ICMI CYANIDE CODE
SUMMARY AUDIT REPORT
RE-CERTIFICATION AUDIT

CYANIDE PRODUCTION

CYPLUS GMBH
SITE WESSELING
KÖLNER STRASSE 122
50389 WESSELING
GERMANY

Submitted to:
International Cyanide Management Institute
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CyPlus GmbH, Site Wesseling, Germany

(Signature Lead Auditor Dr. Steinweg)

Audit Date 13.02.2012
Name of Cyanide Production Facility: CyPlus GmbH, Wesseling Plant
Name of Facility Owner: CyPlus GmbH
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Location detail and Description of operation:

The CyPlus facility is located on the premises of Evonik in Wesseling, close to Cologne, Germany. The facility is specialized in the manufacturing of sodium cyanide (NaCN) used in the international gold mining industry. The production of alkali cyanides is completed in several steps. The subject facility depends on several tasks and services provided by Evonik industrial park site services in Wesseling, in particular related to energy and pressurized air supply, steam, water and cooling water supply, general environmental management services, wastewater treatment, waste management, security, medical services, emergency preparedness including fire brigade and fire water retention. The services retained are governed by an appropriate service contract. CyPlus is completely involved into the Emergency Response Plan and into the corresponding mock drills.

The present report describes the results of the second re-assessment of the ICMC.
Auditor’s Finding

This operation is

☒ in full compliance
☐ in substantial compliance *(see below)
☐ not in compliance

with the International Cyanide Management Code.

This operation has maintained full compliance with the International Cyanide Management Code throughout the previous three-year audit cycle.

* For cyanide production 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 ......................... LULU Intelligent Organization
Audit Team Leader ...................... Dr. Benno Steinweg
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Names / Signatures of other auditors ... n/a
Date of audit ............................. Feb 13, 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 Production Operations and using standard and accepted practices for health, safety and environmental audits.

CyPlus GmbH, Site Wesseling, Germany

(Author's Signature)

Audit Date 13.02.2012
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
☐ in substantial compliance with Production Practice 1.1
☐ not in compliance with

Summarize the basis for this Finding:

The CyPlus facility was built using sound, accepted engineering practices and quality control processes. Extensive QC & QA records regarding the construction of the production, packaging and warehouse facilities were reviewed and were found to be acceptable. Appropriate quality assurance and quality control, management of change documentation, drawing control, equipment sign-offs and usage of a data control computerized system (DCS) were available to demonstrate compliance to Code requirements. Acceptable materials of construction are formally defined in Evonik / CyPlus’s Engineering Standards and a review of records confirmed that materials used conform to internal requirements. All operations and process equipment are in a closed building or under a roof of an open-air building within lined concrete secondary containment areas with concrete sumps. The production / packaging area has appropriate containment systems that ensure full containment with sufficient capacity in case of a storm event bringing rain water. Alarms and interlock systems keep the production process under control in the event that there is an upset condition or a container that is being loaded becomes full. CyPlus uses management system procedures and standard forms to inspect their interlocks, dust collection systems, process equipment, and containment systems regularly to ensure functionality and integrity.

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

☐ in full compliance with
☐ in substantial compliance with Production Practice 1.2
☐ not in compliance with

Summarize the basis for this Finding:

The facility has a full set of procedures that describe the standard practices necessary for it’s safe and environmentally sound operation, for contingencies during upsets in it’s activities that may result in cyanide exposures or releases. All further work instructions are still maintained, updated and valid. Preventive maintenance programs are in place. The facility runs a procedure for the management of change with a corresponding form sheet. In case of planned changes or planned engineering work /
projects the site management needs to sign it to release the change suggestion. To assure a safe and stable production in-line measurement devices instrumentation such as HCN detectors, transducers, level transmitters etc. are installed. Solid cyanide and cyanide solution is / are recycled within the process and thus do not generate waste. Contaminated solids and other materials are shredded, washed and collected in waste drums which are labeled according to European resp. German law and are transported and disposed by authorized waste-companies. The storage locations are constructed at all sides with full protection against rainfall. Fire fighting with water is prohibited. Inside the building HCN detectors / indicators are in place. The storage of the final goods is located in an outside building, naturally ventilated. The storage area/s are located within an industrial park property, that is –in general- protected by an very restricted access control system. The produced cyanide is packed in packages which are in full compliance with the international regulations for transportation of dangerous goods (e.g. ADR and UN regulations).

