International Cyanide Management Code Certification Audit

Production Facility – Summary Audit Report

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International Cyanide Management Code Certification Audit

Production Facility – Summary Audit Report

0782151-00

Hongtao Hu
ICMI Lead Auditor/ Technical Specialist

ERM (Shanghai) Limited
Suite 2005A, LITONG PLAZA
1350 North Sichuan Road, Shanghai
200080, China

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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
ICMC	International Cyanide Management Code
ICMI	International Cyanide Management Institute
CPV	Cyanide Production Verification
UNEP	United Nations Environmental Program
MES	Manufacturing Executive System
HAZOP	Hazard and Operability Study
LOPA	Layers of Protection Analysis
DCS	Distributed Control System
SIS	Safety Instrumented System
IBC	Intermediate Bulk Container
WAD	Weak and Dissociable

1.0 OPERATION GENERAL INFORMATION

Name of Production Facility:	Hebei Shanli Chemical Co., Ltd.
Name of Facility Owner:	Hebei Shanli Chemical Co., Ltd.
Name of Facility Operator:	Hebei Shanli Chemical Co., Ltd.
Name of Responsible Manager:	Xiaogang Cao
Address:	Cangzhou Lingang Economic and Technological Development
State / Province:	Huanghua City, Hebei Province
Country:	China
Telephone:	(+86) 0317-5837136
Fax:	(+86) 0317-5768015
Email:	hebeilghg1688@163.com

2.0 OPERATION LOCATION DETAIL AND DESCRIPTION

Hebei Shanli Chemical Co., Ltd. ("Hebei Shanli", "The Facility" or "The Site") was established in 2005. It is a joint-stock enterprise with approximately 1,600 employees. The company has obtained ISO9001: 2015 certificate, ISO14001: 2015 certificate and ISO 45001:2018 certificate. The company has the right to import and export. The products are sold to many countries and regions, including South America, North America, Africa, Asia etc.

Hebei Shanli is located at Cangzhou Lingang Economic and Technological Development, Huanghua City, Hebei Province, China. And the surroundings are as below:

- East: Cangzhou Xiongyin New Material Co., Ltd. And Cangzhou Linggan Zhengheng Chemical Co., Ltd.
- South: Hebei Jiehong Pigment Chemical Co., Ltd. and Keluoyi Pharmacy Co., Ltd.
- West: Bianque Road and floodplain
- North: Hebei Zehao Chemical Co., Ltd, Beijing Chunfeng Pharmacy Co., Ltd and Hebei Tiancheng Pharmacy Co., Ltd

The railway for transporting coal is about 0.3 km south of Hebei Shanli. G307 Speedway is about 1.5 km south of Hebei Shanli. South Huanghua Station is about 15.6 km to west of Hebei Shanli. The detailed location of the Site is shown in *Figure 1: Regional Location Map.*

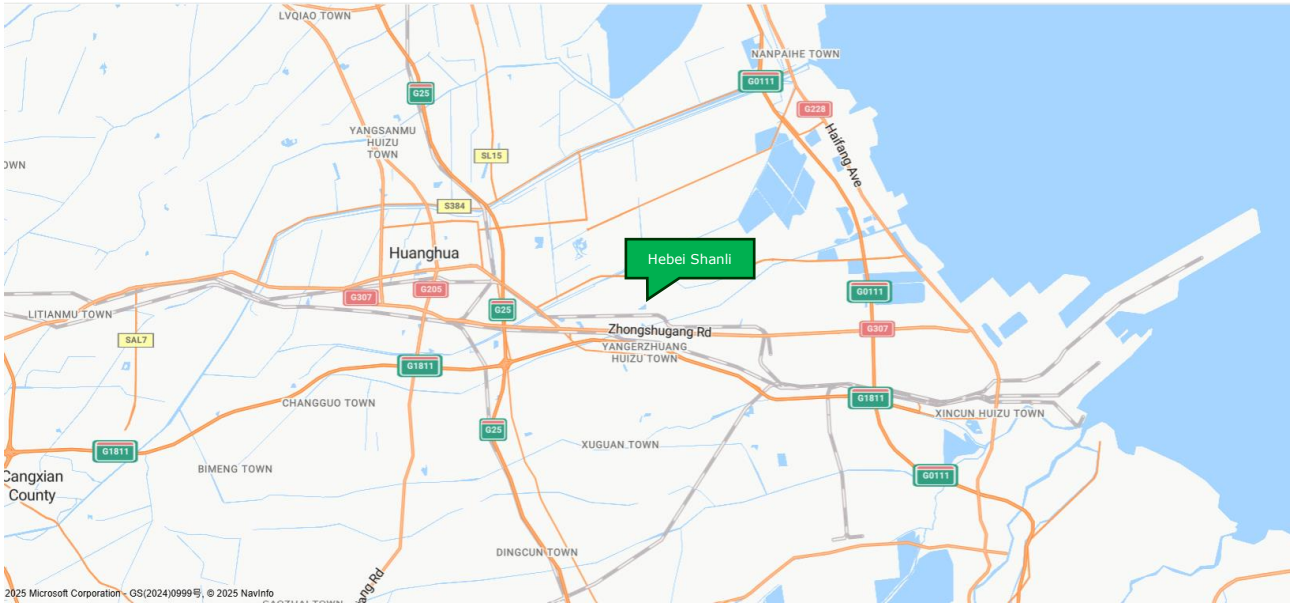

Figure 1: Regional Location Map

The part of the Hebei Shanli used to manufacture liquid sodium cyanide and then convert to solid sodium cyanide, which is referred to in this report as the Cyanide Production Units. The term 'the Site' used in this report refers to the entire Hebei Shanli Facility and includes a large number of manufacturing plants, but these manufacturing plants are not subject to this report.

Hebei Shanli solid sodium cyanide manufacturing processes are described as below:

- Mixture and preheat – The feedstocks to the cyanide facility are light oil and ammonia (stored on site as liquid ammonia). The feedstocks are preheated and evaporated to produce a gaseous reaction mixture.
- Reaction 1 – The mixture is passed to an electric arc reactor furnace where the oil fumes are heated to approximately 1,200-1,400°C and passed over a platinum catalyst. This reduces the oil fumes to methane and coke (carbon particles). These intermediate reactants react with the ammonia in an endothermic reversible partial reduction reaction producing a raw gas that is a mixture of hydrogen cyanide and hydrogen with small quantities of methane, oil fumes, coke particles and ammonia. The coke particles in the product gas are removed in cyclones and recycled.
- Reaction 2 –The gas is then cooled in a heat recovery heat exchanger to less than 100°C and passed through a bag filter. This filtered hydrogen cyanide gas is passed through a sodium hydroxide absorber, which generates sodium cyanide liquor.
- Evaporation and Crystallization – Liquid sodium cyanide is pumped into liquid cyanide volume measuring tanks, then be pumped into the vacuum evaporator to remove water and the concentrate is fed to the crystallizer.
- Centrifuge – Wet crystals are generated by continuous solid-liquid separation of the concentrated crystal pulp.
- Drying – The sodium cyanide crystals are heated in the dryer to evaporate the residual water, and the crystals are dried into dry powder.
- Moulding – Dry sodium cyanide powders are moulded into "pillows".

- Packaging – Sodium cyanides are delivered to the tablet tank through an oscillatory conveyor and then weighted in the weighing and packing machine. Products are tested by random sampling and the qualified products are packed in 50 kg drums or 380 kg, 1,000 kg, 1,100 kg timber boxes with inner polyethylene liners. The packaged cyanide is stored in the warehouse at the cyanide facility prior to despatch from the Site.

The liquid Cyanide Production Unit was constructed in 2013 and expanded in 2019. The solid Cyanide Production Unit was constructed in 2023. Modifications to the cyanide facility occurred between 2022 and 2025, specifically involving the replacement of the liquid cyanide pipelines.

The infrastructure at the cyanide facility comprises:

- Liquid ammonia tank farm.
- Light oil tank farm
- Sodium hydroxide tank farm.
- Workshop 801– Liquid sodium Cyanide Production Unit.
- Workshop 815– Solid sodium Cyanide Production Unit.
- Liquid sodium cyanide tank farm.
- A product warehouse for storage of packaged solid sodium cyanide.

The facilities are paved with concrete. The liquid sodium cyanide medium tanks in Workshop 815 are located within concrete bunded areas. The solid sodium cyanide production buildings are both self-bunded with concrete floors, concrete walls, and bunds at each doorway. The cyanide facilities are connected with the Site's utilities including stormwater drains and the Site's Wastewater Treatment Plant. No process wastewater generated from the cyanide facility except for the waste condensate water that will be discharged into Site Wastewater Treatment Plant (WWTP) for pre-treatment, then discharged into the WWTP of Cangzhou Economic and Technological Development Zone for final treatment. The treated wastewater will be discharged into Old Huangnan Paigan Channel after the treatment meets the pollutants discharge standards.

