INTERNATIONAL CYANIDE MANAGEMENT INSTITUTE

Cyanide Production Summary Audit Report

For the International Cyanide Management Code

TaeKwang Industrial Co., Ltd. Petrochemical Plant #3

21 July 2020

TaeKwang Industrial Co., Ltd. Petrochemical Plant #3

Name of Cyanide Production Facility	**TaeKwang Industrial Co., Ltd. Petrochemical Plant #3**
Name of Facility Owner	**TaeKwang Industrial Co., Ltd.**
Name of Facility Operator	**Mr. Young-Taek Woo**
Name of Responsible Manager	**Mr. Jang-Soo Seo / Safety Team Leader**
Address	**68 Bugok-ro, Nam-gu,**
State/Province	**Ulsan-city, 44785**
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Location detail and description of operation:

TaeKwang Industrial Co., Ltd. has plant in Petrochemical Complex in Ulsan Metropolitan City an industrial city located in southern part of South Korea. The sodium cyanide plant of TaeKwang Industrial Co., Ltd. was constructed during 1996 year and started production at April 1997. The production capacity of solid sodium cyanide is about 63,000 tons per year.
The briquette type solid sodium cyanide is produced from sodium hydroxide and hydrogen cyanide. The hydrogen cyanide is produced as by-product from acrylonitrile plant operated within same plant area. The solid sodium cyanide is packaged into wooden box or steel drum and exported to gold mining located in overseas area.
TaeKwang Industrial Co., Ltd. was initially International Cyanide Management Code (Herein after ICMC) certified during April 2008 and recertified during May 2011, May 2014 and June 2017. Almost 3 years were elapsed since the last ICMC recertification, so forth recertification audit is needed during this time.
The recertification audit was performed during May 2020. There has been no accident and incident related to environment, health and safety in TaeKwang Industrial Co., Ltd.'s operations of sodium cyanide production, packaging and dispatch since June 2017 when they ICMC recertified lastly until now May 2020.

Auditor's Findings

This operation is

X in full compliance
in substantial compliance *(see below) with the International Cyanide Management Code.
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 years audit cycle.

Audit Company : 3Points Co., Ltd.
Audit Team Leader : Mr. Sang Ho Ahn
E-mail : triplepoint@naver.com
Dates of Recertification Audit : 04, 07 and 08 May 2020

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.

During this recertification audit, I confirmed that the TaeKwang Industrial Co., Ltd. have not experienced any significant cyanide incident or compliance problem during the previous three-year audit cycle.

TaeKwang Industrial Co., Ltd. Petrochemical Plant #3	S.H Ahn	21 July 2020
Name of Production Facility	Lead Auditor Signature	Date

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

Production Practice1.1: Design and construct cyanide production facilities consistent with sound, accepted engineering practices and quality control/quality assurance procedures.

The operation is	**X in full compliance with**	Production Practice 1.1
	in substantial compliance with	
	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The sodium cyanide plant of TaeKwang Industrial Co., Ltd. was constructed during 1996 and started operation at April 1997. Before the construction, facility and piping material were tested by suppliers. The construction company implemented test and inspection according to quality plan and submit the results to technical team and supervising agency. Technical team and supervising agency reviewed the result reports and concluded that facilities were established according to drawing and specification. The cyanide process has received the PSM (Process Safety Management) inspection by KOSHA (Korea Occupational Safety & Health Agency) and Ministry of Labor every four year according to Korea legal requirement. According to the inspection reports from KOSHA, TaeKwang Industrial Co., Ltd. continued operation within established parameters and protection against cyanide exposure and release. Records related to quality control and assurance inspection were maintained. And also the materials used for construction are compatible with hydrogen cyanide, liquid sodium cyanide and other reagents. Emergency shut down system and automatic interlock system were applied to control the shut-down of production system and prevent release due to power outage or equipment failures.
To prevent cyanide seepage to subsurface, all cyanide process facilities including condensation, reaction, centrifuge, drier, packaging, storage and pipeline were established and controlled on concrete. Level gauge and alarm system were installed to cyanide process and storage vessels to prevent overfilling and overflow. Secondary containment and dikes were installed enough to contain spilled cyanide solution. And also pipelines were covered by outer piping to prevent spillage of cyanide solution.
Since the last recertification audit during 2017, there were several light facility changes including separation of oil drain line for centrifuge and line installation to increase of washing efficiency for crystallization. Those facility changes were completed under the change control procedure. For each case, change control committee was opened. The change control committee checked quality, environmental and safety issues and finally the changes were approved by technical teal leader and plant manager. After the facility changes, technical team inspected the changed facility, revised operation manual, trained operators and maintained inspection reports and training records. The quality control and quality assurance records including test and inspection reports from engineering and construction company and review results by technical team were maintained. And also records generated from change control committee, test and inspection reports from external agency were maintained according to record control procedure.