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

☐ in full compliance with

☐ This operation is in substantial compliance with Production Practice 1.3

☐ not in compliance with

Summarize the basis for this Finding:

The facility runs routine inspection and maintenance programs to assure the functionality of all equipment. Besides the inspections (required by legislation or by Evonik regulations) for tanks, pipelines, containments, etc. routine inspections are performed regularly by shift leaders and operating personnel throughout the facility. Preventive controls incl. statutory driven controls such as metering the thickness of tank and container surfaces are considered and are part of the maintenance program; inspection plans are determined The performed inspections are sufficient and are in compliance with German/European law. Frequencies are defined by law or by risk assessments the facility conducts a routine inspection program for tanks, valves, pipelines, containments and other cyanide production and storage facilities. In general, these inspections are in accordance to German resp. European regulation and legislation. These requirements are very strict and equivalent or better than expected by the Code; all verified inspections were without any complaint. A Technical Measurement system is in place to deal with deficiencies coming out of inspections or technical checks.

**PRINCIPLE 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.

☐ in full compliance with

☐ This operation is in substantial compliance with Production Practice 2.1

☐ not in compliance with

[Signature: Lead Auditor Dr. Steinweg]  
Audit Date 13.02.2012
Summarize the basis for this Finding:

In accordance to German law the CyPlus organization is enforced to perform a danger and risk analysis in which all relevant aspects regarding safety on work are considered. All working places and all employees such as operational manager, shift leaders or shift-workers have been analyzed. As a result of this analysis, different measures and actions concerning personal protective equipment (PPE), monitoring devices, technical equipments, inspection routines, procedures, instructions, emergency plans, warning signs, medical check-ups were developed and implemented in cooperation with medical experts, doctors and safety engineers. The danger and risk analysis docs are reviewed routinely by an expert team (medical department, safety engineer and plant superintendent), periodically by internal audits or "clean and order" inspections, partially together with the employees. In addition to this analysis job safety analysis is implemented. All workers in the production and storage area have to wear a personnel portable HCN detector. Within these procedures all items of verification protocol chapter 2.1 are taken into account.

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

☐ in full compliance with
☐ in substantial compliance with Production Practice 2.2
☐ not in compliance with

Summarize the basis for this Finding:

The cyanide plant has developed and implemented an operational alarm and emergency response plan in accordance to European Seveso II - regulation and respective German law. This includes the specific conditions and measures in the production plant, e.g. summary of the most important responsibilities for emergency cases, behaviour in case of emergency, cooperation with cyanide squad of the CEFIC organization and the "Mutual Aid Scheme". Antidote management system and handling standard operation procedures are in place. Material Safety Data Sheets (MSDS) are available in German language, e.g. for sodium cyanide bricks and cyanide solution. According to German law additional advices in writing are available on that place where cyanide handling is performed. These advices are basis of routine trainings. First-aid equipment is in place at the plant. The emergency facilities are inspected periodically, records are available and in place. Medical support with all required instruments and equipments is implemented. First aid and emergency response equipment is stored and in maintenance as recommended by the experts (medical doctor, manufacturer). The Evonik medical doctor cooperates with local hospitals and neighboured industry. Beside these activities, in cooperation with Evonik and local fire-brigades mock-drills are conducted routinely on the site. Lessons learned are derived from those drills and the corresponding operating procedures are updated, as required.
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

☐ in substantial compliance with  Production Practice 3.1

☐ not in compliance with

Summarize the basis for this Finding:

The CyPlus production plant at Wesseling has no direct discharge to surface water. Production plants operating on the Evonik site in Wesseling discharge their wastewater in the Evonik infrastructure sewer system. Process wastewater is treated at the on-site wastewater treatment plant. Monitoring and control systems are in place to prevent unplanned spill into the river Rhine. The CN concentrations of the wastewater prior to discharge into the Evonik sewer are determined per titration each 5 to 10 minutes and displayed in the CyPlus control room and also transmitted to the water protection department of Evonik infrastructure service. The measurements show that the free cyanide content before biological treatment is not higher than 20 mg/l (average: 1,2 mg/l). The cyanide content leaving the biological treatment is lower than 0,1 mg/l and meets the requirements. The Evonik defined and operated continuous measurements after final mixing and before discharging to Rhine River show in each case values below 1 ppb CN-free and 0,5 mg / ltr. WAD CN. The groundwater regime is well and continuously investigated due to the submission of an application for groundwater abstraction. CyPlus is following the requirements of an EHS management system according to ISO 14001 and is member of the Responsible Care initiative of the chemical industry. The CyPlus operations are regulated by a number of permits according to the German Federal Air Emission Act, as outlined in the list of permissions.