The first flush stormwater is routed to a first flush system comprising three confined concrete pits with total capability of 3,280 m^3, which services the entire site (i.e. all the other chemical manufacturing plants of Hebei Shanli). Also, a confined concrete tank with 4000 m^3 for emergency response of incident wastewater collection has been installed on the Site.

Hebei Shanli operates on 12-hour shifts, 24 hours per day, seven days per week, with three production teams.

No cyanide exposure incidents occurred during the audit period.

3.0 AUDITOR'S FINDING

This operation is

☒ in full compliance

☐ in substantial compliance

☐ not in compliance

with the International Cyanide Management Code.

4.0 AUDITOR INFORMATION

Audit Company:	ERM (Shanghai) Limited
Lead Auditor:	Hongtao Hu
Lead Auditor Email:	hongtao.hu@erm.com

Names and Signatures of Other Auditors:

Auditor Trainee:	Wenhai Wang	王闻海	
	Name	Signature	
Dates of Audit:	8 to 10 July 2025		

5.0 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.

Hebei Shanli Chemical Co., Ltd.	Hongtao Hu	21 October 2025
Name of Facility	Signature of Lead Auditor	Date

6.0 PRINCIPLES AND STANDARDS OF PRACTICE

PRINCIPLE 1 | OPERATIONS

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

STANDARD OF PRACTICE 1.1

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

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

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 1.1 requiring cyanide production facilities to be designed and constructed consistent with sound, accepted engineering practices and quality control/quality assurance procedures.

Quality control and quality assurance programs have been implemented during construction and modification of cyanide production and storage facilities. The quality control and assurance records have been retained. Qualified personnel from the accredited third party have reviewed the facility's construction and provided documentation confirming that it has been constructed as proposed and approved.

According to the regulations of China, chemical plant shall be designed and constructed by qualified agency or company. Also, an independent construction management company shall be assigned for project management of QA/QC, health safety and environment, schedule control and cost control. In the Construction Acceptance Reports for the Liquid Cyanide Production Unit and Solid Cyanide Production Unit, the project's outcome is certified. These reports have been signed and stamped by the relevant companies, including Shanli, design firm, construction company, design review firm, independent construction management company.

Construction Acceptance Reports on Safety Facilities and Environmenta Protection Facilities have also concluded that the certification of these facilities is complete.

Quality control and quality assurance records for the construction structure and foundation have been included in the Construction Acceptance Reports for Workshop 801 and Workshop 815, which mainly include details of:

- Excavation depth, length and width deviation from design
- Soil type and quality tests
- Level of the compacted surface compared to design
- Moisture content of compacted soil
- Survey of position and height of each floor of the building
- Specification, spacing and connections of reinforcing steel in concrete foundations and slab
- Concrete formwork location for the walls and floors
- Concrete surface condition following pours
- Concrete structure dimensions, deviation from design
- Brick strength compared to specification
- Roof impermeability experiment
- Brick wall dimensions
- Cement render quality
- Elevator installation test
- Lightning and grounding test

Quality control and quality assurance records for the construction and installation of the Cyanide Facility have been incorporated into the Construction Acceptance Report for Cyanide Production Units, which mainly includes details of:

- Qualification verification for the special operation: such as welding operator, NDT personnel
- Verification of facility, pipelines installation work method
- Materials qualification and certification verification
- Valve testing
- Safety valve testing.
- X-ray testing
- Pressure testing

Equipment List of Workshops 801 and 815 were updated in 2025 to include the equipment number, specification, producer, and installation location. All equipment information has been entered into the Manufacturing Executive System (MSE) to facilitate regular monitoring and generate preventive maintenance alerts.

The quality assurance document of tanks and vessels with normal pressure has been retained for each tank and vessel confirming adequacy of construction. For the pressure tanks, vessels and pipelines, the quality assurance document has been retained with design details, Usage Registration Certificate, Usage Verification Certificate, Safety Function Supervision and Testing Certificate, periodically verification report.

The materials used for construction of cyanide production facilities are compatible with the reagents used and processes employed. No changes to the materials or processes employed

have been undertaken during the audit period. The materials used for the cyanide facilities comprise the following:

- Pipe work – 304 grade stainless steel
- Reactor – 304L grade stainless steel
- Liquid cyanide volume measuring tank – 304 grade stainless steel
- Filter – 304 grade stainless steel
- Evaporators – 304 grade stainless steel
- Crystallizers – 304 grade stainless steel
- Centrifuge – 304 grade stainless steel

These materials are recognized as being compatible with the chemicals used to manufacture and store cyanide.

There are automatic systems or "interlocks" in place to shut down production systems and prevent releases due to power outages or equipment failures.

The cyanide facilities are supplied with electricity by two separate power supply circuits. In the event of failure of one power supply, the other power supply can fulfill facilities' needs. The Site is also equipped with a UPS to address emergency power outages, which will automatically sustain power to the facilities for approximately 3 hours, allowing for the safe shut down of production systems and prevent releases.

Controls established for equipment failure generally comprise alarms to signal the detection of HCN gas or high levels in tanks/vessels. When the alarm is activated, the control room operator switches off the associated part of the process. The system will remain inactive until the cause of the problem has been investigated and resolved.

The Facility has established the Distributed Control System (DCS) and Safety Instrumented System (SIS) for the cyanide production processes.

The elements of the liquid cyanide part of the plant connected to the DCS are:

- High, high-high alarm for temperature of reactor
- High, high-high alarm for outlet pressure of reactor
- High and high-high alarm for ammonia, light oil
- High and high-high, low and low-low alarm for liquid cyanide tank
- Air supply fans (failure of the fans, the system will be shut down)

The elements of the liquid cyanide part of the plant connected to the SIS are:

- High and high-high alarm for temperature of reactor
- High, high-high for outlet pressure of reactor
- High (9m) alarm for liquid cyanide tank, switch off the inlet valve

The controls for the reactor comprise the following:

- One of the two temperature detectors of SIS reached 1500℃
- One of the two temperature detectors of DCS reached 1470℃
- One of the two pressure detectors, outlet pressure of reactor of DCS reached 0.005 Mpa

The elements of the solid cyanide part of the plant with high, high-high, low, low-low liquid level alarm connected to the DCS are:

- Mother liquid cyanide tank: reached 6000mm, switch off the feeding pump in liquid cyanide tank farm, reached 400mm, switch off the feeding pump of evaporator in Workshop 815.
- Vapor cooling water tank: reached 5500mm, switch off the feeding pump intermediate water tank, reached 400mm, switch off the feeding pump of membrane treatment facility
- Membrane treatment intermediate water tank：reached 5500，switch off the process of membrane treatment facility, reached 400mm, switch off the outlet valve
- Recycling Liquid Cyanide Tank: reached 5500, switch off the process of membrane treatment facility, reached 400mm, switch off the outlet valve
- Recycling Ammonium Sulfamate Tank: reached 5500, switch off the process of membrane treatment facility, reached 400mm, switch off the outlet valve
- Liquid cyanide measuring tank: reached 5500 mm, switch off the feeding pump in liquid cyanide tank farm. reached 400 mm, switch off the feeding pump of evaporator in Workshop 815

In the event of failure of both power supplies, the liquid or gas in the process will remain in place, posing no environmental risk. The critical area of the plant is the reactor. If the plant needs to be shut down, the cyanide facility's emergency response procedure will be initiated. The procedure states that in the event of a power failure, UPS will be automatically activated to supply power to the control system, facilitating the safe shut down of the production process.

In conclusion, in the event of power failure or equipment failure, the contents of each vessel and pipe will remain within the vessel or pipe and will not leak into the environment. There has not been a simultaneous failure of both power supplies to the cyanide facility in the past three years.

In the event of equipment failures, the operators shut down the associated part of the plant. The Cyanide Production Unit has not experienced any incidents requiring a shutdown of the plant (either manually or automatically) in the past three years, aside from planned maintenance.

Also, Hebei Shanli conducts HAZOP every three years to assess the process risk of cyanide production facilities.

The Cyanide Production Unit areas are paved with concrete.

The cyanide warehouse facilities have a concrete floor and were observed to be in good condition.

The ground under transfer pipelines for cyanide solutions is paved with concrete. There are no flanges or valves present on the transfer pipelines for cyanide solutions from liquid cyanide tank farm to Solid Cyanide Production Unit.

The concrete surface comprises roadways and pedestrian paths, which were observed to be in fair condition. The first flush system comprises three confined concrete pits with 3280 m^3 in total.

These concrete pits can only be emptied by switching on a transfer pump (both automatic and manual) to transfer the contents to the wastewater treatment plant which serves the entire site (not just the cyanide facility).

The Facility does employ, inspect, test, and maintain systems -- such as level indicators and high-level alarms -- to prevent the overfilling of cyanide process and storage vessels.

The Facility does have regular inspection for the control system, which includes the indicators and alarms as well as secondary containments the vessels are stored in. Also, the Facility conducts the annual testing for the DCS and SIS System. The test results have shown that the systems are in good condition.