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

	X in full compliance with	
The operation is	in substantial compliance with	Production Practice 1.2
	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The production team has established and maintained process operation manual in which standard practices such as operational criteria for pressure, temperature and flow were defined. And also they have maintained start-up and shut down manual and packaging procedure. The maintenance team and safety team have maintained maintenance procedure and emergency response manual to assure safe and sound process operation.
They also have established and maintained emergency response plans to control the possible emergency cases such as spillage, hydrogen cyanide leakage, fire, explosion and human cyanide exposure. They have tested the emergency response plans periodically. They established and maintained change control procedure in which identification and control of change as the review of any process change or modification by change control committee including safety and environmental personnel, prior to sign-off any implementation of proposed changes and modification were defined.
Maintenance team established and implemented preventive maintenance program.
Main process parameters as flow rate, temperature and level were monitored by DCS (Distributed Control System) and monitoring equipment was calibrated according to calibration procedure. During the calibration, the maintenance team have checked and followed the calibration method and period defined in the manual from manufacture of instrument.
Cyanide solution and cyanide contaminated water has been treated in waste water treatment facility and prevented unauthorized and unregulated discharge according to waste control procedure. According to the waste control procedure, the cyanide solution and cyanide contaminated water collected in secondary containment in the event of emergency as process trouble and heavy rain shall be treated in waste water treatment facility. The solid waste was collected and dispatched to qualified sub-contractor according to waste control procedure.
The cyanide contaminated solid waste was incinerated by waste sub-contractor. The waste control procedure also defined the management and disposal of cyanide contaminated solid waste including collection, segregation, dispatch to qualified waste sub-contractor, on-site check of waste sub-contractor and recording the results of cyanide contaminated waste disposal.
The cyanide products were filled and packed in wooden box or steel drum and stored in warehouse in which ventilation fans were installed and operated to prevent exposure of moisture. The ventilation fans served to prevent the build-up of hydrogen cyanide gas. The cyanide products were packaged according to packaging procedure in which the IMDG (International Maritime Dangerous Goods) code reflected. The public is strictly prohibited to enter the warehouse without special acceptance. The warehouse is monitored by CCTV.

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

X in full compliance with

The operation is in substantial compliance with Production Practice 1.3
not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

The main facilities including reactor, tank, valve and pipeline were inspected periodically according to self-inspection procedure. And also detail inspections were implemented by special inspection contractors every five years. The secondary containments, were checked to find out deterioration and leakage were checked and results were recorded daily by production team and weekly by safety team. Inspection frequency for reactor, tank and pipeline was defined from the decision of critical item control rule according to self-inspection procedure and maintenance procedure.
The inspection frequency for reactor, tanks and pipeline was determined and defined in self-inspection procedure, maintenance procedure and facility significance grade control procedure. Recently there was no severe incident and accident related to equipment failure. The current frequency of preventive maintenance and inspection were properly established and sufficient to prevent failure, incident and accident. Inspection results including inspection date, inspector and deficiency were recorded. And also corrective actions for identified deficiency were implemented according to corrective and preventive action procedure.

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.

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

Summarize the basis for this Finding/Deficiencies Identified:

Since initial certification during 2008 year, TaeKwang Industrial Co., Ltd. have established and implemented safety and health control procedure and PPE control procedure. Employee, visitor and contractor were protected from exposure of cyanide during normal, abnormal and emergency operation, maintenance and overhaul activities according to safety and health control procedure and PPE control procedure. And also each team have developed and maintained work instructions including detail control and handling method of sodium cyanide and hydrogen cyanide for processes including raw material control, production, packing and shipping. They have developed and maintained work permit procedure for out-sourced repair works and maintenance works. In the work permit procedure, the detail steps of decontamination of equipment which has been contact with cyanide prior to repair works and maintenance were defined. Training for precaution and handling of cyanide have been implemented before repair and maintenance works and PPE wearing are mandatory for workers according to work permit procedure.
According to change control procedure, they have reviewed facility and operational changes for their impacts on employee health and safety. And necessary measures and pre-requisite