Generally all filling processes are controlled by suction units in the immediate surrounding of the scales. The emissions are finally treated in a gas scrubber. In the past site management has initiated workplace measurement for CN and NH₃ in order to evaluate the consequences of a proposed decrease of the cyanide limit. Based on a report, it was concluded that current allowable workplace concentrations are met. The site operates in compliance with the permit requirements stipulated for air emissions.

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 minimizes the potential for cyanide exposures and releases.

[Signature]

CyPlus GmbH, Site Wesseling, Germany

Audit Date 13.02.2012
This operation is in full compliance with Production Practice 4.1

Summarize the basis for this Finding:

Based on their professional education, the operating employees are qualified as skilled chemical workers. They went through professional training, especially training-on-the-job mostly for a 3-yrs period and finished their education with an examination that leads to a certified degree by industry and commerce chamber. This education is the basis for the further training concept which is specified to the requirements of the certain function of each employee. One of the many further trainings are basic safety trainings which are enforced by German legislation or which are in accordance to the risk analysis, such as: handling of hazardous materials, usage of PPE, alarm and emergency response plans, emergency drills, cyanide exposures and releases or operating procedures/instructions. These trainings are partially mandatory and have to be repeated annually, held by specially qualified trainers. The trainings are focussing on the specifics of the dangerous materials, e.g. cyanides. A training schedule is maintained, based on requirements of the jobs (taking HAZOP studies into account) and also based on the skills of each individual.

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

This operation is in full compliance with Production Practice 4.2

Summarize the basis for this Finding:

All employees at the CyPlus plant undergo periodical training lessons regarding safety issues when cyanide handling occurs. This includes potential exposures and releases. The training contents are mostly an outcome of the Emergency Response Plan. The risk scenarios (PAAG assessments) are practised by routine drills. Corrective actions are derived, defined and realized. The acting people of the CyPlus plant are involved throughout the complete mock drill activities to improve their skills and to optimise their awareness. Following the specific requirements of ISO 9001 ch. 6.2 resp. ISO 14001 ch. 4.4.2 the trainings are documented as required: to be traced back personally to each individual, covering the subjects trainer, topic, date, duration and kind of verification of understanding resp. effectiveness.

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.

CyPlus GmbH, Site Wesseling, Germany

Audit Date 13.02.2012

(Signature Lead Auditor Dr. Steinweg)
This operation is ☑ in full compliance with Production Practice 5.1
☐ in substantial compliance with
☐ not in compliance with

Summarize the basis for this Finding:

All relevant and potential failure scenarios are regulated through both emergency response plans: the plan from CyPlus and the plan from Evonik, the operator of the industrial park at the Wesseling, Germany site. Both work together in a handshake system, crisis and emergency response management is regulated in detail. The local emergency responders such as fire brigade and medical doctors are involved in the process of developing these Emergency Response Plans. Objectives and contents of the ERP are defined and described. In all emergency situations the central fire-brigade and the medical station are alarmed; they are present on site within a few minutes in order to control releases, to extinguish fires, to give first aid measures and cyanide antidotes.

