RMI Risk Management Intercontinental

UPL

Certification Audit: International Cyanide Management Code - Production Verification Protocol

Summary Audit Findings Report

16-17 November 2022

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SUMMARY AUDIT REPORT

Facility:	Unit 12, UPL Limited
Facility Owner and Operator:	UPL Limited
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LOCATION DETAIL AND DESCRIPTION OF OPERATION

UPL Limited operates a cyanide production facility at Dahej in the state of Gujarat in India. The facility's initial certification audit with respect to the ICMI Code is reported herein. The audit was undertaken on November 16 and 17, 2022.

The operation is located within the Gujarat petroleum, chemical, and petrochemical investment region (Dahej industrial area). The Dahej industrial area is over 70 square kilometres.

Manufacturing activities commenced at the UPL production facility in November 2020 with the manufacture of hydrogen cyanide to produce solid sodium cyanide tablets for gold mining (largely export markets) and chemical companies who produce derivatives of Sodium cyanide.

The site has approximately 500 employees and has gained third party certification of their management systems to ISO 9001, 14001 and 45001 by Bureau Veritas. The company produces 17300 tonnes of solid sodium cyanide per annum.

Hydrogen cyanide is manufactured by using Andrussow Process which involves use of natural gas (methane), ammonia and air over a platinum-rhodium alloy catalyst gauzes. Hydrogen cyanide is captured and absorbed into caustic soda solution to form a solution of sodium cyanide which is then evaporated, concentrated and crystallized. Crystals of sodium cyanide are separated by centrifuge, dried and compacted in a tablet press to form tablets. Sodium cyanide tablets are packed into sealed plastic lined steel/HDPE drums for storage in

an onsite warehouse where customers arrange for distribution. UPL also loads palletized drums into shipping containers for distribution.

The aspects of the operation that are included in the scope of the audit include the following:

- HCN Plant which produces hydrogen cyanide;
- NaCN plant which produces sodium cyanide;
- Effluent Treatment Plant where cyanide concentrations are reduced to a level that allows liquid to be released to the Gujarat pollution control board for disposal;
- Warehouse facility where product is pelletised and packaged in steel/HDPE drums with heat sealed plastic liners and placed on wooden pallets.

The cyanide manufacturing plant is operated with all safety and good manufacturing practices to meet all statutory and regulatory requirements.

AUDITOR'S FINDING

This operation is:

☑ in full compliance

☐ in substantial compliance

☐ not in compliance

with the International Cyanide Management Code Production Facility Verification Protocol. This compliance has contributed to UPL not having experienced any significant cyanide incidents or compliance problems during the previous recertification audit cycle.

Audit Company

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24th January 2023

Date(s) of Audit

Inclusive of the period from 16-17 November 2022.

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.

Unit 12, UPL Limited		24th January 2023
Name of Facility	**Signature of Lead Auditor**	**Date**

PRINCIPLE 1 – OPERATIONS

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

Production Practice 1.1

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

	☑ in full compliance with	
The operation is	☐ in substantial compliance with	Production Practice 1.1
	☐ not in compliance with	

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 1.1, requiring the operation to design and construct cyanide production facilities consistent with sound, accepted engineering practices and quality control/quality assurance procedures.

The plant is only recently constructed and commissioned (2020). Records of the original construction and design documentation have been maintained at the UPL production facility. Overall there has been a progression from an initial business proposal to selection of process licensor, to basic design followed by detailed design, appropriate risk assessment studies and production of "as built" drawings. Records include quality assurance and controls processes completed during construction. Records from the design and construction process include sign-off by the design engineer of completion of construction in accordance with design standards. Records of commissioning and associated training were also available. Given the age of the plant, there has been no significant change to the design or operation of the UPL cyanide production facilities since commissioning. The site has in place a Management of Change Procedure. This procedure is a UPL Corporate Procedure based upon an online database that requires records to be retained of all material changes to the plant design or operational management.

The basis for design documentation indicated that the materials used are compatible with use. Document records were available indicating that equipment was designed to relevant standards. Interlocks and alarms are provided in the HCN (hydrogen cyanide) Plant and the NaCN (sodium cyanide) Plant. These include alarms and level indications to prevent overfilling of vessels. These are maintained and calibrated to ensure that they present a reliable mechanism to prevent significant process deviations. The plant also has a SIL2 Safety Management System that is independent to the operational control system for the plant. The purpose of the SIL2 system is to ensure that any significant process deviations are identified and the plant is shutdown to prevent release of materials.