The filling process of each tank or vessel is overseen by the control room operator, who can deactivate the relevant transfer pump upon activation of an alarm.

Secondary containments for process storage tanks and containers are constructed using materials that provide a competent barrier to leakage and are sized to hold a volume greater than that of the largest tank and container of cyanide solutions within the containment and any piping draining back to the tank, and with additional capacity for the design storm event.

The liquid cyanide produced from Workshop 801 is pumped into liquid cyanide tanks. Secondary containments for process tanks and containers are constructed of concrete and concrete-rendered brickwork. The secondary containment of the liquid cyanide tanks is sized to contain at least 110% of the volume of the largest tanks and is paved with concrete.

The secondary containments are constructed of concrete and have been observed to be in fair condition.

In the event of a loss beyond the bund of the liquid cyanide tanks the facility would rely upon the concrete pavement stormwater first flush system to contain the loss. The area outside of the bund comprises concrete paved pedestrian way and roadway, which drains into the site's stormwater systems first flush pits. The cyanide facility would rely upon the first flush system to contain a loss from the tank. The capacity of three first flush pits is 3280m^3 in total. The stormwater collection in the first flush system is sampled and analyzed by onsite lab to determine the concentration of cyanide before being transferred to the site's wastewater treatment plant.

The wastewater treatment plant uses sodium hypochlorite to break down the cyanide when required.

Spill prevention or containment measures are provided for all cyanide solution pipelines.

The Cyanide Production Unit areas are paved with concrete.

The ground under transfer pipelines for cyanide solutions is paved with concrete. There are no flanges or valves present on the transfer pipelines for cyanide solutions from liquid cyanide tank farm to Solid Cyanide Production Unit.

Cyanide labels and glow direction signs are in place on the pipelines. Daily inspection is carried out to observe whether there is leakage from the transfer pipelines.

There are no leak alarms on the cyanide pipelines.

Hourly inspections and 12-hourly inspections are undertaken to include pipe work, flanges, pumps, high level alarms and tanks to identify leaks. Records of the inspections are kept.

In the event of loss from a pipeline within a bunded area, the spill would drain to a sump from where the liquid would be pumped to the Emergency Storage Tank and return to the process.

The cyanide facility undertakes inspection of the pipe wall thicknesses annually. The inspection records reflect the integrity of the pipe and support structures. The results indicate all pipelines have wall thicknesses greater than the relevant standard of 3.5 mm, 4.0mm and 4.0mm for a DN50, DN80, DN100 mm diameter steel pipe.

Cyanide is stored under conditions to prevent or minimize the potential for moisture exposure, along with adequate ventilation to prevent the build-up of hydrogen cyanide gas and cyanide dust.

Solid cyanide is stored in two sizes:

- 50 kg plastic bags within steel drums, and
- 1000 kg, 1100 kg within plastic bags within timber intermediate bulk containers (IBCs).

The drums and IBCs are stored inside a smart warehouse which is transported from the package area to the smart warehouse by automated conveyor belt. The smart warehouse is enclosed with concrete floors, walls and roofs to prevent exposure of cyanide to moisture. The smart warehouse is secured with two locks, and the keys are held by two designated individuals.

No fixed HCN monitors have been installed in the smart warehouse. Normally, no personnel shall be allowed to enter the smart warehouse except for the maintenance tasks of the smart warehouse system. If any maintenance needs to be performed in the smart warehouse, a Permit to Work will be applied. And the maintenance operator must carry portable HCN detectors. The cyanide warehouse features 48 windows, providing adequate ventilation to prevent the build-up of hydrogen cyanide gas.

The cyanide warehouse is located within the Cyanide Facility boundaries. The site is surrounded by a concrete/brick wall. Access to the site is only via a manned security gate. Public access is prohibited.

Only solid cyanide stored in the warehouse, which is separately from incompatible materials.

The liquid cyanide solution is stored in tanks within an open tank farm, where is located in a secure area separate from incompatible materials, with appropriate barriers, as necessary, to prevent mixing. Fixed HCN monitors have been installed in the tank farm. Access to the tank farm is only via locked gate.

STANDARD OF PRACTICE 1.2

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

☒ in full compliance with

The operation is ☐ in substantial compliance with Standard of Practice 1.2

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 1.2 requiring development and implementation of plans and procedures to operate cyanide production facilities in a manner that prevents accidental releases.

The Facility holds ISO certifications for safety, environment and quality management systems.

The Facility has established Standard Operational Procedures, QEHS Management Procedures and Emergency Response Plans to manage the EHS risks of Cyanide.

Standard Operational Procedures are integrated procedures addressing the full production process, included for:

- Raw materials
- Reaction
- Ammonia clearance
- Liquid Cyanide
- Desulfurization
- Loading and unloading
- Cycle water
- Evaporation
- Dry
- Forming
- Packaging
- Laboratory test
- Centrifugation
- Forklift
- Discharging

The procedures do describe the necessary operating practices including pre-start checks, personal protective equipment and contingency measures.

The Facility has contingency plans for non-standard operating situations that may present potential for cyanide exposures or releases.

The plant is automated and operated via DCS with separate control rooms for the liquid plant and solid plant. Emergency shutdown and interlocks are built into the plant design and managed via the DCS.

The Standard Operational Procedures for Workshop 801 and Workshop 815 include details of the DCS for cyanide production process and details of the measures to be taken should an upset occur. There are interlocks built into the system to shut down the process if necessary. And the facility also has UPS for emergency power outage situations, which will automatically

power the facilities for approximate 3 hours, allowing for the safe shut down of production systems and prevent releases.

Should there be a cyanide exposure or release, the situation is managed via the site's Emergency Response Plans that provide details on the response actions.

The Facility has a procedure to identify when there are changes to cyanide facilities or operating practices that differ from the initial design and operating practices standards. This process requires a review and sign-off by environment, health, and safety management.

The MOC Procedure details the changes that require MOC process. It details the types of work that must be reviewed and by whom, with process changes requiring review by both the department supervisor and the safety engineer, as well as representatives from the environment, health and safety department. Safety equipment changes require review by the safety management department. Changes involving facility process, new project, expansion project, renovation project must be reviewed and approved by the Chairman. The procedure details execution of the change, inspection, acceptance, commissioning and review after work, together with training and communication.

A minor modification to the cyanide plant has been undertaken during the audit period which involved the replacement of light oil pipeline replacement in liquid cyanide tank farm and replacement of pressure vessels in solid cyanide workshop. Records of Management of Change (MOC), along with qualifications or certifications of the pipelines and vessels have been provided for review.

Preventive maintenance programs are implemented, and activities are documented for equipment and devices necessary for cyanide production and handling.

The Facility Operations and Maintenance Procedure is an integrated procedure that documents the routine inspection and preventative maintenance requirements for the cyanide facility, which includes the requirements as below:

- The Annual Facilities Maintenance Plan must be prepared and submitted for approval before February every year.
- The maintenance plan for key facilities (which may cause termination of production) must be prepared and submitted for approval one month in advance at least.
- For the normal facilities maintenance, work permits are applicable to the task.
- Maintenance frequency of key facilities.

The Equipment Maintenance Plans list and describe the maintenance requirements of the equipment by items. Equipment maintenance plans for cyanide facilities were reviewed for the audit period and aligned with the description of maintenance activities provided by site engineers.

The Facility will shut down for approximately a week to conduct overhaul annually.

Process parameters are monitored with necessary instrumentation that is calibrated according to manufacturer's recommendations.

The procedure requires that the calibration should be conducted according to the planned frequency. Following calibration, a label must be placed on the equipment. The Facility

maintains annual calibration lists detailing the instruments in the plant needing calibration throughout the year. These instruments include high pressure gauges, vacuum pressure gauges, numerical temperature displays and flow meters.

The calibrations are undertaken by an independent externally qualified company. Equipment was sampled at random and the corresponding calibration records were available with valid period.

Procedures are in place and being implemented to prevent unauthorized/unregulated discharge of any cyanide solution or cyanide-contaminated water to the environment from the secondary containment area.

Water collected within the secondary containment structures cannot leave the structure unless it is pumped out or otherwise intentionally removed.

The Emergency Response Plan for Environmental accidents requires that water collected within the secondary containment areas must be pumped to the first flush stormwater tanks, via a manually switched pump and a dedicated wastewater pipe, then to the wastewater treatment plant.

All first flush of stormwater is discharged into the wastewater treatment plant, and the stormwater after the first flush is sampled and tested by Shanli lab, if the test results show no detection of the cyanide, the stormwater can be discharged.

The Facility has environmentally sound procedures for management and/or disposal of cyanide waste or cyanide-contaminated materials properly.

The streams of cyanide waste and cyanide-contaminated materials include packaging materials (such as plastic bags, plastic drums and timber), PPEs (such as coveralls, respirator filter cartridges and gloves), waste from lab and Sludge from the frame filters of wastewater from the wastewater collection tanks in cyanide production units. Solid cyanide waste and cyanide-contaminated materials are disposed by qualified vendors.

