International Cyanide Management Code
Operational Certification Audit of:

Coatzacoalcos
Sodium Cyanide Production Facility

Summary Audit Report

Submitted to:
The International Cyanide Management Institute
1400 I Street, NW – Suite 550
Washington, DC 20005
USA

2020 Audit Cycle

CyPlus Idesa Coatzacoalcos Sodium Cyanide Production Facility Summary

Company Names & Contact Information

Name and location of Operation:	CyPlus Idesa, S.A.P.I. de C.V. Boulevard Morelos Km 4.2 Parque Industrial Petroquímico Morelos, Coatzacoalcos, Veracruz de Ignacio de la Llave, 96400 Mexico
Responsible Manager for Operation:	Oscar Vélez Alvarez Plant Manager
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Description of Operation

CyPlus Idesa S.A.P.I de C.V., Mexico, is a 50:50 joint venture of Grupo Idesa, Mexico and Advent International. The Coatzacoalcos sodium cyanide production Plant has a production capacity of 40,000 metric tons and uses state-of-the-art hydrocyanic acid and cyanide technologies.

The International Cyanide Management Code (ICMC) pre-operational certification of this operation was conducted in November 2015. Cyanide was introduced to the Plant in August 2016 and the first commercial production and delivery of product was in September 2016. The ICMC certification audit was performed in November 2016.

CyPlus GmbH and Idesa are both large companies that bring years of experience in chemical production to the joint venture. Among other things, CyPlus Idesa benefits from CyPlus' mature

integrated management systems for environment, health, safety, and quality and from CyPlus sodium cyanide technology and production experience. Idesa also brings mature systems, experienced chemical operations personnel, infrastructure, and regional knowledge to the joint venture.

The facility produces solid sodium cyanide for the precious metals mining market.

Audit Implementation and Conclusions

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

Locally defined procedures were evaluated during this audit. This ICMC compliance assessment was based on random samples of information. Interviews, observations, and a review of records and data were typical of an EHSQ management system or compliance audit.

The CyPlus Idesa operational certification audit was performed by an independent third-party auditor who is pre-approved by the ICMI as Lead Auditor and as technical expert for ICMC audits of cyanide mining, transportation and production operations.

During the past three years of this recertification period, there have been no cyanide-related incidents, spills, or exposures during cyanide production in the facility.

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

Auditor's Finding

The cyanide management practices for the CyPlus Idesa Coatzacoalcos production facility (the Plant) were evaluated for ICMC compliance using the *ICMI Cyanide Production Operational Verification Protocol.* CyPlus Idesa internal standards, policies, practices, and procedures regarding the management of the cyanide operations were reviewed.

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

There have been no cyanide-related incidents, spills, or exposures during the past three years of this recertification period since.

The results of this operational certification audit demonstrate that the CyPlus Idesa Coatzacoalcos production facility and all cyanide-related operations are in FULL COMPLIANCE with International Cyanide Management Code operational requirements.

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Date(s) of Audit:	February 4 thru 6, 2020

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Certification 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 the Audit Reports accurately describe 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.

CyPlus Idesa		February 6, 2020
Name of Operation	Signature of Lead Auditor	Date

Cyanide Production Verification Protocol
Summary Audit Results

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.***

CyPlus Idesa has implemented quality control and quality assurance (QA/QC) programs as part of the Coatzacoalcos production facility construction project. The auditor confirmed that the company retained all quality control and quality assurance records from the construction of the cyanide production and storage facilities. QA/QC documents for the construction of this facility were readily available for review. There were no new constructions during this recertification period. Records were available to demonstrate that appropriately qualified personnel reviewed the facility construction process at frequent intervals and confirmed that all stages of the facility conformed to engineering Plans.
The materials of construction for the cyanide production facility are compatible with reagents that are used in the production processes. Materials of construction specifications were sampled during the initial certification audit and were found to be acceptable.
Interlock information was reviewed during the audit. Each critical system has been designed to have an interlock mechanism. The interlocks are designed to prevent cyanide releases in the event of a power loss or equipment failure. The interlocks are linked through the Distributed Control System (DCS) and will prevent releases in the event of a power loss.
All production activities are done on a concrete surface. No cyanide-related activities are performed outside of the containment area. In occasion of this recertification audit, the auditor confirmed through observation the concrete surface and its construction joints are in good condition, providing an adequate surface to avoid any infiltration to the subsoil.