The UPL plant has been constructed with an engineered secondary containment structure designed to contain seepage and spillage from cyanide production activities. The secondary containment system is designed to contain the volume of the largest storage vessel with a minimum additional allowance of 10%. The NaCN plant has a roof and side cladding to prevent ingress of water during significant rain events, ensuring that bund capacity is maintained. Inspection of the secondary containments for the cyanide facilities found these to be maintained in good condition. Monthly inspections occur with records maintained. The majority of pipe work is continuously welded and is located within the secondary containment area of the plant. Where cyanide containing pipework crosses roads, it is subject to regular inspections. Any spillage, should it occur, is directed to a collection system and is reprocessed. UPL operates a "Zero Leak Programme" at all of its sites. The rainwater system is lined with concrete to prevent soil or groundwater contamination in the event of cyanide releases collected by the system.

Cyanide product is stored in a warehouse which is totally enclosed. i.e. not open to water ingress from rain. There are no water systems within the facility and the floor is elevated above ground level and is constructed from concrete, and so there is no potential for cyanide to be contacted by water. Ventilation is designed to allow air flow throughout the building without letting in moisture. Engineering drawings in relation to the design of the facility were available. The warehouse is dedicated to cyanide products. Warehouse doors are locked at all times unless required to be open operationally. Extensive signage is provided on the exterior of the storage. This includes:

- List of authorised personnel
- Emergency telephone numbers
- Spill response requirements

Cameras are also installed to enable continuous monitoring of the status of the facility. A SOP has been developed in relation to the export of finished goods. Drums and containers used for export have appropriate HAZCHEM labels attached.

Production 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
☐ not in compliance with
Production Practice 1.2

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 1.2, requiring the operation to develop and implement plans and procedures to operate cyanide production facilities in a manner that prevents accidental releases.

Documents available include manuals, procedures, plans and work instructions for safety and environment management controls of identified significant risks. UPL procedures and plans have been developed and document controlled in accordance with a certified ISO 9001 Quality Management System, ISO 14001 Environmental Management System and ISO 45001 Safety Management System. Systems based upon these standards provide the basis for developing and maintaining operating procedures.

An operations manual is available for the plant. This is supported with Standard Operating Procedures (SOPs) for the the HCN plant, The NaCN plant and the effluent treatment plant and the cyanide storage facility.

Section 4.4 of the Operations Manual addressed abnormal conditions including abnormal shutdown. The plant is also provided with a SIL2 rated shutdown system to address circumstances outside "normal" operations. A Management of Change Procedure is documented and implemented at the UPL plant. This procedure requires sign off by various personnel before the change is instituted, including personnel with health, safety and environmental responsibility. There was evidence of modifications occurring since commissioning. A SAP-based preventative maintenance programme is in place and is implemented. UPL has created Work Instructions for mechanical and electrical maintenance that include lists of equipment items and specify the required frequency of maintenance. Records of the inspection and maintenance having occurred are also retained in hard copy and are available.

Various process parameters are monitored throughout the production facility to ensure operation within the design parameters including pressure, temperature, flow and vessel levels. Calibration procedures are in place for all monitoring instruments and calibration records are maintained. Equipment associated with the SIL2 safety system is checked and calibrated every six months. UPL has procedures in place for collection of cyanide containing liquids and either reuse of this material through the process or treatment.

Operating and maintenance procedures are in place for this plant. Procedures are in place and implemented for the collection of solid cyanide containing wastes and recycling of this material through the cyanide production facility or disposal to approved external waste treatment facilities. Records of disposal of cyanide waste at external waste treatment facilities were available. Packaging material and labelling is certified to relevant dangerous goods codes and has the required markings placed on the containers.

An SOP is available for the control of non-conforming product.

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	

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 1.3, requiring the operation to inspect cyanide production facilities to ensure their integrity and prevent accidental releases.

