C.

Conclusion on HCN Destruction: Given that HCN has an autoignition temperature of 540°C, the high flame temperatures ensure that even if 2% of HCN is not initially destroyed, the surrounding temperature would still exceed the autoignition point, ensuring complete destruction of HCN.

In addition, seven IBRID (proprietary name) portable HCN gas monitors are used to ensure that workers are not exposed to hydrogen cyanide during the course of any operations that may cause the release of hydrogen cyanide gas, as defined by the risk assessment for the job. The seven Portable gas monitors (MX6 IBRID Multigas units) are sent in weekly for calibration to the Sasol internal calibration department. (The manufacturer recommends a minimum 6 monthly calibration frequency.) The cyanide monitors are equipped with a deactivation function to prevent the monitor from being used if not appropriately calibrated or faulty. Basic maintenance can be done on-site (sensors, batteries, etc.) More serious faults result in the replacement of the unit. All calibration certificates were sighted, and the following calibration certificates were sampled for: -

- VG001 – 16 March 2022 and 28th September 2022, 22nd April 2024 10th September 2024
- UH005 – 24 March 2022 and 28th September 2022, and 25th April 2024 and 27th September 2024.

Portable HCN gas monitors activate at 5 ppm HCN gas and workers are required to leave the area and report to Production supervisors. They will send in staff using airlines or SCBAs (Self Contained Breathing Apparatus) to investigate and initiate corrective action.

The use of standby (the Buddy) is included in the specific procedures where a standby is required. This was confirmed in the Sasol Regional RSA Procedure for work permits. All process operators have two-way radios linked to the control room. Completed vessel entry permits to work, including Standby (Buddy) details, No. 2022/05739POL to enter and redo brickwork inside a reactor in Cyanide 1, dated 21st July 2022, and a Fitter pre-work risk assessment – Yagen Moodley, replace a transfer line, 12th May 2023, were sighted.

The operation assesses the health of employees to determine their fitness to perform their specified tasks. Annual medicals, pre-employment medicals, exit medicals, and surveillance medicals are

routinely undertaken. Staff are blocked from entering the site at the security gate if not recorded as having had an up-to-date medical. Operational staff have medicals every year and non-operations staff every two years. Surveillance medicals are linked to the clock-in card. Ad hoc medicals may be required for previous medical conditions to confirm employees are fit to work. The Procedure for medical surveillance was sighted and reviewed.

The operation has procedures covering clothing change and laundering of work clothes. The normal laundry procedure is followed for routine washing of employee overalls and work clothing after pre-washing in the laundry. The site has a cyanide-specific laundry. Cyanide plant personnel are issued with overalls and work clothing, which are returned at the end of the shift for washing on the plant. Laundering of work clothes forms a part of the Decontamination and Laundry Service in Cyanide Plant procedures. The procedure states that water is identified as the medium of decontamination and persons exposed should proceed to the nearest safety shower and wash the exposed areas with copious amounts of water. Employees are required to change overalls after all spills or splashes. If visitors or contractors have clothing contaminated, they will be washed in the cyanide laundry. The effluent from the laundry is returned to the plant for processing. The emergency procedures include washing of contaminated cyanide PPE. The affected PPE will be disposed of according to the emergency procedure. This reduces the risk of sending any high-risk contaminated clothing to the laundry.

There is a Procedure for symbolic safety signs, colour coding, and emergency showers. Sasol uses the SANS (South African National Standards) standards for PPE signage. Goggle areas are delimited by yellow painting on handrails. The use of appropriate signage, including Safety Data Sheets (SDSs) display boards, was sighted. Warning signs sighted during the site inspection were in good condition and located in appropriate positions.

Signage prohibiting smoking, eating and drinking, and open flames in the appropriate areas is addressed in a Policy document. Eating and drinking only in designated mess areas is included in induction and training. The Online Induction video includes references to smoking, eating and drinking, and open flames. The signage at the entrance gate to the plant covering minimum PPE requirements and prohibitions complies with ICMI requirements. Dedicated smoking areas were sighted on the Plant.

Standard of Practice 2.2

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

	X in full compliance with	
The operation is	☐ in substantial compliance with	**Standard of Practice 2.2**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The Sasolburg Operations procedure, Area Emergency Action Plan, Level 1, is site-based. The

Procedure for Levels 2 and 3 is area-based, i.e. Level 2 is the Midland complex, and Level 3 is external to the Sasol complex.

The Cyanide Exposure Emergency Care Protocol (Summary) is signed by Dr ZM Lintso and Dr TA Rammutla-Chechi and is the basis for dealing with employees who arrive at the Clinic after cyanide exposure. The Protocol includes the necessary responses to inhalation of cyanide gas, ingestion of cyanide, or skin contact with liquid or gaseous cyanide. The Protocol notes the current scarcity of cyanide antidotes and states that the administration of 100% oxygen remains the mainstay of management for acute cyanide exposure poisoning. The Clinic and external hospital are familiar with the Protocol.

Showers, low-pressure eye wash stations and non-acidic fire extinguishers are located at strategic locations throughout the facility. Operational shift inspections are undertaken covering dry powder fire extinguishers and fire hydrants (also inspected by EMS (Emergency Management Services) who carry out maintenance and pressure testing), eye wash bottles (inspected by Production using the IMS system) and boxes, utility points and safety showers. An Internal note Emergency Management Maintenance dated 23-11-2022 detailing inspections of emergency equipment (DCP (dry chemical powder) extinguishers, CO2 extinguishers, SCBA sets, Hose reels, fire hydrants and monitors), deviations, and repairs and replacements were sighted. The Report for 2024 is only due in November 2024. Safety showers form part of the monthly visual inspections. Showers are repaired when defective. In the PMS, they are on breakdown maintenance.

Monthly inspection sheets, which include fire extinguishers, safety showers, and eye wash boxes and bottles, are available. The checklist for SCBA (Self-Contained Breathing Apparatus) sets was sampled. The fire station inspects fire extinguishers annually. The reports mention deviations only. The fire station emergency equipment workshop was inspected, and repair, refurbishments, cleaning and disinfecting facilities were sighted. This facility was commended as a best practice facility. The 'Procedure for the inspection and maintenance of fire and life support equipment' is in place and was reviewed. A Fire Protection Survey (including maintenance, pressure testing and servicing) is conducted every 5 years. The latest Report on the cyanide plant was done in 2020. No changes from the 2020 report were required.

