Cyanide Code Audit

Summary Audit Report

PROJECT NO. 0158665

JANUARY 2013
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1. **GENERAL SUMMARY**

1.1. **INFORMATION ON THE AUDITED OPERATION**

Name of Cyanide Facility: CyPlus Transloading Terminal and Warehouse  
Name of Facility Owner: CyPlus  
Name of Facility Operator: Evonik Degussa Mexico  
Name of Responsible Manager: Antonio Dominguez Perez  
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CyPlus Mexico, subsidiary of Evonik, is a distributor for sodium cyanide in solid state (briquettes) in Mexico. Currently, CyPlus supplies several mines in Mexico. CyPlus operates under the commercial name of Evonik Degussa Mexico, S.A. de C.V.

Cyanide is transported to Mexico by ship and is delivered by the cargo company at the Mazatlan and Guaymas Ports. Ship unloading operations are performed by the respective Port Authority, which releases the container by placing it on a truck’s platform. The cyanide is transported either to a distribution center located in Ciudad Obregón, Sonora, or directly to a mine. The distribution center is operated by CyPlus.

**This audit comprises the warehousing operations of the Distribution Center. CyPlus has followed the Cyanide Code principles since 2010 in Mexico; however, being this the first certification audit, records were reviewed back to January 2012, some records from 2011 were also reviewed.**

The distribution center operations include storage of cyanide containers as received and transferring cyanide from big bags to ISO type containers.
1.2. **OVERALL AUDITOR’S FINDING**

This operation is

- √ in full compliance
- □ in substantial compliance *(see below)*
- □ not in compliance

with the International Cyanide Management Code.

* For cyanide transportation operations seeking Code certification, the Corrective Action Plan to bring an operation in substantial compliance into full compliance must be enclosed with this Summary Audit Report. The plan must be fully implemented within one year of the date of this audit.

Audit Company: ERM Mexico, S. A. de C. V. 
Audit Team Leader: Juan Carlos Rangel Lopez  
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Names and Signatures of Other Auditors:

Jaime Martinez

Beatriz Valencia

Date(s) of Audit: 23 to 27 July 2012

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

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

This operation is

√ in full compliance
□ in substantial compliance
□ not in compliance

with the International Cyanide Management Code

2.1. OPERATIONS PRACTICE 1. DESIGN, CONSTRUCT AND OPERATE CYANIDE PRODUCTION FACILITIES TO PREVENT RELEASE OF CYANIDE

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

The operation is

√ in full compliance with
□ in substantial compliance with Transport Practice 1.1
□ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

There is a system in the final stages of commissioning at the CyPlus Obregon site, known as the SLS project. The system is intended for transferring Cyanide from Big Bags into ISO type containers.

According to the documents reviewed, the main components of the system satisfy the requirements of international guidelines and standards.

The distribution center is constructed with concrete floor, block and sheet metal walls, and sheet metal roof. The design of the warehouse was performed by a certified engineer and included the requirement of performing concrete resistance test. According to the laboratory reports, the tests were performed and the results were above the minimum resistance established in the design report.

1. CyPlus complies with the eight elements of Production Practice 1.1; CyPlus has designed and constructed cyanide storage and transferring facilities consistent with sound, accepted engineering practices and quality control/quality assurance procedures.
2.1.2. 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 Transport Practice 1.2
- [ ] not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

CyPlus has developed the following procedures related with the cyanide management:

- Procedure to receiving, handling and storing hazardous chemicals;
- Procedure to conduct loading and unloading of hazardous chemicals;
- Procedure to the use Personal Protective Equipment during site activities; and
- Procedure to transfer of cyanide received in damaged containers.

In addition, the site has a regulation applicable to workers and contractors that conduct activities inside the cyanide warehouse.

Emergency response procedures describe the equipment required by type of emergency as well as the responsibilities of the Emergency Response Brigade, a copy of the procedures and Civil Protection Plan were provided as evidence.

CyPlus Obregon has a change management procedure. Procedure is applied by CyPlus before that new projects or equipment be installed on site. As part of the procedure a risk analysis should be conducted.

