November 2015

INTERNATIONAL CYANIDE MANAGEMENT CODE PRODUCTION VERIFICATION AUDIT

Hebei Chengxin Co Ltd Production Facility Summary Audit Report

Submitted to:
International Cyanide Management Institute (ICMI)
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Washington DC 20005
UNITED STATES OF AMERICA

REPORT

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Distribution:

International Cyanide Management Institute
Hebei Chengxin Co Ltd

Golder Associates

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1.0 SUMMARY AUDIT REPORT FOR CYANIDE PRODUCTION OPERATIONS

Name of Cyanide Production Facility:	Hebei Chengxin Co., Ltd
Name of Facility Owner:	Hebei Chengxin Co., Ltd
Name of Facility Operator:	Hebei Chengxin Co., Ltd
Name of Responsible Manager:	Zhi Qunshen, Hebei Chengxin Co Ltd
Address:	Hebei Chengxin Co Ltd Yuanzhao Road Yuanshi County Shijiazhuang City 051130
State/Province:	Hebei Province
Country:	Peoples Republic of China
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2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION

Hebei Chengxin Co. Ltd is located at Yuan Zhao Road, to the east of Yuanshi County railway station, two kilometers west of Beijing/Guangzhou railway and No.107 Stated Road, 3.6 kilometers east of Beijing/Zhuhai speedway, 30 kilometers south of the province capital Shijiazhuang City. To the north is Yuan Zhao Road (400 metres), to the west is Jingyuan Road (400 metres), and to the east and south is farmland.

Hebei Chengxin Co. Ltd. was established in 1990. It is a joint-stock enterprise with 4000 employees. It is a specialised manufacturer of cyanide and its derivatives in China. The company has been approved by the Quality Management System, Environmental Management System, Occupational Health and Safety Management System, and KOSHER. The company has licences to import and export. The products are sold to many countries and regions, including South America, North America, Europe, Asia, Australia and South Africa,etc.

The site manufactures a large number of chemicals using liquid sodium cyanide as a basic feed-stock. 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 Hebei Chengxin Co. Ltd facility and includes a large number of manufacturing plants which use liquid sodium cyanide as feedstock; these manufacturing plants are not subject to this report.

The cyanide facility is connected to the site's utilities including stormwater drains and the site wastewater treatment plant. The cyanide facility does not have its own wastewater treatment plant.

The cyanide facility was constructed in 2007 and replaced earlier cyanide production facilities. There have not been any major modifications to the cyanide facility since 2007. The changes since the ICMC Certification Audit in 2012 comprise:

- Liquid ammonia is now predominantly piped into the plant from a new adjacent ammonia production facility operated by Hebei Chengxin Co., Ltd.

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- The HCN plant is now fully automated and controlled via computerised digital control system (DCS) operated from the control room in the solid cyanide production building.

The feedstocks to the cyanide facility are light oil and ammonia. The feedstocks are preheated and evaporated to produce a gaseous reaction mixture. This mixture is passed to an electric arc reactor furnace where the oil fumes are heated to approximately 1,200 – 1,400ºC and passed over a platinum catalyst. This reduces the oil fumes to methane and coke (carbon particles). These intermediate reactants react with the ammonia in an endothermic reversible partial reduction reaction producing a raw gas which is a mixture of hydrogen cyanide and hydrogen with small quantities of methane, oil fumes, coke particles and ammonia.

The coke particles in the product gas are removed in cyclones and recycled. The gas is then cooled in a heat recovery heat exchanger to less than 100ºC and passed through a bag filter. This filtered hydrogen cyanide gas is passed through a sodium hydroxide absorber, which generates a 40% sodium cyanide liquor, which is transferred via overhead pipelines to bulk storage tanks.

The liquid sodium cyanide liquor then passes through overhead pipelines to the solid sodium cyanide plant where it is concentrated by evaporation in evaporation vessels under vacuum and then crystallised in crystallisation vessels to produce sodium cyanide crystals. The sodium cyanide crystals are then passed through a centrifuge to remove moisture, then through a drier to remove more moisture and passed via a cyclone to the pelletising unit. The vapour from the evaporation unit is passed through a condenser to form condensate, which is stored in bulk above ground storage tanks at the liquid sodium cyanide tank farms prior to reuse in the absorption process.

The sodium cyanide crystals are pressed into pellets which are loaded into plastic bags in either 50 kg iron drums or 1,000 kg timber boxes. The packaged cyanide is stored in the warehouse at the cyanide facility prior to despatch from site.