Three medical (including resuscitator) Oxygen cylinders and 6 x SCBAs and resuscitators are located in the control room hallway for use in an emergency. Clean potable water is available at the plant. A medical treatment kit is held in the Control Room. There is no antidote kept in the control room or on the Plant. The Clinic is 2 minutes from the Plant. Cyanide poisoning alarm points are located on Cyanide 1 and 2 Plants. Poison alarms are tested monthly on the 1st Friday of each month. A radio communication system is in place for plant-based communications, and all operators carry two-way radios.

The Clinic Emergency Room is fitted with defibrillators, static oxygen points, beds, and standby oxygen cylinders. It was reported that five cyanide antidote kits, (Cyano-Kits - Hydroxocobalamin) are available in the fridge in the Clinic pharmacy. If the plant cyanide alarm is set off, an alarm is triggered in the Clinic. The ambulance from the Fire Department is then directed to a safe location to receive

any affected personnel once it reaches the plant. Communication between the Clinic and the plant is via internal "red" telephone.

First aid equipment consists of first aid boxes, Cyanide First Aid treatment boxes, SCBA (Self-Contained Breathing Apparatus) sets, and emergency escape chairs. First aid boxes are maintained and replenished by the Complex medical station. Operational shiftly inspections check oxygen, emergency SCBA sets, First aid boxes, and poisoning alarms. The Clinic is responsible for ordering the cyanide antidote kits timeously, according to a Stock control procedure controlled by the pharmacist. This was confirmed by the clinic pharmacist during the site inspection. SCBA sets are checked monthly by Operations and annually checked and maintained by EMS (Emergency Management Services). Medical oxygen is checked by the Complex Fire Station and replenished by the fire station using oxygen supplied by Afrox (contractor).

Respirator cartridges at the Clinic are checked and ordered by the Clinic themselves. First aid inspections in the plant are checked monthly by the day shift according to the Procedure for the First Aid Box inspections. Control room oxygen sets are inspected shiftly and recorded in the IMS system. The revised cyanide first aid protocol is available in the clinic emergency room, and the emergency treatment kit is in the control room. The business language of the plant is English, and all procedures and informational materials are in English. The Plant has moved to electronic SDSs (Safety Data Sheets) available to all on the Intranet Bubbles Portal. All employees are computer literate and have access to computers. The latest Liquid Cyanide SDS, dated September 2022. (Valid for 5 years) was sighted and confirmed.

Tanks and pipes are clearly marked using a stencil signage format. Cyanide is identified with the flow direction indicated on the pipes, and all tanks (including new tanks and associated pipelines) are labelled. This was confirmed during the site inspection. Signage is monitored on a complex-wide level annually. The last Report, Midland Signage Replacement, was issued in 2023. The Cyanide operation was found to be 100% compliant, with minor findings related to obsolete signs. The Cyanide Plant Safety Officer will report any signage deviations during his inspections.

With regard to a decontamination policy or procedure for employees, contractors and visitors leaving areas with the potential for skin exposure to cyanide, there is a Decontamination procedure in place. Section 7 of the procedure details minor and major exposures to cyanide. . The procedure states that water is identified as the medium of decontamination and persons exposed should proceed to the nearest safety shower and wash the exposed areas with copious amounts of water. The Handbook: Sasolburg Operations Induction – Cyanide Plant (EOSEO-HB-1018, dated 10/14/2024), under General Rules on the Cyanide Plant, states, **"…**always wash your hands when returning from the plant, especially before eating, drinking or smoking**…"** Cyanide emergencies are decontaminated at the plant, and the hospital is equipped with the appropriate PPE and a specific cyanide emergency sealed bag. At the Clinic, a water hose outside at the ambulance receiving bay, a shower, and a bath in the emergency room, are available for decontamination, if necessary. The Clinic and hospitals assume that the emergency team will deliver a decontaminated patient to the ambulance unless otherwise notified. The operation has a laundry which can wash normal worker clothing at the end of each shift.

Specific cyanide "splashing" of clothing is bagged and disposed of as hazardous waste according to the procedure, Laundry Service on Cyanide Plant.

First aid is provided in any emergency situation, and the on-site Clinic provides an ambulance to take the person to the Clinic. A Day clinic is in place, 2 minutes from the plant. Patients are delivered to the Clinic by ambulance via gates directly from the plant. The gates are operated remotely by ambulance drivers. The Clinic is equipped with oxygen, 5 x Cyano-Kit cyanide antidotes, potable water, and medical equipment to treat cyanide cases. Trained staff include registered nurses and doctors on dayshift and 1 nurse and 1 doctor on standby after hours. The Clinic can treat 16 patients in beds and 42 on oxygen points. Clinic staff are trained in the 1,2, and 3 level-based emergency plans. There is at least one trained first aider on every shift.

There is a procedure in place for ambulance service and ambulance points on the Sasolburg sites, which includes transport during day clinic hours to the on-site Clinic and after clinic hours to Vaal Park Hospital offsite. Patients can also be transported to Fezi Ngubentombi Provincial Hospital (Sasolburg). There is also a High-level agreement with Vaal Emergency Services (Private Ambulance Services) in place. There is a Mutual Aid Agreement (currently signed in 2016) between Sasol, NATREF, Karbochem, Safripol, Omnia and the Metsimaholo local municipality. This agreement covers emergency services (Ambulance and Fire Services).

The standard Sasol procedure, 'Group Procedure for SHE Incident Management,' is used to conduct all incident investigations, and the incident investigation is reported using a specific related template. A specific incident involving a cyanide exposure was reviewed.

