



**REPORT**

# International Cyanide Management Code Certification Audit

*Inner Mongolia Chengxin Yongan Chemical Co., Ltd. – Production Facility  
ICMC Certification Audit – Summary Audit Report*

Submitted to:

**International Cyanide Management Institute (ICMI)**

1400 I Street, NW Suite 550, WASHINGTON DC, 20005,  
UNITED STATES OF AMERICA

Submitted by:

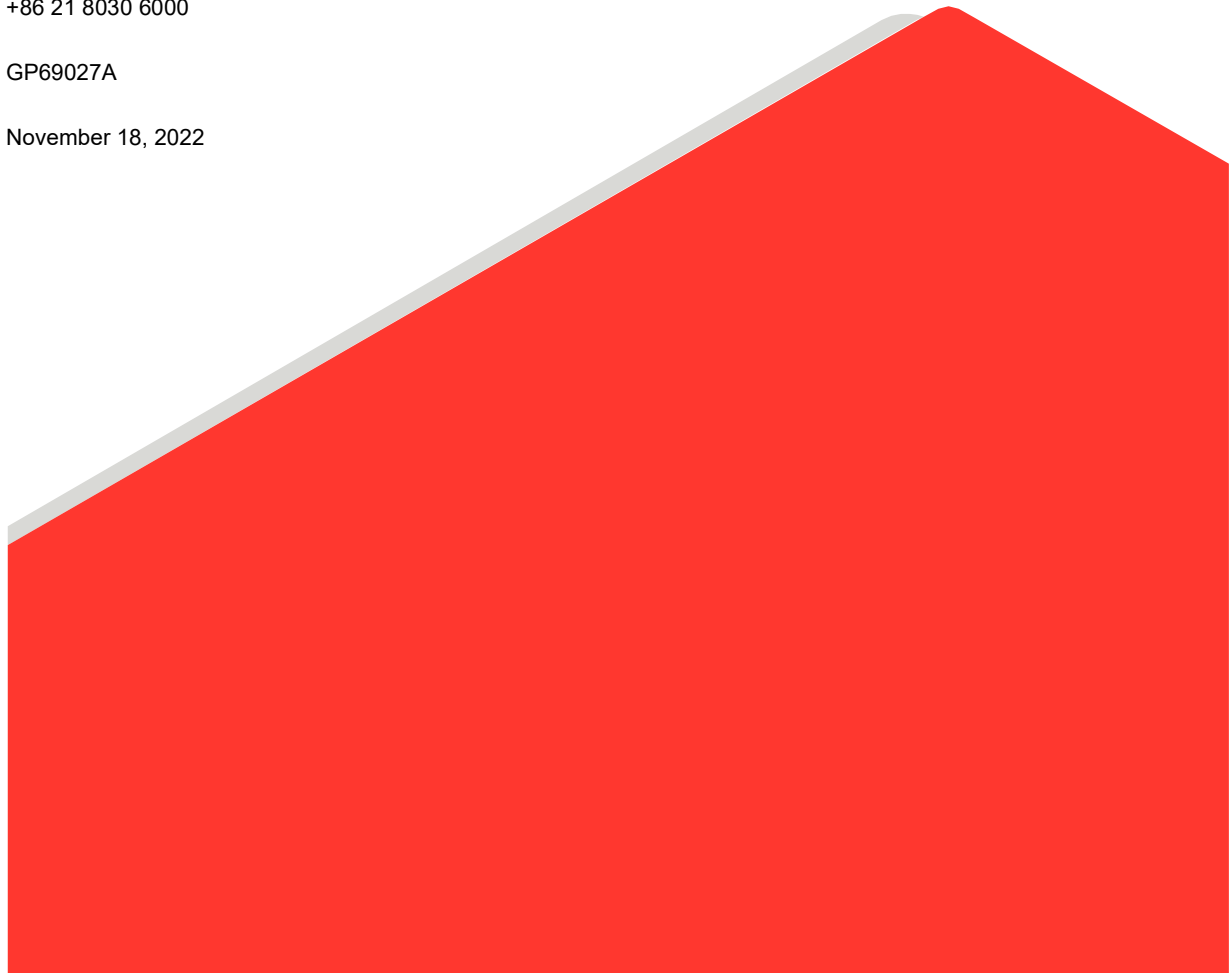
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## Distribution List

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Important Information

## 1.0 INTRODUCTION

### 1.1 Operational Information

<b>Name of Production Facility:</b>	Inner Mongolia Chengxin Yongan Chemical Co., Ltd.
<b>Name of Facility Owner:</b>	Inner Mongolia Chengxin Yongan Chemical Co., Ltd.
<b>Name of Facility Operator:</b>	Inner Mongolia Chengxin Yongan Chemical Co., Ltd.
<b>Name of Responsible Manager:</b>	Xingzhe Hu
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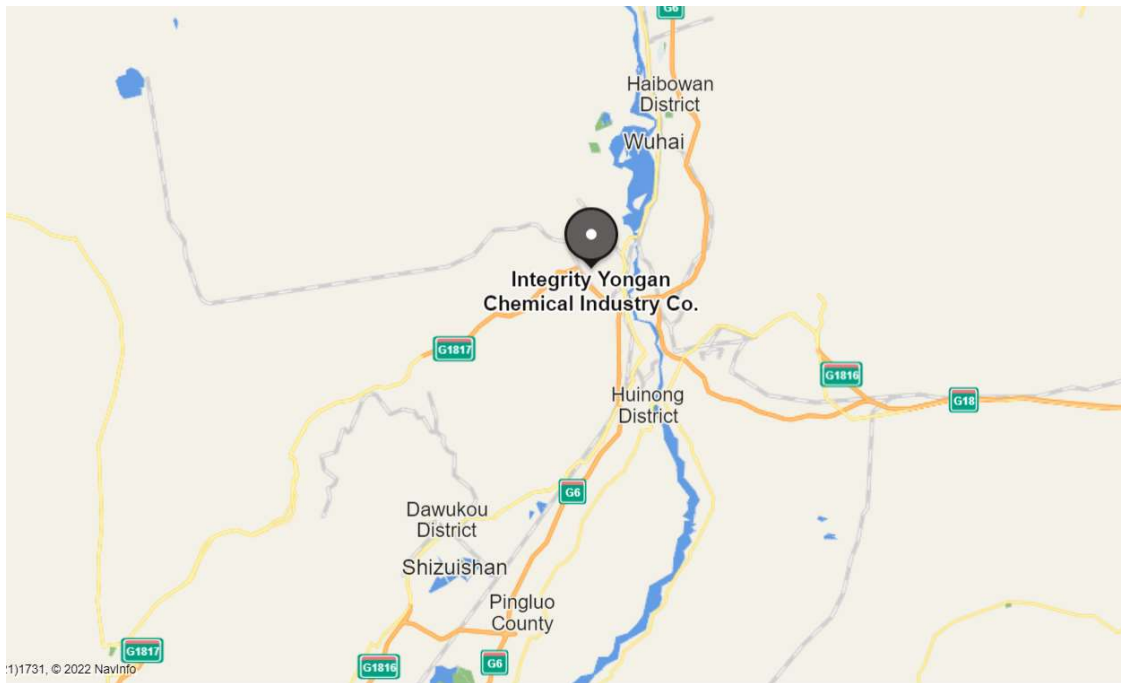
### 1.2 Operation Location Detail and Description

Inner Mongolia Chengxin was established in 2012. It is a joint-stock enterprise with 600 employees. The company has obtained ISO (International Organization for Standardization) 9001: 2015 certificate, ISO 14001: 2015 certificate and ISO 45001:2018 certificate. The first liquid cyanide production line in Workshop 701 was put into production in May 2015 which used as raw material for hydrocyanic acid production. The other liquid cyanide production line in Workshop 701 and solid cyanide production line in Workshop 708 were put into production in December 2019 as well as solid cyanide warehouse 704 and liquid cyanide tank farm. The company has the right for import and export. The products are sold to many countries and regions, including South America, North America, Africa, Asia and etc.

Inner Mongolia Chengxin is located at North end of Lantai Avenue, Alxa Economic Development Zone, Inner Mongolia, China, the surroundings are as below:

- East: Inner Mongolia Dongfu Fine Chemical Co., Ltd.
- South: Inner Mongolia Jushi Energy Co., Ltd and Wusitai Power Plant.
- West: Jiekang Sterilization Co., Ltd.
- North: China Petroleum Gas Station

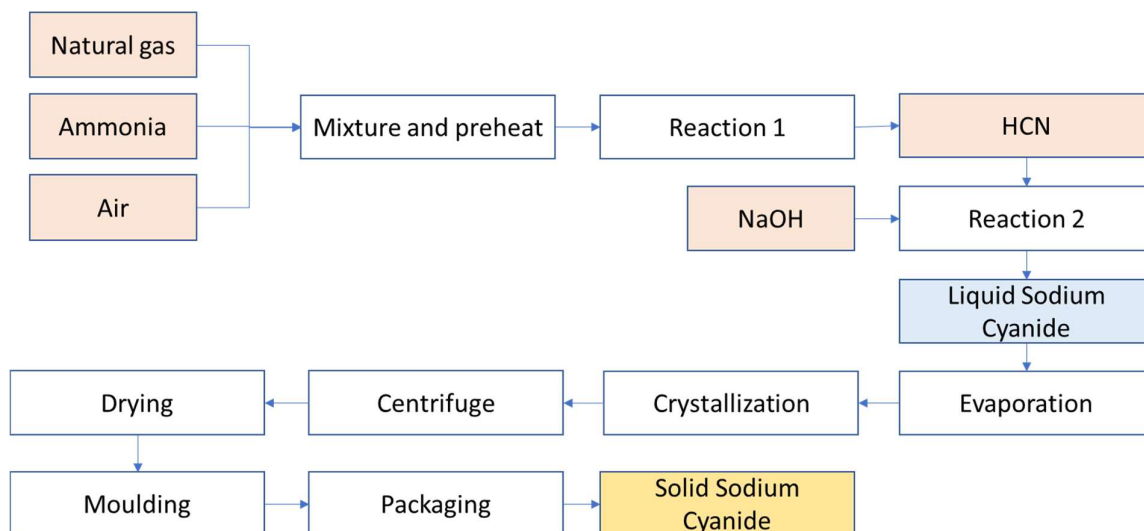
West Wuhai Railway Station is about 5.6 km to the east of Inner Mongolia Chengxin. G1817 Speedway is about 2.0 km to the west of Inner Mongolia Chengxin. Wuhai Airport is about 40 km to the north of Inner Mongolia Chengxin.