The cyanide-contaminated wastewater from the cyanide-contaminated containers cleaning is collected in a wastewater tank and treated with hydrogen peroxide to break the cyanide. The treated wastewater is pumped to the wastewater treatment plant.

There are procedures to ensure that the cyanide is packaged and labelled as required by the political jurisdictions through which the packaged cyanide will pass.

The cyanide facility packages cyanide in accordance with the Chinese standards. Classification and Code of Dangerous Goods (GB 6944-2025) is developed to align with the requirements of the United Nations Recommendation on the Transport of Dangerous Goods – Model Regulations, (2023).

The Standards of GB 19268-2021 and GB 6944-2025 specify the requirements for packing cyanide for export, including the packaging materials and method for inspecting the packaging. The facility sources their drums and IBCs from a third party that obtains compliance certificates with each supply of the packaging.

Standard Operational Procedure for Workshop 815 specifies the packaging requirements, including that the packaging must meet the Standard GB 6944-2025.

The Zhengding Customs Bureau has inspected the cyanide facility's packaging systems for each supply consignment during the audit period (2022-2025) and approved the packaging systems for international transport of the cyanide.

Stored cyanide has been observed to be labelled in Chinese and English, marked with global harmonized system GHS pictograms and a UN number that identifies the product.

STANDARD OF PRACTICE 1.3

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

The operation is	☒ in full compliance with	Standard of Practice 1.3
	☐ in substantial compliance with	
	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 1.3 requiring inspection of cyanide production facilities to ensure their integrity and prevent accidental releases.

The Facility conducts routine inspections of tanks, valves, pipelines, containments and other cyanide production and storage facilities, including:

- Tanks holding cyanide solutions for structural integrity and signs of corrosion and leakage
- Secondary containments 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
- Pipelines, pumps and valves for deterioration and leakage
- Containers used for transportation, where the producer is responsible for their integrity

Tanks and vessels

The Facility maintains a register of tanks and vessels and identifies which ones contain cyanide solutions. Inspections on the integrity of the tanks are completed via 1-hourly inspections and 12-hourly inspections on the cyanide storage tanks, including pipe work, flanges, pumps, high level alarms and tanks to identify deterioration and leaks. The inspection records are dated and detail the results of the inspection including the following items:

- Tanks' foundation stability
- Insulation and corrosion prevention materials
- Stairs and fences
- Bund
- Tank volume indicator
- High level alarms
- Tank valves
- Tanks signage
- Pipeline connection integrity

- Flanges and valve condition
- Wastewater collection facilities
- Presence of tank corrosion or leakage

In addition to the 1-hourly inspection and 12-hourly inspections, the wall thickness of the vessels is tested annually.

Secondary containments

A site inspection confirmed that secondary containments are in reasonable condition, with evidence of periodic maintenance and patching observed. The facility has updated its inspection process to clearly define the criteria for secondary containments. Minor defects in liquid cyanide loading area and NaOH tank farms have been rectified during the audit.

Discharge from the secondary containment is via a manually operated pump, which discharges to the stormwater first flush containment tanks at the site's wastewater treatment plant, or in the case of a concentrated liquid cyanide spill, to a mobile tanker for re-use at the cyanide facility. Therefore, there is no need to ensure that drains are closed or locked to prevent accidental releases to the environment.

Pipes – Annual Pipe Wall Thickness Testing

The wall thickness of cyanide carrying pipes is checked every six months. The inspection records document the integrity of the pipe and supporting structures. The inspection records are dated. Records were reviewed for selected pipelines from 2022 to 2025.

Hebei Shanli is not responsible for cyanide transportation. Instead, a qualified dangerous chemicals transportation supplier will be engaged to handle cyanide transportation, and this supplier shall be responsible for ensuring the integrity of the transportation containers.

Based on interviews, facility inspection and a review of the inspection records, the frequencies are deemed adequate to ensure that the equipment operates within its design specifications.

The Facility retains records of inspections that are documented. The documentation outlines specific items to be observed and includes the date of the inspection, the name of the inspector, and observed deficiencies. The details and date of corrective actions have been recorded and retained.

PRINCIPLE 2| WORKER SAFETY

Protect workers' health and safety from exposure to cyanide.

STANDARD OF PRACTICE 2.1

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

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

Summarize the basis for this Finding/Deficiencies Identified:

Hebei Shanli Chemical Co., Ltd.		21 October 2025
Name of Facility	Signature of Lead Auditor	Date

The Facility is in FULL COMPLIANCE with Production Practice 2.1 requiring the Facility to develop and implement procedures to protect plant personnel from exposure to cyanide.

The Facility has developed formal procedures to minimize worker exposure during:

a) Normal plant operations from receipt of raw materials through finished product packaging and shipping
b) Non-routine and emergency operations
c) Maintenance related activities

Standard Operational Procedures are integrated procedures covering the whole cyanide production and packaging operations. The procedures cover normal and non-routine operations, and the production facility is managed via DCSs in two control rooms, one for the liquid plant (Workshop 801) and one for the solid plant (Workshop 815).

In addition to the operating procedures there is an online permit to work system that covers:

- Working at heights
- Confined space
- Lifting
- Digging
- Machinery maintenance
- On-site road route change
- Flow isolation plate
- Hot work
- Temporary electricity, and
- Equipment dismantling and scrapping.

The procedure specified that the PPE must be worn, and operators must undertake a field level risk assessment prior to commencing work as well as using a lock out/tag out system for working on all cyanide plants. Decontamination of equipment must be completed prior to its maintenance. It also requires that the maintenance team must communicate with the local cyanide department prior to the work commencing and report any unsafe conditions to the department supervisor.

The safety permit requires a field level risk assessment to be undertaken prior to the work commencing, the use of a buddy system, records of tagging out, checking of PPE, undertaking flammable and toxicity tests. The permit is signed by the operator, the safety manager and department manager.

The Facility does solicit and considers worker's input in developing and evaluating health and safety procedures.

Employees can make suggestions to the procedures via 'written suggestions' that they can submit in suggestion boxes, hand to their shift leader for forwarding to the supervisor, or directly to the cyanide department safety manager. They also have an option to communicate their opinions to the plant manager via WeChat. Workers interviewed have confirmed that they have opportunities to share their input.

The Standard Operational Procedures for the Cyanide Production Units details the locations where the risk of hydrogen cyanide and cyanide dust is considered high, and must use PPE, including either a respirator equipped with a filter (suitable for cyanide) or one that provides oxygen.

All the cyanide production areas with HCN release risk have been identified. In total 130 fixed HCN detectors have been installed in these areas, which include liquid cyanide production areas, liquid cyanide storage tank farm, liquid cyanide loading areas, and solid cyanide production areas. The high alarm threshold for the fixed HCN detector is set at 0.8 ppm and the high-high alarm threshold is set at 1.0 ppm.

Pipeline from liquid cyanide farm to solid Cyanide Production Unit is designed without any flanges or valves. No detector has been installed for the pipeline.

During inspections of the facilities, it was observed that workers were wearing PPE as outlined in the procedures and signage present in the work area.

The Facility uses monitoring devices and associated alarms to confirm that controls are adequate to limit worker exposure to hydrogen cyanide gas and/or cyanide dust exceeding 10 parts per million (ppm) on an instantaneous basis or 4.7 parts per million continuously over 8-hour, as cyanide.

A combination of fixed and portable detectors is employed at the facility. The fixed detectors are set to trigger a high alarm at 0.8ppm and a high-high alarm at 1 ppm. The portable detectors are set to activate a high alarm at 4.7 ppm and a high-high alarm at 10 ppm. Portable detectors are used for task specific activities, while the fixed detectors are intended to detect any issue within the process.

When HCN gas concentrations trigger the high alarm threshold, the site operator is required to wear the filter gas mask for a short time duration not exceeding 30 minutes. When HCN gas concentrations trigger high-high threshold, the site operator must evacuate the site area immediately. The emergency response personnel must wear air breathing apparatus and heavy protective clothing upon arriving at the site to identify and seal the source of the leakage.

The HCN monitoring equipment is maintained, tested and calibrated according to manufacturer's recommendations, and records are retained for five years. There are fixed detectors within the plant area and portable detectors used for task specific activities. Calibration certificates were reviewed for this monitoring equipment.

The Facility has a buddy system which requires employees to work in pairs for positions involving cyanide exposure. All operators are equipped with explosion-proof radio or explosion-proof mobile phones to communicate with the associated process control room.

The Facility assesses the health of employees to determine their fitness to perform their specified tasks.

All workers have a medical examination every year at the local hospital (Huanghua City). The medical examination includes a variety of checks, including blood pressure, lung capacity, electrocardiography (ECG), blood, urine, liver scan, nervous system, ear examination, nose

and pharynx, blood eosinophil count, pure hearing threshold test air conduction, skin examination. depending on the working location and duration of the service.