- Date of Incident – 20 September 2024,
- Location – Cyanide 2 Coke Plant.
- Incident - whilst replacing level switch electronics (LAL 2322) of the stream 4 hopper vessel, the Instrument Artisan felt dizzy. Subsequent blood results confirmed the presence of cyanide.
- Root Cause Analysis (RCA) - Direct causes identified were exposure to fine soot HCN and HCN release from a threaded flange. Underlying causes included a lack of QC checks and insufficient thread sealing tape. Root causes were insufficient nitrogen pressure causing the reverse flow of cyanide and passing through outlet valves XV2386 and XV2387.
- Risk Management and Safety Procedures - Identified gaps in task risk assessments, pre-task risk assessments, permit-to-work exemptions and lack of procedures for maintenance work. The need for routine and familiar task assessments, normal working hours, and the importance of emergency response communication were highlighted. Emphasized the necessity of fixed gas detectors, proper lockout procedures, and maintenance strategies for instrumentation equipment.
- Corrective and Preventive Actions- Actions included investigating nitrogen pressure issues, valve passing, box-up of threaded instrumentation, leak tests, and developing work instructions for level switch maintenance. Additional actions were improving the extraction

system, installing fixed gas monitors, purchasing additional radios, issuing standing instructions for dust masks and gas testing, and reviewing isolation practices.

- Learnings and Good Practices - Learnings for employees included conducting QC checks, ensuring proper emergency equipment use, and developing TRA procedures. Management learnings involved conducting RCA for repeat failures, installing fixed gas detectors, ensuring sufficient radios available and undertaking wellness checks.
- Good practices identified were the alertness of the learner artisan, proper emergency response by production personnel, calibrated gas monitors, buddy system, and detailed medical reporting.
- This incident was reported to the ICMI.

Principle 3 | MONITORING

Ensure that process controls are protective of the environment.

Standard of Practice 3.1

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

	X in full compliance with	
The operation is	☐ in substantial compliance with	**Standard of Practice 3.1**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

It is possible for the facility to have a direct discharge to surface water. This does not usually occur, as effluent water and stormwater within the cyanide plant are captured in the lined, concrete containment pits (A, B, C, D) prior to being returned to the plant to be used in the process. If Pit D is full, overflow will pass to the CAP Dams. Water from the CAP (A & B) Dams is pumped back to Pit D via a diesel pump and, as a last resort, passed to the discharge from the site via the South Channel.

A cyanide discharge is viewed as an abnormal and infrequent event. The discharge does not exceed the water standards during normal rainfall. Exceedances may occur during excessive rains. The last high rainfall incident occurred during February 2017, which was reported to the National Department of Water Affairs & Sanitation. The discharge is controlled upstream through an internal service level agreement between the cyanide plants and the Complex utility department. The Water Use Licence (WUL) limit is 0.1ppm total cyanide. There were 5 WUL licence exceedances between 1 August 2021 and 30 September 2024. Investigations showed that the cyanide came from the historic solids dump.

The geographic location difference clearly identifies the different sources. Indications are that the samples are primarily at less than 0.022 mg/l WAD cyanide. The limits of detection of 0.05 mg/l Total Cyanide were improved to 0.01 mg/l Total Cyanide. MINTEK (Quasi-governmental organisation providing accredited laboratory testing and consulting services on cyanide and cyanide speciation) is used for inter-laboratory comparison and Quality Assurance from time to time. Free CN analyses are done daily.

The Probabilistic Water Balance (PWB) model, including dams A, B, C, and D, and the CAP dams, was re-run for the October 2024 recertification audit. Under maximum rainfall circumstances, there will be no overtopping and release to the Outfall. The following are included in the Model and its assumptions: -

- Tank volumes are included to simulate a tank failure.
- Includes the rainstorm, which exceeds the 1:100-year 24-hour rain event. The Model indicated that there is a risk of overflowing to Dam D in the case of the storm event.
- Includes tank ruptures, spillage scenarios, and extreme rainfall events.
- Includes the effect of dilution during rainstorm events on the dams.
- Can model varying dam concentrations.

As there is no established Mixing Zone, the discharge itself must contain less than 0.022 mg/l free or WAD cyanide at the T1 sampling point. (First discharge point outside of Sasol factory) There has been no discharge from Cyanide operations above 0.5 mg/l WAD cyanide in the past 3 years. The levels of free cyanide between T5 (upstream-Taaibospruit) and T6 (downstream) show little difference, indicating insignificant discharge of cyanide levels from the site. Results from 1 February 2022 to January 2024 show no significant total cyanide levels. The Sasol laboratory is ISO 9001 Quality Management Systems certified (certificate sighted - expires 29-01-2025). The MINTEK laboratory is SANS 17025 Laboratory certified (expiring 31-08-2027). The Sasol laboratory carries out inter-laboratory calibration exercises with the Mintek laboratory to ensure high standards of quality assurance. Values downstream of the discharge are measured at T2, T5 and T6 and are less than 0.022mg/l free cyanide. This was confirmed in the results sighted since the previous audit. There is no evidence of indirect discharge to surface water. The levels of free cyanide between T5 (upstream) and T6 (downstream) show little difference, indicating insignificant discharge of cyanide levels from the site.

There is no numerical standard established by the applicable jurisdiction for WAD cyanide or any other species of cyanide in groundwater; therefore, there are no compliance points below or downgradient of the facility. There are no identified beneficial uses of the groundwater in the area, i.e., no boreholes that extract water for drinking purposes or stock watering. The Sasol deemed standard for groundwater is 0.1 mg/l total cyanide. The Cyanide 1 and 2 plants discharge into the CAP dams (historical name). The CAP dams are, however, not considered to be the plants' final discharge point. This is because the water is contained and does not discharge directly into a water resource from the dams. The CAP dams are managed with other effluents and are discharged in a combined stream with the south and north dams.

The Sasolburg site Water Use Licence (WUL), dated 1 May 2024, with reference 14/C22 K/FG/4958, authorises the Outfall on the Midland site to be its effluent discharge point. The Outfall, as per WUL, is situated on the southern boundary and reflected in the WUL. The receiving water mixing zone is considered to be in the Taaiboschspruit at monitoring points T5 for up-stream and T6 for downstream monitoring. This is because of the Taaiboschspruit being a water body that normally only flows during the summer months. The impact of the water resource can effectively be monitored at T5 and T6 in the Taaiboschspruit. Five WUL exceedances were recorded for the auditing period. The exceedances were recorded on 25 July 2022, 14 & 15 November 2022 and on 13 & 16 February 2023. The exceedances were related to seepage from the Solids dump, which is situated at the south-eastern corner of the Sasol Midland site. The seepage is related to historical cyanide impacts associated with this waste facility and not due to the current operations of the Cyanide plant. Seepage was seen at the toe of the eastern corner of the dump that flowed into a channel which runs parallel to the eastern boundary of the waste facility. In some instances, the seepage could not be contained in the existing infrastructure and resulted in exceedances to the cyanide WUL water quality discharge parameter. The incidents were investigated, and temporary mitigation measures were implemented. No further WUL exceedances were experienced after 16 February 2023. Furthermore, there were no other exceedances of the Sasol voluntary groundwater standard of 0.1 milligrams per litre total cyanide during the audit cycle.