requirements to control the risk from changes were identified and applied to change works. Employee have participated safety committee to develop health and safety procedures. Working environment was inspected by external agency twice per year for such items as the concentration of hydrogen cyanide and sodium cyanide dust. The inspection results of hydrogen cyanide and sodium cyanide dust were usually complied with ICMC and Korea legal requirement. They also used monitoring device to detect the leakage of hydrogen cyanide. The production team and safety team have set the alarm levels for fixed and portable hydrogen cyanide monitoring devices. For the cases of hydrogen cyanide gas triggers the alarms, the safety team and production team have informed to relevant employee to escape, checked the cause of triggers of alarm and announced emergency if needed according to safety and health control procedure.
The fixed monitoring equipment and portable detectors for hydrogen cyanide were calibrated every year. Employee, contractor and visitor shall wear clothing provided by safety team and exchanged clothing when they are leaving cyanide process according to safety and health control procedure. They identified areas and activities where workers can be exposed to cyanide and maintained warning signs of cyanide presence. Employee, visitor and contractor were required to wear PPE and prohibited from smoking, eating, drinking in those potential cyanide contamination areas such as process and packaging areas. They maintained buddy system for dangerous works as patrol, maintenance and repair works. During those works, employee and contractor use mobile phone and radio to request assistant for the case of emergency situation. Employee receives health check every year. And according to health check results, fitness of employee to perform their tasks were determined and follow up action implemented.

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

The operation is	**X in full compliance with**	Production Practice 2.2
	in substantial compliance with	
	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

TaeKwang Industrial Co., Ltd. have maintained emergency response plan development procedure. According to the procedure, they have developed and maintained detail emergency response plans including emergency response plans for leakage of toxic gas, spillage of sodium cyanide and humane exposure. First aid equipment such as water shower and eye-wash stations, air guns and fire extinguishers were maintained in process and packaging areas. First aid kits such as drinking water, saline water, oxygen mask, resuscitator and nithiodote type antidote were maintained in cabinets installed in safety team office, process control room and product packaging areas. Safety team have inspected the first aid equipment and kits by monthly basis and replaced the equipment and kits not effective any more according to safety and health control procedure. They maintained the MSDS, first aid procedure, emergency plans and cyanide handling method written in Korean in relevant areas. The storage tanks, containers and pipe line containing cyanide were identified by material name, MSDS and warning signal. And cyanide flow directions were identified by arrow mark in pipe line. They have established and implemented basic safety procedure to control the entrance and leaving from process area. According to the procedure, employee, contractor and visitor shall exchange clothing before leaving the process. They have employed nurse and maintained first aid kits in plant. They nominated JungAng Hospital in Ulsan city and informed about potential need to treat employee exposed to cyanide. The JungAng Hospital understands TaeKwang Industrial Co., Ltd. situation

and nominated staff ready for emergency situation. Emergency plans of cyanide exposure cases were tested every year and the result and lesson were reflected revised plans. They established and maintained incident evaluation procedure in which detail investigation and evaluation for cyanide exposure incidents were defined. Since the last recertification audit during 2017 until now May 2020, cyanide exposure incident has not been occurred in the plant.

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.

The operation is	**X in full compliance with**	Production Practice 3.1
	in substantial compliance with	
	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

Waste water from process was treated in waste water treatment facility and then discharged to Yongyeon final waste water treatment facility operated by Ulsan Metropolitan City. Monitoring results of discharged from in-house waste water treatment facility showed the cyanide concentration range was 0.10 mg/l to 0.20 mg/l WAD cyanide during 2017 to 2020 year and comply with ICMC requirement and Korea legal requirements. The discharged water is mixed and diluted in Yongyeon final waste water treatment facility, so the cyanide concentration is far below the 0.022mg/l. TaeKwang Industrial Co., Ltd. do not need to monitor the free cyanide concentration in mixing zone, because the final waste water treatment facility has been operated by Ulsan Metropolitan City. TaeKwang Industrial Co., Ltd. do not discharge to surface water as all cyanide process were covered by dike and spilled cyanide, chemical and rain water were collected and dispatched to waste water treatment facility in the plant. The secondary waste water tank was installed to collect rain water poured into process areas. The capacity of secondary waste water tank is enough to collect initial rain water poured into cyanide process areas.
In Ulsan Metropolitan City, there is no designated beneficial use of ground water, no regulatory requirement of compliance and no actual beneficial use of the ground water. So they do not monitor the quality of ground water. Only they have conducted the monitoring of land contamination to preserve land and soil. The result of recent test was that the cyanide was not detected. They limited the hydrogen cyanide gas emissions maximum 5.0 ppm according to Korean legal requirement to protect the health of employee and local community. Monitoring result of hydrogen cyanide concentration was 0.1 ppm to 0.2 ppm during 2017 to 2020. Monitoring frequency for air emission of hydrogen cyanide and water discharge was defined in air emission control procedure and implemented according to Korea legal requirements.
TaeKwang Industrial Co., Ltd. has analyzed weekly base the cyanide concentration of upgradient surface water and soil and downgradient the outlet of rainwater discharged. Recently the cyanide was not detected in surface water, soil at plant site and discharged rainwater.
The environmental monitoring frequencies were adequate to identify changes in a timely manner. With the analysis of monitoring results, they can identify the process change, incident and implement required corrective action.