Interviews and a review of a sample of specifications and drawings confirmed that all tanks and storage vessels have tank level indicators and high-level alarms that are linked into the distributed control system (DCS). The indicators were deemed to be enough for preventing the overfilling of cyanide process and storage vessels. Operators can also monitor and control tank levels and hear alarms in cases of overfilling. The Plant has implemented a procedure and a program to conduct routine inspections of all instrumentation, including level indicators at tanks, to confirm that the tank level instrumentation and alarm systems are functioning properly. The procedure describes the inspection route to follow where the systems and equipment are listed, in which a periodic review should be carried out according to the frequency assigned.
The secondary containments for process and storage tanks and containers are constructed with materials that provide a competent barrier to leakage. Additionally, these secondary containment areas are sized to hold a volume greater than that of the largest tank, any piping draining back to the tank, and additional capacity to account for the highest possible rainfall from a severe storm event. Engineering Planning information, calculations, and rainfall information were reviewed during the initial certification audit, all information was found to be appropriate and acceptable. In occasion of this audit, the auditor verified that secondary containment systems are kept in good condition.
All cyanide solution piping is located over concrete that has secondary containment.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 1.1? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

<u>Production Practice 1.2:</u> Develop and implement Plans and procedures to operate cyanide production facilities in a manner that prevents accidental releases.

The Plant production and storage facilities have the necessary procedures in place for a safe and environmentally sound operation. Extensive operational and emergency response procedures have been created by CyPlus Idesa specifically for this operation. Procedures that address normal operations, upset conditions, and emergency events are addressed in the documentation.
Maintenance procedures and operational procedures were reviewed and provide information about minor process upset issues. CyPlus Idesa also additional procedures for contingencies during upsets in its activities, as emergency stop due to electrical failure, boot of the reaction system (referred to interlocks system), management of levees and ditch levels, among others.

CyPlus Idesa has implemented a formal management of change procedure that calls for a risk analysis to be performed prior to making any changes to procedures or equipment. The procedure requires review and sign-off by the environmental and safety supervisors prior to implementation of proposed changes and modifications. Several examples of when the Management of Change (MOC) procedure was used were available for review including the change of position of the flow transmitter and update of the HAZOP (Hazard and Operability Studio).
A preventive maintenance program called EAM (Enterprise Asset Management) has been developed and is in use. The Plant registers in this program all its assets and related preventive maintenance, as well as predictive and reactive maintenance.
Process parameters at the Plant are monitored with necessary instrumentation. Calibrations performed by the Plant personnel are done according to a defined procedure, with calibrated test equipment, and with personnel who have been trained and found to be competent. Calibrations are performed at frequencies that are consistent with manufacturer recommendations.
CyPlus Idesa has implemented procedures to prevent discharges of cyanide-contaminated water to the environment and for managing and disposing of cyanide-contaminated solids in an environmentally sound manner. Contingency procedures for the control room and operators were sampled during the audit, including the Contingency Plan for Operations - Loss of Power and the procedure for testing water for the presence of cyanide prior to discharge to the fire water collection tank or other non-process streams.
CyPlus Idesa has implemented environmentally sound procedures for the decontamination of cyanide-contaminated solids and the proper disposal of all materials. The procedure for the disposal of waste from the lab was reviewed, also procedures for washing of waste and for management and disposal of waste. Records were available for review and confirmed that the hazardous waste disposal company used is authorized to take toxic (hazardous) waste. CyPlus-Idesa also maintains a file with all the permits from this transport company.
Cyanide is stored in the warehouse building which has adequate ventilation to prevent the build-up of hydrogen cyanide gas. The beneficial ventilation features of the warehouse include: a very high ceiling, vented walls, vented roof line, and large rolling overhead doors that were deemed to provide appropriate levels of ventilation. All cyanide production and storage activities are done under a roof to prevent contact with moisture and water. The perimeter of the facility is completely fenced and there is 24 hours 7 days per week (24/7) manned security to ensure that no unauthorized personnel access the site.