**Figure 1: Regional Location Map**

The part of the Site used to manufacture liquid sodium cyanide and then convert the liquid sodium cyanide into solid sodium cyanide is referred to in this report as ‘the cyanide facility’. The term ‘the Site’ is used in this report to refer to the entire Inner Mongolia Chengxin facility and includes a large number of manufacturing plants, these manufacturing plants are not subject to this report.

Inner Mongolia Chengxin solid sodium cyanide manufacturing processes include:



**Figure 2: Solid Sodium Cyanide Manufacturing Process**

The feedstocks to the cyanide facility are ammonia (stored on Site as liquid ammonia) and liquid alkali. Natural gas is supplied by China National Petroleum Gas Station. General production processes are described as below:

- Mixture and preheat – ammonia (evaporated to ammonia gas), natural gas and air will be filtered before entered the vessels for preheating and mixing, the mixed gas will be preheated via steam to produce a gaseous mixture.
- Reaction 1 – gaseous mixture then enters the HCN reactor. HCN will be obtained under the action of the platinum-rhodium catalyst net at about 1100 degrees.
- Reaction 2 – HCN is reacted with 30% sodium hydroxide to generate liquid sodium cyanide.
- Evaporation and Crystallisation – liquid sodium cyanide is pumped into two liquid cyanide volume measuring tanks, then be pumped into the vacuum evaporator to remove water and the concentrate is fed to the crystalliser.
- Centrifuge – wet crystals are generated by continuous solid-liquid separation of the concentrated crystal pulp.
- Drying – the sodium cyanide crystal is heated in the dryer to evaporate the residual water, and crystals are dried into dry powder.
- Moulding – Dry sodium cyanide powder is moulded into “pillows”.
- Packaging – sodium cyanide is 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 with 1,000 kg or 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 Site.

The cyanide facility was constructed in 2018. There were some minor modifications to the cyanide facility in 2021 and 2022 are shown as below:

Workshop 701:

- Installed humidity detectors to the instrument air compressor

Workshop 708:

- Upgraded the recovery efficiency of solid sodium cyanide
- Installed an additional mixer in finished product discharge room
- Installed additional ammonia gas detectors
- Made a renovation to the evaporative cooling water supply

The infrastructure at the cyanide facility comprises:

- Natural gas supply pipelines
- Compressed air supply pipelines
- Liquid ammonia storage tank farm
- Sodium hydroxide tank farm
- Workshop 701 – Liquid sodium cyanide production unit
- Workshop 708 – Solid sodium cyanide production unit
- A products warehouse 704 for storage of packaged solid sodium cyanide

■ Liquid cyanide tank farm

The facility is paved with concrete. The liquid sodium cyanide medium tanks in Workshop 708 and liquid sodium cyanide product tanks 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. No process wastewater generated from the cyanide facility except 44,843.52 tons/ annual(t/a) of the process condensate water generated from solid cyanide workshop, which is discharged into Site wastewater treatment plant.

Due to the rare raining in the area Inner Mongolia Chengxin located, no separate stormwater pipeline system was designed, all the stormwater is piped into an emergency collection tank (6480m<sup>3</sup>) for water quality testing before discharging into the wastewater treatment plant which services the entire Site (i.e. all the other chemical manufacturing plants of Inner Mongolia Chengxin).

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

The audit period was from 2019 to 2022. No cyanide exposure incidents were noted during the audit period.

## 2.0 AUDITORS FINDINGS

Hebei Chengxin  in full compliance with **The international Cyanide Management Code**

in substantial compliance with

not in compliance with

## 2.1 Auditor Information

The audit was undertaken by (Lead Auditor and Technical Specialist) and Zoey Tang (Auditor Trainee) of Golder Associates. Auditors' information is as below:

**Audit Company:** Golder Associates Consulting Ltd.

**Audit Team:** Hongtao Hu- Lead Auditor and Transport Technical Specialist

Zoey Tang- Auditor Trainee

**Email:** hongtao.hu@wsp.com

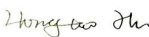
zoey.tang@wsp.com

### Names and Signatures of Other Auditors:

Name	Position	Signature	Date
Hongtao Hu	Lead Auditor and Transport Technical Specialist		November 17, 2022
Zoey Tang	Auditor Trainee		November 17, 2022

**Dates of Audit:** 22 to 25 August 2022

Inner Monolia Chengxin Yongan Chemical Co., Ltd  
Name of Facility

  
Signature of Lead Auditor

18 November 2022  
Date



## 2.2 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.

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Name of Facility

  
Signature of Lead Auditor

18 November 2022  
Date

## 3.0 PRINCIPLES

### 3.1 Principle 1 – Operations

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

#### 3.1.1 Production 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 **Production Practice 1.1**  
 in substantial compliance with  
 not in compliance with

#### **Summarise 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. Appropriately qualified personnel reviewed the facility construction and provided documentation that it has been built as proposed and approved.

Cyanide production facility was designed by Hebei Shengterui Engineering Design Co., Ltd., which is certified by the Construction Administration of the Peoples Republic of China to design chemical process plants.

The Foundation and Structure of the First Production Line of Liquid Cyanide was constructed by Guoji Construction Group Co., Ltd from May 2013 to December 2013 and Supervised by Huhehaote Construction Supervision and Consulting Co., Ltd.

The facility installation of the First Production Line of Liquid Cyanide was constructed by China Chemical Ninth Construction Co., Ltd from August 2013 to May 2014 and Supervised by Beijing Zhongheng Xinda Engineering Management Co., Ltd.

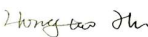
The Foundation and Structure of Liquid & Solid cyanide workshops was constructed by Shijiazhuang Sanjian Construction Co., Ltd from November 2018 to March 2019. The facilities of Liquid & Solid cyanide workshops were constructed by Province Installation Engineering Co., Ltd and Shandong Junhui Construction Co., Ltd from March 2019 to October 2019.

Cyanide warehouse was constructed by Henan Hongsheng Construction, Engineering Co., Ltd from November 2018 to September 2019.

Chengdu Jiaoda Engineering Construction Co., Ltd was contract as the interdependent construction management company for project management of QA/QC, health safety and environment, schedule control, cost control.

Construction Acceptance Report has been prepared by the construction company, which reviewed by Inner Mongolia Chengxin, construction company and interdependent construction management company. The conclusion of the cyanide facility is acceptable.

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The cyanide facility is mainly comprised by four unites as below:

- Liquid cyanide production unit: Workshop 701
- Solid cyanide production unit: Workshop 708
- Solid Cyanide Warehouse 704
- Liquid Cyanide Tank Farm

A quality assurance document 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.

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

- Excavation depth, length and width deviation compared to 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.
- Lightning and grounding test.
- Shim plate Covert records. and
- Concrete quality test.

Quality control and quality assurance records for the construction and installation of the cyanide facility have been included in the Construction Acceptance Reports, which mainly includes details of:

- Qualification verification for the special operation: such as welding operator, Non-Destructive Testing (NDT) personnel
- Verification of facility, pipelines installation work method
- Materials qualification and certification verification
- Valve testing.
- Safety valve testing.
- X-ray testing. and
- Pressure testing for valves and piping system.
- Welding records and visual inspection records
- Piping system purge records
- Pipeline electrostatic grounding test record
- Production and installation inspection quality acceptance record of pipeline support and hanger

- Cyanide facility commissioning records.

Some minor modifications to the cyanide facility have been undertaken during the audit period as below:

Workshop 701:

- Installed humidity detectors to the instrument air compressor

Workshop 708:

- Upgraded the recovery efficiency of solid sodium cyanide
- Installed an additional mixer in finished product discharge room
- Installed additional ammonia gas detectors
- Made a renovation to the evaporative cooling water supply

MOC (Management of Change) records were provided for review.

Quality control and quality assurance documentation is available for the cyanide facilities.

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 comprises the following:

- Pipe work – 304 grade stainless steel
- Gas-liquid Mixture vessel – 316L grade stainless steel
- Liquid cyanide volume measuring tank – 304 grade stainless steel
- Filter – 304 grade stainless steel
- Evaporators – 304 grade stainless steel
- Crystallisers – 304 grade stainless steel
- Centrifuge – 316 grade stainless steel

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

There are automatic systems or “interlocks” 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 supply the other power supply is able to meet facilities’ requirements. The facility is also has equipped with a UPS (Uninterruptible Power Supply) for emergency power outage, which will continue to automatically power the facilities for approximately 3 hours to shut down production systems and prevent releases.

