Saratovorgsintez LLC

CYANIDE PRODUCTION
SUMMARY AUDIT REPORT

FOR THE

INTERNATIONAL CYANIDE MANAGEMENT CODE

JULY 2023

Author: Bruno Pizzorni - Lead Auditor

Cyanide Auditors

Tel +51 947 259 440 | Email bpizzorni@cyanideauditor.com | Web CYANIDEAUDITOR.COM

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Operation General Information

Name of Production Facility	Saratovorgsintez LLC
Name of Facility Owner:	Saratovorgsintez LLC
Name of Facility Operator:	Saratovorgsintez LLC
Name of Responsible Manager:	Vladimir Shulyndyn, General Director
Address:	Sovetsko-Czehoslovatskaya Druzhba sq. Saratov, 410059
State / Province:	Saratov
Country:	Russian Federation
Telephone:	+7 (8452) 98-52-09
Email:	vladimir.shulyndin@lukoil.com

Operation Location Detail and Description

Saratovorgsintez LLC (Saratovorgsintez), is a petrochemical company located in a designated industrial area of Saratov, approximately 15 km southwest of Saratov city centre Saratov, Russia. The company specializes in the production of acrylonitrile, acetonitrile and sodium cyanide technical briquettes.

Saratovorgsintez is part of the LUKOIL Company, which manages a large oil and gas production, oil refining, petrochemical complex, including several production facilities and facilities not only within the Russian Federation, but also abroad. LUKOIL plays a significant role in the oil and gas production, oil refining and petrochemical industries in Russia and has been actively increasing its production capacity in recent years. The company focuses on modernization and technological advances to improve the quality of its products and meet market demands.

The Plant manufactures sodium cyanide briquettes for the mining industry using hydrogen cyanide generated as a by-product from an acrylonitrile Plant located within the complex. The Plant includes two production lines of similar design.

The first line began operation in 2008. A second line was constructed in the same building and began operation in 2015. The first line has a production capacity of 18,000 tonnes/year. In September 2019, the second Plant increased production capacity from 15,000 to 18,000 tonnes/year of sodium cyanide briquettes to give a total production capacity of 36,000 tonnes/year.

The key process involves the reaction of liquid hydrocyanic acid with sodium hydroxide to

form a sodium cyanide mother solution. The mother liquid is concentrated through evaporation and fed to a crystallizer under controlled conditions. The cyanide crystals formed are separated from the mother liquid and the filtrate is recycled back through the crystallizer. The wet cyanide crystals collected are dried and molded into briquettes.

The briquettes are packed in one ton Intermediate Bulk Container (IBC) boxes. The IBCs are transferred to a dedicated warehouse, which is connected to the production Plant by means for an enclosed conveyor, to await shipment. Cyanide freight forwarding in IBCs is performed by Krok-Trans LLC rail company, from Saratovorgsintez , Russia to Polyus Krasnoyarsk and Polyus Verninskoye gold mines. Krok-Trans LLC, became a signatory to the International Cyanide Management Code for the Manufacture on February 14, 2020.

All off gases from the process and ventilation systems pass through a wet scrubber system to remove cyanide and hydrogen cyanide (HCN) gas prior to discharge through an incinerator to the atmosphere. Wastewater from the process and wash down water is collected in tanks and treated with sodium hypochlorite prior to being piped to the biological treatment plant of the enterprise before being discharged into the Volga River.

Auditor's Finding

This operation is

- ✓ in full compliance
- ☐ in substantial compliance
- ☐ not in compliance

with the International Cyanide Management Code**.**

This operation has not experienced any compliance issues or significant cyanide incidents during the previous three-year audit cycle.

The Saratovorgsintez operational certification audit was performed in April 2023 by an independent third-party auditor who is pre-approved by the International Cyanide Management Institute (ICMI) as Lead Auditor and as technical expert for ICMI audits of gold and silver mining, cyanide production and transport operations.

Solid sodium cyanide production operations, policies and procedures, and the facility, were evaluated during this recertification audit. The audit was conducted through discussions and interviews with operations personnel, senior management, operations management, engineering, and environmental, health, safety & quality staff (EHSQ). Personnel involved in the audit were Saratovorgsintez employees. The auditor used the International Cyanide Management Institute (ICMI) "Cyanide Production Verification Protocol" from 2021 to evaluate the International Cyanide Management Code (ICMC) compliance.

Locally defined procedures were evaluated during this audit. This ICMC compliance

assessment was based on random samples of information. Interviews, observations, and a review of records and data were typical of an EHSQ management system or compliance audit.

The auditor found that the overall level of preparedness for the assessment and understanding of ICMI Cyanide Code requirements was excellent. Management systems upon which the operation is based were found to be very mature and personnel demonstrated excellent operational discipline.

All aspects of the cyanide operation were included in this ICMC Recertification Audit. The operation was found to be in FULL COMPLIANCE with the ICMC Cyanide Production Operational requirements.

Auditor Information

Audit Company:	Cyanide Auditors S.A.	
Lead Auditor:	Bruno Pizzorni	bpizzorni@cyanideauditor.com
Production Technical Auditor:	Bruno Pizzorni	
Dates of Audit:	April 3 to 7, 2023	

Auditor Attestation

I attest that I meet the criteria for knowledge, experience and conflict of interest for a Cyanide Code Certification Audit Lead Auditor, 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 Cyanide Code Auditors.

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

PRODUCTION VERIFICATION PROTOCOL

Principle 1 | OPERATIONS

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

Production Practice 1.1

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

The operation is

- ✓ in full compliance with
- ☐ in substantial compliance with
- ☐ not in compliance with

Production Practice 1.1

Summarize the basis for this Finding/Deficiencies Identified:

The auditor verified through discussion with the head of Design and Engineering Department (PKO), and by inspection of the PKO archive. that the facility has retained its records of the review and approval of the facility's design and construction by regulatory agencies. The auditor verified that the facility keeps all the construction quality control and quality assurance records in a documentation archive dedicated to maintaining these records as well as all manuals of the equipment installed in the Plant. The files are kept correctly labeled and ordered for its easy access.

During the previous certification audits the quality control and quality assurance programs were validated. No new cyanide production facilities have been built since the last audit. Sodium cyanide is produced in the two production lines commissioned in 2008 and 2015.

Design of the first line began in 2004 by Giprosintez and the Plant construction began in 2007 after the design was approved by State expertise. Construction supervision was undertaken by Giprosintez. Construction was signed-off by Rostekhnadzor and a Commissioning Act of acceptance was issued prior to start of production. The second line was designed by GLATT Ingenieurtechnik GmbH, a German engineering company, under license from E.I. du Pont de Nemours and Co., Inc. (USA). The design was approved by Glavgoseksperitza. Construction supervision and acceptance up to the point of commissioning was undertaken by LUKOIL Nizhegorodniinefteproekt LLC. A Certificate of Conformity to Technical Regulations for Capital Construction was issued in June 2015. Both lines are housed within the same Plant (frame 650).

All Saratovorgsintez engineering documentation and approvals for construction are retained in Saratovorgsintez the PKO archive in the main office. The archive is managed by a full-time specialist and document retention is carefully controlled with only copies of

documents permitted to leave the archive.

The materials used for construction of the cyanide production facility are compatible with reagents that are used in the production processes. Materials specifications were sampled during the initial certification audit and were found to be acceptable.

The Certificate of Conformity to Technical Regulations for Capital Construction confirms the project compatibility. The document “Permanent Technological Rule Book for the Production Sodium Cyanide and Degassing Cyanide Compounds (PTSN and DTSS)at the Sodium Cyanide Production (SCP) and Cyan-Containing Compound Degassing (CCD) Plant (Technological Rule Book), in Section 11 -– “Specifications of the Main Technological Equipment” - provides details of the materials used in construction of the various equipment and piping at the Plant. Most piping and vessels used to convey and process cyanide solutions are constructed of various grades/standards of stainless steel depending on use and country of origin of the component, with some impellers and other components constructed of carbon steel. This requirement was verified through site inspection and review of the Technological Rule Book.

Interlock information was reviewed during the audit. Each critical system has been designed to have an interlock mechanism. The interlocks are designed to prevent cyanide releases in the event of a power loss or equipment failure. This requirement was verified through discussion with the shop manager, site inspection, and review of the Technological Rule Book.

The interlocks are linked through a system and will prevent releases in the event of a power loss. Both cyanide production lines are of similar design. The pipelines valves are activated by pressure, temperature and/or feed rate deviations. The liquid hydrocyanic acid supply line is equipped with interlock valves that activate to shut off supply and flush the associated piping with nitrogen if there is a problem. The hydrocyanic acid supply also enters the Plant on the fourth floor providing a head of 11 m, which in the unlikely event of a failure of the nitrogen flush system, provides an addition safety mechanism to drain the HCN line. The Technological Rule Book, Section – Table 8 Technological Controls, lists the controls installed for each piece of equipment and the pressure, flow and/or temperature settings of alarms and interlock systems.

In addition to the interlock valves, HCN sensors are in place at the valve boxes for the hydrocyanic acid lines to detect possible leakage. The HCN sensors also activate the interlocks if HCN gas is detected.

All production activities are done on a concrete surface. No cyanide-related activities are performed outside of the containment area. In occasion of this recertification audit, the auditor confirmed through observation, the concrete surface and its construction joints are in good conditions, providing an adequate surface to avoid any infiltration to the subsoil. During the site visit, the auditor inspected the operation confirming that the impermeable surfaces are intact and do not have cracks that compromise their ability to contain released

cyanide.

The industrial premises including frame 65 0are designed to contain any spill. Spillage or wash water from each floor is directed to the collection wastewater tank 602 and 606. The wastewater tanks are located just outside the Plant in a concrete containment basin; one basin for each production line. All wastewater no longer suitable for return to the process is directed to the local wastewater sodium hypochlorite treatment Plant (frame 572) before being sent to the biological wastewater treatment Plant that serves the industrial complex. Each floor in the Plant were observed to be competent and well maintained.

The auditor observed the secondary containment at the wastewater sodium hypochlorite treatment Plant, where the floor surface has acid resistant bricks, needing to fix the seals in-between bricks to conform an impermeable barrier to avoid infiltrations to the underground in case of a spill. Reviewing the engineering drawings, the auditor confirmed that under the bricks there is a reinforced concrete slab of 20 cm thick, impermeabilized with two layers of polybutylene rubber, providing an adequate barrier against spills infiltration into the subsurface. Anyway, the auditor as a recommendation for improvement, asked to fix the bricks joints, which was positively accepted by the management of the workshop as an improvement opportunity.

The wastewater tanks are linked to the production frame 650via two pipelines (one for each production line) that are buried for a short distance between the Plant and the wastewater tank containment basins that serve each production line. Although these pipelines are not double contained, they are constructed of stainless steel. Also, because the operation is regulated as a Class I hazardous facility all piping is required to be inspected by an external party, annually and hydraulic tested at least every 8 years. These wastewater pipelines are periodically hydrostatically tested and have been approved by Rostekhnadzor for continued operation. This requirement was verified through discussion with the head of the production shop as well as review of pipeline inspection and testing records.