The main chemical reaction equation:

$$5NH_3+C_5H_{12} \longrightarrow 5HCN+11H_2 \quad \text{[redox reaction]}$$

$$HCN+NaOH \longrightarrow NaCN+ H_2O \quad \text{[condensation reaction]}$$

The facility is paved with concrete. The vessels and tanks containing liquid sodium cyanide, such as the absorption tanks, 40% liquid sodium cyanide tanks and condensate 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. The cyanide facility does not generate any wastewater. The first flush stormwater is piped to a first flush system comprising two open concrete pits at the wastewater treatment plant which services the entire site (i.e. all the other chemical manufacturing plants of Hebei Chengxin Co., Ltd).

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3.0 SUMMARY AUDIT REPORT

3.1 Auditor's Findings

Hebei Chengxin Co Ltd is:

☒ **in full compliance with**

☐ in substantial compliance with

☐ not in compliance with

The International Cyanide Management Code

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

Audit Company:	Golder Associates
Audit Team Leader:	Tom Carmichael, Lead Auditor and Production Technical Specialist
Email:	tomcarmichael@golder.com

Name and Signatures of Auditors

Name, Position	Signature
Tom Carmichael, ICMI Pre-certified Lead Auditor and Production Technical Specialist	
Floria Feng, Auditor	

3.2 Dates of Audit

The Re-Certification Production Audit was undertaken over five days between 10 and 14 August 2015.

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

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

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3.3 Principle 1 – Operations

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

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

☒ **in full compliance with**

The operation is ☐ in substantial compliance with **Operations Practice 1.1**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 1.1 requiring an operation design and construct cyanide production facilities consistent with sound, accepted engineering practices and quality control/quality assurance procedures.

The facility implemented quality control and quality assurance programs during construction of the cyanide production and storage facilities in 2007. Records have been retained of the quality control and quality assurance programs.

Materials used for the construction of plant and equipment containing or handling comprise stainless steel or carbon steel. Secondary containment is provided predominantly by concrete bunding and pavement. These materials are recognised as being compatible with cyanide.

The facility is designed to provide full containment within reaction vessels and pipelines in the event of a power outage or equipment failure.

The entire plant has been paved with concrete to minimise seepage to the subsurface.

Each cyanide process and storage vessel has been equipped with a level indicator and a high-level alarm.

Secondary containments for process and storage tanks and containers are constructed of concrete and concrete-rendered brickwork. The secondary containments of the 40% bulk cyanide storage tanks 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 insulating material or metal sheeting to minimise the risk of projectile flow beyond the bund boundary in the event of a leak in the upper part of the tank.

The absorption area of the process comprises 16 steel vessels within two concrete paved areas. Both areas are surrounded by a concrete bund.

Spill prevention and containment measures are provided for all cyanide solution pipelines in the form of secondary metal casing or silica compound casing. The ground beneath the pipelines is paved with concrete and drains to the stormwater first-flush system which provides the final form of secondary containment.

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

The operation is

☒ **in full compliance with**

☐ in substantial compliance with **Operations Practice 1.2**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 1.2 requiring an operation develop and implement plans and procedures to operate cyanide production facilities in a manner that prevents accidental releases.

The facility has an extensive system of procedures, instructions and checklists which support management of the integrity of processing equipment and its operation in a manner intended to avoid cyanide releases and exposures.

The facility has procedures for contingencies during upsets in its activities that may result in cyanide exposures or releases. The facility's General Emergency Response Plan and Workshop Site Emergency Response Plan address responses to losses of HCN gas and spills of NaCN liquids.

The facility has a change management process to identify when site operating practices have or will be changed from those on which the initial design and operating practices were predicated.

Preventive maintenance programs have been planned and implemented and activities documented for equipment and devices according to manufacturer's recommendations as evidenced by annual maintenance plans and supporting maintenance completion records.

Some minor deficiencies with regards to preventive maintenance identified during the 2012 audit had not recurred during the audit period (2012-2015).

Process parameters are monitored with necessary instrumentation, which is calibrated according to manufacturer's recommendations. The cyanide production facility maintains annual Calibration Lists detailing the instruments on the plant which require calibration during the year.

The instruments include: high pressure gauges, vacuum pressure gauges, numerical temperature displays and flow meters. The calibrations are undertaken by an independent external qualified company.

Procedures have been 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 collected in secondary containment areas is transferred to the site's first flush system for testing for total cyanide before being treated at the site's wastewater treatment plant.

The facility has environmentally sound procedures for disposal of cyanide or cyanide-contaminated solids. Solid cyanide is reprocessed through the production plant. Other contaminated items are decontaminated by washing, followed by incineration.