CyPlus has developed a maintenance program and routines for forklifts, the SLS system, the ISO-tanks. Maintenance activities are recorded in an electronic log; periodic inspections are also performed to these elements.

Instrumentation is used in the SLS system. CyPlus Obregon site has three hydrogen cyanide portable gas detectors. Portable gas detectors are used by the operative personnel during their daily activities inside the cyanide storage warehouse. The portable gas detectors are included in an annual calibration program. Portable monitors’ calibration is conducted in accordance with the manufacturer’s recommendations, a certified third party company. CyPlus Obregon keeps the equipment calibration records.

Wastewater generated from personnel showers, two washing machines used to wash workers and contractors uniforms and the SLS project area are discharged into two aboveground storage plastic tanks. Plastic tanks are located inside the cyanide warehouse and have secondary containment.

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Signature of Lead Auditor
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Date
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The cyanide warehouse is not connected to the municipal sewer system.

Occasionally, plastic bags that were in contact with cyanide are generated by the Site. These bags are incinerated by the Site through a third party company authorized to handle hazardous waste.

Cyanide is packaged in bags which protect the product from the air-environment moisture. Cyanide is received in plastic bags within closed boxes of 1 ton capacity and closed drums of 100 kg capacity. Boxes and drums are stored on concrete floor.

Access to the unauthorized personnel is prohibited. CyPlus Obregón keeps a record of all site personnel and subcontractors that access to the cyanide warehouse.

CyPlus complies with the eight elements of Production Practice 1.2. CyPlus has developed and implemented plans and procedures to operate cyanide storage and transferring facilities in a manner that prevents accidental releases.

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

The operation is

- [√] in full compliance
- [ ] in substantial compliance Practice 1.3
- [ ] not in compliance

Summarize the basis for this Finding/Deficiencies Identified:

Workers perform daily inspections in the warehouse to detect potential risks and potential warehouse damages. Even though there are not inspection checklist implemented, the workers were knowledgeable regarding the aspects that could present a treat and that they have to notify them to the site manager.

CyPlus has a chemicals delivery procedure which establishes the configuration for the different shipment modalities from the distribution center, the procedure requires e.g. that every vehicle is inspected prior its departure from the distribution center. Additionally, the transport contractor inspects the vehicle prior to departure (see Section 6.1).

For the containers received at the ports please refer to the different sections devoted to each transport contractor.

CyPlus complies with the three elements of Production Practice 1.3. CyPlus has developed and implemented procedures to inspect cyanide storage and transferring facilities to ensure their integrity and prevent accidental releases.
2.2. **WORK SAFETY: PROTECT WORKER’S HEALTH AND SAFETY FROM EXPOSURE TO CYANIDE**

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

The operation is

- √ in full compliance
- □ in substantial compliance with Practice 2.1
- □ not in compliance

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

CyPlus Obregon has developed the following procedures to minimize worker exposure during routine and non-routine activities:

- Procedure to receiving, handling and storing hazardous chemicals;
- Procedure to conduct loading and unloading of hazardous chemicals;
- Procedure to the use Personal Protective Equipment (EPP) during site activities;
- Procedure to transfer of cyanide received in damages containers;
- Regulation to conduct activities inside the cyanide warehouse;
- Emergency response procedures in case of evacuation, fire, explosion, cyanide release and cyanide exposure;
- Change management procedure; and
- Civil Protection Plan.

Documents mentioned above include a description of the safety measures that personnel should adopt in order to conduct routine and non-routine activities. As well as the EPP required according to the activity developed.

During site maintenance activities, the subcontractors should adopt the measures included in the procedures developed by CyPlus Obregon. The interviewed operators were familiar with these procedures.

Safety procedures are reviewed and updated as result of the potential impacts identified, if required.

CyPlus requires feedback from their workers regarding potential health and safety risks identified during their routine activities, activities and process changes and emergency drills. The site has feedback mailboxes where the workers’ recommendations are deposited.