Interviews with the Chief Metrologist of the plant, maintenance schedules and maintenance logbooks samples, confirmed that all tanks and storage vessels have tank level indicators and high-level alarms that are linked into a control system. Process tanks are fitted with low and high level visual and audial alarms that give a signal to the control room of the shop, to prevent them of overflows. The alarms are generally set to alarm when solution drops below 20% and to alarm and lock out when solution reaches 80% of the vessel volume. The required alarm settings for various vessels are specified in the Technological Rule Book. The indicators were deemed to be enough for preventing the overfilling of cyanide process and storage vessels.

The Plant has implemented procedures and programs to conduct routine inspections of all instrumentation, including level indicators at tanks, to confirm that the tank level instrumentation and alarm systems are functioning properly. The use of control and measuring devices at hazardous production facilities is subject to local regulations. The

tanks level alarms are checked each shift and recorded in the logbook in accordance with Instruction for the Operation and Maintenance of Automatic Alarm Systems (SAS) and Emergency Automatic Protection (PAZ) in the workshops of Saratovorgsintez. The operability of the alarm is checked according toa monthly schedule as recommended by the manufacturer and as defined in the Russian Federation Certificate of approval for the devices.

The secondary containments for process and storage tanks and containers are constructed with materials that provide a competent barrier to leakage. There have been no changes in secondary containment provided for cyanide production facilities since the previous ICMC certification audit. Secondary containments have been designed to prevent releases to the environment. Construction monitoring and quality assurance and quality control was conducted of containment structures as part of federal requirements and approved prior to site commissioning.

All operations and process equipment are enclosed within the Plant building containment or are located outside in appropriately sized concrete secondary containment areas equipped with pump sumps and generally protected from the precipitation by a canopy roof. All secondary containment areas are sized to hold a volume greater than that of the largest tank, any piping draining back to the tank. Engineering information, calculations, and rainfall information were reviewed during the initial certification audit, all information was found to be appropriate and acceptable. The process tanks located in exterior areas without roofing have appropriate containment systems that ensure full containment with sufficient capacity to retain precipitation from a design storm event.

In occasion of this audit, the auditor verified that secondary containment systems are in good condition and as a request for improvement, requested to impermeabilize and seal all the joints in the acid proof bricks installed at the floor of the secondary containment of the sodium hypochlorite treatment Plant.

All cyanide solution pipelines are located within secondary containment provided by the Plant with exception of the liquid hydrocyanic acid supply line to the workshop, wastewater tank.

The hydrocyanic acid supply line is constructed of double welded stainless steel and is equipped with shut-off valves that will flood and flush the pipe with nitrogen if there is a critical change in flowrate, pressure, or temperature outside of normal operating parameters. The pipeline is 57 mm diameter pipeline with thickness of walls of 3 mm to 6 mm and is constructed on an above-ground pipeline gantry that runs between the hydrocyanic acid warehouse (frame 508) and the Plant (frame 650). At the time of the 2016 ICMC audit, the pipeline extended between the acrylonitrile production Plant and frame 650, along an indirect route. In September 2018, a new hydrocyanic acid warehouse was built(frame 508) and the hydrocyanic acid supply pipeline redirected toa more direct route to frame 650; reducing the total length of the pipeline, significantly reducing inspection and

maintenance requirements.

Stainless steel pipelines transfer wastewater from the plant for the production of cyanide sodium (frame 650) for waste treatment, to the sodium hypochlorite water treatment plant (frame 572) via the wastewater collection tanks located in the containment basins just west of the Plant. Between frame 650 and the wastewater secondary containment basin the pipelines are buried. Between the containment basin and frame 572 the lines are constructed above the ground on a pipeline gantry.

The integrity of all pipelines and supporting structures are required to be visually inspected annually and hydrotested at intervals depending on the use of the pipeline, but at least every eight years as specified by Instruction MO-10 – Manual on Audit and Repair of Technological Pipelines with a Pressure up to 10 Mega Pascal (100 kgf/cm^2), which incorporates Federal Rules and Regulations for Safety of Hazardous Production Facilities, requirements. In compliance with these rules, the HCN pipeline is hydrotested every 3 years and the wastewater lines every 8 years.

Detailed investigation including visual inspection, ultrasound testing, valve inspection and hydraulic testing was completed on all pipelines. A licensed expert organization conducted an industrial safety review and approved the further operation of process pipelines.

This requirement was verified through discussion with the Head, Technical Supervision Department, site inspection, review of pipeline inspection and maintenance procedures, and review of the pipeline maintenance records for inspection and hydrotesting of the buried wastewater lines between the Plant and the wastewater tank containment basins.

Cyanide is packed in closed wood boxes, Intermediate Bulk Containers (IBC), packaged in polyethylene and polypropylene bags which protect the product from the air-environment moisture. IBCs are stored on concrete floor in good conditions to prevent contact with water. No water systems for potable use is near this area. The surfaces adjacent to the warehouse are graded away from the warehouse to prevent ponding of water near the walls.

The IBC boxes are packed and sealed in the packing area located on the ground floor of frame 650 and transferred to the warehouse via a covered conveyor system (transport gallery),, which prevents the containers being exposed to moisture.

The warehouse is equipped with 25 fixed HCN gas analyzers. A balanced general exchange natural ventilation system is provided at the warehouse for the finished products. The exhaust is channeled through baffles and air is supplied through windows and structural openings. Emergency extraction ventilation inside the warehouse is designed to turn on in response to hydrogen cyanide gas detectors, in order to ensure the air exchange necessary to maintain the content of pollutant to less than the maximum permissible concentration level (i.e., 0.3 mg/m3). The amount of air exhausted is compensated by intake of air through the automatically opened accesses.

The production and storage facilities are located within an industrial area that is protected by a very restricted access control system. . Access to the territory of the plant is controlled by a security company. Access to the warehouse is further restricted to authorized personnel only and entry requires signed authorization.

The cyanide storage is in a dedicated warehouse for sodium cyanide, no other material is stored inside. Cyanide is separated of incompatible materials in all cases. This requirement was verified through site inspection and discussion with the shop deputy.

Production Practice 1.2

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

The operation is	✓ in full compliance with ☐ in substantial compliance with ☐ not in compliance with	Production Practice 1.2

Summarize the basis for this Finding/Deficiencies Identified:

The facility has written management and operating plans and procedures for operating its cyanide production Plant and maintains management system certifications in accordance with the International Standards Organization (ISO) 9001:2015 - Quality management systems, ISO 14001:2015 Environmental management systems, ISO 50001: 2018 - Energy management system and ISO 45001:2018 - Occupational health and safety management.

The facility has a full set of operating procedures that describe the standard practices necessary for its safe and environmentally sound operation. Operating procedures, parameters and instructions related to the cyanide production process are, among others:

- Permanent Technological Rule Book for the Production of Sodium Cyanide Compounds at the Sodium Cyanide Production and Degassing Plant.
- Instructions for Fire Safety of the workshop for the monitoring station and DCS .
- Instruction for synthesis of the 5th and 6th category of the department for the production of sodium cyanide of the workshop, the central monitoring station and the DCS .
- Instruction for category of the department for the production of sodium cyanide of the workshop of the central monitoring station and the DCS.
- Instruction for the 5th category of the department for degassing of cyanide compounds of the workshop of the central monitoring station and the DCS.
- Instruction of the Oxidation Operator of Category 4 and 5for the CCD Section. Discharge department of the degassing of cyanide compounds of the workshop of the central monitoring station and the DCS.

- List of process standards controlled by workshop of monitoring station and DCS to assess self-control.
- Regulations on the workshop for the production of PTSN and DCS O

Procedures for personal protection equipment and instruction for respiratory protection. These include:

- Instruction for safety, industrial sanitation and fire safety of the workshop of the central monitoring station and centralized control system.
- Instruction on Labour Protection for Operators in DCS.
- Instruction for Labour Protection for receiver of raw materials, , semi-finished and finished products of the workshop of the central monitoring center and DCS.
- Manual on Industrial Filtration and Isolating Means for Protection Respiratory Organs.
- Instruction of Labour Protection During Loading and Unloading Operations.
- Instruction on Labour Protection when Working with Chemicals.
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This requirement was verified through review of documentation and interviews with the workshop personnel.

The facility written operating plans and procedures for operating its cyanide production Plant include contingency instructions for non-standard operating situations that detail measures to be implemented if there is an upset in any activity that may result in cyanide exposures or releases. Operating procedures detail actions to be taken in the event of an upset or an emergency. Alarms and interlocks are in place for critical equipment to shut down the process and alert operators in the event of a potentially serious event. All foreseeable situations are documented in the procedures together with the response required to rectify an upset or emergency situation. This requirement was verified through review of the operating procedures.

Procedures are in place to address changes in the facility as equipment, operating practices, personnel, and product specifications. A procedure is established by law for making structural changes of projects previously approved by Glavgosekspertiza. Proposed facility changes are introduced through a company order in which all service areas affected by the change, including the safety and environmental departments are directed to discuss the proposed change and develop a term of reference from which the engineering design is developed. The proposed change is submitted to Glavgosekspertiza for approval and issuance of a construction permit. No changes have been made to the cyanide production facility since the last ICMI certification audit that have required review and approval by Glavgosekspertiza.

On any change in regulations related to the site, the affected procedures are updated in accordance with the plant regulations. It is required that development of technical

regulations and instructions for work in technical workshops, or changes to these regulations or instructions must be approved by the Head of Industrial Safety, Labour Safety and Environmental Protection prior to implementation of the proposed changes and modifications.

The staff of the Plant is required to undergo specialized training and pass an exam in labor protection and industrial safety in order to be ready for the position held. If a person is to be promoted the candidate is required before taking up the position to complete specialized training in order to be prepared for the new position. Where product specification changes are proposed, procedure requires pre-agreement of customers and others that may be impacted by the proposed change.

These procedures require to evaluate any impact on the worker´s Health & Safety (H&S) and the environment before any change in project, procedures, personnel or equipment implemented on site; require conducting a risk analysis before changes are done; to identify changes that may increase the potential for cyanide releases and adverse impacts on worker health and safety before such changes are implemented so that they can be evaluated and addressed, as necessary; and require written notification to environmental and health and safety personnel and a sign-off before the change can be instituted. Verification was through review of the procedures as well as completed management of changes forms, signed off by environmental and health and safety personnel.

The facility has a preventative maintenance program based on Regulation “Provisions on the Maintenance and Repair of Technological Equipment.” This Regulation follows Company standards and provides instruction for inspection and maintenance of piping and valves. Because the operation is regulated as a Class I hazardous facility, monthly inspections of the Plant are undertaken by Rostekhnadzor.