CyPlus Idesa ensures that all cyanide packages are labeled in the appropriate languages for the countries through which the material is transported.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 1.2? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

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

CyPlus Idesa has implemented a procedure and a program to conduct routine inspections of all cyanide production and storage facilities including tanks, pipelines, pumps, valves, and containments. The procedure describes the inspection route to follow where the systems or equipment are listed in which a periodic review should be carried out according to the frequency assigned. In the Control Room all information regarding frequency and aspects to verify is available. Any anomaly is immediately reported to the supervisor on duty to take corrective actions. Tanks holding cyanide solutions are on a preventative maintenance program and are inspected annually. Secondary containment is inspected monthly and pipelines, pumps and valves are inspected monthly as part of the preventive maintenance program. Cyanide tanks are inspected for structural integrity and signs of corrosion and leakage. Secondary containments are assessed for their integrity, the presence of fluids, their available capacity, and to ensure that any drains are closed to prevent accidental releases to the environment.
Inspection frequencies were found to be sufficient to assure that equipment is functioning within design parameters. Pipelines, pumps and valves are inspected monthly for deterioration and leakage. Records were reviewed and found to be complete.
CyPlus Idesa documents inspections and retains records in the work order system and in hard copy. The inspections include items observed, date of inspection, name of inspector and any observed deficiencies. Corrective actions, in the event that deficiencies are observed, are also documented. This information was confirmed through interviews and a review of records.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 1.3? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

2. WORKER SAFETY: Protect workers' health and safety from exposure to cyanide.

Production Practice 2.1: Develop and implement procedures to protect Plant personnel from exposure to cyanide.

The facility has developed and implemented procedures that minimize worker exposure, under normal operations, to the production, storage, and shipment of cyanide. In addition to the Production Department procedures list, the Plant has a set of procedures related to the department of emergency services and patrimonial security. Procedures are in place also for abnormal and emergency operations. A list of all operational, maintenance, and EHSQ procedures was available for review and found to be acceptable. Non-routine and emergency procedures reviewed include the emergency response plan, spill control, notifications procedure and medical treatment. The Plant has procedures for preventive maintenance which are supported by periodic inspections of the facility and equipment. The procedures address periodic maintenance of several different types of equipment including cyanide detectors, cyanide production equipment, forklifts, firefighting equipment, and emergency response equipment.
CyPlus Idesa employs the Management of Change (MOC) procedure to review proposed operational changes as necessary. Changes in documentation, installations and operational changes are processed using this procedure. MOC records were available for review and were found to be acceptable.
CyPlus Idesa solicits worker input and considers this when developing and evaluating health and safety procedures. The facility's Safety Committee meets quarterly and includes operators, supervisors, and managers. During these meetings and in the daily 5 minutes safety minutes, as well as during the refreshment training sessions, operators are encouraged to provide feedback on procedures and changes at the facility.
HCN toxic gas monitors are located throughout the production area and requires HCN gas personal monitors are used by operators. The alarm levels are set at 4.7 and 10 parts per million (ppm) for the fixed and personal HCN monitors. At 4.7 ppm personnel must stop work and withdraw until HCN levels drop. When the alarm sounds at 10 ppm, they must evacuate the area. The facility currently had 25 Dragger personal monitors at the time of the audit and around 10 Honeywell fixed HCN gas monitors. Personal monitors are maintained bi-annually according to manufacturer's specification; they are also weekly calibrated at the site by mean of the bump test in a calibration module with HCN pattern gas. Set points were confirmed to meet ICMI requirements during the audit.

HCN monitors are calibrated according to the manufacturer's specifications. Maintenance and calibration is performed by internal personal and an external service provider. Fixed monitors area calibrated by external provider *Dajo Petrol*. Records were available for review and found to be complete. Records are retained for at least one year.
With regards to ensuring safe work environments, areas of the Plant and warehouse were formally evaluated by engineers with extensive experience in the production and storage of cyanide. The need for using portable HCN monitors was incorporated into operational procedures for operations known to have the potential for exposure to elevated cyanide or HCN levels (more than 4.7 parts per million). It is a requirement of the operation that at least every two operators must carry a portable monitor with them. Monitoring for cyanide dust and HCN gas, among others, is being performed periodically at the Plant.
CyPlus does not allow people to work alone in areas where cyanide present. It is established in the Safety, Hygiene and Environmental Guidelines that operators must work in pairs for the following cyanide activities considered risky: cyanide washing, clogging in solid areas, at the start of machinery such as briquetting, drying, chilling, big bag packaging machine, among others. Upon entry into the production area, each person signs into the area. The control room operator is responsible for who is in the production area. Each person in the production area is equipped with a handheld radio. Additionally, stationary two-way communication equipment is located on each level of the operation and in the warehouse.
Fitness for duty medical exams are done prior to hiring and on at least an annual basis thereafter. According to the procedure, employees must go through the medical services at the beginning of the day before carrying out risky work, with a Pass or Fail result. Periodical special medical analysis of in thyroid profile, cyanide and thiocyanates in blood is also performed to workers involved in cyanide related tasks.
CyPlus Idesa uses a "Black and White" clothing changing policy - this requires that operators change clothing prior to leaving the operation. Clothing and PPE requirements are also defined for contractors and visitors. Clothing for personnel who may encounter cyanide is washed on-site by a dedicated laundry service. Procedures details the facility clothing change policy for employees, contractors and visitors to areas with the potential for cyanide contamination of clothing.
Appropriate cyanide warning signs and PPE signs are present in all operational areas. Eating, drinking, smoking, and open flames are prohibited where there is a potential for cyanide contamination. Leadership and operators showed very good awareness of the restrictions and of the potential dangers of not adhering to those restrictions.