The recommendations provided by workers are considered to review and update health and safety procedures.
CyPlus Obregon has three hydrogen cyanide portable gas detectors. Detectors are used by the workers in charge to operate the cyanide warehouse.

Portable gas detectors are calibrated in accordance with the manufacturer recommendation through a certified third party company. The detectors’ alarm is set at 4.7 ppm.

The hydrogen cyanide portable gas detectors owned by CyPlus Obregon are maintained and calibrated as recommended by the manufacturer. The portable gas detectors calibration certificates are retained by the site at least one year.

CyPlus Obregon policies determine that routine and non-routine activities should be performed using a buddy system. Workers are prohibited from working alone.

CyPlus Obregon has a commercial agreement with a hospital in order to assess periodically the health of the site employees.

The Site has a clothing change policy and a decontamination procedure. Both are applicable to employees, visitors and subcontractors.

According to the mentioned policy and procedure, clothes potentially contaminated with cyanide (as uniforms) should be washed in the washing machines installed in the workers shower area. Uniforms are permanently stored on-site, even if these are clean.

The site has showers for the daily decontamination of workers and subcontractors.

It is prohibited that employees wear uniforms used in the cyanide warehouse when they stay in cafeteria areas.

Warning signs advising workers that cyanide is present and the required personal protective equipment are placed in the site including cyanide warehouse and the SLS system area.

CyPlus complies with the ten elements of Production Practice 2.1. CyPlus has developed and implemented procedures to protect plant personnel from exposure to cyanide.
2.2.2. **Production Practice 2.2: Develop and implement plans and procedures for rapid and effective response to cyanide exposure.**

The operation is

- [✓] in full compliance with
- [ ] in substantial compliance with Production Practice 2.2
- [ ] not in compliance with

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

The facility has the procedure CDO-Expo-013 to attend personnel that have been exposed to cyanide. Procedure is applied by the Emergency Response Brigade members.

The members of the site emergency response brigade are trained to provide first aids to workers exposed. However, if external assistance is required, exposed workers are transported to the hospital. The procedure CDO-Expo-013 includes instructions to transport the exposed personnel to the San José hospital along with the antidote kit. Availability of antidote kits was confirmed during the audit.

Site emergency response equipment includes: oxygen tank, antidote, autonomous breathing equipment, spills kits, first aid kit, hydrogen cyanide gas detectors, gases masks and communication radios. The availability and operability of this equipment was confirmed during the audit.

During the site inspection showers, low-pressure eye wash stations, and dry chemical powder fire extinguishers were observed distributed around the site, and are inspected monthly, the extinguisher agent is replaced annually. Check list with routine inspections information was observed at each of these stations.

Cyanide Material Safety Data Sheets (MSDS) are available in the cyanide warehouse and site offices. MSDS are in Spanish language and site personnel is aware the information they contain.

Workers that handled cyanide are members of the Emergency Response Brigade; and, they are trained to provide first aids if required.

Cyanide containers, and pipes and tanks containing wastewater from ISO-tank cleaning are properly identified.

There are procedures for entering and leaving the storage and cyanide transferring areas. During the site visit, auditors and its companions where subject to these, and entered/leaved the relevant areas according to indications contained in the procedures.
The site has a mock emergency drills program. Lessons learned are used to update emergency response procedures, if required.

The site has a procedure to investigate and evaluate cyanide exposure incidents. Investigation and evaluation of incidents have not been required; the site has no incidents reports.

CyPlus complies with the 12 elements of Production Practice 2.2. CyPlus has developed and implemented procedures for rapid and effective response to cyanide exposure

2.3. **MONITORING: ENSURE THAT PROCESS CONTROLS ARE PROTECTIVE OF THE ENVIRONMENT.**

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

The operation is

- [ ] in full compliance with
- [ ] in substantial compliance with Production Practice 3.1
- [ ] not in compliance with

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

The site does not have direct discharges to surface water bodies, wastewater potentially contaminated with cyanide is sent to mine sites to be integrated in the mines cyanide circuit. Routine operations of the site do not generate hydrogen cyanide gas emissions.