Controls has been implemented in the event of equipment failure generally comprise alarms to inform that HCN gas being detected or high levels in tanks/vessels. When the alarm is activated, the control room operator switches off the relevant part of the process. The system is not restarted until the cause of the problem has been investigated and rectified.

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

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

- High and high-high alarm for pressure and temperature of reactor
- High and high-high alarm for temperature of outlet of reactor
- High and high-high alarm for ammonia, nature gas and air supply rate
- High and high-high alarm for pressure of pumps

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- High and high-high alarm for liquid level of liquid alkali intermediate tank
- High and high-high alarm for liquid level of Sulfuric acid metering tank
- Low and low-low alarm for liquid level of Gas-liquid separator
- High and high-high alarm for liquid level of liquid cyanide recycling tank
- High and high-high alarm for liquid level of Ammonium sulphate waste liquid tank.

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

- High alarm and linkage value for temperature of reactor

One of the following linkage values reached, the system automatically shutdowns the feeding outlet valve and opens the vent valve of reactor:

- There are two separate temperature sensors for reactors, one for Reactor Up section, the other for Reactor Down section. When Sensor TIZAS010404 in Reactor Up section reaches 1250, or TIZAS010403 in Reactor Down Section reaches 1270 in SIS system.
- Two of the three temperature detectors of DCS reached 1250°C.
- Liquid level of Gas-liquid separator of DCS reached 200mm.
- Inlet pressure of reactor of DCS reached 0.09 Megapascal (Mpa).
- Ammonia/Nature gas rate  $\geq 0.9$  and  $\leq 1.4$ .
- Air/Ammonia rate  $\geq 5.3$  and  $\leq 7.98$ .

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

- Liquid cyanide tanks
- Mother liquid tanks
- Cyanide wastewater tanks
- The main linkage values for solid cyanide production process are as below:
- When the liquid level of liquid cyanide measuring tank reached 5000mm, switch off the feeding pump in Workshop 701. When liquid level of liquid cyanide measuring tank reached 500mm, switch on the liquid cyanide feeding pump P0201ab in Workshop 701.
- When the liquid level of mother liquid tanks reached 200mm, switch off the mother liquid pump.
- When the liquid level of cyanide wastewater tanks reached 200mm, switch off the mother cyanide wastewater pump.

In the event of failure of both power supplies, the liquid or gas in the process will stay at its location and not present a risk of loss to the environment. The critical risk area of the plant is the reactor. In the event of a need to shut the plant down, the cyanide facility's emergency response procedure will be activated. The procedure states that in the event of a power failure, UPS will be automatically activated to supply power to the control system to further shutdown the production process.

In summary, in the event of power failure or equipment failure the contents of each vessel and pipe will remain within the vessel or pipe and cannot escape to the environment. There has not been a failure of both power supplies to the cyanide facility in the last three years.

In the event of equipment failures, the operators shut down the relevant part of the plant. The cyanide production facility has not had a situation where it has had to shut-down the plant (either manually or automatically) in the last three years, other than planned maintenance.

Also, Inner Mongolia Chengxin conducts HAZOP (Hazard and Operability) and LOPA (Layer of Protection Analysis) every three years to assess the process risk of cyanide production facilities.

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The cyanide facility areas are covered with concrete pavement to prevent seepage to the subsurface.

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

The transfer pipelines for cyanide solutions comprise stainless steel pipes wrap with insulating compound. The concrete surface beneath the pipelines drains to the cyanide facility's emergency stormwater collection system at the Site's wastewater plant.

Due to the rare raining in the area where Inner Mongolia Chengxin located, no separate stormwater pipeline system designed, all the stormwater is piped to an emergency collection tank (6480m<sup>3</sup>) for water quality testing before discharging into the wastewater treatment plant which services the entire Site.

The concrete surface comprises roadways and pedestrian ways and were observed to be in reasonable condition.

The emergency collection tank 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 whole Site (not just the cyanide facility).

The Facility does employ methods to prevent the overfilling of cyanide process and storage vessels, including level indicators and high-level alarms.

The Facility has included the following elements to the DCS in Workshop 701 and Workshop 708:

Workshop 701:

- High and high-high alarm for liquid level of liquid alkali intermediate tank
- High and high-high alarm for liquid level of Sulfuric acid metering tank
- Low and low-low alarm for liquid level of Gas-liquid separator
- High and high-high alarm for liquid level of liquid cyanide recycling tank
- High and high-high alarm for liquid level of Ammonium sulfate waste liquid tank.

Workshop 708:

- High, high-high, low, low liquid level alarm of liquid cyanide tanks, mother liquid tanks and cyanide wastewater tanks.

The filling of each tank or vessel is supervised either by the pump operator or by the control room operator. Upon activation of an alarm the respective operator is able to switch off the relevant transfer pump. During material transfer the operator stands next to the pump switch close to, and in sight of, the flashing lights/alarms and tanks, to enable quick reaction time in the event of the need to switch off the transfer pump.

The Site has established Safety Production Inspection and Correction Procedure that include inspection of level indicator equipment and secondary containments the tanks are stored in.

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

The secondary containment for process and storage tanks and containers is composed of concrete and concrete-rendered brickwork. The secondary containments are sized to contain at least 110% of the volume of the largest tanks and are paved with concrete. The tanks are also lined with an outer layer of silica compound insulation or metal sheet to minimise the risk of the projectile flowing to the bund boundary in the event of a leak in the upper part of the tank.

The containments were constructed with concrete and were observed to be of suitable quality.

If losses exceed the bund of the absorption tank area, the facility will rely on the stormwater first flush system from the concrete pavement to control the loss. The area outside the bund comprises concrete paved pedestrian way and roadway. All drainage will enter the Site's emergency collection tank with 6480m<sup>3</sup> capacity. The cyanide facility would rely upon the emergency collection tank to collect the loss from the tank. The water in the emergency collection tank system is sampled and analysed 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 pipelines from liquid cyanide workshop to solid cyanide workshop are located on overhead gantries which pass over concrete paved roadways.

There are no buried cyanide pipelines on the cyanide facility.

The pipelines are wrapped with stainless steel and compound, which provides thermal insulation. Cyanide labels and flow direction signs are in place on the pipelines.

There are no leak alarms on the cyanide pipelines.

1-hourly inspections and 12-hourly inspections are undertaken of Workshop 701, Workshop 708 and the liquid cyanide storage tank farm. The inspections 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 cyanide wastewater tank for re-use in the process.

The cyanide facility undertakes monitoring of the pipe wall thicknesses every six months. The inspection records note the integrity of the pipe and support structures. The results indicate all pipelines have wall thicknesses greater than the relevant standard of 4.0 mm for a 65 mm diameter steel pipe.

According to the Environmental Management Procedure, Chapter 19, Water Bodies, Soil Pollution Prevention and Remediation Control Procedures, in the event that a leakage of cyanide solution from a pipeline discharge onto concrete paving, which will be drained into nearby wastewater drain, after cyanide breaking treatment with hydrogen peroxide (the volume concentration for hydrogen peroxide is 0.25mg/L) then pump into wastewater treatment plant.

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

Solid cyanide is stored in 1000 kg or 1100 kg plastic bags within timber intermediate bulk containers (IBCs) to avoid or minimize the possibility for moisture exposure to the cyanide. The IBCs are stored in a secure warehouse building prior to despatch from the Site. The warehouse is enclosed with concrete floor, walls and roof to prevent exposure of cyanide to moisture.

The walls of the building are equipped with vents to ventilate the building. The build entry points have large doors which also provide for ventilation of the building during moving IBCs in and out of the building by automatic conveyor belt and trolley.

There are four fixed HCN monitors in the warehouse which connected to the DCS system in control room.

The warehouse is fully automated without staff operation in the warehouse normally. Operator will transfer the IBCs from solid production workshop onto the conveyor belt of the warehouse for storing. The entrance for employee inspections or maintenance are normally locked and accessible only through the security office, which is manned by a security person and fitted with security cameras which transmit to the security office. Visits to the warehouse are logged on paper records in log-books.

The warehouse building is located within the cyanide facility boundaries which is close to the solid cyanide production workshop. 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.

Liquid cyanide stored in four 500m<sup>3</sup> tanks in a tank farm with separate secondary containment in an open-air environment. One fixed HCN monitors in the area which connected to the DCS system in control room. And the access of the tank farm is locked by two locks which the keys are kept by two individuals. Only authorized personnel can enter the tank farm.

### 3.1.2 Production 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 **Production Practice 1.2**

not in compliance with

#### Summarise 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 does have plans and procedures that describe the standard practices necessary for its safe and environmentally sound operation.

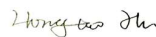
The facility holds ISO certifications for safety, environment and quality management systems.

The Process Operational Rules is an integrated procedure addressing the full production process.

Operational procedures for posts are included for:

- Raw gas purification
- Reaction
- Ammonia clearance
- Liquid Cyanide
- Desulfurization
- Loading and unloading
- Cycle water
- Evaporation
- Dry
- Forming
- Packaging

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- Laboratory test
- Centrifugation
- Forklift
- Discharging.

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

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

The facility is automated and operated via DCS with separate control rooms in a separate building for the liquid plant and solid plant which are out of the production area. Emergency shutdown and interlocks are built into the plant design and managed via the DCS for the liquid plant. As noted previously, the solid cyanide part of the cyanide facility does not have any automatic systems to shut down production systems and prevent releases due to power outages or equipment failure. However, the design of the facility inherently means that in the event of power outage or equipment failure the contents of the vessel, tank or pipe will remain in place until power is reconnected or the equipment re-started. And the facility also has UPS for emergency power outage situation which will continue to provide power automatically for the facilities with approximate 3 hours to shut down production systems and prevent releases.