Cyanide is stored either in liquid form in the tank farms or in solid form in a secure, ventilated warehouse, where public access is prohibited and rainwater ingress is prevented.

Cyanide is packaged for transport in accordance with Chinese regulatory standards for packing of solid cyanide, which were prepared to meet the requirements of the United Nations Recommendation on the Transport of Dangerous Goods – Model Regulations, (2005) and thereby meet the requirements of the political jurisdictions through which the loads will pass.

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

☒ **in full compliance with**

The operation is ☐ in substantial compliance with **Operations Practice 1.3**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

Inspections of the integrity of pressure vessels, tanks, pumps, pipes, valves and containment bunds (addressing structural and corrosion concerns) are undertaken on a planned basis.

The inspection frequencies are considered to be sufficient to assure that equipment is functioning within design parameters.

12-hourly inspections are undertaken of the cyanide storage facility, including bunding, pipe work, flanges, pumps, high level alarms and tanks to identify deterioration and leaks.

The cyanide facility undertakes monitoring every 6 months of the wall thickness for pipes transferring cyanide solutions.

The cyanide facility undertakes monitoring of the thickness of vessels every 12 months.

Inspections are documented. The documentation identifies specific items to be observed and include the date of the inspection, the name of the inspector and any observed deficiencies. Corrective actions are identified, dated and records kept.

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3.4 Principle 2 – Worker Safety

Protect Workers' Health and Safety from Exposure to Cyanide

Practice 2.1: **Develop and implement procedures to protect plant personnel from exposure to cyanide.**

The operation is

☒ **in full compliance with**

☐ in substantial compliance with **Worker Safety Practice 2.1**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The site has developed operational procedures to minimize worker exposure during for their activities during normal plant operations from receipt of raw materials through finished product, and packaging. Shipping is undertaken by a sub-contractor.

Maintenance related activities are covered by the 'Maintenance Operating Procedure' this discusses the use of safety permits and maintenance permits.

The change management procedure details what changes require implementation of the procedure. It details what type of work needs to be reviewed and by who, with process changes requiring review by both the cyanide department supervisor and the safety engineer. Safety equipment changes require review by the safety management department.

Employees have the opportunity to make suggestions regarding the procedures via 'written suggestions' which they can place in suggestion boxes.

All workers have a medical examination at the local hospital (Yuanshi County disease control centre) to assess their fitness to perform their specified tasks.

The PPE Management Procedure 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.

Hydrogen cyanide monitoring equipment is maintained, tested and calibrated as directed by the manufacturer, and records are retained for at least one year.

The Departmental Level Management procedures detail that a buddy system must be used in the following areas or activities: cracking, the vacuum pump, pelletising and drying, carbon adding to the cracking furnace, centrifuge and maintenance of the vacuum pump.

The Clothes Exchange and Shower Procedure in the Departmental Level Management Procedures details that all employees and contractors must enter into the exchange room and exchange clothes before work, after the shift they must shower and exchange clothes again.

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

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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.

Practice 2.2: **Develop and implement plans and procedures for rapid and effective response to cyanide exposure.**

The operation is

☒ **in full compliance with**

☐ in substantial compliance with **Worker Safety Practice 2.2**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The Production Facility is in FULL COMPLIANCE with Standard of Practice 2.2 requiring an operation develop and implement plans and procedures for rapid and effective response to cyanide exposure.

The site has developed specific written emergency response plans and procedures for response to cyanide exposures. There are six main documents at a company and a department level and specific actions are included – three documents relate to safety and three documents relate to the environment.

Showers, low-pressure eye wash stations and non-acidic fire extinguishers are located at strategic locations throughout the facility. They are maintained and inspected or tested on a regular basis. A sample of showers and eye wash stations were tested during the site tour and found to be working adequately.

The facility has water, oxygen, resuscitators, antidote and a means of communication or emergency notification readily available for use in the plant. The departmental safety engineers inspect the first aid equipment and antidote station as directed by the manufacturers every month. The site's first aid clinic doctors inspect the oxygen bottles and resuscitators in the clinic each month. Records for representative months from 2013 to 2015 were reviewed. The inspection documents list the locations of each item.

Material safety datasheets are displayed adjacent to all storage areas and in all process control rooms in the cyanide department. The displays were of a high quality adjacent to the tank farms. The displays are in Chinese, the language of the workforce.

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 procedure for employees, contractors and visitors leaving the areas with the potential for skin exposure to cyanide.

The site has its own on-site capability to provide first aid or medical assistance to workers exposed to cyanide. The site has an on-site infirmary which is staffed 24 hours a day by three fully qualified doctors.