An annual maintenance plan is developed that itemizes equipment by the name of the equipment and its schematic reference name. The frequency of maintenance -based on the requirements recommended by the manufacturer and provided in the equipment’s technical passport- and the estimated hours to complete the maintenance are also included. This annual schedule is used to develop a monthly maintenance schedule that itemizes equipment, the date scheduled for the maintenance and the estimated hours to complete the task. The monthly schedule is updated as a record of maintenance completed. Records show the total hours of maintenance undertaken on the equipment and the hours that the equipment is in operation each year.

Saratovorgsintez schedules a plant shutdown annually to allow maintenance of critical equipment; usually is during September/October when the acrylonitrile Plant that supplies the liquid hydrocyanic acid has its scheduled shutdown repairs. This requirement was verified through discussion with the Head, Technical Supervision Team, and review of Company Maintenance Standards and selected examples of maintenance records. The auditor reviewed work orders describing work performed, spare parts changed, and

recommendations. Maintenance records were available for review and found acceptable.

Process parameters at the Plant are monitored with necessary instrumentation. Calibrations performed by Plant personnel are done according to a defined procedure, with calibrated test equipment, and with personnel who have been trained and found to be competent. Calibrations are performed at frequencies that are consistent with manufacturer recommendations. The master schedule of calibrations to be done and the calibration records were sampled during the audit.

The production process is continually monitored by shift operators in the Plant control room and centralized central control system . Instrumentation readout is monitored on the control room display console. There are separate consoles and operators for each of the two production lines. The control systems are checked and calibrated every two years.

The Technological Rule Book, – Section 7.2 Technological Controls, lists the instrument controls installed for each piece of equipment and the pressure, flow and/or temperature settings of alarms and interlock systems. This instrumentation is inspected and calibrated as per Company Standard Organization of Metrological Maintenance. There is a complete team of employees in the Department of Chief Metrological Engineer that manage instrumentation maintenance. These staff are supplemented by full time contractors from various specialized organizations. Except for instrumentation that cannot be removed and is calibrated in place by government approved contractors, all instrumentation must be sent to a specialized licensing centre for maintenance and calibration.

This requirement was verified through discussion with the Head, Cyanide Plant, Chief Metrological Engineer and review of and site inspection logs and instrument maintenance records.

All wastewater from the facility is directed to the wastewater tanks located in a concrete containment basin of frame 650. The containment basins for each line are partially protected from precipitation by canopy roofs. Each tank is equipped with a pump for pumping sediment into one of the wastewater tanks. All wastewater, with the exception of domestic wastewater, is sent to local treatment facilities (frame 572) for cyanide neutralization and then sent to the biological wastewater treatment plant located at the industrial site of Saratovorgsintez for further treatment. The concentration of free cyanide in wastewater discharged from the local treatment of frame 572 does not exceed 3 mg/l. At the biological wastewater treatment plant the effluent is processed to remove contaminants, including any residual cyanide, to meet regulatory environmental surface water standards prior to discharge into the Volga River. Discharge is regulated under permit. The wastewater storage and treatment tanks for the local wastewater treatment Plant are located within concrete secondary containment basins. Reservoirs for storage and treatment of wastewater for the local treatment plant are located in a concrete embankment with additional chemical protection.

The laboratory controls the discharge from frame 572 and, additionally, before entering the

treatment plant, to make sure that the standard is maintained, not more than 0.569 mg/l. Although stormwater from the surrounding area mixes with discharges from frame 572 on its way to the biological treatment plant, these discharge criteria have been set so that the free cyanide content in the wastewater does not exceed 0.048 mg/L at the outlet of the biological treatment plant. structures. Free cyanide above this concentration will be toxic to humans and aquatic organisms.

This requirement was verified through discussion with the Ecologist and Head of Industrial Safety, Labour Safety, and Ecology Protection; and review of environmental analysis.

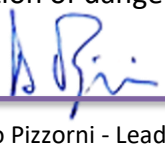
Although no solid cyanide waste is generated as it is recycled within the process, the Plant has implemented environmentally sound procedures for the decontamination of cyanide-contaminated solids and the proper disposal of all materials.

Instruction PTSN-TB-1 on safety, industrial sanitation and fire safety of the Workshop for the production of sodium cyanide and degassing of cyanide compounds (PTSN and DCS), item 2.8. Safety measures for waste disposal and cleaning production Plants, describe the procedure to follow in the event that cyanide compounds come into contact with workwear during operation. Protective clothing should be removed immediately in compliance with precautionary measures (use of respiratory and skin protection equipment) and immediately sent for disposal by soaking for 2 hours in hot water. Neutralization is carried out in the workshop. After neutralization, overalls can be sent for washing or for disposal in the manner prescribed for contaminated waste. Garbage and waste materials must be placed in metal boxes, and then removed from the workshop to a designated place.

The Instruction outlines how to proceed with cyanide waste and potentially contaminated solids with cyanide as used Tyvek suits, other used personal protective equipment (PPE) and any other material used to recover any spill of cyanide. The procedure also describes how equipment that may be contaminated with cyanide should be decontaminated prior to disposal.

Records were available for review and confirmed that the hazardous waste disposal company used is authorized to take toxic (hazardous) waste. The Plant maintains a file with all the permits from this transport company.

The requirements for packaging and labeling are provided in the document Sodium Cyanide Briquettes Technical Conditions and comply with the United Nations (UN) Recommendations on the Transport of Dangerous Goods and Agreement on International Goods Transport by Rail, to ensure that the cyanide is packaged and labeled as required by the political jurisdictions through which the packaged cyanide will pass. Packaging has Certificates of Conformity to the Standards of UN Maritime Dangerous Goods Code (IMDG). The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), and Regulations concerning the International Carriage of Dangerous Goods by Rail (RID). The produced cyanide packages and labeling are in full compliance with the international regulations for transportation of dangerous goods.



This requirement was verified through site inspection and discussion with the Head of Sodium Cyanide Plant and acting as head of sales department

Production Practice 1.3

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

The operation is	✓ in full compliance with ☐ in substantial compliance with ☐ not in compliance with	Production Practice 1.3

Summarize the basis for this Finding/Deficiencies Identified:

The facility conducts routine inspections of tanks holding cyanide solutions for structural integrity and signs of corrosion and leakage; also the maintenance department performs on a regular basis, inspections to pipelines, pumps and valves, for deteriorating and leakage, in compliance with the procedure Provisions on Engineering Maintenance and Repair of Technological Equipment and detailed work instructions. Instruction MO-10 Instruction on Exploitation, Revision and Repair of Technological Pipelines with Pressure up to 10 MPa, provides requirements on inspection and maintenance of piping and valves. There are also instructions in place that detail routine inspection and maintenance requirements for the various types of pumps used in the Plant.

Routine inspections of the integrity of installations are undertaken by operators per shift in accordance with the work instructions of the workshop monitoring station and DCS. Any concerns are documented in the shift log that is maintained in the operator´s room. The logbook is reviewed and signed by the Head and Deputy Head of the Sodium Cyanide Plant each day. Records were available covering the last 3 years.

In addition to shift inspections, periodic inspections are undertaken by the Chief Mechanical Engineer's maintenance department, to the industrial building structures, including secondary containment areas for their integrity, the presence of fluids and their available capacity, and to ensure that any drains are closed and, if necessary, locked, to prevent accidental releases to the environment, as required by C-1 - Instruction on Operation and Maintenance of Industrial Buildings and Facilities of Saratovorgsintez, Section 5.8. These include quarterly inspections of structures located within a normal environment and monthly inspections of structures located within harsh environments. The results of these inspections are recorded in technical journals or, for significant deficiencies, in regulations or acts that address the deficiencies. The floors within the Plant and warehouse, and the secondary containments for the wastewater collection tanks were observed to be in good condition.

The facility conducts inspections of containers integrity prior to every cyanide shipment, although the producer is not responsible of its maintenance. Cyanide freight forwarding in IBCs is performed by Krok-Trans LLC rail company, who is responsible for the container's maintenance and integrity.

These requirements were verified through site inspection, interview with the shop manager and department head of the technical supervision, and review of operating instructions and maintenance procedures and records.

Inspection frequencies were found to be sufficient to assure that equipment is functioning within design parameters. Inspection frequencies are set out in the detailed work instructions for inspection and maintenance of equipment and buildings. The inspection and maintenance frequencies are selected based on the specific equipment passport requirements which follow Rostekhnadzor requirements. Being the facility a Class I hazardous operation, monthly inspections are undertaken by Rostekhnadzor inspectors. Based on observations made during the site visit the Plant appeared to be neat and equipment well maintained indicating that inspection frequencies are sufficient to assure that equipment is functioning with design parameters.

This was verified through interview with the head of the department of the technical supervision, site inspection, and review of operating instructions and maintenance procedures and records. Records were available for review and found to be complete.

The facility documents inspections and retains records in electronic and in hard copy. Any concern identified during shift inspections of the Plant are documented in the shift log that is maintained in the control room. This logbook is reviewed and signed by the Head and Deputy Head of the Sodium Cyanide Plant each day. Inspections are conducted in accordance with the updated procedure -Provisions on organization and performance of preventive activities in area of industrial safety, labor safety and environmental protection at Saratovorgsintez - whereby all inspection services of the company file a designated form or checklist on the results of the inspection, which includes information on the nature of observed deficiencies, the date of the inspection, as well as the date of deficiency being eliminated, the name of the inspector, and the measures undertaken to address and fix deficiencies are identified. This information was confirmed through interviews and a review of records. All information was found to be acceptable by the auditor.

Principle 2 | WORKER SAFETY

Protect workers' health and safety from exposure to cyanide.

Production Practice 2.1

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

The operation is	✓ in full compliance with ☐ in substantial compliance with ☐ not in compliance with	Production Practice 2.1

Summarize the basis for this Finding/Deficiencies Identified:

The facility has developed and implemented procedures that minimize worker exposure under normal operations for cyanide production, storage and shipment. Safe work procedures are established in the Instruction for Personnel of the shop for the production of sodium cyanide and degassing of cyanide compounds . This manual provides descriptions on the main hazards to be encountered, basic rules of work, fire safety, Personal Protective Equipment (PPE) and cyanide exposure first aid measures. In addition, there are specific instructions on the safe performance of hazardous tasks, including, respiratory protection, confined space entry, hot work, working with chemicals, working at heights, working around mobile equipment, handling of loads, performing specific maintenance tasks, isolation of dangerous energies, handling, transport and storage of hazardous chemicals, correct use of HCN personal analyzers and handling and storage of compressed gas cylinders, among others.

Procedures are in place for normal operations, abnormal operations, maintenance-related activities and for emergencies. A list of all operational, maintenance, and Health and Safety (H&S) procedures was available for review and found to be acceptable. The Permanent Process Regulations for the shop for the production of sodium cyanide and degassing of cyanide compounds, section 8 " Possible incidents in operation and methods for their elimination ", has instructions to evaluate and rectify non-routine or abnormal situations, Sections 9.2 Incidents and Accidents has instructions on addressing emergency situations and Sections 9.4.1 – 9.4.11 Safety measures for exploitation of Plant has instructions on emergency shutdown.