A shallow seepage trench was constructed between the Solids dump and the carbide channel. This intervention is a permanent solution to address seepage at the eastern boundary of the waste facility. Seepage from the waste facility is captured in the newly constructed seepage trench. It can, therefore, not reach the carbide channel. With this, the source is effectively managed and contained in a formalised system.

There is no identified beneficial use for groundwater designated by the authorities. An extensive monitoring borehole network for groundwater monitoring exists across the site. The cyanide contamination leaving the site does not appear to be related to activities at the Cyanide 1 and 2 Plants. The authorities have not required the site to undertake any remedial action.

The Sasol Midland Site have a permitted landfill site where various wastes, including cyanide waste, were disposed of until 1999. The waste facility was closed, and wastes were routed offsite for handling and safe disposal. Surface water impacts from the waste facility will report to the northern channel that will eventually be discharged from the Outfall after it combined with effluents from the southern channel. Operational impacts from the Cyanide plant will be seen in the Southern channel. Differentiation of historical and current impacts was therefore possible. The elevated cyanide concentrations were related to the mentioned waste facility and not the cyanide manufacturing facility.

Higher than normal rainfall was experienced during the summer of 2023/2024. The high rainfall led to higher-than-normal leachate from the waste facility, which daylighted in an adjacent channel. Existing infrastructure could not handle the additional flow, which led to isolated elevated cyanide concentrations in the effluent system.

Temporary management interventions were implemented to manage the additional flows whilst a permanent solution to handle leachate from the waste facility was constructed. The shallow seepage trench system is effectively a barrier between the historical waste facility and the channel. Leachate from the waste facility is now handled in the newly constructed seepage trench, which is a closed system. The implementation of the temporary and permanent solution proved to be effective, as no elevated cyanide concentrations have been seen since February 2023.

In the AIRSHED (proprietary name) Atmospheric Impact Report: Cyanide Plant at the Sasol Sasolburg Operations, by M Steyn and T Bird, No. 22SAS06E, Rev 1, dated Sept 2023, it was reported that AERMOD (a regulated dispersion model) was used to simulate non-compliance over the period January 2020 to July 2023. Simulated concentrations showed no exceedances of the 1-hour, 4-hour or 8-hour Acute Exposure Guideline Levels (AEGLs) in the air emission licence. The impact significance was therefore deemed to be very low. The chronic health effect screening level was exceeded within a small area within the site boundary for the annual average simulation period. However, the simulated concentrations could be an overestimation as a result of the assumption made that the exceedance occurred over the entire simulation period. The Impact significance is therefore rated to be low. Emission rates during normal operating conditions for HCN are less than 0.001 g/s(grams per second) for all point sources.

Non-compliance with the Atmospheric Emissions Licence (AEL) for HCN was confirmed during a sampling campaign on 29th and 30th June 2023. During the non-compliance incident, HCN emission rates were 0.172 g/s for STK1 (Stack 1), 0.167 g/s for STK2 (Stack 2), and 0.011 g/s for STK3 (Stack 3). The Report explains the challenges in measuring emissions during start-up, shutdown, and upset conditions due to safety risks and instability.

Groundwater monitoring for cyanide is conducted 6 monthly for boreholes where the boreholes contain water. Surface water sampling is through continuous online monitoring, and surface water 4 hourly samples, daily samples and external third-party quarterly samples (MINTEK). Frequencies are reviewed on a case-by-case basis, considering performance, normal, abnormal, and emergency conditions, as well as other factors that might influence results. The frequencies are deemed adequate. If there are deviations in the sample values, frequencies may be increased during the upset period. Frequencies are also dictated by water licence requirements.

Principle 4 | TRAINING

Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner.

Standard of Practice 4.1

Train employees to operate the facility in a manner that minimizes the potential for cyanide exposures and releases.

	X in full compliance with	
The operation is	☐ in substantial compliance with	**Standard of Practice 4.1**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

Plant-specific induction training is given to all new employees. Plant hazard awareness training is conducted every 3 years for all employees. Contractors receive plant induction training every time they come on to the plant for work ("Permanent" contractors receive training every two years.)

Training includes induction training, plant-specific training, special skills training, and work instructions, including hazards associated with the respective tasks. Training is continually reviewed and revised. PSM (Process Safety Management) requirements from the wider site are also included in the work instructions. Refresher training is scheduled in the training matrix. Plant-specific induction (Plant Hazard Awareness) includes plant details and cyanide information. Pre-task risk assessments are done before every task commences, and they include consideration of cyanide hazards.

The Training matrices include plant hazard awareness training, including cyanide (with refresher training every 3 years). The training matrices (Process, Engineering and Electrical & Instrument (E & I) were sighted and reviewed. The training matrices flag training 2 months (mechanical) and 3 months (process) before the training expires. Contractors are given induction by the plant, and records are kept in a separate filing system. A new Development Plan for Production Operators has been released, but the formal procedure is still not yet available.

Every works instruction indicates what PPE is required. PPE training is covered in the Permit to Work process or if identified during the pre-task risk assessments. PPE signage is in place for each specific area. PPE training is mandatory for all (incl. Engineering). Decontamination is discussed as part of the pre-task risk assessments. PPE training is included in the training matrix using electronic learning. E-learning is also used for refresher training. Face-to-face interactivity is used for competency training and assessment.

The various jobs in the operation have skills and training requirements which are documented. Basic chemical worker training, followed by area training, e.g., tanker loading, quality testing, reaction, and outside and panel operator (control room), is given. The training matrices were reviewed, including all employees and the training requirements for the various jobs. Linked to the matrices is the employee's individual profile, including the training to be undertaken and the progress completed to date. Competency assessments are undertaken by experienced plant personnel and panels (trainer, two foremen and optional additional specialists). Training of replacement staff is done through a structured program supported by training quality control systems and records. Experiential requirements for each job are documented and backed up with a personal development plan (PDP) and succession plan for each employee. Theoretical training is refreshed every 3 years.