The Site has retained records for each worker detailing the date of the examination and whether they are fit to perform their specified tasks.

The Facility has a clothing change policy or procedure for employees, contractors and visitors entering areas where there is a risk of cyanide contamination of clothing,

Clothing Change Procedures have specified the requirement of using and replacing personal protection supplies for employees, visitors, and contractors before and after entry into the Cyanide Production Units.

Before leaving work, employees must go to the workshop locker room to change and clean the protective equipment used during their shift and put them in the designated area.

It is forbidden to wear labor supplies home, and the used protective equipment is not allowed to be resold or disposed of improperly. The used labor supplies must be returned to the recycling box designated by the workshop, where they will be handled uniformly. All employees in the cyanide production units have their clothes laundered on site by the department.

Visitors are supplied with laboratory coats for use while visiting the facility.

Additional PPEs are required in the packaging area including the use of coveralls, gloves and full-face respirators. Personnel leaving the packaging facility must proceed to the changing room for a shower and clothes changing.

Warning signs advocating the present of cyanide and use of suitable PPE are posted throughout the Facility.

Warning signs for both sodium cyanide and hydrogen cyanide are placed in all process and storage areas, detailing the PPE requirements.

Warning signs were observed outside of the warehouse buildings at entrance points and inside the warehouse on the outside of the IBCs. Warning signs were present in the work area of Workshop 801, Workshop 815 and solid cyanide warehouse.

All personnel are prohibited from smoking, eating and drinking, and using open flames in areas where there is a risk of cyanide contamination. All process and storage areas have signs stating no smoking, no eating or drinking and no open flames.

STANDARD OF 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	Standard of Practice 2.2

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 2.2 requiring the development and implementation of plans and procedures for rapid and effective response to cyanide exposure.

The Facility has developed specific Emergency Response Plans to respond to cyanide exposures.

Emergency Response Plans for cyanide exposures and On-site Disposal Plans to illustrate detailed treatment procedure after a spill or exposure. The detailed response processes have been specified to cyanide exposure through ingestion, inhalation, and absorption through the skin and eyes in these documents.

The people interviewed were aware of these actions, including relocating exposed individual offsite, removing contaminated clothes, administering cyanide resistant injections, rinsing the contaminated area with flowing water, and contacting the first-aid clinic and hospital for emergency assistance.

Showers, eye wash stations and non-acidic fire extinguishers are located at strategic locations throughout the Facility. They are maintained and inspected weekly. The inspection and maintenance details have been specified in the Emergency Shower Eyes Washing Stations Inspection and Maintenance Programme. The maintenance items include water supply pressure, water spray pattern, tidiness of the stations.

The Facility has an annual preventative maintenance and inspection programme.

Dry powder fire extinguishers were observed throughout the Facility. No carbon dioxide fire extinguishers were observed throughout the cyanide facility areas.

The Facility is equipped with oxygen, resuscitators, antidotes and communication system or emergency notification method that is readily accessible for use.

Onsite inspection of the facility confirmed that operators are equipped with explosion-proof radio communication devices or explosion-proof mobile phones, and antidotes are stored strategically throughout the plant. Oxygen and resuscitator are available in the medical room on the site. Water is available around the plant through safety showers and fire hydrates.

Personnel interviewed were aware of the location of antidotes and the emergency notification process. Inspection records sampled during the audit period were found to be well organized.

The Facility inspects its first aid equipment regularly to ensure that it is accessible when needed. The first aid and emergency response equipment are stored and tested in accordance with the manufacturer’s instructions and replaced as scheduled to ensure their effectiveness at the time of use.

The antidotes are produced by China People’s Liberation Army Medicine Science Institute, with instructions indicating they should be stored at room temperature and protected from the sun. The antidote was stored appropriately and within its expiry date.

The doctors at the Site’s first aid clinic inspect the oxygen bottles and resuscitators in the clinic every week.

Fire extinguishers are sent in rotation to an off-site facility and refilling as required by the manufacturer. Fire extinguishers have been inspected and within service duration.

Safety Data Sheets, first aid procedures or other informational materials regarding cyanide safety are provided in the local language understood by the workforce and are available to workers in areas where cyanide is handled.

All signages and procedures are in Chinese, the official language. The SDS has been developed in compliance with global harmonized system (GHS) requirements.

Information boards have been erected at the cyanide handling areas of the plant that detail hazards and precautions. The drum and IBC labels also provide information on cyanide hazards.

Storage tanks, process tanks, containers and piping containing cyanide are identified to be labelled clearly to alert workers of their contents.

The flow direction of the pipes is clearly shown.

The Facility has a decontamination policy or procedure for employees, contractors and visitors leaving the areas where there is a risk of skin exposure to cyanide.

Clothing Change Procedures have specified the requirement of using and replacing personal protection supplies for employees, visitors, and contractors before and after entering the Cyanide Production Units.

Before leaving work, employees must go to the workshop locker room to change and clean the protective equipment used during their shift and put them in the designated area.

It is forbidden to wear labor supplies home, and the used protective equipment is not allowed to be resold or disposed of improperly. The used labor supplies must be returned to the recycling box designated by the workshop, where they will be handled uniformly. All employees in the cyanide production units have their clothes laundered on site by the department.

Visitors are supplied with laboratory coats for use while visiting the facility.

Additional PPEs are required in the packaging area including the use of coveralls, gloves and full-face respirators. Personnel leaving the packaging facility must proceed to the changing room for a shower and clothes changing.

Interviews and site inspection confirmed that the decontamination procedure is implemented and followed.

The Facility is equipped with on-site first aid capabilities for workers exposed to cyanide, but not a higher-level medical assistance. The Site has an on-site first-aid clinic operational 24 hours a day, staffed by two fully qualified doctors.

According to the instruction manual of cyanide antidote provided by the Site, the formulation of cyanide antidote is confidential, which is described as a colorless or light-yellow clear liquid.

The Facility has provided training on the proper use of cyanide antidotes to employees who may be exposed to cyanide. Based on random interviews with on-site personnel, it has been confirmed that these employees are familiar with the proper use of such antidotes.

The Facility has developed a procedure to transport exposed workers to nearby accredited local medical facilities.

The Emergency Response Plan for Production Safety Accident details the procedure to transport workers to local medical facilities. The Site would use either its own vehicles or in case of severe injury or exposure, contact the emergency services at Cangzhou City Bohai District Zhongjie Hospital, which is roughly a 10- minute drive from the Site.

The Facility has made formalized arrangements with local medical facilities of the potential need to treat patients for cyanide exposure, and the Facility is confident that the medical provider has adequate, qualified staff, equipment, and expertise to respond to cyanide exposures.

The Facility has signed a medical service guarantee agreement with Cangzhou City Bohai District Zhongjie Hospital. The Hospital is the designated partner for medical services at the Site. It will undertake emergency medical treatment of the venue, offer expedited medical access for the Site, and provide 24-hour medical services. Before signing the agreement, the Facility verified that Cangzhou City Bohai District Zhongjie Hospital possesses the necessary staff and equipment to effectively respond to cyanide exposure incidents.

The Occupational Hazards Control Effectiveness Report and Emergency Response Plan for Production Safety Accident are in place to investigate and evaluate cyanide exposure incidents to determine if the operations programmes and procedures designed to protect worker health and safety as well as to respond to cyanide exposures, are adequate or need to be revised.

It outlines an accident classification system which specifies the type of investigation required, and the accident reporting and communication process. The most serious accident and exposures require investigation by the government or an external party. For accidents without lost working day, the investigation is to be undertaken by the cyanide production units along with the safety engineer to determine the root cause of the incident.

The accident and treatment report details the accident, the accident analysis, the prevention measures, the person/s responsible and their financial punishment decision. It then moves to a corrective measures section which lists the hazard, corrective actions, date for implementation and the person responsible.

No cyanide exposure or cyanide release incidents have been reported during the audit period.

The non-cyanide-related incidents response process has also been specified in the Emergency Response Plan for Production Safety Accident. And some first aid incidents have been investigated as required in the past three years.

PRINCIPLE 3 | MONITORING

Ensure that process controls are protective of the environment.

STANDARD OF PRACTICE 3.1

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

☒ in full compliance with

The operation is ☐ in substantial compliance with Standard of Practice 3.1

☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 3.1 requiring environmental monitoring to be conducted to confirm that planned or unplanned releases of cyanide do not result in adverse impacts.

The Facility does not have any direct wastewater discharge to surface waterbody.

Quarterly monitoring results of discharges from the site wastewater treatment plant, from 2023 to 2025 are provided for review.

The certified external laboratory was entrusted by the Site to undertakes the analyses in accordance with the method in Chinese National Analytical Standard No. HJ484-2009 (Nicotinic acid-pyrazolone spectrophotometric method and pyridine-barbitone acid colorimetry method). Total cyanide has not been detected and is always below the Method Detection Limit (MDL) of the two methods (0.004 mg/L) in the past 3 years' reports.