.Procedures for normal operations, abnormal operations, emergency response, and maintenance-related activities were sampled, personnel were interviewed, and records were reviewed. Implementation and compliance with procedures were confirmed through these auditing methods.

These documents include statements for use of personal protective equipment and for pre-work inspections, as appropriate and necessary for the Plant operation. Pre-work inspections are required, the use of personal protective is addressed in the procedures. Pre-work inspections are focused on safety and operational issues and documented in inspection. The operation has also procedures in its emergency response plans describing the specific steps necessary to decontaminate emergency response equipment which could have been in contact with cyanide.

The auditor reviewed these procedures confirming they describe safe work practices and are implemented, through employee interviews and observation.

Workers at the facility have the opportunity to express their feedback in development and evaluation of health and safety procedures during diffusion of the updated procedures, briefings at the beginning of the working day, and during the daily work planning, in which various topics are discussed and work is planned.

Operators are encouraged to provide feedback on procedures and changes at the facility. The Plant solicits workers input and considers it when developing and evaluating health and safety procedures. This is achieved through designated worker Health and Safety (H&S) representatives on the Saratovorgsintez Professional Union H&S Committee. Committee meetings are held quarterly, during which worker representatives present input. Saratovorgsintez also holds and annual H&S review competition in which workers are invited to present ideas for improvement. The winners of the competition receive a financial bonus.

The 5S methodology (efficiency and effectiveness management) competition held between Saratovorgsintez departments is still in place in which several operational aspects are judged during this competition. The competition encourages improvement in production efficiencies and overall organization including H&S management and general housekeeping. The winning department receives a financial reward. Saratovorgsintez has also embraced the Six Sigma Lean program to encourage improvement in process and energy efficiency. There is also a suggestions box located at the main office reception that can be used to communicate anonymously.

This requirement was verified by interview with Head of Department of Standardization of management systems, and post on boards of the Plant offices s featuring the names and photos of the employees of the department winning of the year. Employee participation in the development and maintenance of safety practices was found to be acceptable.

The facility identified areas and activities where workers may be exposed to hydrogen cyanide gas and/or cyanide dust. To ensure safe work environments, areas of the Plant and cyanide warehouse were formally evaluated by engineers with extensive experience in the production and storage of cyanide. The need for using portable HCN analyzers was incorporated into operational procedures for operations known to have the potential for exposure to elevated cyanide or HCN levels. The detectors are equipped with audial and

visual alarms and are set to alarm at 0.3 mg/m3, the maximum permissible concentration. It is a requirement of the operation that operators must carry a portable analyzer with them. Additionally, stationary analyzers are installed in areas that have the potential of having elevated levels of HCN gas or cyanide dust.

All hazards associated with the workplace are identified in the Instruction Manual for Health and Safety. Fixed HCN gas detectors are located in all areas where HCN is a potential risk. Workers are trained in use of appropriate PPE, including mandatory PPE to be used in the workplace as well as additional PPE required for undertaking specific tasks. The required PPE is displayed on signs posted throughout the Plant. Instruction - Use of Filtering and Insulating Respiratory Protection, addresses requirements for respiratory protection. The Instructions require PPE and gas analyzers in the areas as protection from exposure HCN gas.

The auditor confirmed by direct observation workers using portable HCN analyzers, fixed HCN gas analyzers installed and signaling warning workers, the use of portable and fix HCN analyzers and require appropriate personal protective equipment for the areas and activities where such exposures may occur. Administrative controls are identified in the Instruction Manual for Health and Safety, as necessary. By interview with the head of cyanide shop Head of Sodium Cyanide Plant and workers and review of the corresponding Instructions, the auditor confirmed that these protective measures are being implemented.

HCN toxic gas analyzers are located throughout the Plant production area and warehouse. The detectors are equipped with audial and visual alarms and are set to alarm at 0.3 mg/m3, the maximum permissible concentration. Fixed HCN Honeywell gas analyzers are located on all floors of the Plant as well as in the warehouse (frame 232). There are currently 15 fixed analyzers located at strategic points along each production line and a total of 25 in the warehouse. The detectors monitor ambient conditions in the workplace as well as interstitial space in liquid hydrocyanic acid lines and conduits to monitor for potential HCN leakage. The detectors are equipped with audial and visual alarms and are set to alarm at 0.3 mg/m3, the maximum permissible concentration. Maintenance keeps an additional 25 analyzers in stock for replacement as detectors are taken out of service to be sent out to specialized organizations accredited by the Federal Service of Accreditation (Rosaccreditation) for calibration. In addition, Saratovorgsintez has 12 portable HCN detectors.

Federal regulation requires all workers to be trained in Instruction on the Action of Personal in Emission Related Emergencies. In the event of a gas emission alarm, workers are instructed to alert others, use their escape respirator which everyone is required to carry at all times in the Plant, determine the direction of the gas, quickly and calmly evacuate to an area out of danger and perpendicular to the wind direction, and confirm their location to the head of shift. Dispatch will alert the emergency response team. A load speaker system is in place to provide workers with further instruction.

This requirement was verified through site inspection and interview with the head of the Gas Rescue Squad.

The fixed and portable HCN gas detectors are maintained following the Organization of metrological inspection of measuring and testing equipment, according to which the schedules for equipment and measuring instruments maintenance are developed. Maintenance is conducted annually in conformance with the recommendations of the manufacturer of the analyzer and as required by their regulatory certificates. Maintenance is only permitted to be conducted by organizations accredited to undertake the work. The HCN gas detectors are sent annually to “ERIS” LLC in St. Petersburg, or to the Federal Budgetary Institution (FBU) Saratov State Regional Centre for Standardization, Metrology and Testing for sensor replacement and calibration. Relevant records and documents are retained.

This requirement was verified through discussion with the Head Instrumental Control and reviewing calibration certificates to fixed and portable HCN detectors performed during this recertification period.

The Instruction Manual for Health and Safety and the Instruction on Labour Protection for Operators , Section 1.5-5, specify those tasks where a second person is required to be in attendance. It is not allowed people to work alone in areas where cyanide is present. It is established that operators must work in pairs for the cyanide activities considered risky. Upon entry into the production area, each person signs into the area operators; all employees have radios for communications. There is also a loudspeaker system. In addition, there are in the workshop 17 cameras located about the Plant that are monitored from the control room.

The auditor confirmed compliance with this provision through review of the Instructions and interview with Head of Sodium Cyanide Plant, Head of Industrial Safety, Labour Safety, and Environmental Protection.

Fitness for duty medical exams are done prior to hiring and on at least an annual basis thereafter. All employees are subjected to obligatory preliminary and further regular medical examinations to determine their fitness to perform their specified tasks. Medical examination is a requirement of the Russian Federation Labour Code, as well as the Order of the Ministry of Health and Social Development of the Russian Federation , Occupational Safety and Health (OHS) Instructions and Work Instructions. A medical clinic is located at the site and undertakes the employee medical examinations, which .include testing the ability to use a respirator, mandatory hearing and vision tests, and spirometry to pulmonary function.

This requirement was verified through discussion Head of Industrial Safety, Labour Safety, and Environmental Protection and review of corresponding documents. Records are maintained in the medical files.

The Plant clothing changing policy requires that operators change clothing before the start of the working day and before leaving work. The clothing change policy is unchanged since the last ICMC certification audit. All employees, contractor representatives and visitors must use PPE, including overalls and safety shoes provided by the facility. This requirement is provided in the Plant Instructions. Coveralls must be removed, vacuum cleaned in a dedicated room, and stored in separate lockers at the end of shift. Onsite laundry facilities are to be used for work clothes. Workers are provided with two sets of coveralls and are required to shower at the end of each shift and launder their coveralls at least every four days.

This requirement was verified through interview with the foreman of the workshop and review of the corresponding policy document.

Appropriate cyanide warning signs and PPE signs are present in all operational areas. Workers are alerted to the presence of cyanide and the need for appropriate personal protective equipment. Leadership and employees showed very good awareness of the restrictions and of the potential dangers of not adhering to those restrictions.

Hazard warning signs are prominently located throughout the Plant to inform workers of the various chemicals and other hazards present. Signs are also posted that display the PPE required to be worn in various areas of the Plant. All piping is color coded and labelled to identify the contents and include flow direction arrows as required by Instruction Manual for Health and Safety, Section 2.6.2.

The auditor verified compliance by observation of signage around the facilities, interviews with site personnel and review of procedures in the Instruction Manual.

The Plant prohibits eating, drinking, smoking, and open flames in the production and storage areas. As part of personal hygiene requirements established in the Instruction Manual for Health and Safety, Section 1.5-5, no food, cooking or eating is permitted to be conducted on the industrial premises except at specific locations or in the dining room. It is a requirement to wash hands before eating. Smoking is only permitted in designated smoking rooms. The use of open flames is prohibited without a hot work permit as required under Instruction on the safe conduct of high-risk work.

The auditor reviewed the training plans and records, interviewed the employees and observed on site signage throughout the facility, finding compliance with this provision. Employees showed awareness of the restrictions and of the potential dangers of not following the rules.

Production Practice 2.2

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

The operation is
- ✓ in full compliance with
- ☐ in substantial compliance with
- ☐ not in compliance with

Production Practice 2.2

Summarize the basis for this Finding/Deficiencies Identified:

The facility has developed a comprehensive emergency response plan - Plan of Measures for Localization and Liquidation of Accidents in the SCP and CCP Plant (Plan) for rapid and effective response to cyanide exposures. These Plans were reviewed and found to be comprehensive. The Plans include procedural steps to be followed if cyanide is ingested, skin or eye contact made, and/or if cyanide dust or gas is inhaled.

The Plans provide the response actions to be taken for various emergency scenarios, describe the employees' responsibilities in case of emergency, and measures on cooperation with local and regional chemical protection organizations. The Plans are approved and signed off by senior management of Saratovorgsintez and representatives of government response agencies. The Instruction Manual for Health and Safety provides response actions in the event of cyanide exposures to Plant personnel. This requirement was verified through review of the Plans , the Instruction Manual and interview with the Head of the Group of Civil Defense and Emergency.

Shower / low-pressure eye wash stations are located on each floor of the Plant throughout the site. The facility also has non-acid fire extinguishers located at strategic locations. They are inspected and maintained on a regular basis. Each station is also equipped with bottled eyewash. There is no shower in the dry zone to prevent water contact with cyanide powder and generation of HCN. However, in the event of worker exposure to cyanide there is a nearby shower and eyewash in the room adjoining the dry zone. The units are inspected as part of daily shift inspections and maintained on a regular basis.

There are no acidic portable fire extinguishers in the Plant. The location of fire-extinguishers is specified in Section 3 of the Instruction Manual for Health and Safety. In the event of a fire this building is equipped with an automatic system charged with Freon gas. The warehouse is provided with an automatic "Buran" type sprinkler system that is charged with a dry powder fire suppressant.