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.

The operation is.	..... **X in full compliance with**	
	in substantial compliance with	Production Practice 4.1
.	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

Since 2008 year, TaeKwang Industrial Co., Ltd. have established and implemented safety training procedure. Their training procedure and program were established effectively to meet the legal requirements and international standards including this ICMC code.
According to the safety training procedure and annual training plan, the safety team and each team provide 2 hours safety training to employee in sodium cyanide process, packaging area, maintenance and utility every month for cyanide hazard issues including MSDS, emergency response plan, PPE usage and maintained records as required by Korea Occupational Safety and Health Act.
The safety team has implemented the health and safety training for overall employees in the plant. And also each team employees need to receive training related to safety working method and standard operation procedures by each team leader or supervisors. Emergency plans and scenarios have been prepared and reviewed through mock emergency drills conducted as planned interval. The responsibility and authority in emergency situation for the case of cyanide release were trained to existing and new employees regularly.
The responsibility, authority and detail control method for each job such as production work, maintenance activities, packing, logistics, transportation and other administration activities are described in the training material and standard operation procedures. Related to the control of main processes in plant, the standard operation procedures were consisted of seven parts applicable to reactor area, crystallizer area, solid area, packaging area, waste water treatment area, unloading area and others. The standard operation procedures were used as training materials for new and existing employees.
The trainings have been provided by team manager, safety team leader and members qualified according to training procedure. Team managers conducting the training have knowledge related to cyanide-related tasks of employees as they received annual supervisor training in which detail cyanide property, risk and control method were included and familiar with tasks of employees in their team. Safety team members conducting training have knowledge related to cyanide as they already received special safety training related to cyanide and participated to safety system set up and implementation.
Training effectiveness has been evaluated every six months by testing and observation. The evaluation results are reflected on training plan. And also all new employees prior to perform their job should be trained on safety and health for 16 hours at the time of joining the plant and for regular training according to yearly training plan thereafter.

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

.....	**X in full compliance with**	
The operation is.	in substantial compliance with	Production Practice 4.2
.	not in compliance with	
.	not subject to	

Summarize the basis for this Finding/Deficiencies Identified:

Since 2008 year, TaeKwang Industrial Co., Ltd. have prepared and implemented training plans including the emergency response plans for cyanide release and exposure. According to the safety training procedure and annual training plan, safety team, production team and each relevant team have provided training for all employees related to the emergency response procedure for cyanide release and exposure. All employees are aware of the emergency response actions against cyanide exposures and releases through repeated training and mock emergency drills. Mock emergency drills are regularly conducted to ensure that the employees are familiar with emergency response plans, duties and roles. The results of the mock emergency drills are evaluated with checklist. The emergency response plans are updated timely and any area need for improvement found was improved. The results of training and emergency mock drills are recorded.

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.

.....	**X in full compliance with**	
The operation is.	in substantial compliance with	Production Practice 5.1
.	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

Since 2008 year, TaeKwang Industrial Co., Ltd. have prepared and maintained emergency response manual and several detail emergency response plans to response emergency cases including cyanide release and human exposure. Response process for workers and company were reflected to emergency response manual and plans considering potential cases as catastrophic release of hydrogen cyanide, releases during loading and dissolution operations, releases during fires and explosions, pipe and tank ruptures, power outages and equipment failures, overtopping of waste water pond and waste treatment facilities. Detail methods to control the release, containment, mitigation and future prevention including cyanide supply shut down, prevention of cyanide spread, collection of spilled cyanide and preventive action were defined in emergency response plans.
Communication system and pager system for evacuation were installed in the plant and safety team has checked the monitoring and communication system status regularly.

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First aid kits were maintained in the plant. And regular training for the using of first aid kits has been provided to all employees during safety training, emergency response training and mock emergency drill. All equipment and utility was installed to prevent cyanide release from the source. And also leakage detection of hydrogen cyanide and alarm systems were designed and installed effectively. The safety team and production team implemented drill for the emergency plan for containment, mitigation and future prevention cooperatively. They reviewed the result of each drill and update the emergency response plans and relevant standard operation procedures.