The Site has engaged a certified laboratory to undertake the soil and groundwater monitoring every year. There are 35 monitoring wells onsite for groundwater sampling. Refer to 3.1.4 for monitoring results.

The Facility does not have any direct wastewater discharge to surface water.

The first flush of stormwater is collected in the site's first-flush stormwater collection tank and treated by the onsite wastewater treatment plant then discharged to Lingang Industrial Park's wastewater treatment plant.

Stormwater after the first flush is pumped through the company's rainwater discharge outlet, subsequently entering the stormwater drainage network of the industrial park after being verified by the site lab. According to the site lab records, the total cyanide concentrations have consistently remained below the MDL of 0.05mg/L over the past years. The analytical instrument is calibrated by an independent calibration company on an annual basis.

The total cyanide is tested in accordance with the standard method in Chinese National Analytical Standard No. HJ484-2009 (Nicotinic acid-pyrazolone spectrophotometric method).

The first flush of stormwater is collected in the site's first-flush stormwater collection tank and treated by the site wastewater treatment plant before being discharged to Lingang Industrial Park's wastewater treatment plant.

The treated effluent from the site's wastewater treatment plant is discharged to Lingang Industrial Park's wastewater treatment plant, where it undergoes further treatment before being discharged into the surface water body, Old Huang Nan Pai Gan Chanel.

According to the quarterly monitoring reports of site wastewater treatment plants conducted by the 3rd laboratory from 2023 to 2025, the total cyanide is not detected below the MDL of 0.004mg/L, which is far below 0.5 mg/L WAD cyanide.

Quarterly monitoring results of discharges from Lingang Industrial Park wastewater treatment plant are provided. The total cyanide is tested in accordance with the standard method 2 in

Chinese National Analytical Standard No. HJ484-2009 (Nicotinic acid-pyrazolone spectrophotometric method). According to the monitoring reports during 2023 to 2025, total cyanide was not detected and below the MDL of 0.004 mg/L, which is far less than 0.022 mg/L.

The Facility develops a soil and groundwater monitoring plan and engages a certified 3rd party to conduct soil and groundwater water monitoring annually. According to the plan and monitoring results, there are up to 118 soil sampling points and 35 groundwater sampling wells onsite.

The certified laboratory undertakes the soil sample analyses in accordance with the standard method Chinese National Analytical Standard No. HJ745-2015 4.1, and the groundwater sample analyses in accordance with the standard method Chinese National Analytical Standard No. GB/T 5750.5-2023 7.2.

According to the annual monitoring results of soil and groundwater from 2022 to 2024, the total cyanide concentrations in soil are around 0.09-54 mg/kg, while the total cyanide in groundwater has not been detected and below the MDL of 0.002mg/L.

According to the local regulatory standard GB 36600-2018, acceptance criteria for total cyanide in soil is 135 mg/kg, while the acceptance criteria of total cyanide in groundwater is 0.05 mg/L based on the local regulatory standard GB/T 14848-2017.

The soil and groundwater monitoring results during the audit period were below the acceptance criteria.

The Facility management confirmed that no groundwater was used within the boundary of the facility.

Refer to 3.1.4, facility operations have not caused the concentration of cyanide in the groundwater to exceed the applicable standards, hence no remedial activity has been taken onsite. However, the site develops Soil and groundwater pollution remediation procedures in Chapter 20 of Compilation of Environmental Protection Systems (LGWJ-HBC-01) to address potential soil and groundwater contamination.

The Facility engages external qualified agency to conduct air emission monitoring on quarterly basis, including point source emission from the solid and liquid cyanide workshops and fugitive emission at boundary. Quarterly monitoring results from 2023 to 2025 are provided for review.

The HCN emissions are tested in accordance with Chinese National Analytical Standard No. HJ /T 28-1999.

The results of HCN emissions from solid cyanide workshops are about $4.87*10^{-4}$-$1.84*10^{-3}$ kg/h, while the HCN from liquid cyanide workshops have not been detected and below the MDL of 0.09mg/m^3. The fugitive HCN emissions have not been detected at the site boundary and below the MDL of $2*10^{-3}$mg/ m^3.

According to the local regulatory standard GB 31573-2015, acceptance criteria for point source HCN emissions are 0.3mg/ m^3, and for fugitive HCN emissions are 0.0024mg/ m^3. The test results were below the acceptance criteria.

Monitoring is conducted at frequencies adequate to characterize the medium being monitored and to identify changes in a timely manner.

The frequency of monitoring undertaken at the cyanide facility is:

- Wastewater discharges – quarterly manual monitoring and continuous online monitoring
- Air emissions – quarterly monitoring and continuously
- Stormwater discharges – Whenever there is rain, by internal laboratory
- Soil and groundwater quality – annually

These frequencies are in compliance with the legal requirements and considered adequate in the operating circumstances to meet Code requirements.

PRINCIPLE 4| TRAINING

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

STANDARD OF PRACTICE 4.1

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

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

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 4.1 requiring employees to be trained to operate the plant in a manner that minimises the potential for cyanide exposures and releases.

The Facility provides training to workers to understand the hazards of cyanide and refresher training is periodically conducted. New employees receive three levels of training comprising company, departmental and operational level training.

Company-level training consists of three days of classroom training. All employees receive a booklet titled 'Safety Training material' during the training. These booklets are available after the course in the control room of cyanide department.

Departmental level training consists of three days' training. The training takes place in both the meeting room and on Site to demonstrate the chemical hazards, emergency response and PPE. The new employee will be familiar with the entire operation of the cyanide production plant. For the staff who may come into contact with cyanide, the training will cover the topics of the health effects of cyanide, the symptoms of cyanide exposure, and the procedures to follow in the event of exposure.

Operational level training consists of three days training on Site within the cyanide department relevant to new employee's role. Each employee is paired with an experienced worker who teaches them how to operate the machinery in that area. During the three days they do not operate the machinery independently, culminating in an examination at the end of the three days. In addition, they go through the operating procedures.

Refresher training is provided in the form of monthly training sessions. Each month the safety adviser of the cyanide department delivers training that lasts approximately two hours.

72 hours are required for the new employee training and 24 hours are required for the refresher training at least.

Interviews with personnel and a review of training records confirmed that workers receive training on cyanide hazards prior to commencing work, along with regular refresher sessions.

The training plan includes training dates and training time, training topic, trainer, training location.

The Facility provides training for workers on the use of personal protective equipment (PPE), including when and where the PPE is required.

PPE training covers all three levels of training (company, departmental and operational). There are specific management and departmental procedures for the selection, storage, use and maintenance of PPE for different operations within the cyanide department.

Interviews with employees confirmed that training on how and when to use PPE is provided.

The Facility trains workers to perform their normal production tasks with minimum risk to their health and safety, and in a manner that prevents unplanned cyanide releases.

The Standard Operational Procedures outline the requirements for safely undertaking specific tasks, including the use of PPE prior to undertaking certain tasks. New employees are paired with an experienced person to gain practical experience, with supervision from the area supervisor.

According to the Safety Operation Regulations, all employees must complete 72 hours of training for new employees prior to handling cyanide. The training records are provided for review as evidence.

Refresher training in normal production tasks has been provided to ensure that employees continue performing their work in a safe and environmentally protective manner.

Refresher training is provided through monthly training sessions. Each month the safety adviser for the cyanide department delivers training that lasts approximately two hours. A minimum of 24 hours are required for the refresher training to all employees. A test is required for each training.

The training components required for each job are outlined in training materials.

These components include the physical and chemical properties of cyanide, fire prevention, personal protection equipment, emergency response, critical hazards prevention, and specific training resources related to each role.

The Facility has 41 personnel with safety management certificates. Internal trainings are provided to the employees by these qualified personnel.

External trainings are provided by the qualified agencies, such as the local safety bureau, environmental protection bureau, fire-fight department and special equipment management authority.

The Facility evaluates the effectiveness of cyanide training by testing. There are questionaries used for the tiered induction training and are retained for records. Tests are also conducted after the annual refresher training and monthly training.

New employees are paired with an experienced person who demonstrates the tasks and observes the performance of the workers.

STANDARD OF PRACTICE 4.2

Train employees to respond to cyanide exposures and releases.

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

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 4.2 requiring employees to be trained to respond to cyanide exposures and releases.

The Facility provides training for workers on the process to take in the event of cyanide exposure or release.

Workers are trained about these procedures in company, departmental and operational trainings, as well as monthly and weekly training sessions. There are 41 qualified safety management personnel as trainers.

Also, workers are required to attend the mock drills to evaluate the effectiveness of emergency response process. Workers interviewed could describe the response processes including evacuation to an upwind location, use of safety showers, reporting the incident and use of antidote. The Site also has appointed emergency responders who receive training on higher level response actions.

The Facility provides training to workers to respond to cyanide exposure and cyanide releases.