CyPlus Idesa procedure prohibits eating, drinking, smoking, and open flames in the production and storage areas. There are dining rooms at the Control Room and at the laboratory. All personnel from other areas must eat at the dining room located in the neighboring Plant, owned by the associated business group. It is not allowed to bring water or drink it in areas other than the mentioned dining rooms, except in the Administrative Area. Smoking is prohibited in the entire Plant.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 2.1? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

<u>Production Practice 2.2:</u> Develop and implement Plans and procedures for rapid and effective response to cyanide exposure.

CyPlus Idesa has drafted a comprehensive emergency response plan (Plan) for rapid and effective response to cyanide exposure. The Plan was reviewed and was found to be comprehensive. It includes procedural steps to be followed if cyanide is ingested, skin or eye contact made, and/or if cyanide dust or gas is inhaled. Procedures for medical care due to cyanide poisoning and for use of personal protective equipment cover the steps to be taken to respond to cyanide exposures.
Shower / low-pressure eye wash stations are located throughout the facility and non-acid fire extinguishers located at strategic locations; all are inspected regularly. Fire-fighting equipment is inspected according to Mexican Standards. Inspections to fire -fighting equipment is performed once a month based on PSP-90018 "Review and testing of emergency systems and equipment" and maintenance is performed annually by an external provider, which complies with local regulation the requirements of NOM-154- SCFI-Current.. The eye wash and safety shower units are tested weekly per ANSI Standard Z358.2014. There is a separate supply line to ensure water pressure. CyPlus Idesa maintains records of all inspections.
CyPlus Idesa has water, oxygen, resuscitator, antidote and means of communication readily available for use in the Plant always. Water pressure in the safety showers and eye wash stations is measured continuously and an alarm sounds in the control room if pressure falls below an acceptable level. Facility operations are only allowed when equipment is functioning. There are three designated social areas where fresh water is provided for drinking. Sanitary water is supplied with a tank on the roof. Oxygen for first aid, a resuscitator and antidote are available both in the medical services and the ambulance. The antidote available for use at the facility is Nithiodote, a kit with injectable sodium nitrite and sodium thiosulfate.

CyPlus Idesa inspects and appropriately maintains emergency response equipment and cyanide antidote to ensure availability during an emergency. The antidote is maintained in the Plant´s medical services according to manufacturer recommendations. Emergency response equipment inspection records were available for review and found to be acceptable. CyPlus Idesa also contracts with the local hospital to maintain appropriate equipment and antidote. The service provider checks equipment monthly and the EHSQ staff checks the service provider's records every six months.
Cyanide Material Safety Data Sheets (MSDS) and first aid procedures are available to workers in the operational and storage areas of the Plant in Spanish. The safety information is also published as posters at the facility. CyPlus-Idesa contracts with CyPlus GmbHfor the provision of MSDSs and the maintenance of this information.
Labeling and marking of piping shows the cyanide contents. Hazard information on tanks was reviewed and found to be acceptable. The direction of cyanide flow in pipes is also identified.
The facility decontamination procedure for employees, contractors and visitors leaving areas with the potential for skin exposure to cyanide requires that all personnel change out of their clothing and personal protective equipment (PPE) after working or visiting areas with the potential for contact with cyanide. The showering and clothes changing part of the facility was included in the facility tour. CyPlus Idesa uses a "Black and White" clothing changing policy - this requires that operators change clothing prior to leaving the operation. A clothing change is also required when people leave the work area and enter offices, social areas, and/or the canteen. Leadership and operators demonstrated an excellent understanding of the decontamination procedure and the need for safety precautions.
CyPlus Idesa has its own on-site capability to provide first aid to workers who are potentially exposed to cyanide. The medical services area is in the Administrative building. When this new facility was constructed a service-level agreement with Idesa and the medical staff who work in the medical office on the Idesa property was made. The facility functions in such a way that on-site medical personnel can quickly respond to any on-site emergency at either Plant. A doctor is available in the Plant´s medical services from 7 am to 3 pm. Paramedic and nurses are available 24/7. The medical services is equipped with 2 stretchers, a defibrillator (resuscitator), decontamination area, an ambulance Type 2 driven by a paramedic, where is also a defibrillator and oxygen, among others. Medical services are provided by the contractor *Semedis*.