Theoretical training is evaluated using an e-learning system ("Talent at Work"). Practical training is done by the Foreman using works instructions and procedures. There is a foreman's development

matrix to provide Foreman with soft skills for training, counselling, mentoring, etc. Also, there is a learner foremen development program for succession planning. Training materials are based upon the work instructions and procedures, which include PPE requirements, hazards associated with the task and safety checks for the tasks.

Mechanical baseline training is received on the person's trade, PJO (Planned Job Observation) is done on each task in the field and specific training is done as identified and needed. Training is done as per the training matrices, which were confirmed electronically.

The new Operators Development Plan includes the use of Competency Declarations in which an authorised person assesses/verifies (and attests in writing by issuing a certificate) the competence or status of individuals with established requirements or standards. The Declaration includes a written test (pass mark -80%) and a practical assessment. The Development Plan for Cyanide Employees is awaiting final approval.

Employees are trained, assessed, and declared competent according to National Qualifications Framework (NQF) unit standards applying to chemical manufacture, if employees come as learners. Qualified workers that are employed need to be assessed for competency by the Panel and will be started at Tanker loading before they are assessed by the Panel. The Panel is preceded by a pre-assessment test and discussions.

New or transferred employees must be "passed out" on new work or tasks to be undertaken. The pass-out process is included in the Development Plan, New or transferred employees are also coached by competent staff.

Discussions have been held with the Foreman to explore ways to provide them with additional skills for their training functions. Contractors are not given access to the site unless they have completed the required training.

Production task training is refreshed every three years. Planned job observations (PJO) are used to check worker competency. Foremen undertake scheduled PJOs, based on the number of direct reports, the number of critical tasks each report has to undertake, and when those assessments expire. (PJO training is part of the leaner foreman training.) Six PJOs were sampled.

Learning Practitioner Mr Moditi Chuene is a qualified Assessor for CHIETA (Chemical Industries Education & Training Authority – a statutory training body). He has an ETDP (Education, Training and Development Practitioner) certificate (sighted Letter of Competence). He also has chemical industry experience as an operator, working in a laboratory, lecturing at the Vaal University of Technology, and experience developing training materials.

After theoretical training, an employee is given an assessment test. Practical training in the plant is checked by a learning practitioner and the appropriate shift foremen. The shift foreman will monitor progress and return an employee for additional training, if necessary. Planned job observations (PJO) are used to check worker competency. Foremen undertake scheduled PJOs based on the number of direct reports and the number of critical tasks each Report has to carry out, as well as when those assessments expire. Competency assessments (Panel assessments) are done by experienced plant personnel. Training records include a competency certificate and subsequent competency

declarations. Competency declarations are backed up by PJOs and other records of competency determination. E-learning tests are used as a testing refresher strategy.

Standard of Practice 4.2

Train employees to respond to cyanide exposures and releases.

	X in full compliance with	
The operation is	☐ in substantial compliance with	**Standard of Practice 4.2**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The procedure to be followed in the event of a Level 1 cyanide release (i.e. within the Plant) is the Area Emergency Action Plan. Employees are made aware of this during induction training. The training is checked during planned exercises/mock drills. The planned exercises/ mock drills cover health and safety and environmental scenarios. Contractors are monitored by full-time SASOL officials while on site. All staff receive emergency preparedness training every 2 years. The training matrices include Sasol emergency training for plant staff. Emergency Services Level 2 training is a joint training session with site-wide staff shiftly covering all 4 shifts as per the training plan covering all the Midland Sites, including the cyanide plant. A monthly report is issued by Emergency Services. Drills form a part of the emergency training. Training covers both cyanide releases and worker exposure to cyanide. Level 2 Procedures are applicable site-wide and are the joint responsibility of the Plant and Complex Emergency Services. Training includes plant area emergency procedures.
Level 3 Procedures are applicable outside the site boundary. They are the joint responsibility of Plant and Emergency Services, as well as external service providers and response agencies. Site staff have first responder fire training (refreshed every two years by EMS), which appears on the matrices. Level 2 Procedures are applicable site-wide and are the joint responsibility of Plant and Emergency Services, and training includes plant area emergency procedures.
Training records are held throughout the working life of the employee, with complete records covering the trainer, courses attended, dates, performance and test results. The training matrix contains the electronic training records on training and completed for all cyanide plant employees. Training hard copy records are retained and recorded in the 1HR electronic system prior to being archived. E-learning training includes an assessment and a pass standard of 80%.

Principle 5 | EMERGENCY RESPONSE

Protect communities and the environment through the development of emergency response strategies and capabilities.

Standard of Practice 5.1

Prepare detailed emergency response plans for potential cyanide releases.

	X in full compliance with	
The operation is	☐ in substantial compliance with	**Standard of Practice 5.1**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 2, dated 01-10-2024, is a Level 1 emergency within the plant, level 2 is site-wide, affecting other operations in the Complex, and level 3 is outside the site boundary. The Works Emergency Action Plan EOROAS-PR-0893 ver. 2, dated 4-9-2024, is referred to in the plant procedure for level 2 and 3 emergencies. Area Emergency Action Plan EOROAS-PR-0890 rev.7, dated 29-04-2021, is referred to in the plant procedure.

The Cyanide Exposure Emergency Care Protocol EOSEO-OM-ET-008, (Summary), Rev. 2, dated 9 October 2024 and signed by Dr ZM Lintso and Dr TA Rammutla-Chechi is used as a basis for dealing with employees exposed to cyanide. The Protocol notes the current scarcity of cyanide antidotes and states that the administration of 100% oxygen remains the mainstay of management for acute cyanide exposure poisoning. Both the Clinic and the external hospital are familiar with the Protocol.

Emergency Management Services Operations Response Plan - Cyanide Response Plan Midland Site EOROAS-SA-0561, rev 3, dated 9 April 2018, is used by the Complex Emergency Management Services (EMS).