Routine mock drills are conducted to test and improve their response skills.

The Facility has conducted mock drills for workers simulating cyanide exposure and release scenarios in Workshop 815 area and the Workshop 801 area. The drills are recorded, and reports evaluate the effectiveness of the exercise along with opportunity for improvements.

Training records are retained for the duration of an individual's employment, documenting the training they have received. The records include the names of the employee and the trainer, the date of training, the topics covered, and how the employee comprehends the training contents.

Training files for employees in cyanide production units were reviewed, which contained evidence of training, including course content, evaluation and certificates.

All workers received trainings on personal protective equipment and emergency response procedures in the event of a spill or exposure in monthly and annual training sessions.

PRINCIPLE 5| EMERGENCY RESPONSE

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

STANDARD OF PRACTICE 5.1

Prepare detailed emergency response plans for potential cyanide releases.

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

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 5.1 requiring a detailed emergency response plan for potential cyanide releases.

The Facility developed an Emergency Response Plan to address potential releases of cyanide that may occur on Site or may otherwise require response.

The following emergency response plans were provided for review:

- Emergency Response Plan for Production Safety Accident outlines general response for cyanide related accidents.
- Emergency Response Plan for Environmental Emergencies details the environmental risk assessment and targets response of cyanide release.
- Special Emergency Response Plan for Major Hazard Sources Accidents details the emergency response specific for potential releases of cyanide.
- On-site Disposal Plan for Solid Sodium Cyanide Plan describes response procedures and actions in the event of cyanide spills for each position in the solid sodium cyanide workshop.

The emergency procedures do consider the potential failure scenarios appropriate for its site-specific environmental and operating circumstances conditions.

a) The Emergency Response Plan for Environmental Emergencies details the response procedures in the event of catastrophic release of hydrogen cyanide. The Site will activate the emergency spray for degradation to reduce evaporation and eliminate static electricity in the surrounding area. The waste liquid after spraying is collected and absorbed in the alkali liquid absorption tower.

b) The Emergency Response Plan for Environmental Emergencies specifies the procedures in the event of leakage. The Site controls the leakage source by closing valves, stopping operations, or by implementing methods such as changing technological processes, conducting partial shutdown, cycling, and reducing load operations. The On-site Disposal Plan details the control methods applicable at various locations in the workshop, comprehensively addressing releases under diverse conditions during packaging, storage, loading and unloading operations.

c) The Emergency Response Plan for Environmental Emergencies, details the disposal methods in the event of cyanide releases during fires and explosions:

- The rescue team shall first conduct on-site detection and investigation to determine the location and radius of the affected area, the release condition, and to assess the risks to facilities and buildings.
- Promptly shut down or cut off the valves of the equipment and pipelines as much as possible. Based on the progression of the fire and release, the command post issues instructions such as partial shutdown or complete shutdown of the entire production facility.
- The fire decontamination team shall implement on-site fire suppression strategies and work to contain the spread of release.
- If the release persists and becomes increasingly challenging to control, the Site command will notify the local environment authority and the industrial park management Committee.

d) The On-site Disposal Plan specifies the emergency actions for pipe, valve and tank ruptures in multiple positions in the workshop.

e) The Power-off Emergency Response Procedure details the emergency actions during power outages. The Emergency Response Plan for Transformer Failure particularly mentioned that in the event of failure of the main transformer, priority should be given to activating the standby transformer or performing a switching operation to ensure power supply.

f) This is not applicable, as the only open ponds are designed to collect stormwater exceeding the first flush volume and are connected to the park's stormwater drainage network. Total Cyanide was not detected in the outlets according to the test reports during the past 3 years.

The emergency response plans describe the specific response actions as appropriate for the anticipated emergency situations, such as evacuating site personnel and potentially affected communities from the area of exposure.

a) The Special Emergency Response Plan for Major Hazard Sources Accidents specifies that the minimum distance for potential leakage should be no less than 25 meters. In the event of significant leakage, the evacuation distance in the downwind direction should be extended based on the initial isolation distance, taking into account the characteristics of the leaked substance. Should leakage occur in water bodies, the Site shall ensure that the public maintains a safe distance from the contaminated water source area.

b) The Special Emergency Response Plan for Major Hazard Sources Accidents details the use of cyanide antidotes and first aid measures for cyanide exposure in Chapter 4.2.1. It elaborates the different first aid actions tailored to the severity of cyanide poisoning.

c) The Special Emergency Response Plan for Major Hazard Sources Accidents specifies that for leakage of liquid sodium cyanide, the Site shall build a barrier and a dike using sand and soil to contain the spill. While for leakage of solid sodium cyanide, the Site shall cover the leakage with dry sand or other non-flammable materials, followed by a layer of plastic sheeting to minimize dispersion and prevent rain exposure. More detailed control actions in different locations of the workshop are provided in the On-site Disposal Plan.

d) Containment, assessment, mitigation and future prevention of releases are covered in the Emergency Response Plan for Environmental Emergencies Article 5.1, where it details the measures to prevent chemical accidents.

STANDARD OF PRACTICE 5.2

Involve site personnel and stakeholders in the planning process.

The operation is
- ☒ in full compliance with
- ☐ in substantial compliance with Standard of Practice 5.2
- ☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 5.2 requiring the Facility to involving site personnel and stakeholders in the planning process.

The Facility has involved its workforce and stakeholders, including potentially affected communities, in the emergency response planning process.

The emergency response plans were distributed to all departments, each of which scheduled specific training days for employees to share information about the procedure and provide feedback. The procedure clearly outlines the responsibilities of all departments.

The Site is in Cangzhou Lingang Economic and Technological Development Zone. There are no other specific environmental protection targets such as scenic areas, nature reserves or key cultural relics protection units within 3 km radius. The Site engages with relevant government authorities and neighbouring industrial facilities within its 3 km radius, including Hebei Tiancheng Pharmaceutical Co., Ltd, Hebei Bilong Chemical Technology Co., Ltd., Beijing Jinchengtai'er Pharmaceutical (Cangzhou) Co., Ltd., etc.

The Facility has informed potentially affected communities about the risks associated with accidental cyanide releases and engaged with them directly or through community representatives to determine suitable communications and response actions.

Before the issue of the emergency response plan, the Site had invited neighboring industrial facilities to participate in the symposium, where they were informed about the potential risk of cyanide leakage in the Site and the possible impact on them after the leakage. The measures for risk response have been coordinated with the neighboring facilities, and a communication mechanism for risk response has been established. The sign-in form for the meeting is provided for review. The Site also invited the secretary of Xinzhuangzi Villiage, which is the only neighboring village within a 2 km radius of the Site, to visit the sodium cyanide operation.

The Facility has engaged local response agencies such as external responders and medical facilities in the emergency planning and response process.

During the revision and upgrade of the emergency response plans, the Site coordinated with and shared copies of the ERP with the relevant government authorities and neighboring industrial facilities, including:

- Wisdom Pharma (Cangzhou) Co., Ltd.
- Yinghai (Cangzhou) Perfume Co., Ltd.
- Cangzhou Odyssey Chemicals Co., Ltd.
- Cangzhou Kangda Pharmaceutical Co., Ltd.
- Hebei Tiancheng Pharmaceutical Co., Ltd.
- Hebei Bilong Chemical Technology Co., Ltd.
- Beijing Jinchengtai'er Pharmaceutical (Cangzhou) Co., Ltd.
- Huanghua Municipal Ecology and Environment Bureau

The external responders who may come to site to assist in the event of an emergency are listed as follows:

- Cangzhou Bohai New Area Public Security Fire Brigade
- Zhongjie Limin Road Public Security Fire Brigade
- Huanghua People's Hospital
- Cangzhou Bohai Zhongjie Hospital
- Cangzhou Emergency Center
- Wisdom Pharma (Cangzhou) Co., Ltd.
- Yinghai (Cangzhou) Perfume Co., Ltd.
- Cangzhou Odyssey Chemicals Co., Ltd.
- Cangzhou Kangda Pharmaceutical Co., Ltd

If the impact of the emergency event exceeds beyond the Site area, the emergency leadership team will change to a related government management department.

The operation engages in regular consultation and communication with stakeholders to assure that the Plan addresses current conditions and risks.

STANDARD OF 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	Standard of Practice 5.3

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 5.3 requiring designated appropriate personnel and committed equipment and resources for emergency response.