The facility has developed instructions to transport exposed workers to locally qualified off-site medical facilities after necessary decontamination and stabilization have been achieved. Procedure *PSP-90000, Medical care for poisoning or work accident* addresses the transportation of the exposure victim to the hospital, was reviewed and found to be acceptable. The operation maintains an ambulance at the site, along with trained emergency medical technicians and nurses which work at the medical services facility 24/7.

Local hospitals and medical staff have been alerted to the use of cyanide at this facility. Procedure *PSP-90000, Medical care for poisoning or work accident* instructs the medical staff to call ahead to the hospital prior to sending an exposure victim. The medical capabilities of the on-site emergency response team and the local hospitals were evaluated at the time of the audit. The formal agreements the facility has in place with these medical facilities were reviewed and found to be acceptable.

As part of the service agreement with a local medical service provider, CyPlus Idesa ensures that the hospital staff is trained and provided with antidote. Personnel from the Evonik Corporate Medical Department visited the local hospitals to determine which had the capability to treat a cyanide exposure victim. The private hospital would be used to treat non-critical conditions. Life-threatening injuries or exposure victims would be brought to the State Hospital because of their more advanced capabilities.

The Plant´s Superintendent of Safety, Hygiene, Environment and Quality is a doctor trained in cyanide related medical emergencies by Evonik / CyPlus GmbH in Germany. She is training *CLAM* doctors in the matter. *CLAM*, the Local Mutual Aid Committee is an industrial mutual aid group in the southern area of the state of Veracruz.

Emergency mock drills are conducted periodically at the Plant. Cyplus Idesa emergency response plan and procedures call to perform at least two emergency response drills per year, varying scenarios of exposure and spills. The auditor reviewed several cyanide related emergency mock drill reports performed during this recertification period, where improvement opportunities generated action plans, and although none required incorporating it into the response planning, all required actions were completed and closed.

CyPlus Idesa has implemented an incident investigation procedure for investigating, evaluating and reporting incidents, including cyanide exposure cases. *Incident Investigation procedures (PSP-90022)* and the *Major emergency and civil protection Plan (PSP-90016)* call for the revision of the emergency response Plans as necessary following a drill or actual emergency.

Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 2.2?

☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

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.

There is no direct discharge to surface water. The process wastewater goes through the detox equipment. On-line titration measurements for total cyanide are made every 10 minutes to confirm complete cyanide destruction. Domestic effluents go to Idesa´s adjacent plant to the treatment tank. The rainwater goes to a drain, made up of a gutter that surrounds the Plant as a perimetral ring and discharges through a gate, that can be closed manually, towards the public drain. According to Mexican regulations, wastewater cannot be discharged to water bodies
The Plant does not have an indirect discharge to surface water. Wastewater discharges only to the Idesa wastewater treatment Plant. The auditor reviewed quarterly monitoring reports confirming that there were no detectable levels of cyanide discharged from the operation.
The groundwater monitoring results were reviewed from 5 groundwater wells that were installed; last testing was done in October 3, 2019 by the contractor *Grupo Microanálisis*; the results showed that there were no detectable levels of cyanide in groundwater under or around the site. The limits of detection were .02 mg/l and the national standard is .07 mg/l for drinking water. This was done also as a baseline before cyanide introduction. There have been no spills or releases at the operation during this recertification period, what's more, there haven't been any since the introduction of cyanide at the beginning of August 2016.
According to interviews, CyPlus Idesa ensures that its operations remain in compliance with ICMC requirements and that its operations do not impact groundwater. In the unlikely event that impact to groundwater occurs, CyPlus Idesa will perform remedial activities to protect the groundwater's beneficial use
The Plant limits its atmospheric process emissions of hydrogen cyanide gas such that the health of workers and the community are protected. Air streams are sent to the thermal oxidizer or to the flare, as necessary. The storage tanks and production equipment that may produce off-gas or dust are attached to the waste gas scrubber. This scrubber circulates caustic solution to minimize the potential for HCN gas production; this off-gas is nonetheless sent to the thermal oxidizer. Operations monitors emissions through the thermal oxidizer, where there is an online analyzer (24/7) which records all the information in the Distributed Control System (DCS). The operating specifications for the thermal oxidizer were reviewed and showed that the emissions from the thermal oxidizer would not endanger the health or workers or the community. The specification sheet for the thermal oxidizer was reviewed. It calls for the final emission of HCN to be under 3 mg/m3.