The Process Operational Rules include details of the DCS for the cyanide production process and details the measures to be taken should an upset occur. There are interlocks built into the system to shut down the process if necessary.

Should there be a cyanide exposure or release these are managed via the Site's emergency response plan documents that provide details on the response actions.

The Facility has a procedure to identify when cyanide facilities or operating practices have or will be changed from those on which the initial design and operating practices were predicated, which requires review and sign-off by environment, health, and safety management.

The Management of Change Procedure details what changes require this procedure to be implemented. It details what type of work needs to be reviewed and by who, with process changes requiring review by both the department supervisor and the safety engineer and representative from the environment, health and safety department. Safety equipment changes are required to be reviewed by the safety management department. Changes involving facility change, process change, new project, expansion project, renovation project must be reviewed by the Vice General Manager or Technical Director. The procedure details conducting changes, inspections, acceptance, commissioning and post-work reviews as well as training and communication.

Some minor modifications to the cyanide plant have been undertaken during the audit period as below:

Workshop 701:

- Installed humidity detectors to the instrument air compressor

Workshop 708:

- Upgrade the recovery efficiency of solid sodium cyanide
- Installed an additional mixer in finished product discharge room
- Installed additional ammonia gas detectors
- Renovation to the evaporative cooling water supply

MOC records for these modifications have been provided for review.

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Preventive maintenance programs have been implemented and activities documented for equipment and devices necessary for cyanide production and handling

The Facility Management Procedure is an integrated procedure that documents the routine inspection and preventative maintenance requirements for the cyanide facility are shown as below:

- Prepare and submit the Annual Equipment Maintenance Plan, for new year in December of last year
- Prepare and submit the Monthly Equipment Maintenance Plan, before the fifth day of each month.
- Inspection frequency for different kinds of equipment
- Maintenance frequency for main production equipment
- Special equipment internal and external third-party inspection requirement and frequency.

The Equipment Maintenance Plans list and describes the maintenance requirements, location, equipment specification, scheduled date, maintenance duration, responsible person. Equipment maintenance plans and records for cyanide facilities for the audit period were reviewed and correlated with the descriptions of maintenance activities provided by Site engineers.

The Facility will shut down for approximately five days to conduct overhaul annually.

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

The procedure requires that the calibration should be conducted according to the planned frequency. After calibration, a calibration notice must be placed on the equipment. The facility maintains annual calibration lists detailing the instruments in the plant that require to be calibrated during the year. The instruments include high pressure gauges, vacuum pressure gauges, numerical temperature displays and flow meters.

Temperature displays and flow meters have been calibrated by Electrical Instrument Department every 6 months.

Inner Mongolia Chengxin has obtained Certificate for Examination of Measurement Standard which was issued by Inner Mongolia Alxa Left Banner Quality and Technology Supervision and Inspection Institute. And there are four employees have obtained the Measurement Calibration Certificates for pressure gauges calibration, So the Facility conduct calibration for pressure gauges every 6 months.

Gas detectors and safety valves have been tested by third-parties which have qualification and registered in Inner Mongolia Alxa Left Banner Quality and Technology Supervision and Inspection Institute annually. The testing reports were randomly selected for review during audit.

Procedures are in place and are being implemented to prevent unauthorised/unregulated discharge to the environment of any cyanide solution or cyanide-contaminated water that is collected in a secondary containment area.

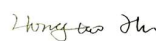
Water which collects within the secondary containment structures cannot exit the structure unless it is pumped out or otherwise intentionally removed.

The Emergency Response Plan for Environmental Emergencies requires that water which is collected within the secondary containment areas is pumped, via a manually switched pump, and a dedicated wastewater pipe to the emergency collection tank.

Due to the rare raining in the area where Inner Mongolia Chengxin located, no separate stormwater pipeline system designed, all the stormwater is piped to an emergency collection tank (6480m<sup>3</sup>) for water quality testing before discharging into the wastewater treatment plant which services the entire Site.

The facility monitors for cyanide in groundwater down gradient of the cyanide facility at two locations. According to the Site representative, the groundwater sampling points of enterprises in the park are all these

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two groundwater wells, and the government does not allow enterprises in the park to drill groundwater wells in their own Site. One location is located a significant distance (7.7km) southeast of the liquid cyanide plant. The other location is located a significant distance (7.7km) to the south of the Site.

The Facility has established Environmental Management Procedure, CXYA-ZZ-HBC, 10 September 2022. Chapter 15 Solid Waste and Hazardous Waste Management Procedure for disposal of cyanide or cyanide-contaminated solids.

The types of solid waste include:

- Activated carbon generated from the production process.
- Fly Ash
- Online waste liquid
- Waste oil generated in the process
- Personal Protective Equipment (including cyanide waste) mainly include gloves, masks, protective clothing and other waste contaminants and other wastes with hazardous characteristics.

For the PPE, it will be transferred to incinerator for disposal on Site. For the cyanide contained wastes during leakage or unexpected action, it will be decontaminated with hydrogen peroxide or sodium hypochlorite prior to incineration on Site. It will be decontaminated with hydrogen peroxide or sodium hypochlorite prior to incineration on Site. The incineration temperature of the incinerator is between 800-1600°C, and the melting point of sodium cyanide is 563.7°C. Cyanide can be destructed completely.

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.

Solid cyanide is stored in 1000 kg or 1100 kg plastic bags within timber intermediate bulk containers (IBCs). The cyanide facility packages cyanide in accordance with the Chinese regulatory standards (Standard for Packing of Solid Cyanide) for packing of solid cyanide. The standard was prepared to meet the requirements of the United Nations Recommendation on the Transport of Dangerous Goods – Model Regulations (2022).

The Standard for Packing of Solid Cyanide specifies 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 supply compliance certificates with each supply of the packaging.

Process Operational Rule for Workshop 701 specifies the packaging requirements, including that the packaging must meet the Standard for Packing of Solid Cyanide.

The Inner Mongolia Alxa League Customs Bureau inspected the cyanide facility's packaging systems for each supply consignment during the audit period and approved the packaging systems for international transport of the cyanide.

Stored cyanide was observed to be labelled in Chinese and English with Global Harmonised System (GHS) pictograms and UN number identifying the product.

### 3.1.3 Production Practice 1.3

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

in full compliance with

The operation is

in substantial compliance with

**Production Practice 1.3**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

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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 are undertaken of the cyanide storage tanks, including pipe work, flanges, pumps, high level alarms and tanks to identify deterioration and leaks. The inspection records are dated.

The inspection records are dated and detail the results of inspection including the following items:

- Tank foundation stability
- Insulation and corrosion prevention materials
- Stairs and fences
- Bund
- 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 inspections and 12-hourly inspections, the wall thickness of the vessels is tested every 6 months.

#### Secondary containments

A Site inspection confirmed secondary containments are in reasonable condition and evidence of periodic maintenance and patching was observed. The facility has updated its inspection process to better define standards for secondary containments.

Minor defects in liquid cyanide unloading area were rectified during the audit.

The tank bund for liquid cyanide has been repaired in June 2022 which looks well during audit.

Discharge from the secondary containment is via a manually operated pump to drums to pour into emergency collection tanks at the Site's wastewater treatment plant, or for a concentrated liquid cyanide spill, to a mobile tanker for re-use at the cyanide facility. Therefore, there is no requirement to ensure that drains are closed or locked to prevent accidental releases to the environment.

#### Pipes – 6-monthly Pipe Wall Thickness Testing

The thickness of the wall of cyanide carrying pipes is monitored every six months. The inspection records note the integrity of the pipe and support structures. The inspection records are dated. Records were sighted

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for selected pipelines from 2020 to 2022.

Containers used for transportation

Before the transportation, the Site will check the containers certificates and inspect the integrity of the containers, emergency response materials.

Inspection frequencies are sufficient to assure that equipment is functioning within design parameters.

Based on interviews, inspection of the facility and content if the inspection records the frequencies are considered sufficient to assure that the equipment is functioning within design parameters.

The Facility has documented inspections that are retained. The documentation identifies specific items to be observed and includes the date of the inspection, the name of the inspector, and observed deficiencies. The nature and date of corrective actions were noted as being documented, and records are retained.

The inspection records have been provided for review during Site visit.

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## 3.2 Principle 2 – Worker Safety

Protect workers' health and safety from exposure to cyanide

### 3.2.1 Production Practice 2.1

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

in full compliance with

The operation is

in substantial compliance with

**Production Practice 2.1**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

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

The Process Operational Rules details formal procedures to minimize worker exposure during normal operations from receipt of raw materials through finished product packaging and shipping. The Safety operation procedures details formal procedures during non-routine and emergency operations.

The production facility is managed via a DCS in two control rooms, one for Workshop 701 and one for Workshop 708. Furthermore, there is a SIS (Safety Instrumented System) in liquid cyanide production control room.

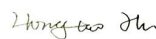
The procedures discussed the PPE that must be worn and to undertake a field level risk assessment prior to commencing work as well as using a lock out tag out system for working on all cyanide facility. It also requires the maintenance team to communicate with the local cyanide department prior to the work commencing and that any unsafe conditions must be reported to the department supervisor.

Safety Production Management Procedures, Chapter 6 details the formal procedures to minimize worker exposure during maintenance related activities.