The Cyanide Actions Plans consider the potential failure scenarios appropriate for the site-specific environmental and operating circumstances, including the following, as applicable: -

- *Catastrophic release of hydrogen cyanide*

  Gas releases (including HCN, Ammonia, methane, hydrogen, and nitrogen) within the plant boundaries will be covered by Area Emergency Action Plan, emergency condition on the cyanide plant Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 2, dated 01/10/2024. The Action Plan cross-references to EOSEO-PR-4894 rev 1 dated 01/10/2024 – Safe Shutdown cyanide 1 and Safe Shutdown cyanide 2, EOSEO-PR-4766, Rev 1, dated 01/10/2024. Gas releases leaving the boundary will be covered by the Works Emergency Action Plan (Level 2) SSP-S-41, rev 6, dated 14/11/2016. The Area Emergency Action Plan (Level 1) SSP-S-024, rev.4, dated 15/8/2013, is referred to in the plant procedure.

- *Releases of solid or liquid cyanide during packaging, storage, loading and unloading operations*

  Liquid and gas releases during loading within the plant boundaries will be covered by the Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 2, dated 01/10/2024, EOSEO-PR-0742 – Loading of Sodium Cyanide Road Tankers, Rev. 1 dated 06-07-2021. Releases

during loading operations leaving the boundary will be covered by the Works Emergency Action Plan EOROAS-PR-0892, Rev 2, dated 24-09-2024.

- *Releases during fires and explosions*

  Liquid and gas releases during loading within the plant boundaries will be covered by the Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 1, dated 19-07-2021, EOSEO-PR-0742 – Loading of Sodium Cyanide Road Tankers, Rev.0, dated 06-07-2021.

  - *Pipe, valve and tank ruptures*

    Pipe, valve and tank ruptures within the plant boundaries will be covered by Liquid and gas releases during loading within the plant boundaries will be covered by Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 2, dated 01/10/2024. Releases during loading operations leaving the boundary will be covered by Works Emergency Action Plan EOROAS-PR-0892, Rev 2, 24-09-2024.

  - *Power outages and equipment failures*

    This is covered by EOSEO-PR-4894 rev 1, dated 01/10/2024 – Safe Shutdown cyanide 1 and Safe Shutdown cyanide 2 EOSEO-PR-4766, Rev 1, date 30/09/2024. Shutting down the Plant during power failure (applies to CN 1 & 2) forms a part of the above procedure.

  - *Overtopping of ponds, tanks and waste treatment facilities*

    Plant Procedure - Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 2, dated 01/10/2024. The Service level agreement with the Complex's Water and Waste Department will manage excess solutions and stormwater, which may result in overtopping through storage (CAP Dams A & B), and redirection using the additional dams. The Cyanide Plant only has control over Dams 1-4 dedicated for cyanide on site. Procedure detailing Actions to be followed in the event of a chemical spillage – EOSEO-WI-1096, rev 1, dated 26-11-2020, would be used as appropriate. Reporting, investigation and recording of environmental incidents, EOSEO-PR-1155, Ver 8, dated 25-07-2019, would be used for any overtopping.

As the site is a part of a chemical complex, personnel will not be evacuated from the site. They will either be sent to self-contained emergency gathering rooms (e.g., gas releases). The Procedure for Emergency assembly points and gathering rooms is EOSEO-PR-0900, rev. 2, dated 13-06-2023. Or, for other occurrences, they may be sent to the emergency assembly points outside. Works Emergency Action Plan EOROAS-PR-0893, Rev 2, 24-09-2024.is referenced in the plant procedure for level 2 and 3 emergencies that might require communities to stay indoors as opposed to evacuate. Community evacuation is the responsibility of the police. This is an offsite function referred to Works in Emergency Action Plan EOROAS-PR-0892, Rev 2, 24-09-2024. In the case of Level 3 emergencies, the Works Emergency Centre includes the Communications Dept, Community Affairs Dept, and Liaison, which will manage the emergency in conjunction with external authorities such as the police, Disaster Management, and Mutual Aid members (on-site companies).

The administering of antidotes is done under the sole control of a medical doctor or via a paramedic

under a doctor's instruction. (Cyano-Kit and Dicobalt EDETATE). Cyanide Exposure is covered by a specific Medical Protocol: Cyanide exposure emergency care procedure (Summary) – EOSEO-OM-ET-008, rev. 2, dated 09-10-2024.

The control of releases at their source is dealt with in the Plant Procedure - Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 2, dated 01/10/2024 and EOSEO-PR-4894 rev 1, dated 1/10/2024 – Safe Shutdown cyanide 1 and Safe Shutdown cyanide 2, EOSEO-PR-4766, Rev 1, dated 1/10/2024.

Containment, assessment, mitigation and future prevention of releases are primarily dealt with via the Plant Procedure - Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 2, dated 01/10/2024. The Procedure detailing Actions to be followed in the event of a chemical spillage is EOSEO-WI-1096, rev 1, dated 26-11-2020. Gas releases leaving the boundary will be covered by - Works Emergency Action Plan EOROAS-PR-0893, Rev 2, 24-09-2024. Clean-up, Remediation and waste disposal associated with Cyanide incidents fall under EOSEO-PR-4682, rev. 1, dated 11-04-2024. The Procedure, SHE Incident Management, EOSS-PR-0003, rev 2, dated 25 November 2022, manages how an incident would be investigated, by whom, and in what context. Also used is Reporting, investigation and recording of environmental incidents. EOSEO-PR-1155, Ver 8, dated 25-07-2019. Management of Water and Wastewater on the Sasolburg Operations, is covered generally under procedure EOSEO-PR-1175, rev 1, dated 10-06-2020.

Standard of Practice 5.2

Involve site personnel and stakeholders in the planning process.

	X in full compliance with	
The operation is	☐ in substantial compliance with	**Standard of Practice 5.2**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

All emergency response documents for Sasol are quality-controlled. The emergency documentation is circulated to all for comment as a part of the document management process. All employees on site have access to electronic documents and are computer literate.

Sasol has conducted a stakeholder perception survey (IPSOS) of Government bodies, fence line communities and NGOs in July 2018. The information from this survey continues to be used to guide and modify improvement opportunities with the local community. Sasol uses Billboards to communicate information regarding radio station involvement in emergency communication.

Tanker Services activities, as an ICMI-certified transporter, overlap with Sasol Cyanide operations. Liaison and cooperation exist.