There is no direct discharge to surface water. Groundwater sampling was performed prior to the start of operations and will be monitored at appropriate frequencies in the future. Continuous monitoring of cyanide levels (free CN-) at the discharge point after the detox area is performed to ensure that there is no impact possible from indirect discharge to surface water. Records were reviewed and found to be acceptable.
Monitoring frequencies were found to be appropriate for the operation. Cyanide concentrations in ambient air are monitored in the operation using portable and stationary HCN detectors. CyPlus Idesa limits atmospheric process emissions of hydrogen cyanide gas such that the health of workers and the community are protected.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 3.1? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

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 minimizes the potential for cyanide exposures and releases.

CyPlus Idesa trains all personnel to ensure that they understand the hazards of cyanide. The training is given prior to working with cyanide and refreshed on an annual basis. The training is offered in Spanish and includes information on a full range of topics related to cyanide. This material is used for the cyanide safety training along with face to face training sessions that are given annually. Training includes requirements for EHSQ, maintenance, administration, and production.
Site personnel receive training regarding the use, storage, cleaning and where to use the personal protective equipment (PPE) required by each activity or task. CyPlus Idesa is committed to training its workers to perform their normal production tasks with minimum risk to worker health and safety and in a manner, which prevents unPlanned cyanide releases. Internal training in the operational procedures was delivered to all relevant personnel prior to cyanide being introduced to the operation.
Employees receive classroom and on-the-job training in production tasks. Small group training is conducted (walk downs) to learn about the production equipment prior to the start of work. Training and competency records (example: testing and/or supervisor reviews) are required for procedural, emergency response, and EHSQ training. Tests were available for review and found to be acceptable. Production training is carried out by the shift supervisor, who in turn was trained by those responsible for installing the Plant's package units.
The training elements necessary for each job are identified in the training materials. The facility uses the work procedures to supplement training materials. Training is provided by appropriately qualified personnel. The training matrix was available for review and was found to be acceptable.
Experienced personnel from, CyPlus GmbH and Idesa provide the training. The trainers are qualified engineering, operations, logistics, medical, and EHSQ personnel with many years of experience. Additionally, the Shift Supervisors and the lab personnel are trained in Germany.
CyPlus Idesa trains all personnel on cyanide awareness prior to their beginning work in the operation. Personnel are trained on job procedures in the classroom before working with cyanide. Records are retained, were available for review, and found to be acceptable.

The facility evaluates the effectiveness of cyanide training by testing and performance evaluations after the initial training sessions. Evaluation records are kept by the site, were available for review and were found to be acceptable.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 4.1? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

<u>Production Practice 4.2:</u> Train employees to respond to cyanide exposures and releases.

CyPlus Idesa trains all personnel on its emergency response procedures. Section 6 of *PSP-90016 Major emergency and civil protection Plan,* calls for employees to use the nearest alarm station if a release is detected. The control room is automatically made aware of the problem. The spill response procedure *PSP-90025 Leak and spill control* describes what steps need to be taken to manage a spill. Training records were reviewed covering the recertification period.
Workers are trained to respond to potential cyanide exposures. Cyanide Safety training is done initially and then annually thereafter. Interviews indicated that different scenarios have been developed for spill, man-down, and environmental release. Additionally, posters and wallet cards explain what needs to be done. Routine drills are performed to test response skills. The surrounding industrial companies would also be informed via the CLAM (Local Mutual Aid Committee). The CyPlus Idesa Emergency Response Brigade has been trained to aid workers exposed to cyanide. Training for the medical staff included the use of the cyanide antidote that is maintained by the site.
Drills are conducted at least twice annually to test general response to chemical emergencies, including cyanide exposure. CyPlus Idesa processes corrective actions and revises emergency procedures as necessary following the drills or actual Plan deployment. Drill results are evaluated from a training perspective to determine the need for revisions to training materials or training approaches. The Plant also participates in the surrounding industrial complex drills.
The site maintains training records and evaluation results of all trained workers. Mexican legislation requires that training records be maintained on official forms. Training records are maintained at least as long as the employee is working at the site and fulfill all ICMI training record requirements. Records are electronically and in paper format.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 4.2? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

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.