In addition, Safety Production Management Procedures, Chapter 7 details if the special operations are involved in the inspection and maintenance process, need to apply for a special operation permit. Special operation mainly shown as follows:

- Working at heights
- Confined space
- Lifting
- Digging
- Machinery maintenance
- On-Site road route change
- Flow isolation plate
- Hot work
- Temporary electricity, and

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- Equipment dismantling and scrapping.

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 employee, the safety manager and department manager.

According to Cyanide-related Device Maintenance Safety Operation Procedures, piping and other devices involving cyanide must be cleaned up before inspection and maintenance by following actions.

1. Piping and other devices involving cyanide must be cleaned up before inspection and maintenance.
2. Stop the circulating pump, pull the caution tape at the site, and prohibit non-staff and unrelated personnel from entering the production plant area.
3. Open the open material valve, discharge material to the sodium cyanide collection tank and promptly pump it into the sodium chloride intermediate tank.
4. After the remaining material is discharged, close the corresponding discharge valves and make up soft water for cleaning and replacement at least 4-5 times and continuously check the cyanogen content in the cyanide-containing wastewater until the cyanogen is zero, then open the corresponding discharge valves and empty the water.
5. Open the nitrogen valve, purge the remaining residual liquid that has not been released, and empty the system material liquid.
6. Ventilation replacement of the system to ensure that the hydrogen cyanide content and oxygen concentration meet the relevant regulations (hydrogen cyanide gas concentration: 0ppm, oxygen concentration: 19.5%~21%)

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

Employees have opportunities to make suggestions regarding the procedures via 'written suggestions' that they can place in suggestion boxes, give to their shift leader who passes it to the supervisor. The company identifies representatives of occupational health and safety affairs, and participates in the communication, participation and negotiation of occupational health and safety affairs, including:

- Formulation and review of risk management policies
- Occupational health and safety objectives formulation and review
- Participate in the review of hazard identification, risk assessment and risk control planning
- Negotiate changes affecting workplace occupational health and safety.

The Major Incident Hazard Special Contingency Plan details the areas where the risk of hydrogen cyanide and cyanide dust is considered high and PPE including either a respirator with a filter (appropriate for cyanide) or with oxygen is worn.

In Sodium Cyanide Personal Protection and Emergency Management Procedure, solid cyanide workshop, solid cyanide warehouse, HCN production facilities, laboratory and liquid cyanide tank farm have been identified where may be exposed to hydrogen cyanide gas and/or cyanide dust.

During inspections of the facilities workers were observed to be wearing PPE as outlined in the procedures and signage displayed 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 monitors is used at the facility. The fixed monitors are set to alarm at 2.0 ppm and the portable monitors are set to alarm at 4.7 ppm. Portable monitors are used for task specific activities and the fixed monitors are to provide detection of an issue with the process.

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When HCN gas levels trigger the alarm levels, the Site operator shall evacuate the Site area immediately. The emergency treatment personnel must wear air breathing apparatus and wear heavy protective clothing to the Site to find out the leakage source and block the leakage.

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

The Facility has a buddy system which requires employees to work in two for posts involving cyanide exposure. All operators have explosion-proof radio communication to communicate with the associated process control room. Inspectors and workshop directors are also equipped with explosion-proof mobile phones.

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 (Wuhai Occupational Disease Prevention and Treatment Institute). The medical includes of checking 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 and depending upon the working location and duration of the employee.

The Site has records for each worker detailing the date of the examination and whether they have passed.

The Sodium Cyanide Personal Protection and Emergency Management Procedure as well as Clothing Change and Clean Procedure detail that all employees are not allowed to take their work clothes out of the work area. They need to take a shower after getting off work and change their clothes before leaving. Store poison-contaminated clothes separately and wash them thoroughly with a washing machine in the workshop before wearing.

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

Additional PPE is required in the packaging area including the use of coveralls, gloves and full-face respirators. Personnel leaving the packaging facility must head via change room for shower and clothes change.

Warning signs advising workers that cyanide is present and that, if necessary, suitable PPE must be worn, are located around the Facility.

Warning signs for both sodium cyanide and hydrogen cyanide are placed in all process and storage areas. The signs include PPE requirements.

Warning signs were observed to be located on the outside of the warehouse buildings at entrance points and within the warehouse on the outside of the IBCs. Warning signs were present at the Workshop 701, Workshop 708 and Warehouse 704.

According to Sodium Cyanide Personal Protection and Emergency Management Procedure, all personnel are prohibited from smoking, eating and drinking, and having open flames in areas where there is the potential for cyanide contamination. All process and storage areas have signs stating no smoking, no eating or drinking and no open flames.

### 3.2.2 Production Practice 2.2

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

in full compliance with

The operation is

in substantial compliance with

**Production Practice 2.2**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

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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 written emergency response plans for cyanide exposures and an On-Site Disposal Plan to illustrate detailed treatment procedure after a spill or exposure.

The persons interviewed knew to relocate exposed person offsite and remove contaminated clothes, inject exposed person with cyanide resistant injection, rinse the contaminated part with moving water, contact the first-aid clinic and hospital for emergency care.

Showers, low-pressure eye wash stations and non-acidic fire extinguishers are located at strategic locations throughout the Facility. They are maintained and inspected on a regular basis. The Facility has an annually preventative maintenance inspection and servicing programme.

Dry powder fire extinguishers were observed throughout the Facility. No carbon dioxide fire extinguishers were observed though out the facility.

The Facility has oxygen, a resuscitator, antidote and a means of communication or emergency notification readily available for use in the Site.

An inspection of the facility confirmed that operators have explosion-proof radio communication or explosion-proof mobile phone, and antidotes are stored strategically throughout the Site. Oxygen and resuscitator are available in the medical room on the Site. Water is available around the Site via safety showers and fire hydrants.

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

The Facility inspects its first aid equipment regularly to assure that it is available when needed. The first aid and emergency response equipment are stored and tested in accordance with the manufacturer's instructions and replaced on a schedule that assures they will be effective when used.

The antidote produced by China People Army Medicine Science Institute, has instructions that state that it should be stored at room temperature and out of the sun. The antidote was stored appropriately and was in date.

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

Fire extinguishers are sent in rotation to an off-Site facility Inner Mongolia Yingjilan Fire Control Co., Ltd. for servicing and refilling as required by the manufacturer. Fire extinguishers inspected were charged and had servicing dates.

Safety Data Sheets (SDS) and first aid procedures on cyanide safety are in the language of the workforce (Mandarin) and are available to workers at the Site. All the signs and procedures are in Chinese, which is the official language. The SDS has been developed in accordance with Global Harmonised System (GHS) requirements.

Information boards have been erected at the cyanide areas of the plant that detail hazards, requirements. The drum and IBC external packaging also provides information on cyanide hazards.

All storage and process tanks and piping are labelled to clearly identify the contents. The direction of flow for the pipes is clearly shown.

The Facility has a decontamination policy or procedure for employees, contractors and visitors leaving the areas with the potential for skin exposure to cyanide.

The Procedure documents for bathroom managements, use and replacement of labour protection supplies for employees, visitors, and contractors specifies the cloth changing and showering requirement for workers undertaking work in areas where they may be exposed to cyanide. This procedure applies to personnel in the laboratory, packaging, evaporation, maintenance personnel, centrifuge, drying, modelling and cyanide storage areas. They are required to have change clothes and shower when they exit the work area. Visitors are

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asked to put on a lab coat when they enter the production area, take them off when they leave the production area, and wash their hands.

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

The Facility has its own on-Site capability to provide first aid or medical assistance to workers exposed to cyanide. The Site has an on-Site first-aid clinic which is staffed 24 hours a day by one fully qualified doctor. According to the instruction manual of cyanide antidote provided by the Site. The content of cyanide antidote is confidential, which is colourless or light-yellow clear liquid.

The doctor has been certificated by Hygiene Department of Gansu Province.

The Facility has developed a procedure to transport exposed workers to locally qualified, off-Site 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 their own cars or in the case of serious injury or exposure they would call the emergency services at the nearest hospitals (Alxa High-tech Zone General Hospital) located approximately 10 minutes' 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 Rescue Cooperation Agreement with Alxa High-tech Zone General Hospital. Alxa High-tech Zone General Hospital is the designated cooperative unit for medical services of the Site. It will undertake the emergency medical treatment of the venue, provide green medical channels for the Site, and provide 24-hour medical services. Before signing the agreement, Yalin Zhang, Safety Director toured the hospitals and advised that Alxa High-tech Zone General Hospital is satisfied that the facilities have suitable staff and equipment to respond to cyanide exposures.

The Occupational Disease Hazard Status Evaluation report and Production Safety Accident Emergency Plan are in place to investigate and evaluate cyanide exposure incidents to determine if the operations programmes and procedures, to protect worker health and safety and to respond to cyanide exposures, are adequate or need to be revised.

It details an accident classification system which determines the type of investigation required, and the accident report process and accident communication process. The most serious accident and exposures require investigation by the government or an outside party. For accidents where no working day is lost the investigation is to be undertaken by the cyanide department 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 responsible person. It proceeds to a corrective measures section which tabulates the hazard, corrective measure, date for implementation and the responsible person.

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

### 3.3 Principle 3 – Monitoring

Ensure that process controls are protective of the environment.

#### 3.3.1 Production 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

**Production Practice 3.1**

not in compliance with

#### Summarise 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 a direct discharge to surface water.

Semi-annually monitoring results of discharges from the Site wastewater treatment plant, from 2021 to 2022 are provided for review. The test results of Weak Acid Dissociable (WAD) cyanide are between 0.061-0.072mg/L.