Routine inspection and maintenance of fire suppression equipment is undertaken in conformance with procedure "Regulations for Maintenance of Security and Fire Alarm

Systems," Section 7, which establishes an annual program for maintenance of security and fire alarm systems. The scope and frequency of maintenance work is in accordance with the recommendations of the equipment manufacturers. The maintenance is undertaken by TechCenter "LUKOMA", which has a license to carry out activities on installation, maintenance and repair of fire safety equipment for buildings and structures. Requirements for periodic inspecting fire extinguishing equipment are set out in the Instruction Manual for Health and Safety, Section 3 – Fire Safety. This requirement was verified through site inspection and discussion with the Head Sodium Cyanide Plant.

The cyanide production Plant operation has the necessary equipment available for emergency response to a worker's exposure to cyanide. Amyl nitrite antidote is available in place, along wilt the corresponding procedures for its application, in refrigerators located in the control room, the medical clinic, the warehouse, and in the Rescue Team Centre. At the Rescue Team Centre, amyl nitrite is packed in ice in an emergency ready medical response bag. The amyl nitrite is also carried by maintenance personnel when undertaking maintenance work in the Plant and returned to the head of shift and refrigerator at the end of shift. Medis, the site emergency response and medical contractor for the Saratovorgsintez industrial complex maintains medical oxygen and amyl nitrite kits at the Team Rescue Centre. There is always one doctor on duty at the centre. Doctors at Medis also have a supply of sodium thiosulphate antidote.

Medical oxygen and resuscitator kits (total of 12 kits), and on the rescue team vehicle are kept at the Rescue Team Centre including resuscitator Air Mask Bag Units (AMBU). The Rescue Team Centre also has equipment for recharging the air bottles of self-contained breathing apparatus.

Operators have radios for communication with the control room. There is also a loudspeaker system and telephones. An emergency dispatch control centre is located at the Rescue Team Centre that is manned 24 hours.

The auditor confirmed compliance with this provision through inspection of the facility and the medical officer , whose workplace is located in the same building as the center of the emergency team, and workers.

The facility inspects their cyanide first aid equipment's regularly, inspection records were available for the auditor's review. Inspection of amyl nitrite kits held in the Rescue Team Centre and control room showed the ampoule kits in stock were within their expiry date. Antidotes amyl nitrite kits and sodium thiosulfate antidote are inspected on a monthly basis and changed according to the approved schedule by the H&S department that ensures it will be effective when used and stored in refrigerators with temperature gauges controlled by thermostat to ensure that the kits are stored within the temperature range recommended by the manufacturer. The expiration date is respected.

The auditor reviewed examples of inspections for antidotes at the control room and Rescue Team Centre and found to be within the expiry dates. Personnel interviewed knew the

location of antidotes and the emergency notification process. Inspection records were sampled for the audit period and found to be in order.

Employees have access to the Safety Data Sheets (SDS) describing hazards information, appropriate PPE, exposure symptoms and information on cyanide first aid in areas where cyanide is used, in the Instruction Manual for Health and Safety.

According to Russian legal requirements additional information is available in writing at working places where cyanide handling is carried out. First-aid instructions was available in all areas visited during the site audit. The site also has additional signage concerning the presence of cyanide and precautions that should be taken. The signage was evaluated and found to be appropriate.

The auditor observed through site inspection that safety and warning signs, Safety Data Sheets, first aid procedures and safety information are provided by the operation is in Russian, the language of the workforce. The auditor found it compliant with the needs of the operation and the availability of this information within the context of the operation's overall safety and training programs.

Process and storage equipment including tanks, vessels, pipelines and containers containing cyanide are identified as such in the cyanide production operation. Tanks, vessels and piping are labelled to inform workers of the various chemicals contained and identify hazards and to ensure that individuals that may come into contact with cyanide or cyanide solutions (including employees involved in maintenance, and any other individual that may be exposed to released solution) be alerted to its presence. The size and frequency of pipeline labeling is sufficient to allow personnel to track the line and identify its contents.

All piping is color coded and labelled to identify the contents and include flow direction arrows, to reduce the potential for releases and exposures during maintenance, in conformance with Instruction Manual for Health and Safety, Section 2.6.2, which requires all piping and vessels to be labelled and color coded.

The labelling was readily observed throughout the site visit and was found to be appropriate, as provides workers and others with notice that a dangerous material is present as necessary to protect their health and safety. Labels are typically near pipe junctions, valves, and in long pipe runs where releases could be most likely or which may require frequent maintenance.

The facility Instructions have requirements implemented for hand washing and showering for its employees who have been in areas posing the potential for skin exposure to cyanide. As part of personal hygiene requirements, no food, cooking or eating is permitted to be conducted on the industrial premises except at specific locations or in the dining room. It is a requirement to wash hands before eating. These requirements are provided in Instruction PCN-TB-1, Section 4.5 and Instruction for the Monitoring Station CMS-OT-1, Section 5. The auditor reviewed these Instructions confirming its implementation through observation of

and interviews with employees. Employees demonstrated an excellent understanding of the decontamination procedures and the need for safety precautions.

The operation has trained medical personnel, emergency medical technicians and operations personnel who are trained in cyanide first-aid on-site to respond in the event of a cyanide exposure. Cyanide awareness training, including symptoms of cyanide poisoning and first aid, are a part of all cyanide Plant personnel training. Several facility personnel are trained as first responders to apply amyl nitrite. The Saratovorgsintez complex retains an emergency rescue team and medical centre under contract. The Medis Medical Center (Medis) has 3 doctors on night shift and 10 doctors on day shift. The rescue team comprises a total of 32 emergency response personnel. All doctors and the rescue team are trained in the application of amyl nitrite and use of medical oxygen. Doctors and medical technicians also have available a supply of sodium thiosulphate, they are the only authorized to administrate these intravenous injectables.

The auditor reviewed training records during interview with the workshop foreman and the rescue team doctor on duty, demonstrating that several facility personnel have received specific training in cyanide first aid, including use of amyl nitrite antidote and application of oxygen.

The facility has written procedures in the event that an exposed worker requires transport to an off-site medical facility for treatment. In case of cyanide exposure, treatment will be undertaken by site medical staff in the first instance. Should the injuries be too severe to successfully treat on-site, patients would be transferred to the local hospital(s). The medical centre maintains an ambulance for conveying workers to the local hospital.

The auditor reviewed the operation’s response procedures confirming compliance with this provision. This requirement was also verified through interview the on-duty Rescue Team Medic.

The decision on sending a worker exposed to cyanide to a particular medical facility is made by the ambulance personnel, arriving at the enterprise. Russian Federal Law No. 323, dated 21.11.2011 requires all medical facilities across the country to provide emergency first aid without the need for a special agreement.

The facility has notified local hospitals of the potential need to treat patients for cyanide exposure, and the site is confident that the medical provider has adequate, qualified staff, equipment and expertise to response cyanide exposures. This requirement was verified through interview with the on-duty Rescue Team Medic and Head of Rescue Team.

The Plant has written Instructions not limited to cyanide incidents, for investigating and evaluating all incidents, to determine if the operation’s policies and programs to prevent such incidents are adequate or whether they need to be revised. Instruction on the Procedure for Registration, Recording and Investigation of Accidents, Incidents in Saratovorgsintez LLC is in place to investigate and evaluate incidents to determine if the

facility's programs and procedures to protect worker health and safety and to respond to cyanide exposures are adequate.

No cyanide related incidents have occurred since this certification audit period, but records were available for other incidents demonstrating the procedure is being used. According to Russian requirements, an evaluation of an incident situation must be completed, and the Emergency Response Plans (ERPs) must be reviewed updated as applicable after each and every incident. This combination of event and time driven procedure is mandatory in accordance with the requirements of Russian legislation Hazards in the Oil and Gas Industry.

This requirement was verified reviewing examples of incidents and investigation reports not related to cyanide and through interview with the shop manager of the cyanide plant.

Principle 3 | MONITORING

Ensure that process controls are protective of the environment.

Production Practice 3.1

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

The operation is
- ✓ in full compliance with
- ☐ in substantial compliance with
- ☐ not in compliance with

Production Practice 3.1

Summarize the basis for this Finding/Deficiencies Identified:

The facility monitors the discharge and the quality of both surface and ground water upgradient and downgradient of the discharge. Wastewater from the process and wash down water is collected in tanks and treated with sodium hypochlorite prior to being piped to the industrial complex biological wastewater treatment Plant prior to discharge into the Volga River.

There is a schedule to monitor both surface water discharge and groundwater quality. The treated wastewater from the sodium hypochlorite treatment Plant is monitored by process operators prior to discharge to the Plant biological treatment Plant, and the discharge is also monitored monthly by the Environmental Department at sampling point 147 located just down gradient from frame 572. The water quality of the Volga River is monitored both upstream and downstream of the discharge point from the biological treatment Plant. There is a network of groundwater monitoring wells located over the industrial complex of which nine wells are monitored by Saratovorgsintez. There are also additional wells located outside the Plant boundary. Monitoring wells Nos. 16, 18a, 20 and 21 are located downgradient of the cyanide production facility. The remaining wells are located laterally and upgradient of the facility. This requirement was verified through interviews with the environmental specialist responsible for monitoring, review of surface and groundwater quality records, and the schedule to monitor both surface water discharge and groundwater quality.

Prior to discharge to the Volga River all wastewater from the production area undergoes local treatment with sodium hypochlorite at the local wastewater treatment Plant (frame 572) to neutralize cyanide, before being fed to biological treatment plant prior to discharge to the environment.

The standard for the level of free cyanide concentration at the control monitoring point prior to discharge to the biological treatment facility is 0.055 mg/l. The treated wastewater

from the sodium hypochlorite treatment Plant is monitored by process operators prior to discharge to the biological treatment Plant, and the discharge is also monitored monthly by the environmental group at sampling point 147 located just down gradient from frame 572. The cyanide concentration is further reduced as the discharge is diluted with other sources of wastewater entering the sewer as it flows to the biological wastewater treatment facility located approximately 1.3 km away from the sodium cyanide Plant. Because of toxic effects to the biological process, the maximum allowable concentration of free cyanide permitted in feed to the biological treatment plant is 0.048 mg/L.

Monitoring data reviewed for monitoring point 147 during this recertification period showed free ion cyanide concentrations were below 0.569 mg/L in effluent flowing to the biological wastewater treatment facility below 0,5 mg/l. At the biological wastewater treatment facility residual cyanide concentrations are further reduced before discharge to the Volga River. The regulated maximum permissible concentration at the discharge point to the Volga River is 0.05 mg/l for protection of fishery water bodies. Discharge to the Volga River is monitored monthly and surface water samples are also collected between April and October each year from the Volga River at points 1,000 m upstream and downstream of the discharge point. Review of analytical records for the last 3 years showed that the concentration of free cyanide ions to the Volga River never exceeded 0.005 mg/L, which is far below the levels of both maximum permissible concentration and concentration limits set out in the Code (0.022 mg/l) for protection of aquatic life. The method of measuring the mass concentration of cyanides in natural and wastewater is by photometric method with pyridine and barbituric acid.