The facility has developed procedures to transport workers to locally available qualified off-site medical facilities.

The site have a cooperation contract with Yuanshi County Chinese traditional Hospital and Yuanshi County Red Cross Shuanghui Hospital the cooperation contracts were reviewed during the audit and they state that the hospitals are aware that they may have to treat cyanide exposure patients.

Mock emergency drills are conducted periodically to test response procedures for various exposure scenarios. One mock drill is undertaken each month at the cyanide production facility, in addition to the four

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mock drills per year arranged by the broader Hebei Chengxin industrial complex. Lessons learned from the drills are incorporated into emergency response planning.

The facility has a procedure to investigate and evaluate cyanide exposure incidents. It details an accident classification system which determines the type of investigation required. It details the accident report process and accident communication process. No cyanide exposure incidents occurred during the audit period (last three years).

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3.5 Principle 3 – Monitoring

Ensure that Process Controls are Protective of the Environment.

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

The operation is

☒ **in full compliance with**

☐ in substantial compliance with **Monitoring Practice 3.1**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The facility does not have direct discharge to surface water. The facility has been designed, constructed and is operated as a zero discharge facility, with the exception of stormwater and rain water accumulating within secondary containment bunds. The plant facilities are located within curbed concrete containments to prevent cyanide spills and other releases from impacting upon the environment.

Stormwater is discharged indirectly to the environment via the site's wastewater treatment plant and/or the municipal wastewater treatment plant in accordance with regulatory approvals.

Monitoring results indicate that the concentrations of total cyanide in releases from the site's combined discharge of treated wastewater and stormwater have been less than 0.022 mg/L.

The facility monitors groundwater at four locations to the northwest, southwest and southeast as well as adjacent to the cyanide solution tank farm. The concentration of cyanide in the groundwater has been less than the regulatory limit of 0.05 mg/L and less than 0.022 mg/L.

No seepage or associated impacts upon groundwater has been detected from the facility.

The facility limits atmospheric emissions of hydrogen cyanide gas via an enclosed process and continuous monitoring, with alarm limits set to the regulatory standard of 5 ppm.

There are no surface water bodies in close proximity to the cyanide facility which require monitoring. The nearest river is approximately 9 km from the cyanide facility.

Monitoring is conducted at frequencies adequate to characterise the medium being monitored and to identify changes in a timely manner. Monitoring includes first flush stormwater (every rain event), groundwater (quarterly), air quality (quarterly on stacks, continuous ambient monitoring at the cracking furnaces) and wastewater (daily at the site's wastewater treatment plant).

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3.6 Principle 4 – Training

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

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

☒ **in full compliance with**

The operation is

☐ in substantial compliance with **Training Practice 4.1**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The Production Facility is in FULL COMPLIANCE with Standard of Practice 4.1 requiring an operation train employees to operate the plant in a manner that minimises the potential for cyanide exposures and releases.

The facility trains workers to understand the hazards of cyanide through the three levels of training (company, departmental and operational). This training is provided before employees are allowed to work with cyanide.

On-going training is given in both monthly meeting and weekly meetings which includes use of the cyanide antidote, PPE training, emergency response, incident reports, maintenance work, maintenance permits, safety permit, toxicity mask training, SCBA use, hot work and buddy requirements.

The facility trains workers to perform their normal production tasks with minimum risk to worker health and safety in a manner that prevents unplanned cyanide releases through the three levels of training and weekly and monthly training.

The training elements that are necessary for each job are detailed in a booklet called 'Safety Training Material'. The booklets are available after the course in the cyanide department control rooms. Training is provided by appropriately qualified people who undergo annual refresher courses at Shijiazhuang City Safety Department.

The effectiveness of emergency training is undertaken through three written tests associated with the three levels of training, as well as a selection of employees who are tested after each monthly training session.

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

☒ **in full compliance with**

The operation is

☐ in substantial compliance with **Training Practice 4.2**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The Production Facility is in FULL COMPLIANCE with Standard of Practice 4.2 requiring the operation train employees to respond to cyanide exposures and releases requiring an operation train employees to respond to cyanide exposures and releases.

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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

Workers are trained how to respond to exposure to cyanide through the induction three levels of training and on-going training. Mock drills are undertaken monthly in the cyanide department. The local fire department has been involved in a mock drill at the site. Training requirements are evaluated after these drills.

Training records are retained throughout an individual's employment. Each employee has a hard copy safety training record showing all the training they have received. It is signed by both the trainer and the employee. It lists the topics covered, and the exam results. The employees are required to demonstrate an understanding of the training material through three exams the results of which are kept with the training record. The training files for a number of employees both those who had joined recently and longer term workers, were reviewed during the audit. A summary of training is held electronically.