The cyanide facility does not have any direct discharge to surface water.

The treated effluent from the Site's wastewater treatment plant is discharged to Alxa Economic and Technological Development Park's wastewater treatment plant, and then discharged into the natural water body, Huang River, after being treated.

Due to the rare raining in the area where Inner Mongolia Chengxin located, no separate stormwater pipeline system designed, all the stormwater is piped to an emergency collection tank (6480m<sup>3</sup>) for water quality testing before discharging into the wastewater treatment plant which services the entire Site.

Environmental Management Procedure (CXYA-ZZ-HBC) details if the concentration of pollutants exceeds the standards, it will be pumped into the Site's wastewater treatment plant, then pumped into the Alxa Economic and Technological Development Park's wastewater treatment plant after treated.

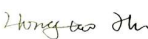
The WAD cyanide concentration of wastewater from the discharge of the wastewater treatment plant is monitored quarterly, and the sampling point is located in the reservoir in front of the discharge. Quarterly monitoring results indicate that the concentrations of total cyanide have been less than 0.5 mg/L for the years 2019, 2020, 2021 and 2022.

The treated effluent from the Site's wastewater treatment plant is discharged to Alxa Economic and Technological Development Park's wastewater treatment plant, and then discharged into the natural water body, Huang River, after being treated.

Due to the rare raining in the area where Inner Mongolia Chengxin located, no separate stormwater pipeline system designed, all the stormwater is piped to an emergency collection tank (6480m<sup>3</sup>) for water quality testing before discharging into the wastewater treatment plant which services the entire Site.

Environmental Management Procedure (CXYA-ZZ-HBC) details if the concentration of pollutants exceeds the standards, it will be pumped into the Site's wastewater treatment plant, then pumped into the Alxa Economic and Technological Development Park's wastewater treatment plant after treated.

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The free cyanide concentration of wastewater from the discharge of the wastewater treatment plant is monitored quarterly, and the sampling point is located in the reservoir in front of the discharge. Quarterly monitoring results indicate that the concentrations of total cyanide have been less than 0.001 mg/L, which is less than the required limit of 0.022 mg/L free cyanide for the years 2019, 2020, 2021 and 2022.

The facility monitors for cyanide in groundwater down gradient of the cyanide facility at two locations. According to the Site representative, the groundwater sampling points of enterprises in the park are all these two groundwater wells, and the government does not allow enterprises in the park to drill groundwater wells in their own Site. One location is located a significant distance (7.7km) southeast of the liquid cyanide plant. The other location is located a significant distance (7.7km) to the south of the Site.

There are no environmental receptors, such as surface water bodies, in close proximity to the cyanide facility. The nearest surface water body is Huang River, which is located 6.9 km east of the Site.

Monitoring is undertaken annually with each well monitored once on one consecutive day during annually sampling.

The certified laboratory was entrusted by the Site to undertake the analyses in accordance with the standard method Chinese National Analytical Standard No. HJ484-2009 (pyridine-barbitone acid colorimetry method). The analytical instrument is calibrated by an independent calibration company on an annual basis.

The local regulatory acceptance criterion is 0.05 mg/L total cyanide. The results are for the audit period were below the acceptance criteria.

There is no protected drinking water area near the Site, and the groundwater in the area is not used as drinking water for humans or livestock.

Seepage from the Facility has not caused the concentration of cyanide in the groundwater to exceed that necessary to protect its beneficial use.

In the Chapter 15 Environmental Protection and Remediation Procedure for Soil and Water Body Contamination of Environmental Management Procedure, remedial activity to prevent further degradation and restore beneficial uses have been specified in event of cyanide contamination.

The Facility limits the atmospheric emissions of hydrogen cyanide gas such that the health of workers and the community are protected.

The discharges from the condensation process pass through the condensers, some non-condensable exhaust was treated by alkali scrubber and then to the atmosphere through a 25m exhaust pipe. The discharge from the crystallization process treated by water scrubber and then to the atmosphere through a 15m exhaust pipe. Fixed hydrogen cyanide gas detectors are installed at every exhaust pipe involving hydrogen cyanide emissions.

There are 4 fixed hydrogen cyanide gas detectors are installed in the solid cyanide storage warehouse and 1 fixed hydrogen cyanide gas detector installed in the liquid cyanide tank. There are 29 and 10 fixed hydrogen cyanide gas detectors in the Workshop 701 and Workshop 708. The facility limits atmospheric emissions of hydrogen cyanide gas via an enclosed process and continuous monitoring, with alarm limits set to 0.8 ppm below the regulatory standard of 5 ppm.

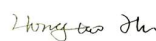
The detectors are calibrated annually in accordance with the manufacturer's instructions.

Monitoring is conducted at frequencies adequate to characterise 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 monitoring and continuously

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- Stormwater discharges –combined in wastewater discharge and on an event basis
- Groundwater quality – annually
- Air quality – semi-annually and continuously.

These frequencies are considered adequate in the operating circumstances to meet Code requirements.

### 3.4 Principle 4 – Training

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

#### 3.4.1 Production Practice 4.1

*Train employees to operate the plant in a manner that minimises the potential for cyanide exposures and releases.*

**in full compliance with**

**The operation is**                       in substantial compliance with                      **Production Practice 4.1**

not in compliance with

#### **Summarise 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 operation does train workers to understand the hazards of cyanide and refresher training is periodically conducted. New employees have three levels of training comprising company, departmental and operational level training.

Company level training consists of three days of classroom training. One main booklet called 'Safety Training material' is given to all employees during the training. The books are available after the course in the cyanide department control rooms.

Departmental level training consists of three days training. The training is held both in the meeting room and on Site to demonstrate the chemical hazards, emergency response and PPE. The new employee is shown the operation of the whole cyanide production plant. For the staff who may encounter 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 in the area of the cyanide department that the new employee will be working, each employee is designated an experienced worker who teaches them how to operate the machinery in that area. During the three days they do not operate the machinery by themselves, at the end of the three days they have an exam. In addition, they go through the operating procedures.

Refresher training is provided in the form of monthly training sessions. Each month the safety adviser for the cyanide department gives training that lasts approximately two hours. The training includes the safety requirement for cyanide-related work tasks. At the end of the training, a test is required to verify their understanding of the safety requirement for cyanide-related work tasks.

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

There are 9 employees who are involved the cyanide process operators have accept 48 hours online training for the first time to obtain the operation certificate after passing the exam. 8 hours online training and test is needed for these operators every year after that.

Interviews with personnel and training records confirmed that workers are trained in cyanide hazards prior to undertaking works and refresher training is provided.

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Annual Training Plans include training target, training method, training date and training time, training topic, trainer, training location.

The Facility trains workers in the use of personal protective equipment (PPE) and when and where this equipment is required.

PPE training is covered in all three levels of training (company, departmental and operational) and there are specific management and departmental procedures regarding PPE storage, maintenance and which type of PPE is required in the 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 worker health and safety and in a manner that prevents unplanned cyanide releases.

The Process Operational Rules of Workshop 701, Workshop 708 and Warehouse 704 include the requirements for safely undertaking specific tasks, including donning PPE prior to undertaking certain tasks. New employees are partnered with an experience person to learn the job and this is overseen by the supervisor for the area.

Employees are trained prior to allowing them to work with cyanide. Worker must complete 72 hours new employee training before being allowed to perform work. New employees are teamed with an experienced operator and are not permitted to work unsupervised until the shift supervisor is satisfied that the person can completed the necessary tasks safely in accordance with procedures.

The refresher training on normal production tasks has been provided to ensure that employees continue to perform their work in a safe and environmentally protective manner.

Refresher training is provided in the form of monthly training sessions. Each month the safety adviser for the cyanide department gives training that lasts approximately two hours. 24 hours are required for the refresher training to employees at least. The training includes the safety requirement for cyanide-related work tasks. At the end of the training, a test is required to verify their understanding of the safety requirement for cyanide-related work tasks.

The training elements are necessary for each job are identified in training materials.

Training elements include the physical and chemical characteristics of cyanide, fire prevention, personal protection equipment, emergency response, critical hazards prevention, etc., and also specific training materials regarding each post.

The Facility has 28 personnel with safety management certificate. Internal trainings about the cyanide operation are provided by these qualified personnel and managers to all employees.

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

The Facility evaluates the effectiveness of cyanide training by testing. There are questionnaires that are used for the tiered induction training and these are retained. Test is also arranged after the annual refresher training.

New employees are teamed with an experience person who demonstrates and observers the worker perform their tasks.

### 3.4.2 Production Practice 4.2

*Train employees to respond to cyanide exposures and releases.*

in full compliance with

The operation is

in substantial compliance with

**Production Practice 4.2**

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not in compliance with

**Summarise 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 does train workers in the procedures to be followed if a cyanide exposure or release occurs.

Workers are trained in procedures to be followed if a cyanide release is discovered during company, departmental and operational training and well as monthly and weekly training. The Facility has 28 designated safety management personnel with qualifications.

Also, workers are required to attend the mock drills to evaluate the emergency response efficiency. Workers interviewed could describe the response processes including evacuation to an upwind location, use of safety showers, reporting the incident and use of antidote. In addition to the processing workers the operation also has dedicated emergency responders that are trained in higher level response actions.

The Facility does train workers to respond to worker exposure to cyanide and to cyanide releases.

Routine mock drills used to test and improve their response skills.