Routine inspections are carried out throughout the UPL cyanide production facility including vessels, pipes, secondary containment, valves and pumps. Bunded area inspections include checks for integrity including cracks, the presence of fluids and whether valves were closed / blanked. The stormwater system is also inspected. Inspection frequencies are specified in accordance with the maintenance plans for specific equipment and are completed by adequately trained personnel in accordance with inspection procedures. All preventative maintenance activities are generated from SAP. Evidence of application was sighted.

Inspection records of plant and equipment, such as boilers, pressure vessels, pressure relief valves, HCN carrying pipelines, were available. In addition, during this period there were regular inspections by Plant Managers and shift personnel. Records are maintained in accordance with the ISO 9001 certified system.

Inspection checklists are generated from SAP, and includes inspection frequency, items to be inspected, date of inspection and the name of person undertaking inspection.

PRINCIPLE 2 – WORKER SAFETY

Protect workers' health and safety from exposure to cyanide.

Production Practice 2.1

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

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

Basis for this Finding:

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

UPL have developed a systems approach to the management of worker safety. UPL have developed and implemented a Operations Manual covering the HCN and NaCN plants. It addresses topics such as: Process Description, Start-up, Shutdown, General Operations, Sampling, etc. SOPs are available for the HCN plant, the NaCN plant, the effluent treatment plant and the cyanide storage facility. UPL has also developed and implemented a Safety Management System that has been certified to ISO 45001. This system includes Standard Operating Procedures (SOPs) for all regular tasks from receipt of raw materials through finished product, packaging and shipping. Each SOP includes sections that address hazards, precautions, specific equipment requirements, etc.

The system includes:

- Inspections including a joint inspection done by the plant team and the safety team and a pre-start-up safety review.
- Decontamination of equipment by operations prior to handing over to maintenance, captured in a SOP and requiring the checking of wash water.
- The required use of PPE is captured in PPE matrices for each plant and communicated as a part of the safety training.
- A Permit to Work System is in place, which is driven by procedural control and training.
- Control of regular tasks via the use of SOPs.

- Non-routine and emergency operations and maintenance related activities are controlled by SOPs where available, and in addition to this, are subject to the use of a Job Safety Analysis (JSA) and a permit to work.

The key mechanism for soliciting and considering worker input is the statutory required Safety Committee. This committee was found to comprise of worker and management representation and meets 3 monthly. UPL ensures a greater than the required 50% elected worker representation. In addition to this, there is also a contractor safety meeting, a Unit Leader safety meeting and a daily on floor team meeting capturing details from the last shift, plan for the shift, anomalies in the plant and a safety talk. Also, all new and changed procedures have a PSSR pre-start-up safety review conducted. Workers are a part of this review. Records were available to demonstrate the effective communication and consultation.

QRA, 3D modelling and gas dispersion studies have been done based on probable leak scenarios. This forms the basis for the identification of where there may be exposure and the locations of the detectors. The HCN and NaCN plants have been recognised as locations where exposure to HCN gas could occur. PPE use is in accordance with the PPE matrix where workers may be exposed to hydrogen cyanide gas and/or cyanide dust exceeding 10 parts per million (ppm) on an instantaneous basis or 4.7 ppm continuously over an 8-hour period, as cyanide.

The plant uses both fixed and personal monitors.

The numbers and locations of the fixed monitors was based on the conduct of QRA, 3D modelling and gas dispersion studies based on the risk associated with leak scenarios. There are 35 HCN detectors in the HCN plant and 16 in the NaCN plant. These are set to alarm at 4.7 ppm and 10 ppm.

Areas requiring the use of a personal monitor are captured within a plant access work instruction. This instruction is summarised in signs located at the plant access locations. It is a requirement for someone in the team to be using one. There is a personal monitor use procedure.

The action to be taken in the event of an alarm being triggered is articulated in an SOP for sensors activated in the plant. The SOP covers the notification of personnel in charge, the associated checking (whilst using SCBA and a buddy system), and the associated action to rectify any issues.

Area monitoring of HCN and NaCN is also undertaken by an independent organisation monthly and is a requirement of the regulator. HCN measurements were below the detection limit. NaCN was measured in the packing room at 7.2 mg/m³. This is the average concentration in the air. PPE is provided in the packing room. Observation indicated that PPE is used as planned. Respiratory protection was stated to be compliant to ISI 9473:2002 and DGMS approved. Filtering efficiency is 80%.