CyPlus Idesa has developed an emergency response plan and procedures specific to the site to address potential releases of cyanide that may occur on site. The *PSP-90016 Emergency Response (Civil Protection) Plan v3* (Plan) and emergency procedures were reviewed during the audit. Among others, the Plan addresses emergency due HCN gas leaks and sodium cyanide spills at the Plant. In the emergency response plan, it is considered that the Plant will participate as support for any emergency transportation of sodium cyanide occurring up to a distance of 320 km from the Plant. For these cases, Plant personnel will go to the emergency site and support with emergency brigades, spill recovery kits, and first aids kits.
The Plan considers the potential failure scenarios appropriate for its site-specific environmental and operating circumstances, including catastrophic release of hydrogen cyanide, potential releases of cyanide from the operation, cases of fire and explosion, and situations where equipment may malfunction, power outages and overtopping of tanks. Emergency response procedures are spread out over several documents. The Plan explains the specific actions to be taken in response to a spill including the ban of the use of chemicals in surface water. For catastrophic release of HCN, the Plan considers support from CLAM as they conform a group of 36 companies in the area that would participate as mutual aid. Releases during fires and explosions have been evaluated by in the study *"Risk Analysis and Vulnerability"* by a specialized contractor accredited by Mexican's agency Civil Protection.
The Plan describes specific emergency response actions as the procedure to be followed to evacuate site personnel in the event of an emergency. The neighborhood *Major emergency and civil protection Plan* and the *Internal Program for Civil Protection* plan were reviewed and updated in May 2019 in coordination with CLAM, which considers the potentially affected neighborhood industrial plants in the area. Procedure *PSP-90000 - Medical care for poisoning or work accident* includes a list of specific first aid actions to be taken, among others, in the event of a cyanide exposure, including the use of cyanide antidotes. Both the emergency Plan and procedure *PSP-90025 Leak and spill control* call for the control of releases at their source and the necessary actions to take for release containment, assessment, mitigation and prevention.

Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 5.1? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

Production Practice 5.2: Involve site personnel and stakeholders in the Planning process

CyPlus Idesa involves its workforce, authorities at the adjacent facilities, and the community in the emergency response Planning process. The operation joined the CLAM (Local Mutual Aid Committee) in early 2016. This organization is involved in emergency Planning and includes industrial neighbors and local response agencies. The Plant Manager holds monthly meetings with all the Plant employees where they are encouraged to comment on different safety issues, including Planning against emergencies. During the emergency response Plan trainings, staff also participate in emergency Planning if necessary, since the training is theoretical and practical and then they have feedback meetings.
The facility is in permanent coordination with potential affected communities through CLAM. All CLAM members area aware of the nature of Cyplus Idesa Plant risks associated with accidental cyanide releases and holds monthly meetings where there are opportunities to consult directly with them regarding communications and response actions would be appropriate for these cases.
The operation has provided training for local agencies such as the Red Cross, State Civil Protection Agency, Fire Department and the local hospitals in the emergency response process for the operation. The dynamic of CLAM is that at each monthly meeting the agency members interact with firefighters, Civil Protection, Red Cross, IMSS *(Instituto Mexicano de Seguridad Social)*, Secretariat of Public Safety (police) and Semedis, the provider of medical services for the Plant.
During monthly meetings with CLAM, CyPlus Idesa engages in regular consultation and communication with stakeholders to assure that the Plan addresses current conditions and risks. Procedure *PSP-90079 Crisis and communication management* describes how communication will be done with authorities and outside responders. Members are in continuous communication via WhatsApp.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 5.2? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