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3.7 Principle 5 – Emergency Response

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

Practice 5.1: **Prepare detailed emergency response plans for potential cyanide releases.**

☒ **in full compliance with**

The operation is ☐ in substantial compliance with **Emergency Response Practice 5.1**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The Production Facility is in FULL COMPLIANCE with Standard of Practice 5.1 requiring the operation prepare detailed emergency response plans for potential cyanide releases.

The Emergency Response Plans detail the emergency response for potential releases of cyanide. The plans deal with specific process areas at the site/ cyanide facility including the raw material storage areas, cracking furnace, finished product area, vacuum pump area and maintenance.

The ERP contains specific response actions including: control of any release at source; evacuation of workers and potentially affected communities; use of first aid measure and antidotes; and containment, assessment, mitigation and future prevention of releases.

Practice 5.2: **Involve site personnel and stakeholders in the planning process.**

☒ **in full compliance with**

The operation is ☐ in substantial compliance with **Emergency Response Practice 5.2**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The Production Facility is in FULL COMPLIANCE with Standard of Practice 5.2 requiring an operation involve 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 facility has involved local response agencies such as outside responders and medical facilities in the emergency planning and response process.

The ERP was issued to all departments and each department had specific training days where employees were disseminated information from the ERP and had the ability to comment on the ERP.

The Yuanshi County Fire Department visited the site in January 2013 and December 2014 to review fire response procedures. In addition the site has given the ERP to the Yuanshi County Fire Department and Yuanshi County Chinese Traditional Hospital and Yuanshi County Red Cross Shuanghui Hospital who have passed it on to their own ambulance services.

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Regular communications with stakeholders are undertaken to assure that the Plan addresses current conditions and risks.

During the revision and upgrade of the emergency response plans during 2014, the cyanide facility liaised with, and provided copies of the plans to, relevant government authorities, neighbouring industrial facilities and community representatives.

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Practice 5.3: **Designate appropriate personnel and commit necessary equipment and resources for emergency response.**

☒ **in full compliance with**

The operation is

☐ in substantial compliance with **Emergency Response Practice 5.3**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The Production Facility is in FULL COMPLIANCE with Standard of Practice 5.3 requiring the operation designate appropriate personnel and commit necessary equipment and resources for emergency response.

The ERP details the following emergency response teams: director, on-site director, departmental control team, medical team, security team and the support team. The cyanide department control team comprises of four control teams that cover every shift plus an additional day time team. Each control team has eight members.

The Emergency Response Plan details the call out procedures, emergency contact list, the duties and responsibilities of the emergency response teams, details of emergency response equipment and inspection procedures. The role of outside responders, medical facilities and communities is detailed in the ERP.

Outside entities included in the ERP have received a copy of the plan and the local fire department and County Safety Security Bureau has attended mock drills at the facility.

Practice 5.4: **Develop procedures for internal and external emergency notification and reporting.**

☒ **in full compliance with**

The operation is

☐ in substantial compliance with **Emergency Response Practice 5.5**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The ERP includes procedures and contact information for notifying management, regulatory agencies, outside responders and medical facilities and includes appropriate telephone numbers.

The ERP include procedures and contact information for notifying potentially affected communities of the incident and/or response measures and for communication with the media.

The System Document details that only the office manager is to communicate with the media.

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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 **Emergency Response Practice 5.2**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The ERP 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 Environmental Accident and Emergency Response Plan 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 would purchase bottled water from an established contracted supplier.

Environmental monitoring requirements during and following cyanide incidents are specified.

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

☒ **in full compliance with**

The operation is

☐ in substantial compliance with **Emergency Response Practice 5.6**

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The Production Facility is in FULL COMPLIANCE with Standard of Practice 5.6 requiring an operation periodically evaluate response procedures and capabilities and revise them as needed.

The ERP prescribes that the plan should be revised or updated every three years. The ERPs were revised and updated during 2014, updating the previous document last reviewed 2012. The review is undertaken by the vice president, managers, safety engineers, departmental managers and emergency response team members.

The cyanide manufacturing facility undertakes one emergency response drill each month as well as participates in four annual emergency response drills of the broader Hebei Chengxin complex. The emergency response drills have included HCN gas releases and cyanide poisoning events.

The ERP prescribes that it should be reviewed and amended according to the deficiencies identified during mock drills.

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GOLDER ASSOCIATES PTY LTD

Tom Carmichael
Principal Environmental Scientist

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