This requirement was verified through interview with the Head of Quality Department and Ecologist, and review of environmental monitoring records.

There are no indirect discharges to surface water. All wastewater is directed to frame 572 for sodium hypochlorite treatment and then to the Plant biological treatment facility before final discharge to the Volga River. The sodium cyanide plant is equipped with a protective screen to prevent seepage into groundwater. No cyanide related spills have occurred outside of containment areas in the past three years.

This requirement was verified through site inspection and interview with the Head, Industrial Safety, Labour Protection & Ecology Department and ecology person responsible for monitoring groundwater.

According to the employees of the enterprise the beneficial use of groundwater has not been determined by local authorities. . The Plant is provided by the local centralized water supply system. The regulated maximum permissible concentration at the discharge point to the Volga River is 0.05 mg/l for protection of fishery water bodies.

There is a network of groundwater monitoring wells located within the Saratovorgsintez industrial complex ,nine of which are monitored quarterly by the laboratory. There are also additional wells located outside the Plant boundary, four of which (Wells Nos. 18, 19, 20

and 21) are located proximate to and downgradient of the sodium cyanide Plant. A program is in place to upgrade the offsite wells by replacing them with new wells. Between 2017 and 2019 five of these wells (Well Nos. 17, 18a, 19, 20 and 21) had been upgraded. The offsite wells are sampled semi-annually. Monitoring data from the wells inside and outside the industrial complex for 2017 through 2023 show that the groundwater has not been impacted by cyanide production activities. The concentrations of free cyanide ions in all wells within and outside the complex were below the detection limit of 0.005 mg/l; i.e., less than 0.022 mg/l standard established for the protection of aquatic life.

This requirement was verified through discussion with the Head, Industrial Safety, Labour Protection & Environmental Protection Department and environmental person responsible for monitoring groundwater.

No seepage from the facility has caused the cyanide concentration of the ground water to exceed that necessary to protect any beneficial use. The concentrations of free cyanide ions in all wells within and outside the complex were below the detection limit of 0.005 mg/l.

The facility monitors hydrogen cyanide gas and cyanide dust emissions concentrations and ambient air quality, as necessary, to demonstrate that the required standards are met. HCN gas analyzers are located throughout the Plant. These are equipped with audible and visual alarms set to alarm when 0.3 ppm is reached , which is the maximum HCN exposure limit set by law.

Air quality monitoring at the facility is conducted according to the Schedule of Analytical Control of Industrial Emissions of Pollutants at Saratovorgsintez, which is an integral part of the Project for the Standards for Maximum Permissible Emissions, approved by Rosprirodnadzor.

Air emissions from production lines are cleaned up in gas recovery installations (scrubbers) controlled scrubber installations and waste incinerators in order to prevent exceeding the maximum limit allowed for atmospheric air quality in settlements on the border of the sanitary zone of the enterprise. . Blockages are triggered when the temperature or flow rate is exceeded, degrading the quality of emissions into the atmosphere. The point emissions from the production facilities (there are 88 emission sources at the enterprise, of which 22 are in the production of central heating stations and DCS) are sampled quarterly. Analysis records show that emissions have not exceeded regulatory standards in the last 3 years.

Atmospheric air quality is monitored using a mobile automotive laboratory equipped with equipment for taking and analyzing air samples. The mobile post allows you to monitor air quality in a mobile laboratory and transfer the results directly to the environmental protection group and to the sanitary laboratory of Saratovorgsintez. Measurements are collected at several points downwind of the industrial complex each day, except weekends, with some special points sampled twice a day. Results show that there have been no exceedances during this recertification period and measurements have consistently been below 0.007 mg/m3 at the boundary of the sanitary zone for the enterprise.

This requirement was verified through interview the Ecologist; inspection of the mobile vehicle laboratory and review of air quality records.

Wastewater quality monitoring after biological wastewater treatment facilities is carried out in accordance with the Schedule for analytical control of wastewater and natural surface water bodies of the Wastewater Service Center and Water Protection Facilities LLC "Saratovenergoneft" , approved by the authorized bodies. Groundwater wells at the site are monitored quarterly, and off-site wells are monitored once every six months.

Air quality monitoring is conducted according to the Schedule of Analytical Control of Industrial Emissions of Pollutants at Saratovorgsintez LLC, which is an integral part of the Project for the Standards for Maximum Permissible Emissions, approved by Rosprirodnadzor.

On the auditor professional judgment, the operation’s monitoring frequencies are adequate to characterize the medium being monitored and to identify changes in a timely manner, considering the amount of existing data, the stability of the parameters being monitored, and for ground water, the depth to groundwater, and the rate of movement.

Principle 4 | TRAINING

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

Production Practice 4.1

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

The operation is
- ✓ in full compliance with
- ☐ in substantial compliance with
- ☐ not in compliance with

Production Practice 4.1

Summarize the basis for this Finding/Deficiencies Identified:

The Plant has written training programs and training materials that provide all personnel who may encounter cyanide with training in recognizing the cyanide materials present at the operation, the health effects of cyanide, the symptoms of cyanide exposure, and the procedures to follow in the event of exposure.

All new workers are required to complete a training program on hazard awareness and emergency response. This training includes hazards associated with cyanide and response to cyanide related emergencies. Emergency response actions to alarms and evacuation requirements are provided to all persons entering the site.

Detailed safety inductions include specific measures to protect human health and environment from cyanide release and exposure for those personnel that undertake work in and around the cyanide facilities. Regular trainings are carried out in accordance with the list of obligatory instructions with the record being made in every worker's personal training card.

The auditor reviewed the training materials and records and interviewed the Head of Industrial Safety, Labour Protection & Environmental Protection Department and employees to verify that cyanide hazards are adequately addressed and potentially exposed personnel receive both initial and periodic refresher training.

The facility trains its workers regarding the proper use of personal protective equipment and the specific personal protective equipment required for the tasks in different areas of the facility. Training includes the use of appropriate PPE including gas masks and respirators. This training is mandatory and must be repeated according to the approved schedule.

The site trains workers in the use of PPE and when and where this equipment is required. The use of PPE is detailed in the Instruction for Sodium Cyanide Production Area and Degasification Area, and the procedure concerning the use of PPE: Instruction on the Use of Industrial Filtering and Isolating Respiratory Equipment. Both trainings are carried out once every half a year.

PPE training covers specific management and operational procedures regarding PPE storage, maintenance and which type of PPE is required in the different operations with cyanide production Plant. Interview with employees confirmed that training on how and when to use PPE is provided on a regular basis.

The auditor reviewed the facility's training records, observed the use of personal protective equipment and interviewed employees and the Head of Industrial Safety, Labour Protection & Environmental Protection Department and Engineers of this Department regarding their training, confirming compliance.

All personnel involved in the production and management of cyanide has been trained to perform their assigned tasks in a safe and environmentally sound manner. The annual training plan is developed at the beginning of the year. The plan includes training elements and specific training materials for each working place. New employees are required to work under direct supervision for 2 months and pass all elements of the job before being allowed to work alone.

Operational personnel are qualified as skilled chemical workers on a basis of their professional education. They undertake professional training, especially training-on-the-job mostly for a three-month period and finish their education with examination that leads to a certified degree. Such education is a basis for the further trainings which are specified to the requirements of the definite function of each and every employee. One of the many other trainings is basic safety training which is enforced by Russian Regulation or which is in accordance with the operation's risk analysis, such as handling of hazardous materials, use of PPE, alarm and emergency response, emergency drills, cyanide exposure and how to act/react, or operating procedures and instructions. These training are partially mandatory requirements and have to be repeated annually and provided by qualified trainers.

Training requirements are specified in the company standard STO IMS 1.25-2019 Personnel Management. In accordance with the approved training plan the workers of the cyanide production Plant were trained in industrial and environmental safety, labor safety, among others, during this recertification period. In addition, workers in the cyanide production Plant should pass through specialized trainings for vessels under pressure, work at height, maintenance of technological pipelines, first aid, etc. Training certificates of the employees were available at the site. The logbook contains data on certificates, date of the training and dates for the next training.

The instructions are developed for every workplace and include requirements on safe conduct of the production process, emergency response, maintenance and other types of

works. Training records are documented and retained for all personnel, including contractors, governmental inspectors and visitor inductions.

Verification of compliance was through interviews with the Head of Industrial Safety, Labour Protection & Environmental Protection Department, other specialists of this Department and review of training records.

Induction and task training is provided to employees before they are allowed to work with cyanide in an unsupervised manner. All new employees for the whole period of job training and training in safety are required to be accompanied by designated persons (supervisor or qualified specialists) according to a Company Order to acquire hands-on experience in the workplace. In case a newly hired worker does not possess the necessary qualification, the worker is offered a training course in an educational agency in accordance with his major field of occupation.

To obtain clearance to work unattended, upon the completion of the course and the traineeship, workers are examined in the field of standard operating procedures and/or specific occupations by a workshop's qualification committee.

To obtain hands-on experience in the field of safety, accident prevention and elimination in production facilities with Class I and II explosion hazard, all workers and engineering staff, directly involved in management of technological process and equipment operations at such facilities, are required to take the qualification course assisted by contemporary training and skills development devices (e.g. computer simulators) in line with the Federal norms in the field of industrial safety General Codes on Explosion Protection for Explosive and Fire Hazardous Chemical, Petrochemical Plants and Oil Refineries.

The auditor verified its compliance reviewing the training materials, assistance records and interviewing operational and supervisory personnel. Training effectiveness is evaluated through testing and through observation of on-the-job performance.

Regular training with obligatory refresher training is conducted for the workers once every half a year. Periodic refresher training is provided to ensure employees retain this potentially lifesaving knowledge. The auditor reviewed training materials and interviewed workers and trainers confirming compliance with this provision

The facility's training programs define the specific elements of cyanide handling that each employee must be trained to properly perform the required tasks. Training on the basis of a written Instruction complies with this provision. There is a list of important items to pass on to a new employee regarding how the various cyanide related tasks should be performed. The elements of training are documented in the operating manuals and operating instructions for the station. There are written instructions for creating new documents, making changes and replacing existing documents. Occupational health and safety procedures are developed and introduced as necessary, with amendments to the questionnaires for feedback from staff.

This requirement was verified through discussion with the Head and specialists of the Health Safety and Environment (HSE) Department, representatives of the Human Resources (HR) Department and review of training materials and records.

The auditor reviewed the training materials and interview workers and the Head and specialists of the Health Safety and Environment (HSE) Department, representatives of the HR Department and review of training materials and records, confirming compliance with this provision

Employee task training is conducted by individuals with knowledge of the specific tasks to be accomplished and experience in effective communication techniques. Trainers are all engineers with higher education and specific safety training. They have worked at the Plant for a minimum of 3 years and are required as part of Russian Regulation to take refresher training every 5 years through examination by special committee.