CyPlus does not generate wastewater containing cyanide or cyanide emissions to the air.

As previously noted, the cyanide transferring operations include dust collectors, which discharge within the warehouse. Although cyanide concentration is not monitored at the dust collectors exhaust, the cyanide concentration in the air environment within the warehouse is permanently monitored using the portable detectors and an accredited laboratory is contracted on an annual basis to determine cyanide concentrations as required by Official Mexican Standard NOM-010-STPS-1999. According to the records reviewed during the audit, no exceedances to limits established in the mentioned standard were reported.
2.4. **TRAINING: TRAIN WORKERS AND EMERGENCY RESPONSE PERSONNEL TO MANAGE CYANIDE IN A SAFE AND ENVIRONMENTALLY PROTECTIVE MANNER.**

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

The operation is

- [✓] in full compliance with
- [□] in substantial compliance with Production Practice 4.1
- [□] not in compliance with

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

CyPlus has an annual training and refresher program. Training program includes workers and members of the Emergency Response Brigade.

The site personnel receive specific training regarding the use, storage and cleaning of the personal protective equipment required by each activity conducted.

The presentation indicated above includes general training topics regarding production activities and tasks and its related hazards and potential risks.

In addition, workers and contractors receive induction training. Induction training program includes the safety procedures and safety measures applicable to the activities that are conducted onsite. The operators and the warehouse supervisors have receive training in the operation of the SLS system.

Site management and supervisors were trained directly in the operation of the SLS system and they provide training to the operators.

The rest of the training topics, mentioned in question 1, are provided by qualified personnel of the Federal Job Agency, State Civil Protection Agency, Fire Department, Red Cross, and the Chemical Industry National Association (ANIQ, Asociación Nacional de la Industria Química).

All employees have been trained prior to work with cyanide. Site keeps records of the induction training provided and the test applied after the training.

General evaluation of the training provided to the site employees is done after induction / training sessions. Evaluation records are kept by the site.

CyPlus complies with the seven elements of Production Practice 4.1. CyPlus trains its employees to operate the storage and transferring facilities in a manner that minimizes the potential for cyanide exposures and releases.
2.4.2. *Production Practice 4.2: Train employees to respond to cyanide exposures and releases.*

The operation is

√ in full compliance with

□ in substantial compliance with Production Practice 4.2

□ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Workers are members of the Site Emergency Response Brigade. Emergency Response Brigade has been trained by qualified personnel from the Chemical Industry National Association (ANIQ, Asociación Nacional de la Industria Química) regarding procedures to be followed in case of a cyanide release.

Training includes the use of the cyanide antidote kit owned by the site. Besides, the site has a commercial agreement with the hospital to assist workers exposed if required. The training includes practice in the use of the antidote kit.

The site has an emergency drills program including worker exposure scenarios. Lessons learned during drills are used to update emergency response procedures if required.

The site keeps training records and evaluation results of all trained workers and contractors.

CyPlus complies with the seven elements of Production Practice 4.2. CyPlus trains its employees to respond to cyanide exposures and releases.
2.5. **EMERGENCY RESPONSE: PROTECT COMMUNITIES AND THE ENVIRONMENT THROUGH THE DEVELOPMENT OF EMERGENCY RESPONSE STRATEGIES AND CAPABILITIES**

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

The operation is

- [✓] in full compliance with
- [ ] in substantial compliance with Production Practice 5.1
- [ ] not in compliance with

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

The site has development and implemented an Emergency Response Plan and safety procedures in case of cyanide release, fire and explosion; including potential releases of cyanide from the SLS, use of cyanide antidotes and first aids kits, evacuation procedure and cyanide containment, assessment and mitigation measures to prevent future releases. Local emergency response agencies such as the Red Cross, State Civil Protection Agency, Fire Department and the hospital had been trained by CyPlus and have been inform of their responsibilities in case of emergency during the training.

CyPlus complies with the seven elements of Production Practice 5.1. CyPlus has prepared detailed emergency response plans for potential cyanide releases.