Subsequent to the audit, a dust extraction system was commissioned in the packing area and atmospheric monitoring was conducted in December 2022 and January 2023 by an independent external agency. Analysis indicated that the concentration of NaCN dust in the packing area was below detection limit.

The personal and fixed monitors were calibrated by the manufacturer on a 6 monthly basis in accordance with their requirements using fresh air and HCN standard gases.

The plant has perimeter fencing and entry warning signage is provided. Access to the production area requires the use of a swipe card and or biometric access, and a buddy so as to have someone available to summon help. This is captured within a buddy system SOP. This requirement is also included within signage at the access points to the plants.

Currently there are ten cameras in the plant. A walkie-talkie system is in place to provide communications between the control room and the plant. There is also a landline phone system available on each floor of the process plant.

Pre-employment medicals are conducted externally. Periodic medicals are conducted 6 monthly. In addition to this there is a daily medical check undertaken of all workers as a requirement for eligibility to undertake work.

Clothing requirements are specified. Boiler suits are used when accessing the plant. There is a dedicated washing machine for the washing of the boiler suits. The wash water is directed to the effluent treatment plant for processing prior to release to the Gujarat Pollution Control Board.

A block diagram was provided outside the NaCN plant providing a summary of process activities. Mandatory PPE and "do's and don'ts" are listed in signage outside the plant. The do's and don'ts include no smoking, no chewing tobacco etc.. A MSDS abstract is also provided outside the plant. Signage is provided in Hindi and Gujarati language. PPE requirements are also addressed in the training video.

Production Practice 2.2

Develop and implement plans and procedure 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	

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 2.2, requiring the operation to develop and implement plans and procedures for rapid and effective response to cyanide exposure.

An onsite Emergency Plan has been prepared in accordance with local regulations. It was noted that this was a whole of site plan. The component that relates to cyanide is driven by the potential events that emanated out of the QRA exercise.

Modelling indicated that the greatest offsite impact is from release from ammonia gas, which was noted to have an impact distance of up to 2km. The releases of HCN that were modelled did not indicate any significant level of HCN at ground level. An Offsite Plan is developed by the District Director based upon the plans submitted by the multiple petrochemical facilities in the region.

Eye wash stations, windsocks safety showers, emergency alarms and dry powder fire extinguishers are provided throughout the operation. The locations of these are documented on a plot plan. There are 23 SCBA units, 30 airline breathing apparatus sets, first-aid boxes and antidote kits. These are routinely inspected. Inspection records were available to demonstrate compliance with the testing schedule.

Ambulance and fire tender were available and are subject to inspections every shift.

Cyanide treatment kits involving the use of Amyl Nitrite, Sodium Nitrite and Sodium Thiosulphate are available. The operation has 2 Factory Medical Officers (doctors) and 6 nurses. A Medical Officer is available onsite 24/7. There are 63 kits available. It is the decision of the doctor regarding whether a cyanide antidote is to be administered. There is a clinic with 6 beds, shower facilities, resuscitators and oxygen. The facility has its own ambulance with a driver ready 24/7. Nurses accompany the patients, and the doctor will keep in constant contact via telephone. If there is a requirement for more than one ambulance, assistance will be requested from the Dahej Industrial Association with whom UPL has a MOU. UPL have an MOU with BAPS Shrimati Hospital, which has senior doctors, ICU capability and ventilation capability.

Safety data sheets are available for NaCN. This is summarised and communicated on signage in the plant for the workers with access to greater detail in the control room.

Tanks and piping containing cyanide were labelled with contents, alerting people to the presence of cyanide. Bund capacities were also labelled. Direction of flow and contents was labelled on pipelines.

There is a procedure that captures decontamination, hygiene control, (including the washing of hands and showering), disposal of PPE and washing of boiler suits. Boiler suits are washed in a dedicated washing machine with wash water directed to the effluent treatment plant.

Emergency alarms, Walkie-Talkies, Radios and telephones are used for communication and for emergency notification.

A Site Incident Investigation Procedure is in place and this will be used to report and investigate any cyanide-related incidents. There have been no cyanide related incidents to date requiring the application of the procedure.