This requirement was verified through interviews with the Head of Industrial Safety, Labour Protection & Environmental Protection Department, other specialists of this Department and representatives of the Human Relations (HR) Department and review of training records

The cyanide production operation evaluate the effectiveness of their task training. Evaluation techniques include testing of employees at the completion of training and observation of employees performing their tasks after initial training. Examinations are undertaken on completion of training and annually as part of knowledge assessment refresher training. Examination is by special committee approved by Company Order. Job competence is also assessed informally through task observation.

Before being allowed to work without supervision, all employees must be tested, testing is carried out by an attestation commission, which includes engineering and technical personnel of production and degassing sites, representatives of the HSE department, personnel department, production and operational technical department.

Following Russian requirements, the trainings are documented as required: to be traced back personally to each individual, covering the training subjects, trainers, topic, date, duration and kind of verification of understanding and effectiveness.

The site evaluates the effectiveness of cyanide training by testing. There are questionnaires that are used for the tiered induction training and they are retained. New employees are teamed with an experienced supervisor who demonstrates and observes how the workers perform their tasks

The auditor verification of such evaluation was a review of records for formally documented evaluations and from interviews with site personnel.

Production Practice 4.2

Train employees to respond to cyanide exposures and releases.

The operation is	✓ in full compliance with ☐ in substantial compliance with ☐ not in compliance with	Production Practice 4.2

Summarize the basis for this Finding/Deficiencies Identified:

Employees working in areas where cyanide is present are trained in what to do in the event they observe a cyanide release and/or exposure. Depending on how the operation's response plans are structured, employees may be trained to call for the assistance of a designated Emergency Response Team or to provide cyanide first aid themselves. The operation is required to train employees to respond to cyanide exposure and releases. All personnel working in or around the cyanide production Plant are trained to respond to emergency cyanide release incidents in accordance with planned response specified in the on-site emergency response plans (ERP).

Training of employees in the field of civil defense and protection from emergencies is conducted annually at the workplace on a basis of a 16-hour program. Four training groups have been created in the cyanide production Plant. All trainers have passed through specialized training at a regional level (City of Saratov). All the staff of the cyanide production Plant was trained in civil defense and emergency situations.

Training of employees is carried out in accordance with the special program of course training of the working population in the field of civil defense and protection from emergencies approved by the Minister of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters, approved by the order of the site General Director.

Following the regulatory requirements of the Russian Federation, the training process is documented accordingly: records are maintained for each individual employee, contain information about the subject and individual topics of the training, instructor data, date, duration and type of verification of the effectiveness of training and the level of assimilation of information received during training.

The auditor reviewed the facility training programs, safety program, through interviews with Company staff and review of training materials and drills materials and records. Verification of the implementation of this provision was through review of the response plan and records of response training, and through interviews with Company staff.

Personnel at the production operation is trained to carry out cyanide exposure and release

response actions they are assigned in the operation's emergency response plans. The operation's requirements for employee training, including records of the training that these employees receive, is included in the operation's training program, emergency response plans and training records.

Employees are trained to respond to worker exposure to cyanide and routine drills are used to test and improve their response skills. Drills are conducted regularly, and lessons learned are analyzed and taken into account during updates of the training programs.

The operation retains the emergency response training records. Training is entered in a logbook that includes the type of training, trainee name and signature, date of training, and trainer name and signature. A Personal Registration Form is also completed, which is filed in the employee's personal file. Training session schedules and session logbooks are kept and signed by the trainers. Training session schedules and session logbooks are retained by the HSE Department and stored in the Training and Information Centre.

An information system registers all information on employees including data on training. The system maintains all employee records including date of training, subjects of training and the validity date of certification. Training records are also maintained for all emergency response personnel and workers who undertake emergency response training.

This requirement was verified through interviews with Company staff responsible for training and preparedness to emergency situations, and review of training materials and training records.

Principle 5 | EMERGENCY RESPONSE

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

Production Practice 5.1

Prepare detailed emergency response plans for potential cyanide releases.

The operation is	✓ in full compliance with ☐ in substantial compliance with ☐ not in compliance with	Production Practice 5.1

Summarize the basis for this Finding/Deficiencies Identified:

The cyanide production facility has the emergency response plan: Plan for Localization and Liquidation of Accidents in the workshop of the monitoring station and DCSSCP and CCP Plant. Plans for responding to a cyanide release emergency and potential failure scenarios that may otherwise require response. According to Russian regulation, the operational alarm and emergency response plan is a mandatory document, where different party involvement is considered, and different parties are informed. The procedure on emergency response in case of releases is provided in Saratovorgsintez LLC Plan for Localization and Liquidation of Accidents in the monitoring station and DCSSCP and CCP Plant and in the Plan of Actions Aimed to Increase Security of a critically important facility Saratovorgsintez LLC. .

The Plans are well-thought-out documents that addresses the potential release scenarios at the site in a realistic manner and with an appropriate degree of specificity. The operation emergency response plans are focused on site-specific circumstances and responses, including cyanide. The auditor confirmed these documents address those release scenarios that may reasonably be expected to occur and result in significant impacts to its workers, community and environment, as applicable to the site-specific features of the operation and its environmental setting.

The Plans are linked to specific emergency situations and the appropriate procedures and responses within the site's systems and include all potential accidental releases of cyanide and potential failure scenarios, such as the following emergency scenarios: accidents with the release of hydrogen cyanide and other hazardous chemicals, explosions and fires, transport accidents, the collapse of building structures, absence of energy resources, terrorist acts, and natural emergencies. Also, all potential scenarios, their likelihood and the potentially exposed areas are addressed in the Plans for the cyanide production and degasification area.

The emergency response plans identifies credible emergency scenarios for catastrophic release of hydrogen cyanide, releases during loading and dissolution operations, pipe, valve and tank ruptures as well as, but not limited to, impacts of power outages and fire, among others.

These requirements were verified through review of corresponding emergency scenarios in the Plans and interviews with the Plant staff responsible for preparedness to emergency situations.

The emergency response planning documents address the types of releases and responses that may reasonably be expected to occur at the site and include sufficient details so that personnel know the specific actions they are expected to take in response to the emergency. The emergency response planning documents address the types of releases and responses that may reasonably be expected to occur at the facility. The degree of detail and specificity in the Plans are adequate to the environmental setting of the operation, the nature of potential receptors, and the controls in place at the facility.

The Plans include actions describing the Plant evacuation personnel in natural and man-made emergencies. The Plans define the procedures for evacuation of personnel in the event of a threat and occurrence of such emergencies.

Specific response measures, first aid measures and use of cyanide antidotes, as well as analytical environmental monitoring are described in the emergency response plans for the cyanide production and degasification area. Specific measures on personnel response actions are presented in modules according to the potential emergency scenarios.

The Plans describe specific emergency response actions for different situations, including control of any release at source; evacuation of workers and potentially affected communities; use of first aid measures and antidotes; and containment, assessment, mitigation and future prevention of releases. On returning to normal operating conditions, the Plans require a detailed investigation in accordance with the incident investigation procedure.

The auditor’s evaluation of the emergency response plans determined that its level of detail is appropriate. This requirement was verified through interviews with the Plant staff responsible for preparedness to emergency situations and review of the emergency scenarios in these plans.

Production Practice 5.2

Involve site personnel and stakeholders in the planning process.

The operation is ✓ in full compliance with ☐ in substantial compliance with ☐ not in compliance with Production Practice 5.2

Summarize the basis for this Finding/Deficiencies Identified:

1. Has the facility involved its workforce and stakeholders, including potentially affected communities, in the emergency response planning process?

The Plant operation has involved its own site personnel in the review of the emergency planning process, as they have the best knowledge of the operation and the identified potential release scenarios, available resources, and workable responses, reflecting the site-specific circumstances of the operation.

Cyanide, as classified a hazardous substance in Russia, cyanide production, storage, transport and handling are strictly regulated by the government, and government involvement in emergency planning is legally required. The site has involved its workforce and stakeholders in the emergency response planning process. Employees input occurs through the emergency drills debrief meetings with allows workers participating in the drills to make recommendations for improvements of the emergency response plans. Also, the workforce has opportunities to comment on emergency response documentation during regular trainings on their content. Subdivision Managers are involved in the process of development of all emergency response plans.

The Plans were reviewed by stakeholders of potentially affected communities to ensure the Plan's effectiveness if calls for evacuation of nearby communities. The Plans were agreed by the Saratov Municipality Administration Department for Protection of the Population and Territories from Emergency Situations and approved by the Head of Administration of the Zavodsky District of the Municipality of the City of Saratov.

The auditor interviewed site personnel and approvals documents of stakeholders, confirming compliance with this provision.

The Plant has submitted the emergency response plans to the potentially affected communities for their review, as the governing authorities of the Region, the City of Saratov, Saratovsky district, and enterprises and organizations located in the 2.5 km zone, to make them aware of the nature of the risks and to identify the risks of any release scenarios that may affect them, including a release of hydrogen cyanide gas potential emergency scenario,

and to advise the community of how the operation will communicate with it in an emergency.

The Plans include a list of the industrial neighbors which may be affected in case of cyanide release. In the event of a threat or occurrence of accident, the senior dispatcher of the facility will notify the specified parties via the local notification network. This requirement was verified through interview with the Plant staff responsible for preparedness to emergency situations.

External entities having designated roles in emergency response plans are identified in these plans. The Fire Brigade, which provides its services to the facility under agreement PCh-11/FB-11, Paramilitary Gas Rescue Squad LLC Medis medical institution, and security for the facility, are involved in the emergency response planning. The site has also involved local response agencies such as outside responders and medical facilities in the emergency planning and response process. The company conducts regular joint drills with city emergency services to check the compliance of communication and emergency response measures, allowing them to have first-hand knowledge of the site and the available resources.

The auditor confirmed this requirement based on interviews with on-site personnel and mock drill reports.

Consultation with stakeholders regarding emergency response is performed periodically. The Plant engages with the Saratov Oblast and Saratovsky District governing authorities, and federal executive authorities on the matter of emergency situations data gathering and exchange; assignment of additional forces and resources for the liquidation of emergency situations; order of emergency response measures to be initiated; and arrangement of security at the facility during emergencies, including terrorist attack, among other emergency scenarios needing their engagement.

This requirement was verified through interview with the Plant staff responsible for preparedness to emergency situations.

Production Practice 5.3

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

The operation is	✓ in full compliance with ☐ in substantial compliance with ☐ not in compliance with	Production Practice 5.3

Summarize the basis for this Finding/Deficiencies Identified:

The emergency response plans address each of the items identified in this Production Practice with respect to response to a cyanide release or exposure. The auditor reviewed the operation's documentation ensuring that all is addressed as appropriate for the operation.