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

	..... **X in full compliance with**	
The operation is.	in substantial compliance with	Production Practice 5.2
.	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

Since 2008 year, TaeKwang Industrial Co., Ltd. have developed and maintained emergency response manual and emergency communication channels. The emergency response manual and communication channels considered not only their workforce in the plant but also those related and concerned with the plant. They have prepared and established emergency communication channels to contact nearby plants at the Ulsan Chemical Complex and potentially affected communities. Communities such as local government office, fire agency, broadcasting station, police, Environment Management Agency and hospitals were included and they have communicated information of the risks related to the cyanide production, release and exposure. They engaged in regular consultation and communication with relevant stakeholders.

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

	..... **X in full compliance with**	
The operation is.	in substantial compliance with	Production Practice 5.3
.	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

TaeKwang Industrial Co., Ltd. have nominated safety team leader as primary emergency response coordinator, technical team leader as alternative emergency response coordinator and plant manager as total supervisor. In emergency response manual and plans, the emergency response organization was consisted of communication team, personnel rescue team, excavation leading team and facility control team. Detail training such as personnel rescue, lead excavation and facility control were required and provided to emergency responders. And also safety team tested the call-out response and feedback the results to responders. The list of emergency response equipment was defined in emergency response plans and maintained in each relevant team. Emergency rescue equipment such as PPE including toxic gas mask, glove and antidote were maintained in each relevant team. And all emergency response equipment inspected and

tested regularly by safety team to ensure availability during emergency situation. The role, responsibility and detail communication channel for outside responders and communities such as fire agency, Ulsan Chemical Complex safety manager committee, Ulsan city, nearby companies and hospitals were defined in emergency plans. And also the outside entities have participated in the mock emergency drills.

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

	..... **X in full compliance with**	
The operation is.	in substantial compliance with	Production Practice 5.4
.	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

TaeKwang Industrial Co., Ltd. have defined the emergency communication channel, communication method and contact information in emergency response manual and plans. In internal communication channel, the contact information as telephone number etc. for top management, plant manager, each team leader and safety team members were identified. In external communication channel, regulatory agencies such as Ulsan Municipal Office, Korea Safety and Health Agency, labor office and outside response providers such as fire agency, nearby plants and hospitals were identified. And through emergency simulation test, they identified potentially affected communities as nearby companies and plants. The communication methods and contact information such as telephone, mobile phone etc. for relevant personnel of outside responders and potentially affected communities were identified and reflected to emergency response manual and channel. They informed the possibility of cyanide accident, hazard and risk to nearby companies and plants.

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

	..... **X in full compliance with**	
The operation is.	in substantial compliance with	Production Practice 5.5
.	not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

TaeKwang Industrial Co., Ltd. have established emergency response manual and toxic chemical neutralization plan. The remediation methods as neutralization, decontamination, control of contaminated material and supply of alternative drinking water were defined in the manual and plan. According to the toxic chemical neutralization plan, the contaminated soil and debris were washed by water. And the cleaning water was dispatched to waste water treatment facility in their plant. The cleaning water was sampled and tested for WAD cyanide concentration. Final concentration of cleaning water 0.1 mg/l WAD cyanide will be allowed in residual soil and

debris as evidence that the release has been completely cleaned up. According to the toxic chemical neutralization plan, the remediation of contaminated soil can be conducted by only professional agency approved by government. Since the plant started the production during April 1997, there was no actual soil contamination needed the remediation work by professional agency.
The toxic chemical neutralization plan defined that sodium hypochlorite, ferrous sulfate and hydrogen peroxide shall not be used to treat and neutralize the cyanide released into surface water. They also have established the environmental monitoring for emergency release to identify the extent and effect of release, sampling methods, parameter and possible location in the emergency response manual and plans.

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

The operation is.	..... **X in full compliance with** in substantial compliance with not in compliance with	Production Practice 5.6

Summarize the basis for this Finding/Deficiencies Identified:

Taekwang Industrial Co., Ltd. have conducted emergency response mock drills every year. August and October 2019, mock drills were implemented by safety team and production team. During the mock drills conducted by safety team and production team, both cyanide release and cyanide exposure incidents were simulated.
And the emergency response plans were reviewed and evaluated for their appropriateness and revised as needed. According to emergency response manual, emergency response plans shall be evaluated their appropriateness after the actual emergency situation and also the plans are revised as needed. Actual emergency situation requiring the plans has not been occurred since last recertification audit and the plant operation.