PRINCIPLE 3 – MONITORING

Ensure that process controls are protective of the environment.

Production Practice 3.1

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

	☑ in full compliance with	
The operation is	☐ in substantial compliance with	Production Practice 3.1
	☐ not in compliance with	

Basis for this Finding:

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

The facility does not discharge to surface or groundwater and discharges effluent to a drain system provided by the Gujarat Pollution Control Board (GPCB). An Environmental Impact Assessment (EIA) was undertaken in 2021 and this involved undertaking surface and groundwater monitoring at five locations within a 10km radius of the plant. This provides baseline measurements in relation to cyanide concentrations.

There is no direct discharge of treated process water to surface water. Any waste process liquids are treated onsite to a level of acceptance defined by the GPCB and are subsequently released to a dedicated drain provided by GPCB. This waste is then combined with treated waste from other facilities. There is continuous monitoring of the liquid discharge to the drain with direct reporting to GPCB. A third-party laboratory monitors the presence of cyanide in the discharge liquid. This is managed through a defined SOP. Approval to discharge issued by the GPCB was sighted.

In general, any waste or spilled process liquids are managed as follows:

- Any liquids in the bund of the HCN plant are collected in a tank and pumped into the NaCN process plant.
- The NaCN process plant has a roof and side cladding to minimise water ingress.
- Any liquids present in the bund of the NaCN plant are collected in a tank and returned to the process plant.

- Any contaminated materials in the tank farm or storm water system are pumped to the cyanide treatment plant. The treatment involves ammonia stripper, cyanide stripper and ozonation. The product from the ammonia stripper and the cyanide stripper is returned to the NaCN plant.
- The remaining material, after ozonation, is tested and if suitable is discharged to the GPCB drain.

Rainwater from the cyanide plant is collected in a rainwater system. Potentially contaminated rainwater is treated and sent to the GPCB drain. There is no uncontrolled discharge of stormwater.

There is no beneficial use of groundwater or surface water in the area. UPL advise that the Government prohibits extraction of water from bores because of the brackish nature of groundwater. Water for local community use is provided by a pipeline.

Stack monitoring is undertaken on a monthly basis by BIEL Infrastructure Ltd. Monitoring from the ammonia stripper, cyanide stripper and tail gas incinerator (waste heat recovery) showed that concentrations in stack discharges were below detection limit (cyanide stripper, tail gas incinerator), or below 10% of the criterion (ammonia stripper).

Where the concentrations at the CN stripper exceed the permissible concentrations, The CN stripper outlet is further treated with sodium hypochlorite to get CN within permissible limit of 0.2 ppm before discharging. Relevant SOPs were in place to cover this.

The monitoring frequencies are considered sufficient considering the historic record of results.

PRINCIPLE 4 – TRAINING

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

Production Practice 4.1

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

The operation is ☑ in full compliance with ☐ in substantial compliance with ☐ not in compliance with Production Practice 4.1

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 4.1, requiring the operation to train employees to operate the plant in a manner that minimises the potential for cyanide exposures and releases.

General induction training is provided for all persons who access the site (employees, contractors, visitors). In addition to this, for the NaCN unit, there is a specific induction which includes a cyanide training video, which covers a wide range of topics including: authorised persons, physical and health hazards, potential routes of entry, symptoms of cyanide exposure, TLV at 5mg/m^3, PPE and hygiene, requirement for air suit to be used during clean-up, requirements for medical checks, requirements for clothing, requirements for storage, requirements for spill reporting, first-aid requirements. Evidence was available to demonstrate that the workers in the NaCN unit had undertaken these inductions.

Site training is divided into three categories: Level 0, Level 1, Level 2. It was noted that Level 0 and Level 1 training occurs together. It involves a three-day training course and is provided to all workers on the UPL site. Level 2 training is specific to the operation of the cyanide plant. New employees undertake "on the job" training initially under the supervision of experienced operators or unit managers. Focus is on the requirements of the various SOPs. The SOPs are designed to capture the knowledge required for each task/job. The key focus on operator training is competency in the relevant SOPs. This includes an "on the job" training component. Confirmation of suitability to act in a "solo" manner is achieved through an interview with the appropriate unit manager and a formal assessment. The level 2 training has a validity period of two years. Evidence was available of initial level 2 training and refresher training.