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

The operation is

- [✓] in full compliance with
- [ ] in substantial compliance with Production Practice 5.2
- [ ] not in compliance with

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

The site Emergency Response Plan and safety procedures were prepared by site personnel.

Local emergency response agencies such as the Red Cross, State Civil Protection Agency, Fire Department and the hospital had been trained by CyPlus and have been inform of their responsibilities in case of emergency during the training. Adjacent facilities have been informed of the site operations, the coordination in case evacuation is required and provided with CyPlus contact details.
The distribution center is located within an industrial park. The site has informed adjacent facilities and civil protection authorities regarding its operations and coordination in case evacuation is required. The site provided a copy of its emergency response procedures to the civil protection authorities.

According to the Emergency Response Plan CyPlus will provide training to the neighbors and external responders and perform emergency drills involving them.

CyPlus complies with the four elements of Production Practice 5.2. CyPlus has involved site personnel and stakeholders in the planning process.

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

The operation is

- [✓] in full compliance with
- [ ] in substantial compliance with Production Practice 5.3
- [ ] not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Site workers, site management personnel and the customer service employee are members of the site emergency response brigade. Their roles are described in the civil protection plan.

The members of the emergency response brigade have been trained by qualified CyPlus personnel and by ANIQ (Asociación Nacional de la Industria Química).

The role of the local emergency response agencies is described in the emergency response plan; they have participated in the emergency drills conducted by the site.

The site has an updated emergency telephone numbers list. It includes telephone numbers of the local emergency response agencies and CyPlus representatives.

Emergency response equipment is inspected using a checklist. Its availability and operability was confirmed during the audit.

External entities as the Police Department, Fire Department, Red Cross, State Civil Protection Agency are aware of their involvement in the site emergency plan; they have received training on cyanide emergency response sponsored by CyPlus and have participated in the site emergency drills.

CyPlus complies with the two elements of Production Practice 5.3. CyPlus has designated appropriate personnel and commit necessary equipment and resources for emergency response.
2.5.4. **Production Practice 5.4: Develop procedures for internal and external emergency notification and reporting**

The operation is

- [√] in full compliance with
- [□] in substantial compliance with Production Practice 5.4
- [□] not in compliance with

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

The Emergency Response Plan includes an emergency telephone numbers list, where telephones numbers of the hospital, local emergency agencies and the CyPlus representatives are included. The Plan also establishes who is responsible of calling the external responders and authorities.

The Distribution Center is located within an industrial park; the contact directory includes the names of the adjacent facilities that would be notified in case of emergency.

CyPlus complies with the two elements of Production Practice 5.4. CyPlus has developed procedures for internal and external emergency notification and reporting.

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

The operation is

- [√] in full compliance with
- [□] in substantial compliance with Production Practice 5.5
- [□] not in compliance with

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

Cyanide release procedure describes specific measures to recover cyanide in solid state and procedure to decontaminate material used during the cyanide recovery. If required material contaminated is disposal as hazardous waste through an authorized company. The scenarios identified are consistent with the activities performed on site.

Considering that all activities are performed inside the site property and there are not surface water bodies near of the site, this question is not applicable.

In case of cyanide release, it could be controlled inside the site. It is not required an environmental monitoring plan.
CyPlus complies with the three elements of Production Practice 5.5. CyPlus has incorporated into response plans and remediation measures monitoring levels that account for the additional hazards of using cyanide treatment chemicals.

2.5.6.  

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

The operation is

- [√] in full compliance with
- [□] in substantial compliance with Production Practice 5.6
- [□] not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

Learned lessons from the emergency drills are considered to update the Emergency Response Plan and procedures if required.

The site has an annual emergency drills program. Emergency drills are evaluated by the site management, workers and local emergency agencies. The Emergency Response Plan does not formally state that it should be reviewed and updated after any emergency. However, during the site interviews, workers and site management employees were aware that the plan should be reviewed in case of emergencies.

CyPlus complies with the three elements of Production Practice 5.6. CyPlus periodically evaluates response procedures and capabilities and revises then as needed.