Mock drills have conducted with workers to train them and test their response skills. The facility has conducted worker exposure scenarios for the Workshop 701 and Workshop 708 and Warehouse 704. The drills are recorded, and reports assess the performance of the exercise and improvements needed.

Training records are retained throughout an individual's employment documenting the training they have received and including the names of the employee and the trainer, the date of training, the topics covered, and how the employee demonstrated an understanding of the training materials

Training files for members of the Workshop 701, Workshop 708 and Warehouse 704 were reviewed and contained evidence of training including course content, assessments and certificates.

All workers received trainings on personal protective equipment and emergency response procedures during a spill or exposure at daily, weekly, monthly and annually trainings.



### 3.5 Principle 5 – Emergency Response

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

#### 3.5.1 Production Practice 5.1

*Prepare detailed emergency response plans for potential cyanide releases.*

in full compliance with

The operation is

in substantial compliance with

**Production Practice 5.1**

not in compliance with

#### Summarise 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 has developed emergency procedures for the management of emergencies associated with the storage of chemicals including cyanide. The facility has the following emergency response plans:

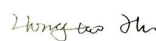
- Emergency Response Plan for Production Safety Accident and Emergency Response Plan for Environmental Emergencies which provide high level guidance for the preparation of the following subordinate plans.
- Major Incident Hazard Special Contingency Plan, Chapter 4.3.2, 4.3.3, 4.3.5 and 4.3.6 details the emergency response for potential releases of cyanide in Solid Sodium cyanide warehouse, Liquid sodium cyanide tank farm, HCN production facilities and Solid sodium cyanide production workshop, respectively.
- Major Incident Hazard Special Contingency Plan, Chapter 4.3.1 details the emergency response for potential releases of liquid ammonia.

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

a) Emergency Response Plan for Production Safety Accident, Section 3.4.2.4 states what to do in the event of catastrophic release of hydrogen cyanide. When a poisoning accident occurs, the person on Site should immediately be evacuated from the Site. Rescuers enter the Site after wearing the positive pressure air respirator or full face heavy protective clothing to avoid rescuer casualties. Quickly move poisoned patients to fresh air, loosen clothing buckles and belts, remove foreign objects from the mouth, maintain a clear airway, and pay attention to keeping warm. In the meantime, call High tech central hospital to request an ambulance or send the patient to the hospital by using the vehicles on duty at the Site. If the poisoned person has difficulty breathing, give oxygen, and at the same time give the poisoned person milk to relieve the symptoms and reduce the irritation of the mucous membrane of the upper respiratory tract, and then send him to the hospital as soon as possible for treatment. If a hazardous chemical leak occurs at the same time, the Emergency Response Plan for Environmental Emergencies will be activated at the same time.

b) Emergency Response Plan for Environmental Emergencies and Environmental Management Procedure, Chapter 19 Water Bodies, Soil Pollution Prevention and Remediation Control Procedures details what to do in the event of a large leak. The Site controls the source of leakage by closing valves, pump the material leaking in the cofferdam into the accident tanks, stopping operations, or by adopting methods such as changing technological processes, material routing, partial shutdown, cycling, and load-reducing operation. The main methods of Site spill disposal are shown as below:

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- 1). Dike blocking. Use protective dikes to divert the flow to a safe location. When a liquid leak occurs in the storage tank area, close the drainage valve outside the cofferdam in time.
- 2). Dilution. To reduce atmospheric pollution, use fire cannons, water guns or fire hoses to spray foggy water to the harmful vapor cloud to absorb the leak while accelerating the diffusion of the gas to high altitudes so that it spreads in a safe area.
- 3). Collection. For large leaks, the Site will construct an embankment or dig a pit to receive recycling or transported to waste disposal Sites. Disposal Large amounts of sodium cyanide leaks are neutralized by hydrogen peroxide oxidation. Hydrogen oxide oxidation is used to neutralize large amounts of sodium cyanide. When the leak volume is small, the leakage was covered with sandy soil for treatment, sandy soil needs Cyanide breaking treatment with hydrogen peroxide, the volume concentration for hydrogen peroxide is 0.25mg/L.
- c) Emergency Response Plan for Production Safety Accident details what to do in the event of a release. If the fire is small, on-Site personnel use on-Site dry powder fire extinguishers to extinguish the fire themselves. If the condition meets the fire and explosion special accident emergency plan start conditions, will activate the corresponding plan immediately.
- d) On-Site disposal plan for liquid sodium cyanide leakage from production facilities and tank area details emergency actions to be taken in the event of rupture to pipes, tanks or valves.
- e) Power outages and equipment failures are dealt with in Safety Production Management Procedures which details what to do in the event of power outages. The Systems Document contains a 'Power off emergency response procedure' that details that the facility is supplied with electricity by two separate power circuits. In the event of a failure of one supply the other power supply is able to meet plant requirements.
- f) Overtopping of ponds, tanks and waste treatment facilities. This is not applicable as the only open ponds are emergency ponds that are pumped to in the case of an emergency.

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

Special Emergency Response Plan for Poisoning Accident and Emergency Response Plan for Environmental Emergencies details the details the evacuation of all people from the incident area and moving of all people 30 m downwind of the incident to an upwind location. The Site has an evacuation alarm that can be used when required. In the case of potentially affected communities the Site has the contact information for the surrounding industrial Sites and residential villages and phone calls would be made to inform them in the case of an incident.

Emergency Response Plan for Production Safety Accident, Chapter 3.4.2, details the use of cyanide antidotes and first aid measures for cyanide exposure. These sections are also kept in antidote storage areas.

Special Emergency Response Plan for Poisoning Accident and hazardous chemical spill accidents detail what to do in the event of both small and large scale leaks including preventing access to the Site drainage, use of bunds, use of plastic to prevent penetration to the underground soils, use of sand or plastic covers to reduce risk of hydrogen cyanide gas generation, the pumping of all liquid into containers, the prohibition of copper or aluminium equipment, the collection of all contaminated soils into a suitable container. The procedures also detail what to do in the event of an incident during loading and dissolution which details the need to select suitable equipment to stop the leak if possible.

Containment, assessment, mitigation and future prevention of releases are covered in the Emergency environmental incident hazard special contingency plan where it details the measures to prevent chemical accidents.

### 3.5.2 Production Practice 5.2

*Involve Site personnel and stakeholders in the planning process.*

in full compliance with

**The operation is**  in substantial compliance with **Production Practice 5.2**

not in compliance with

#### Summarise 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 procedures were issued to all departments and each department had specific training days where employees were disseminated information from the procedure and had the ability to comment on the procedure. The responsibilities of all departments have been stated in the procedure.

The Site is located in Alxa High-Tech Industrial Development Zone in Ulanbuhe Industrial Park. There are no other specific environmental protection targets such as scenic spots, nature reserves and key cultural relics protection units in the surrounding 3 km radius. The project is located in a non-environmentally sensitive planning industrial park. The Site communicates with relevant government authorities and neighbouring industrial facilities within a 3 km radius of the Site. The villagers have a tour of the facility and are able to discuss the production and storage of cyanide. The emergency response plans were discussed during the visit and meeting records was provided for review. Relevant government authorities and neighbouring industrial facilities were included as below:

- Inner Mongolia Dongfu Fine Chemical Co., Ltd.
- Inner Mongolia Jushi Energy Co. Ltd.

The Facility has made potentially affected communities aware of the nature of their risks associated with accidental cyanide releases, and consulted with them directly or through community representatives regarding what communications and response actions are appropriate

Before the issue of the emergency response plan, the Site had noticed neighbouring industrial facilities that there may be a risk of cyanide leakage in the Site and the possible impact on them after the leakage. The measures for risk response have been agreed with neighbouring industrial facilities, and a risk response communication mechanism has been established. Mutual Aid Agreement for Emergency Rescue of Neighbouring Sites were provided for review.

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

During the revision and upgrade of the emergency response plans during 2022, the cyanide facility liaised with, and provided copies of the plans to, relevant government authorities and neighbouring industrial facilities, including:

- Inner Mongolia Dongfu Fine Chemical Co., Ltd.

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- Inner Mongolia Jushi Energy Co. Ltd.
- Inner Mongolia Alxa High-tech Industrial Development Zone Environmental Protection Bureau
- Inner Mongolia Alxa High-tech Industrial Development Zone Emergency Management Bureau.

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

- Inner Mongolia Alxa High-tech Industrial Development Zone Security Fire Brigade.
- Inner Mongolia Dongfu Fine Chemical Co., Ltd.
- Inner Mongolia Jushi Energy Co. Ltd.

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

If the impact of the emergency event exceeds the Site area, the emergency leadership team will change to related emergencies government management department and neighbouring industrial facilities will join the emergency response team.

### 3.5.3 Production Practice 5.3

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

in full compliance with

The operation is

in substantial compliance with

**Production Practice 5.3**

not in compliance with

#### Summarise 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 Plan (ERP) does meet the requirements of this question.