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

This operation is ☑ in full compliance with Production Practice 5.2
☐ in substantial compliance with
☐ not in compliance with

Summarize the basis for this Finding:

In addition to the ERP regulation a documentation and an emergency response system is in place to respond to transport accidents with cyanides within Europe. This system, the Alkali Cyanide Mutual Aid Scheme (MAS), was initiated by CEFIC and the cyanide production of CyPlus Wesseling is participating. In accordance to the Seveso guidelines all companies at the Evonik Wesseling site are obliged to inform the neighbourhood on potential hazards, emissions and other safety risks. The companies involved meet periodically for a so called “Domino” meeting. Especially the risks resulting from cyanide releases are obligate part of these evaluations. Beside this, potentially affected communities such as local government and environmental authorities, the mayor, fire-brigades, police or hospitals are involved and well informed about the nature of the risks of the cyanide production facility. The ERP contains a list of the industrial neighbours which may be affected in case of cyanide release. Their activities, addresses, contact dates and contact names are listed. Some communication activities with interested parties and stakeholders are initiated to assure that the relevant information and updates concerning the actuality of emergency response plans are addressed. Among others the regular “Domino” meeting is a main driver for spreading the correct and actual information to the relevant parties.

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

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

CyPlus GmbH, Site Wesseling, Germany

(Signature lead Auditor Dr. Steinweg)  
Audit Date 13.02.2012
Summarize the basis for this Finding:

Crisis and emergency response management is clearly defined and trained. The ERPs are the core documents to describe the relevant activities in case of incidents. Parts of these documents are the determination of tasks and responsibilities and the description of certain functions such as security personnel, fire-brigade, medical department, 24-hour-standby duty service team or site crisis team. The specific members of these teams are named, listed and kept up to date. The responsible coordinators and functional leaders are defined as well, e.g. the Wesseling site manager and his backup, the chief emergency response coordinator, the head of the fire-brigade or the communication manager. Call-out procedures are included and 24-hour contact information for the response team members is ensured. Alert chains and internal / external reporting lines are implemented. According to the ERP and to detailed procedures appropriate trainings for the staff of the fire-brigade are exercised routinely; the crisis team meets for training reasons at least once per year. All emergency respond equipment including it’s inspection is listed in corresponding work instructions as a part of the EHS management system. The cooperation with outside responders is also part of the ERP; telephone numbers, addresses and contact persons (includes internal contacts and external contacts such as authorities, police, neighboured companies, public institutions, transport companies, hospitals and medical support, public media such as local radio stations, press...) are listed and kept up to date. In addition to the ERP regulation a documentation and an emergency response system is in place to respond to transport accidents with cyanides within Europe.

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

☒ in full compliance with
☐ in substantial compliance with Production Practice 5.4
☐ not in compliance with

Summarize the basis for this Finding:

According to the Seveso guidelines all companies on Evonik Wesseling site are obliged to inform the neighbourhood on potential hazards, emissions and other safety risks by a defined broshure that contains assignments and directions for behaviour in case of emergency in detail. The companies involved meet periodically for a so called "Domino" meeting. The Seveso guideline also regulates the involvement of neighbouring communities in permitting issues and potential risk information. That means that all interested parties are allowed to read the official safety report of the cyanide plant. In all cases the public relations department of the site services at the Wesseling site is involved in the external communication processes.

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

☒ in full compliance with
☐ in substantial compliance with Production Practice 5.5
☐ not in compliance with

CyPlus GmbH, Site Wesseling, Germany

(Signature Lead Auditor Dr. Steinweg)  
Audit Date 13.02.2012
Summarize the basis for this Finding:

Both emergency response plans -the plan from CyPlus and the plan from Evonik- include remediation measures as integrated requirements; at Wesseling site these activities are accompanied by the analytical lab and, in case of spillage, by the mobile environmental lab. Evonik is qualified and certified according to technical standards (external validation). If necessary, specific activities will be realized in relation to the environmental impacts. The use of chemicals is regulated in the procedures, sodium hypochlorite, ferrous sulfate or hydrogen peroxide treatment of cyanide that has been released into surface water is prohibited. Furthermore, if negative environmental impact may occur from cyanide accidents, monitoring instruments, methods, parameters and locations have to be identified to check the current situation and to figure out an appropriate action plan for remediation activities.

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

☑ in full compliance with

This operation is □ in substantial compliance with  Production Practice 5.6
☑ not in compliance with

Summarize the basis for this Finding:

The routine and the non-routine process for plan reviewing procedure is described in the different emergency response plans. Intensive and routinely performed mock emergency drills have been conducted with all necessary resp. interested parties as described in the previous chapters of this report. Resulting findings and room for improvement analysis are part of systematic evaluation process of the emergency response plans. This is the basis for the continuous improvement of the safety and security situation at the CyPlus site within the industrial park in Wesseling.