One-day contractor training package is available consisting of 107 slides and delivered in Hindi. Topics include: safety policy, helmet colour coding (e.g. contractor-blue, visitor-yellow), PPE requirements, SCBA requirements, explanation of UN classification system, explanation of NFPA symbols, permit to work system, scaff tag system, LOTO system, use of fire extinguishers, role of windsocks. Also included in this induction is the cyanide video.

PPE training is provided as part of the training video presented in the NaCN induction, training on the PPE matrix and SOPs training as part of the Level 2 training.

Safety talks are provided on a daily basis with a monthly theme.

There is a requirement for trainers to have undertaken a "train the trainer" process. Level 2 training including "on the job" training is delivered by experienced operators/unit head. Training is assessed via examination (typically 30 questions) and sign-off by the trainer and unit head.

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
	☐ not in compliance with	

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 4.2, requiring the operation to train employees to respond to cyanide exposures and releases.

All personnel working in or around cyanide facilities are trained in the response to emergency cyanide release incidents in accordance with the planned response detailed in the Onsite Emergency Plan. Training is captured within a cyanide training video that is part of the induction which includes the procedures to be followed if a cyanide exposure or release occurs. This video covers a wide range of topics including: authorised persons, physical and health hazards, potential routes of entry, symptoms of cyanide exposure, TLV at 5mg/m³, requirement for air suit to be used during clean-up, requirements for medical checks, requirements for clothing, requirements for storage, requirements for spill reporting, first-aid requirements. Operators in the cyanide production area are trained annually for small spills inside the containment area through the procedure training.

As a part of the unit induction, the onsite doctor provides training in cyanide antidote treatment and Diphoterine use.

An Emergency Response Team has been formed and training has been provided by an external trainer. This training has been approved by the Factory Inspectorate of Gujarat Province.

A Training Register was sighted. This is a centralised database for UPL and contains information regarding name, type of training, date of training, etc.

All training packages have an examination which is used to assess understanding of the material.

PRINCIPLE 5 – EMERGENCY RESPONSE

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

Production Practice 5.1

Prepare detailed emergency response plans for potential cyanide releases.

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

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 5.1, requiring the operation to prepare detailed emergency response plans for potential cyanide releases.

The Emergency Response Plan for the UPL cyanide production facilities is contained within the Onsite Emergency Response Plan. The Emergency Response Plan is required by regulation and is also required to be updated annually which was found to be done. The emergency plan addresses all potential emergencies onsite and not simply those associated with the cyanide plant. Cyanide related emergencies are included in the plan. The site has not prepared a formal Offsite Emergency Plan. The offsite plan is prepared by the District Collector based upon the plans submitted by the multiple petrochemical facilities in the region.

Potential cyanide emergency events were identified as a part of the quantitative risk assessment (QRA). This fed into the Onsite Emergency Plan which articulated the types of major potential accidents. These include fire and explosions, toxic gas releases, environmental pollution, spillage and toxic chemical releases. Also documented are key causes such as inadequate design, failure as a result of force corrosion, temperature and pressure, mechanical failure, rupture, leakage, spillage, overflow, ignition, power outages etc.

The Onsite Emergency Management Plan captures the response plans for identified potential events, including evacuation, treatment plan which includes decontamination (shower), administering oxygen and the use of the cyanide antidote kit including the administering of amyl nitrite by qualified trained first-aiders, and subsequent administering of Sodium Nitrite and Sodium Thiosulphate by a qualified doctor.

The onsite emergency plan suggests that the key component in the control of release is the SIL2 shutdown system in the plant. Plant shutdown will limit severity of the release.

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	

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 5.2, requiring the operation to involve site personnel and stakeholders in the emergency response planning process.

Employee input occurs through the Central Safety Committee which contains greater than 50% worker representation in accordance with legislation and meets three monthly, a contractor safety meeting and through the pre-start-up safety reviews.

Community involvement is via a Corporate Social Responsibility (CSR) Programme. UPL has focused its CSR activity within a radius of 10km of the plant and addresses the seven villages that exist within this region. Communication initiatives currently revolve around home safety, road safety and chemical safety. The plan also includes update and refresher communication regarding emergency response and meetings occur on a quarterly basis with the elected body (Local Government Body of Villages).