The Emergency Response Plans have include the following information:

a) and b): The Emergency Response Plan for Production Safety Accident Chapter 2.1 and Appendix 5, and Emergency Response Plan for Environmental Emergencies Chapter 4, detail

the emergency response teams, i.e. director, deputy director, on-site director, rescue team, security evacuation team, professional fire brigade, logistics support team, communication support Team, medical team, environmental monitoring team and workshop disposal team.

c) Company level and departmental level training on Emergency Response Plan for Environmental Emergencies Chapter 9.1 is undertaken, to help emergency responders comprehend the content of the emergency plan and be familiar with emergency responsibilities, procedures and on-site emergency disposal plans.

d) The Emergency Response Plan for Production Safety Accident Appendix 5 and Emergency Response Plan for Environmental Emergencies Chapter 12.1.1 details 24-hour contact information for company leaders and team members. All members of the emergency response team are required to keep the phones on 24 hours a day. The emergency management office has established an emergency communication network to update the emergency contact list and communication methods whenever there are personnel or contact change. Also, the call-out process for initiating a response to a cyanide-related emergency has been specified in the Emergency Response Plans.

e) The Emergency Response Plan for Production Safety Accident Chapter 2 and Emergency Response Plan for Environmental Emergencies Chapter 4.2-3 details the organization structure and corresponding responsibilities for all the coordinators and team members.

f) The Emergency Response Plan for Production Safety Accident Appendix 4 and Emergency Response Plan for Environmental Emergencies Chapter 12.1.3 details all emergency equipment.

g) The Emergency Response Plan for Production Safety Accident Chapter 3.10 states that the safety department conducts a monthly inspection of all emergency supplies within the company. In case where departments lack sufficient emergency supplies or fail to maintain them adequate, a deadline for corrective action is set, and the department supervise the implementation of these actions.

h) The Emergency Response Plans detail the responsibilities of the hospital, the fire department and the government safety department, which provides guidance on emergency response.

The Facility has confirmed that external entities involved in the Emergency Response Plans are informed of their participation and are included as necessary in mock drills or implementation exercises.

The Emergency Response Plan for Production Safety Accident Chapter 3.9 states that the site has signed an emergency rescue agreement with Yinghai (Cangzhou) Perfume Co., Ltd., which is a level 3 county emergency rescue team located at the south of Chemical Avenue, Cangzhou Lingang Economic and Technological Development Zone.

Cangzhou Municipal Ecological and Environment Bureau, Huanghua Municipal Ecology and Environment Bureau and neighboring industrial facilities attended the Site’s mock drill of Emergency Response Plan for Environmental Emergencies. The drill report is provided for review.

STANDARD OF PRACTICE 5.4

Develop procedures for internal and external emergency notification and reporting.

The operation is
- ☒ in full compliance with
- ☐ in substantial compliance with Standard of Practice 5.4
- ☐ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 5.4 requiring development of procedures for internal and external emergency notification and reporting.

The Emergency Response Plan for Production Safety Accident Appendix 5 and Emergency Response Plan for Environmental Emergencies Chapter 4.3 includes procedures and contact information for notifying site management, regulatory agencies, external response teams and medical facilities about the emergency.

According to the Emergency Response Plan for Production Safety Accident, upon receiving the alarm, the emergency office will promptly contact the leaders of each emergency rescue team and report to the company's emergency command center. The emergency response director will organize the emergency response team and decide whether to involve external response teams and whether to inform the government department as well as surrounding neighbors. Appendix 5 details the contact information of the Fire, hospital and government office (safety department and environmental protection department), and surrounding industries.

The Emergency Response Plan for Production Safety Accident details that the emergency response director will decide when to inform potentially affected communities. The Emergency Response Plan for Production Safety Accident Appendix 5 and Emergency Response Plan for Environmental Emergencies Chapter 3.4.1 details contact information for surrounding industries and village representatives in a 3 km radius of the Site.

The Emergency Response Plan for Production Safety Accident details that it is the director’s responsibility to communicate with the media.

The operation has a written procedure for notifying ICMI of any significant cyanide incidents, as defined in ICMI’s Definitions and Acronyms document.

Hebei Shanli has established Risk and Opportunity Response Control Procedures, which defines that if any significant cyanide incidents occur, Hebei Shanli will report to the international trade department of Chengxin Group. The International trade department will notify ICMI.

As interviewed, no such significant cyanide incidents have occurred.

STANDARD OF PRACTICE 5.5

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

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

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 5.5 requiring the Facility to incorporate monitoring elements that account for the additional hazards of using cyanide treatment chemicals into response plans and remediation measures.

The Emergency Response Plan for Environmental Emergencies describes specific and appropriate remediation measures, such as recovery or neutralization of solutions or solids, decontamination of soils or other contaminated media, management and/or disposal of debris from spill clean-up, and provision of an alternative drinking water supply, when necessary.

The Emergency Response Plan for Environmental Emergencies details the 2-step hydrogen peroxide oxidation method in Chapter 6.4 as follows:

- Spray 30% hydrogen peroxide (with a liquid-to-solid ratio of 1:3) and adjust the pH to a range of 9.5~10.5.
- Allow the reaction to proceed for 30 minutes, then add a 5% copper sulfate catalyst and raise the temperature to 50°C to accelerate decomposition. The removal rate of CN^- can reach 99.8%.
- Use a portable cyanide detector (such as Hach CN-71V) to confirm the residual concentration in real time.

This chapter also specified the soil remediation method: execute a 5-meter-deep rotary jet grouting injection of medicine (0.5 mol/L potassium permanganate) in the infiltration area.

The Compilation of Environmental Protection Management Systems (LGWJ-HBC-01) Chapter 20 Soil and groundwater contamination management procedure also details multiple remediation methods for soil and groundwater contamination.

The drinking water on the Site is sourced from bottled water, so there is no concern about the contamination of drinking water.

There is no surface water on the site or within a 1 km radius of the site therefore the question is not applicable.

The Emergency Response Plan for Environmental Emergencies Chapter 6.3 states that for pollutants that persist in water bodies, soil, crops and other environments and are not easily removed or degraded shortly after environmental pollution incidents, necessary follow-up monitoring should be conducted. The sampling methodologies and parameters have been specified in the Annual Soil and Groundwater Monitoring Plan, which shall comply with national standards.

According to the annual monitoring results of soil and groundwater from 2022 to 2024, there were as many as up to 118 soil monitoring points each year, along with up to 35 groundwater monitoring points.

STANDARD OF 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	Standard of Practice 5.6

Summarize the basis for this Finding/Deficiencies Identified:

The Facility is in FULL COMPLIANCE with Production Practice 5.6 requiring the Facility to periodically evaluate response procedures and capabilities and revise them as needed.

The Emergency Response Plan for Production Safety Accident Chapter 4.3 and Emergency Response Plan for Environmental Emergencies Chapter 11.3 state that both plans are generally evaluated every three years. A review shall be conducted, and the plan will be updated if necessary, under any of the following circumstances:

- Major changes occur in the laws, regulations, rules and standards on which the plan is based.
- The emergency command structure and its responsibilities are modified.
- Major changes occur in the risks faced with production safety.
- Major changes occur in important emergency resources.
- Major issues requiring revision of the plan are discovered during plan drills or emergency rescue.
- Other circumstances that require revision.

Mock emergency drills are conducted periodically as below to test response procedures for various exposure scenarios, with the lessons learned from the drills being incorporated into emergency response planning.

- Mock Drill of Emergency Response Plan for Environmental Emergencies, every 6 months
- Mock Drill of Special Emergency Response Plan for Major Hazard Sources Accidents and Cyanide Poisoning Response, every April and July
- Mock Drill of On-site Disposal Plans, every 3 months
- Mock Drill of fire response, every April and August
- Mock Drill of emergency evacuation, every 6 months
- Emergency drills for all positions in the workshop, every week

For each drill the following is recorded:

- Description of emergency scenario
- Record of training attendance and assessment
- Photographs of the event

Independent Emergency Drill Reports are prepared to identify the deficiencies of the Emergency Response Plan. An updated version of the Emergency Response Plan will be prepared to address the deficiencies after the drill if necessary.

The Emergency Response Plan for Production Safety Accident Chapter 4.3 and Emergency Response Plan for Environmental Emergencies Chapter 11.3 include the provisions to evaluate the Plan after any emergency and mock exercises and revise it as necessary.

7.0 IMPORTANT INFORMATION

Your attention is drawn to the document titled – "Important Information Relating to this Report", which is included in **Appendix A** of this report. The statements presented in that document are intended to inform a reader of the report about its proper use. There are important limitations as to who can use the report and how it can be used. It is important that a reader of the report understands and has realistic expectations about those matters. The Important Information document does not alter the obligations ERM (Shanghai) Limited has under the contract between it and its client.

APPENDIX A IMPORTANT INFORMATION RELATING TO THIS REPORT

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Shanghai Office

Suite 2005A,
Litong Plaza,
No. 1350 Sichuan North Road,
Shanghai 200080 China

T: +86 21 5385 3050

Beijing Office

Unit A, 10th Floor, Tower B,
Gateway Plaza,
No. 18 Xia Guang Li,
North Road East Third Ring,
Chaoyang District,
Beijing 100027 China

T: +86 10 8440 0686

Guangzhou Office

Room 120, 66th Floor,
No. 28 Zhujiang East Road,
Tianhe District,
Guangzhou 510000, China

T: +86 20 6299 5392

www.erm.com