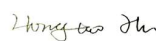
a and b): The Emergency Response Plan for Production Safety Accident (CXYA-2022-01) Chapter 2 and Emergency Response Plan for Environmental Emergencies (CX-YA-202201) Appendix 1, details the following emergency response teams: director, on-Site director, departmental control team, medical team, security team and the support team.

c) Company level and departmental level training in Emergency Response Plan for Environmental Emergencies (CX-YA-202201) Chapter 9 is undertaken. The emergency response team have training in responsibilities, fire information and use extinguisher, on Site emergency procedure training, emergency equipment, including use of SCBAs, administering antidote, hazard identification, different emergency response training, major hazardous sources, management procedure training, hazardous operations training and mock drill training.

d) The Emergency Response Plan for Production Safety Accident (CXYA-2022-01) Chapter 6.5.2 and Emergency Response Plan for Environmental Emergencies (CX-YA-202201) Appendix 1 details cell phone contact information for company leaders and team members are called by radio.

e) The Emergency Response Plan for Production Safety Accident (CXYA-2022-01) Chapter 2 and Emergency Response Plan for Environmental Emergencies (CX-YA-202201) Chapter 4 details the organisational framework for the company level and responsibilities, it details the responsibilities for the director, the on-Site director, the departmental control team, the medical, security team, and support teams.

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f) The Emergency Response Plan for Production Safety Accident (CXYA-2022-01) Chapter 6.4 and Emergency Response Plan for Environmental Emergencies (CX-YA-202201) Appendix 3 details all emergency equipment. It includes fire extinguishers (dry power and foam), fire hoses, eye wash bottles, shower and eye wash stations, fire hydrants, fire pumps, high temperature emergency clothing, SCBAs, chemical coveralls, gloves, light oil, HCN and ammonia detectors, emergency lighting, masks, chemical resistant gloves, sand, sand drum, shovel, and cyanide antidote.

g) Inspections of fire extinguishers, cyanide antidote, eye wash bottles, fire hydrants, SCBAs, PPE, gloves, fixed and portable monitors, emergency lighting and masks, are undertaken as part of monthly inspections.

h) The ERP details the hospital responsibilities and the fire department's responsibilities and the government safety department who provide advice on emergency response.

The Facility has confirmed that outside entities included in the ERP are aware of their involvement and are included as necessary in mock drills or implementation exercises.

The Site has given the ERP to Inner Mongolia Alxa High-tech Industrial Development Zone Security Fire Brigade and Alxa High-tech Zone General Hospital used by the Site who have passed it on to their own ambulance services.

The Inner Mongolia Alxa High-tech Industrial Development Zone Security Fire Brigade attended the mock drill that was undertaken in June 2021 which simulated a fire in the light oil storage area within the cyanide department.

In addition, the medical staff on duty from the Site has attended all mock drills.

The Site has requested that the hospitals attend one of their drills, but the hospitals are unable to do so.

### 3.5.4 Production Practice 5.4

*Develop procedures for internal and external emergency notification and reporting.*

in full compliance with

The operation is

in substantial compliance with

**Production Practice 5.4**

not in compliance with

#### Summarise the basis for this Finding/Deficiencies Identified:

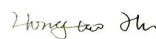
The Facility is in FULL COMPLIANCE with Production Practice 5.4 requiring development of procedures for internal and external emergency notification and reporting.

The Emergency Response Plan for Production Safety Accident (CXYA-2022-01) Chapter 6.5 and Emergency Response Plan for Environmental Emergencies (CX-YA-202201) Appendix 1 includes procedures and contact information for notifying management, regulatory agencies, outside response providers and medical facilities of the emergency.

The ERPs has a Communication Procedure which details that the supervisor must be called who reports to the plant manager or vice manager. The plant manager will organise the emergency response team, the outside emergency services and whether to report to the government department and whether to inform the surrounding neighbours. Appendix 1 of the ERPs' details contact information in the following:

- Fire, hospital and government office (safety department and environmental protection department)
- Surrounding industries.

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Contact information for the emergency response team, the on-Site doctor, ambulance, fire and hospital is placed on the safety information adjacent to the tank farms and process control rooms.

The ERP's Communication Procedure details that the plant manager will decide when to inform potentially affected communities. The Emergency Response Plan for Production Safety Accident (CXYA-2022-01) Chapter 8.2.1 and Emergency Response Plan for Environmental Emergencies (CX-YA-202201) Appendix 2 details contact information for surrounding industries and village representatives in a 1 km area of the Site.

The System Document details that only the office manager will 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.

Inner Mongolia Chengxin has established Environmental Accident Management Procedure which has specified the requirement for significant cyanide incidents as: If any significant cyanide incidents occur, Inner Mongolia Chengxin will report to the international trade department of Chengxin Group. International trade department will notify ICMI.

As interviewed, no such significant cyanide incidents that have occurred.

### 3.5.5 Production Practice 5.5

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

in full compliance with

The operation is

in substantial compliance with

**Production Practice 5.5**

not in compliance with

#### Summarise 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.

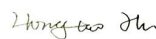
The Emergency Response Plan for Environmental Emergencies (CX-YA-202201), describes specific, appropriate remediation measures, such as recovery or neutralization of solutions or solids, decontamination of soils or other contaminated media and management and/or disposal of spill clean-up debris, and provision of an alternate drinking water supply, as appropriate. The Site has installed a hydrogen peroxide tank (the concentration is 27.5%), it will be transferred to a metal tank in the Wastewater treatment station and diluted it to around 7%. Dilution operations will be performed in the metal tank.

According to Environmental Management Procedure., Chapter 20 Environmental Monitoring Management Procedure, if a spill accident occurs, the soil at the accident area and the surrounding area will be tested after the accident is over, and the contaminated soil will be collected in time and sent to the incinerator for incineration". The final (maximum) concentration allowed in the residual soil is: 135mg/kg, which is the standard for Class II Sites in the *Soil environmental quality-Risk control standard for soil contamination of development land* (GB36600-2018).

The Water Bodies, Soil Pollution Prevention and Remediation Control Procedures Section 4.4 details that remedial measures will include digging out contaminated soil, then decontaminating the soil using hydrogen peroxide in a concrete contained area.

In the event of requirement for drinking water the Site will purchase bottled water. They already have a contract with a supplier. (Connected to municipal water supply network).

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There is no surface water on the Site or within 7.5 km of the Site.

Emergency Response Plan for Environmental Emergencies (CX-YA-202201), Appendix 4 address some of the monitoring instruments including spectrophotometers and HCN gas detectors.

The on-Site laboratory has capacity to test water samples for WAD cyanide using EDTA (Ethylene Diamine Tetraacetic Acid) titration and gas chromatography methods. No on-Site monitoring wells that could be used for collection of groundwater samples. So, the groundwater was regularly monitored by Inner Mongolia Alxa High-tech Industrial Development Zone Environmental Protection Bureau from 2019.

According to Environmental Management Procedure, Chapter 20 Environmental Monitoring Management Procedure, the sampling method refers to the requirements in the *Technical Specification for Soil Environmental Monitoring (HJ/T166-2004)*, and the monitoring method refers to the *Spectrophotometric Method for the Determination of Soil Cyanide and Total Cyanide (HJ745-2015)*.

### 3.5.6 Production Practice 5.6

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

in full compliance with

The operation is

in substantial compliance with

**Production Practice 5.6**

not in compliance with

#### Summarise 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 Plans (ERPs) includes provisions for annually reviewing and evaluating its adequacy. The evaluation is undertaken by the vice president, managers, safety engineers, departmental managers and emergency response team members.

The requirements for periodically evaluating response procedures and capabilities have been described in the ERPs. And the revision records have been kept for review during audit. The last reviewed ERPs are listed as below:

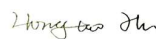
- Emergency Response Plan for Production Safety Accident, CXYA-2022-01, 27 June 2022.
- Special Emergency Response Plan for Hazardous Chemical Spill Accidents, 27 June 2022.
- Special Emergency Response Plan for Poisoning Accident, 27 June 2022.
- Special Emergency Response Plan for Sodium Cyanide Warehouse, 27 June 2022.
- On-Site Disposal Plan for liquid sodium cyanide leakage in tank area, 27 June 2022.
- On-Site Disposal Plan for liquid sodium cyanide leakage from production facilities, 27 June 2022.
- Emergency Response Plan for Environmental Emergencies, CX-YA-202201, 14 July 2022.

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

The whole of the Inner Mongolia Chengxin Site undertakes four emergency response drills each year in accordance with Chinese standards and the facility's Emergency Response Plan.

The cyanide manufacturing facility (Workshop 701 and 708) also undertakes another emergency response drill once per month.

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Examples of the drill reports for the following scenarios over the last three years were reviewed.

- Practice emergency evacuation due to HCN gas release. This mock drill is mainly to simulate the emergency drill of hydrogen cyanide poisoning caused by a leak at the flange connection of the pipe at the root of the intermediate tank of sodium cyanide.
- Fire response (Emergency drills after a fire, including rescue, disposal of pollutants after a fire, etc.)
- Fire extinguisher training
- Cyanide poisoning response (post-incident handling drills in the event of cyanide poisoning.)
- Light oil spill and fire, which is mainly include the mock drill for an environmental release, how to clean up the spilled contaminants and how to deal the fire event which caused by the oil spill.
- Ammonia liquid spills, which is mainly include the mock drill for the ammonia liquid spills in the tank farm, how to clean up the spills and evacuation of the affected area.

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 is prepared to identify the deficiencies of the ERP. And an updated version to address the deficiencies is prepared after the drill as required.

There are provisions to evaluate the Plan after any emergency and for revising it as necessary. The operation has not had the need to implement the plans during the audit period, but revisions have been made following mock exercises and periodic review to keep the plans updated.

#### **4.0 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 Golder Associates has under the contract between it and its client.



# Signature Page

**Golder Associates Consulting Ltd.**



Hongtao Hu  
*ICMI Lead Auditor/ICMC Technical Specialist*



Oliver Liu  
*Managing Director*

HH/OL

**APPENDIX A**

**Important Information**

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