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

The Plan designates the production supervisor as the brigade commander. The advisor staff also has authority to implement the emergency Plans. This includes: Plant Manager, EHSQ Superintendent, Maintenance and Production Superintendents and alternate emergency response coordinators with explicit authority to commit the resources necessary. The Plan identifies the Emergency Response Team (ERT) as the Plant operators, along with management personnel and office staff. The site manager is the brigade coordinator and the responsibilities for internal and external communications in case of emergency are designated. The Plan requires emergency response training for the ERT, including spills control, cyanide intoxication, rescue at heights and confined spaces. The Plan includes a phone list for internal and external responders. There are 3 working shifts at the Plant. First call will be to the Plant employee at field, then to the Control Room, where there are always two panelists 24/7. The responsibilities, authorities and duties of the coordinators and team members for managing an emergency are clearly described in item 5 of the Plan. The Plan and procedures list the emergency response equipment maintained by the site. The Plan includes lists and locations for firefighting, chemical response, and medical equipment. As required in the Plan, emergency response equipment is inspected regularly using a checklist. Its availability and operation was confirmed during the audit. The roles of outside responders are defined in the Plan, including Idesa´s emergency brigades and medical staff and external responders as hospitals staff, Civil Protection, fire responders and police.
Outside entities included in the CLAM are aware of their involvement in the Plan during emergencies. External responders are included in the emergency response drills and implementation exercises. CyPlus Idesa is a member of CLAM which meets monthly. Meeting minutes were available for review and found to be acceptable.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 5.3? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

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

Procedures and contact information for notifying management, regulatory agencies, outside response providers and medical facilities of the emergency, are addressed in the Plan and in procedure *PSP-90079 Crisis management and communication*. The Plan includes a communication flowchart for emergency cases and up-to-date emergency telephone numbers and includes the telephones numbers of the nearest hospital and local emergency agencies, as well as CyPlus Idesa emergency numbers. The Plan and the procedure establish who is responsible for calling the external responders and authorities.
The Plan includes procedures and contact information for notifying potentially affected communities of the incident and for communication with the media. The production facility is located within an industrial park. The CLAM emergency response Plan points to an Operations Coordinator from CLAM who is responsible for notifying CyPlus Idesa leadership, parent organizations, neighboring industrial partners, and authorities.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 5.4? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

***Production Practice 5.5:* Incorporate into response Plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.**

The Plan and procedures describe specific remediation measures for recovery and neutralization of solutions and solids, management and disposal of spill clean-up debris. *PSP-90065 Identification, management and disposal of hazardous waste and special handling waste*, addresses management and disposal of dangerous waste. Procedure PSP-90025 *Spills control* details how to recover sodium cyanide spills in soil. Procedure *PSP-91074 Basis for soil remediation* considers that there are established maximum soil limits in Mexico for cyanide. If a spill is over the limit, the response team has to treat the soil. The soil treatment method must be approved by the government. CyPlus Idesa is responsible for the remediation of the soil and the disposal of contaminated solids, for its subsequent reprocessing, treatment or for its final disposal according to the General Law for the Prevention and Integral Management of Waste as well as its regulations. If required, CyPlus Idesa must contract an external service specialized in remediation. In case of spilling 1 m^3 of dangerous chemical substance, the PROFEPA (Federal Attorney for Environmental Protection)

and the competent authorities must be informed immediately that the spill, infiltration, discharge or discharge of hazardous materials or hazardous waste. The Plant personnel, like the neighboring industrial Plants, only use bottled water for human consumption.
The Plan prohibits the use of chemicals such as sodium hypochlorite, ferrous sulfate and hydrogen peroxide to treat cyanide that has been released into surface water. The Plan states that cyanide treatment chemicals are prohibited from being used in surface water.
The Plan and procedures at the Plant address the need for environmental monitoring. Procedure *PSP-90065 Identification, management and disposal of hazardous waste and special handling waste* PSP-90065 addresses the potential need for environmental monitoring to identify the extent and effects of a release. *PSP-91074 Basis for soil remediation* considers that the maximum soil limits in Mexico for cyanide are established and that any soil treatment method must be approved by the government.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 5.5? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance

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

The Plan states it must be reviewed at least once a year and that emergency response drills are to be performed at least two times per year. These drills include cyanide spill and worker exposure scenarios, as well as evacuation drills. The Plan also states it would also be reviewed, if necessary, after an accident.
Emergency response drills have been periodically conducted at the Plant during the recertification period, as part of the Plan evaluation process. Drills included cyanide spill and worker exposure scenarios, as well as evacuation drills. The auditor reviewed several drill reports indicating that the improvement actions assigned to managers with a closing date, had been completed mentioning the evidence.

The Plan states it must be reviewed after an emergency thar required its implementation, to evaluate and revise it if necessary. During this recertification period such reviews have not been performed as no emergency required implementation of the Plan.
Finding: Is the operation in full compliance, substantial compliance, or non-compliance with Production Practice 5.6? ☑ **Full Compliance** ☐ Substantial Compliance ☐ Non-Compliance