When Sasol stages emergency exercises, it is the role of the Sasol Specialist: Internal and External

Communications – Community Affairs to feed information to stakeholders on the exercise and manage expectations from stakeholders. Sighted notice to radio stations on the transportation emergency exercise held on the R59 road on 7 April 2022 and a holding statement dated 7 April 2022 to publication editors providing more detail on the exercise.
An article in the Vaal Monthly dated 1 May 2022 about the 7 April 2022 exercise was sighted, and it included a report on the exercise. This included two stationery tankers, a staged chemical spill, a diesel spill, a hijacking scenario, injuries and a road closure. Participants included various public and private sector emergency responders, including ER24 (private ambulance service provider), a helicopter ambulance, local hospitals, Midvaal Fire and Traffic Departments, the SA Police, Rapid Spill Response, and the Road Incident Management System (RIMS).
Similar evidence was sighted for a product transportation offsite emergency response simulation that took place on 30 August 2023 on the N17 on an off-ramp near Devon, in the Gauteng Province.
The Sasol Community Affairs Dept will invite community representatives to observe the various Sasol emergency exercises to understand what happens when Sasol responds to incidents and why Sasol practices its response. For example, there were community observers in attendance at the emergency response drill held on 7 April 2022 and 30 August 2023. Information is shared amongst members via the Mutual Aid Agreement, including the nature of their risks associated with accidental cyanide releases. All communication to external parties is handled by the Sasol corporate affairs department.
As indicated above, during emergency exercises, external agencies such as the 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.
The Disaster Management Advisory Forum Meeting meetings were held on 30-06-2022, 20-10-2022, 30-03-2023, December 2023, 20-03-2024, 26-09-2024. Members attending include: - Chief Municipal Fire Officers, Disaster Management Practitioners, Municipal Traffic Managers, SAPS, Government Departments, Vaal Water Catchment Management Agency, SANDF (South African National Defence Force), Sasol, and the Provincial EMS (Emergency Management Services). The Mutual Aid Agreement membership includes the local authority, Karbochem, NATREF (commercial name – oil refinery), Omnia, Sasol Complex, and Safripol (commercial name), and their meetings are held jointly with the Disaster Management Forum.

Standard of Practice 5.3

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

	X in full compliance with	
The operation is	☐ in substantial compliance with	**Standard of Practice 5.3**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The Shift Foreman is the Area Emergency Controller, trained and appointed in writing, or the most senior person on site and is initially the primary emergency response coordinator in the level 1 plan. The Shift Foreman is authorised to commit whatever resources are necessary to manage the emergency as per Plant Procedure - Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 1, dated 19-07-2021 which identifies the primary controller and the assistant controller and their duties and responsibilities. They also have the authority to escalate the incident to level 2, if necessary. For the local area (plant), this is designated in Works Emergency Action Plan EOROAS-PR-0893, Rev 2, 24-09-2024.

The emergency response team list is included in the "red files" (emergency response files located in the emergency gathering rooms, control room and the Foreman's office). As per the training matrices, the central Sasol emergency services team receives specialised training. All plant personnel receive emergency preparedness training every two years as per the training matrices.

Plant Contact information is located on standby, and callout rosters. This was also confirmed in the bubbles electronic system. The list is updated weekly via e-mail. All Site Contact information is maintained at the Sasol Complex emergency centre. Information is updated monthly and distributed to all control rooms (Works Emergency Control Centres - WECC). The list is updated weekly and distributed to the appropriate plants, and a hard copy is available in the WECC. The WECC is the primary contact with the plant in case of any plant emergencies. When an alarm is raised, the alarm also sounds at the Medical Clinic and the Fire Department Control Room. For the site, this is designated in the Works Emergency Action Plan EOROAS-PR-0893, Rev 2, 24-09-2024. The area (beyond the plant) is designated in the Area Emergency Action Plan (Cyanide Specific) EOSEO-PR-0736, Rev 2, dated 01/10/2024.

Emergency response equipment for the Plant is included in the Fire Protection Survey dated 17 June 2020 (and also included in the red files in the emergency gathering room, which is the control room). This is also covered in EOROAS-PR-0880, rev. 2, dated 13/06/2022 - Procedure for the Inspection, maintenance and testing of Fire and Life Support Equipment. The procedure for the inspection, maintenance and testing of fire and life support equipment also includes site emergency services response equipment. Detailed inspections are undertaken annually. The inspections for 2022 and 2023 were sighted. The 2024 inspection will be undertaken in November.

The cyanide plant is part of a much larger Sasol chemical complex, which has its own emergency response and support facilities. Roles and responsibilities for outside responders are part of the Complex's Emergency Procedures (Works Emergency Action Plan EOROAS-PR-0893, Rev 2, 24-09-2024.). The procedure for ambulance service and ambulance points Sasol Sasolburg sites. EOSEO-PR-0882, rev. 3, dated 21-11-2019, includes roles and responsibilities. Communities are not directly involved in the Plan. During emergency exercises, external agencies such as the 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. The Mutual Aid Agreement also confirms roles and responsibilities.

Standard of Practice 5.4

Develop procedures for internal and external emergency notification and reporting.

	X in full compliance with	
The operation is	☐ in substantial compliance with	**Standard of Practice 5.4**
	☐ not in compliance with	

Summarize 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 'Group crisis communication guidelines' dated October 2022. There are only 3 named persons within the guidelines who are the primary contact persons. In the event of an emergency, the on-site Clinic and the control room for Cyanide 1 and 2 Plant are directly in contact via telephone.

A Practice Note – Reporting of Cyanide Incidents to ICMI, dated 26 October 2021, effective from 1 September 2021, is in place and functioning. One environmental incident of 6th April 2022, has been reported to ICMI. A channel overflowed due to blockage (grass) into the veld. The incident was reported by email on 11 April 2022 and an acknowledgement was received from ICMI by email dated 3rd May 2022.

A second incident, a gassing incident, occurred on 20th September 2024. While replacing an electronic level switch on the Cyanide Stream 4 hopper vessel, the instrument technician felt dizzy. He was treated for possible cyanide exposure by the medical team and kept in for observation overnight. A cyanide exposure was confirmed from blood tests received on 1 October 2024. The first Report was sent to ICMI on 1st October 2024, once the blood results were received. A full investigation was undertaken and was sighted. The full Report has been submitted to the ICMI.