Booklets providing information regarding emergency response were distributed to the local community. The booklet, which is in the local language with pictorial support, provides guidance on response to a toxic gas release. This communication is required under the Factory Act Section 41-B. A second booklet has also been prepared in accordance with Section 68K of the Act and again addresses offsite impacts including release of HCN. Distribution occurred at the start of the project and the intention is to redistribute on a two yearly basis.

The regulator is responsible for coordination of the emergency plans/responses of multiple industries. A copy of the plan has been provided to the regulator for their knowledge and inclusion in their planning process.

The other key participants are the hospital and the Dahej Industrial Association (DIA) with whom there is a memorandum of understanding and a mutual aid agreement respectively. The agreement with DIA includes the provision of firefighting and ambulance services. The agreement has a provision for joint drills. UPL is a member of the Dahej Disaster Management Centre and provides financial support.

Production Practice 5.3

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

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

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 5.3, requiring the operation to designate appropriate personnel and commit necessary equipment and resources for emergency response.

The Emergency Response Plan designates primary and alternate Emergency Response Coordinators (These are members of Top Management (i.e. the unit head and the duty officers respectively) and assembly locations. The Plan also addresses Emergency Response Teams and the minimum resources and training required for each team. The VMS system captures the emergency response team availability on the day. The alarm is raised via the use of the alarm system or the sirens, which initiates the Safety Team to mobilise the responders.

The Plan addresses specific duties and responsibilities of all key participants. Suitable emergency response equipment is available at UPL and is routinely inspected and maintained. The role of external emergency responders is included in the Emergency Response Plan.

The main outside services would be assistance with firefighting and assistance with ambulance services and hospital services. Confirmation of assistance is provided through memorandums of understanding and mutual aid agreements

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	

Basis for this Finding:

UPL is in FULL COMPLIANCE with Production Practice 5.4, requiring the operation to develop procedures for internal and external emergency notification and reporting.

For the purpose of communication and notification, the Emergency Plan includes contact details of offsite personnel and agencies and onsite personnel. The responsibility for communication is included within the duties and responsibilities for participants. For example, the Site Controller is responsible for notifying the District Collector (Magistrate). Offsite emergency management is managed by the District Magistrate. The duty, as defined within the onsite emergency management plan, is for the Site Main Coordinator to initiate the offsite plan by notifying the District Magistrate. It is noted the modelling indicates that there are no communities that will be affected by a HCN release. An offsite emergency siren was available for use.

UPL's incident investigation procedure includes a requirement to report significant cyanide incidents to ICMI.

Production Practice 5.5

Incorporate remediation measures and monitoring elements into response plans and 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

Basis for this Finding:

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

The emergency response plan indicates that the remediation measures have been submitted to the regulator and are consistent with the Government requirements.

The emergency management plan captures spillage, recovery and neutralisation. The plan specifically prohibits the use of chemicals such as sodium hypochlorite, ferrous sulphate and hydrogen peroxide to treat cyanide that has been released into surface water or that could reasonably be expected to enter surface water. The spillage component of the Emergency Plan references the need for environmental monitoring by the quality assurance team, after cyanide release. Drinking water is provided to the surrounding region by means of a dedicated pipe. This supply will not be affected by any cyanide release.

A SOP for NaCN solution spill control which suggests the use of hydrogen peroxide and/or sodium hypochlorite and/or water for the neutralisation and cleaning associated with NaCN spills. This SOP includes instructions for neutralization or decontamination, provide information such as which treatment chemical is to be used and where it is stored; how the treatment chemical is to be prepared to the proper concentration; and how the remediation end point is defined.

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

Basis for this Finding:

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

The UPL Emergency Response Plan is reviewed annually in accordance with regulatory requirements and, subsequent to drills and actual events, updated as required. The Management of Change process is also expected to indicate any need to revise the Emergency Plan. Mock drills in the NaCN plant are conducted at least quarterly to test the adequacy of response readiness and resources. These capture both releases and human exposure. There is a requirement to review and update the plan as necessary after any emergency. This is defined in the Emergency Preparedness and Response Procedure. There have been no events to date and as such, no requirement for review and update.