Plans for the production of sodium cyanide and a degassing section for cyanide compounds Responsible parties and procedures for responding to emergencies are indicated. The Plans describe designated primary and alternate emergency response coordinators with explicit authority to allocate the resources needed to implement the Plans, they define emergency response team roles , responsibilities and descriptions such as security personnel, fire brigade, medical service, 24-duty duty group and emergency rescue team. Specific members of these teams are named, listed and updated. Responsible coordinators and functional managers have also been identified, namely the general director of the Saratovorgsintez site , his deputies, the emergency response coordinator, and the head of the fire department.

Appropriate training is required for the emergency responders, which is conducted in the course of emergency drills, training modules for every shift, including all specialized response services being called. Training needs of the organization are defined in the emergency response plans, and formal training of all personnel involved in cyanide production/handling is carried out. Telephone numbers, addresses and contact persons (includes internal contacts and external contacts such as authorities, police, neighbored companies, public institutions, transport companies, hospitals and medical support, and public media) are listed and kept up to date. A list of emergency response equipment available is in Appendix 3 of the Plan for the Elimination of Accidents of the Central Station and DCS Shop. Suitable Emergency Response Equipment is available at the Rescue Team Centre and is routinely inspected and maintained. Maintenance results are registered in logbooks inspections of compressed air breathing apparatus; protective suits; explosion-proof lamps and gas rescue equipment, among others. The Plans also describes the role of outside responders, medical facilities and communities in emergency response procedures.

The auditor confirmed these provisions are being implemented at the site through inspection of the site, review of the corresponding emergency response plans and by employee interviews.

External responders have been made aware of the roles designated to them in the Plant emergency response plans as these were developed with input and agreement with third party organizations, involved in localization and liquidation of emergencies; and with the facility security service, fire brigade and gas rescue squad. The Plant has an annual mock drills plan for the different areas of the facility which is distributed among all facility areas and third parties: security services, fire brigade, gas rescue squad, and medical services. The site confirmed that outside entities included in the emergency response plans are aware of their involvement and are included as necessary in mock drills or implementation exercises that simulate a cyanide release or exposure which would trigger their involvement.

Outside entities are included in the emergency response plans through the Regional Authority who produces the External Emergency Plan for the City of Saratov. Records of the drills conducted in this recertification period were reviewed and showed that the formal follow up training were reviewed and accepted.

The auditor verified compliance with this requirement reviewing meetings records, confirmation that these entities were sent copies of the emergency response plans, and interviews with on-site personnel, as well as the mock drills reports indicating the various parties that participated in the drills.

Production Practice 5.4

Develop procedures for internal and external emergency notification and reporting.

The operation is	✓ in full compliance with	Production Practice 5.4
	☐ in substantial compliance with	
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The Plans require to notify the Plant management, and the government agencies regulating worker safety and environmental protection, in the event of a cyanide emergency. The Plans include procedures and contact information for notifying outside entities that may play a role in the response. If external medical support or follow-up care is required, medical facilities and care are available at Saratov City hospitals. The Plan for increase security of critically important facility of Saratovorgsintez, includes appendices with schemes to notify the Plant organization including management and a communication protocol. The emergency response plan for the cyanide production and degasification area also contains

a detailed emergency notification flowchart, including communication with security services, fire brigade, gas rescue squad, and medical services.

The Plans require that a cyanide emergency that constitutes a "significant cyanide incident," as defined in the Code's Definitions and Acronyms, requires notification to the International Cyanide Management Institute. No such events occurred during this recertification period, so there was no need to notify the ICMI, the management or regulatory agencies.

The auditor reviewed the emergency response plans and associated documentation verifying that this information was available and up to date.

Response planning documents include procedures and contact information for notifying nearby communities that may be affected by a cyanide emergency, as well as procedures for communicating with the media. In the event of a threat of an emergency situation or its occurrence, the dispatcher of the Dispatch Service of the facility notifies enterprises and organizations within a radius of 2.5 km from the facility using the means of a local notification network. Local civil defense and emergency authorities are notified via direct communication. At plant manager remote control operator (staff work in shifts, around the clock) there is a list of contacts for immediate notification, which is updated annually. This information was available for verification by the auditor in the emergency response plans.

The Plant emergency response plans include a requirement and details to notify ICMI of any significant cyanide incidents, as defined in ICMI's Definitions and Acronyms document. No such communications have been done as there was no significant incident in the operation during this recertification period.

Production 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	✓ in full compliance with	Production Practice 5.5
	☐ in substantial compliance with	
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The emergency response plan for cyanide production and degasification area under section Measures and Means for Emergencies Localization and Liquidation, describes, among others, emergency spill clean-up measures and personnel actions for every particular scenario. Post emergency activities are described, including removal of contamination, disposal to appropriate approved facilities; use of decontamination chemicals as sodium

hypochlorite, monitoring requirements/methods and provision of alternative drinking water where necessary. The emergency response team have the capability and resources to respond to all but the largest events and has made arrangements to request assistance from third party responders as needed. Remediation would be planned and executed by the environmental department with assistance from environmental contractors as needed.

Although the possibility for cyanides being released into surface water is extremely low, the Plans prohibit the use of chemicals such as sodium hypochlorite, ferrous sulfate and hydrogen peroxide to treat cyanide that has been released into surface water or that could be expected to enter surface water. Due to the provision of secondary containments and a system for collection of cyanide releases into wastewater collection reservoirs, the possibility for cyanides being released into surface water is extremely low. The Plant has local treatment facilities of cyanide production and degasification area by neutralization using sodium hypochlorite solution. After this neutralization process, wastewater is discharged to the Saratovenergoneft biological treatment facility for additional treatment. From interview with staff revealed that there is a clear understanding about a general prohibition on the use of chemicals such as hydrogen peroxide, ferrous sulphate or sodium hypochlorite for the removal of cyanide in or near surface waters.

Analytical monitoring is carried out throughout all stages of production. Discharge into the biological treatment facility is exercised only under permission given based on the results of laboratory analyses of wastewater at the inlet. Cyanide concentrations control at the biological treatment facility inlet is carried out every two hours. All types of polluting substances are neutralized at the biological treatment facility using microorganism activated sludge, which achieves minimum pollutant concentrations in wastewater treated. The level of cyanide ion concentrations prior to discharge into surface water to the Volga River is evaluated at 0.0048 mg/l.

The Plans include sufficient information to provide a basis for decision-making during an emergency in compliance with the Code and applicable regulatory requirements.

The Plans address the necessary monitoring activities in the event of a release. Based on the potential release scenarios identified in its emergency response plans, the operation has determined the sampling and analytical methodologies it will use if cyanide is released to the land surface or to surface water. To prevent high concentrations of cyanide being released to the biological treatment Plant, there is a monitoring system where wastewater sampling is conducted every two hours. In case of emergency wastewater will be gathered into reservoirs with follow-up two-stage treatment. Additional monitoring of pollutants releases is provided according to the emergency response plans.

Before wastewater is discharged to biological treatment facilities, additional wastewater sampling is carried out at a viewing well. The storm sewer system is designed to collect wastewater in tanks, which are discharged into the industrial sewerage system for further treatment. All emissions and discharges from the cyanide production and degassing site are

separated from the storm sewer system and treated at the hypochlorite plant local treatment facilities treatment with sodium hypochlorite in building 572 before being discharged into the industrial sewer system for further treatment.

Production Practice 5.6

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

The operation is
- ✓ in full compliance with
- ☐ in substantial compliance with
- ☐ not in compliance with

Production Practice 5.6

Summarize the basis for this Finding/Deficiencies Identified:

Requirements for reviewing and evaluating the adequacy of the emergency response plans and revision are included within the Plans. The process for review of the different emergency responses are described in these Plans. Under Russian Federation regulation, an emergency response plan is valid for two years. Regulation requires Plans to be updated at least 15 days prior to expiration or within 1 month after changes to the facility or technical production. This process includes updating information such as the names and contact information for emergency response coordinators and response team members as needed to ensure its accuracy when the Plans are implemented. The Plans also state that can be modified based on the lessons learned during emergency events or mock drills.

The auditor confirmed that such updates have been conducted reviewing dated updates to the emergency response plans and copies of the Plans before the revision. The review implementation was verified through interviews with site personnel.

Mock emergency drills are included in the operation's response plans requirements, for testing and evaluating an operation's response procedures for cyanide releases and exposures and testing and evaluating the training provided to response personnel. Mock emergency drills are conducted periodically to test response procedures for various emergency scenarios including release of hazardous chemicals, explosion and fire, and exposure and injury to personnel. During this certification period, mock emergency drills have been conducted with all necessary respective interested parties.

The operation documented the emergency scenarios, the personnel involved, and the response actions taken, and evaluated the drills to determine how well its procedures worked and the adequacy of the training provided to response personnel. Review of drills results did not identify the need to update the Plans, but decisions had been made to deliver elements of the emergency response training materials more widely within specific services of the organization.

They divide the topics of emergency drills by process blocks, for example crystallizing, tanks, pipelines, and each year they carry out drills according to a simulation program. It is done by the shift master. The drills are carried out every 3 months with the participation of the rescue team and medical personnel and once a year with the participation of the responsible engineer. The frequency of these specific drills for cyanide emergencies were sufficient to evaluate the operation's plans, training, resources, and preparedness for a response to cyanide releases and to cyanide exposures of workers.

On February 5, 2022, a drill was conducted in the Monitoring Station Workshop. The topic of educational anxiety: Block No. 5. "Action plan for localization and elimination of the consequences of accidents at a hazardous production facility - the gas consumption network of LLC Saratovorgsintez." The nature of the accident - depressurization of the flange connection with a natural gas valve to the VTK-1120-400 technical gas heater in the shutter 650 of the housing.

The next training exercise was held on July 20, 2022 at Block No. 6 "Chlorine waste gas neutralization". Reception and distribution of sodium hypochlorite in building 572. The simulated accident consisted in the depressurization of the flange connections of the suction pump 121 in front of the fittings, with the release of sodium hypochlorite in building room 572 .

Other mock drill was held on January 4, 2022 at the V shop monitoring station and DCS. The subject of the educational alarm: "Block No. 1 Giving raw materials and crystallization". They activated the Plan activities for localization and liquidation consequences accidents on dangerous production objects at "Saratovorgsintez". The nature of the accident was "Depressurization of the flange connection on the pipeline hydrocyanic acid before valve dispenser 2V-104 V zone security 2X-102".

On January 31, 2022, the next training exercise was held after the workshop at the monitoring station and DCF. Topic of training alarm: Block No. 6. "Decontamination and distribution of sodium hypochlorite B corps frame 572". The nature of the accident: "Depressurization of flange connections at the outlet of the tanks after fittings with the release of sodium hypochlorite"

The Plans includes provisions to evaluate it and revise as necessary after any emergency that required its implementation. Review of findings and room-for-improvement analysis are part of a systematic evaluation process of emergency response actions and mock drills. This is the basis for the continuous improvement of the safety and security at the site within the industrial area of Saratov. The procedure (Item 4.1.6) on development of emergency response plans includes a provision for undertaking such reviews. No such reviews have been conducted as there were no cyanide incidents requiring to activate the Plans.