On 4th January 2025, a Sasol service provider employee was exposed to HCN gas whilst removing lids and end blanks, in preparation for high pressure cleaning of gas cooler F. However, he removed blanks from gas cooler G in error. The incident was reported to the ICMI on 6th January 2025 and a full investigation report including causes, controls and recommendation for corrective actions was submitted to ICMI as soon as this was completed. The HCN gas affected multiple parts of the employee's body and he was rendered unconscious. Although off work from 4th to 21st January 2025, he has fully recovered and is back at work. This incident falls outside of the scope of this recertification audit and will be reported on more fully in the next recertification audit.

Standard of Practice 5.5

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

The operation is	**X in full compliance with** ☐ in substantial compliance with ☐ not in compliance with	**Standard of Practice 5.5**

Summarize the basis for this Finding/Deficiencies Identified:

The Sasol remediation procedures cover the Sasol Sasolburg Complex, including the Cyanide Production Plant (reference made to EOSS-PR-0034, rev. 01, dated 03-07-2024 – Procedure: Sasol Energy Procedure for Emergency Response to Offsite Product Logistics Incidents and EOSEO-PR-4682, rev. 01, dated 4/11/2024 – Clean-up, Remediation and Waste Disposal associated with Cyanide incidents: -

Section 6.1 Manage and remediate cyanide contaminated soil, describes evaluating the cyanide spillage and risk, field monitoring and testing, managing and disposal of contaminated soil, and soil remediation.

Section 6.2 Management of cyanide in a water course, prohibits neutralisation or complexing of chemicals for Cyanide in a water course.

The procedure for the management of waste on the Sasol Operations site, is OSEO-PR-1157, ver. 2, dated 17-03-2024, and clean-up is provided by approved service providers. Service Providers are subject to a successful SQAS-AFRICA (Safety, Quality Assessment System for Sustainability) audit. Reporting and investigation are covered by Procedure: SHE Incident Management, CGR-SHE-000059, Rev 1, dated July 2021.

The procedure: Sasol Energy Procedure for Emergency Response to Offsite Product Logistics Incidents, EOSS-PR-0034, rev. 01, dated 03-07-2024, includes: -

Section 6.2.1 prohibits the use of sodium hypochlorite, ferrous sulphate and hydrogen peroxide to neutralise or complex sodium cyanide that has entered a watercourse.

In the Area Emergency Action Plan, EOSEO-PR-0736, rev.1, dated 19-07-2021, the plan includes a specific prohibition of the use of chemicals in Section 6.3.

The need for environmental monitoring to identify the extent and effects of a release, including sampling methodologies, is included in EOSEO-PR-4682, rev. 01, dated 4/11/2024 – Clean-up, Remediation and Waste Disposal associated with Cyanide incidents (Section 7-1 for soils and section 7.2) and 'Procedure for the reporting, investigating and recording of environmental incidents' EOSEO-PR-1155, rev. 8, dated 25-07-2019. Where possible, the current monitoring locations would be used as the most likely locations for monitoring surface water and groundwater. Otherwise, the location of the monitoring points would form part of the investigation.

Surface water sampling is through continuous online monitoring, 4 hourly samples, daily samples and external third-party monthly samples. Sampling frequencies are reviewed on a case-by-case basis, considering performance, normal, abnormal, and emergency conditions, as well as other factors that might influence results. Sampling options will be decided once the conditions and location of the spill are established.

Standard of Practice 5.6

Periodically evaluate response procedures and capabilities and revise them as needed.

	X in full compliance with	
The operation is	☐ in substantial compliance with	**Standard of Practice 5.6**
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The emergency response documentation is reviewed every five years as part of a document control system. The review will occur more frequently, should circumstances dictate.

Drills are carried out monthly, based on the top ten plant risks, of which at least half are direct or indirect cyanide-related. Feedback (post-mortem) meetings are held after emergency exercises and recommendations are made. The post-mortem report, including recommendations, is fed back to the responsible Departments and/or Persons.

Level 1 Mock drills are undertaken on a regular basis at all levels, Plant Monthly per shift. 50:50 split between physical activities and desktop drills. Level 2 and 3 drills are organised by the Sasol Complex Emergency Management Services. They are organised by roster and coordinated with all Sasol complex companies.

Drills

- Level 1 Drill on 23 October 2022 of water pollution due to off-specification cyanide effluent contaminating the water streams. Testing inspection checks for leaks, knowing where to look, reporting to supervision standbys, and arranging sampling of CAP dams. Satisfactory result with no deviations and no recommendations.
- Level 1 Drill on 29 January 2023 of major bag filter fire (never done before) at the Cyanide plant with water used becoming contaminated and ending up in the final discharge system. Testing prevention and isolation of fire and preventing contaminated water from flowing into outfalls. The isolation of the bag filter went well, and fire extinguishers were used. Concerns about what would be done if there were large quantities of contaminated water collected in a small bunded area. It prompted the question as to whether water can really be used on a bag filter fire. A follow-up discussion considered the lack of sandbags or mitigating equipment. Prevention is better than cure.
- Level 1 Drill on 13 April 2023 of a sodium cyanide spillage due to overfilling of a road tanker. The objectives are to stop loading as soon as possible, ensure the Foreman is notified asap,

and contain the spilt cyanide in the bunded area so it can be reworked back into the plant. The spillage was noticed while it was small, the stopping of loading was immediate, and washing of the area commenced. The deviation was that the tanker driver (a contractor) was not familiar with Plant spillage procedures at the loading bay. The lesson learned was not to assume plant visitors know all the plant procedures.

- Level II Emergency Exercise – Cyanide Plant held on 10 May 2023. The scenario involved the failure of a 2-inch gasket between ammonia stock tanks and the control valve, resulting in Ammonia gas detector alarms going off at Cyanide 2. A mechanical artisan working in the area was exposed and pressed the poison alarm. The ammonia gas plume affected neighbouring plants, resulting in a Level II emergency being declared. Gas release meant that the site's Emergency Gas Rooms had to be used by evacuating personnel and visitors. On the positive side, Sasol employees and some service providers followed their emergency protocols; there was a quick response from Emergency Management; communications were good; and the Emergency control room was calm and handled the situation expertly. Weaknesses included: - some service providers ignored the alarm or were not aware of its meaning; the Poly canteen carried on, as normal, and ignored the alarm; and there was congestion outside the main gate, and vehicle management could have been better. A complete list of deviations was added to the deviations register for detailed mitigation and follow-up.

The procedure will be amended as appropriate based on drills and actual events. This has not occurred in recent memory.