(전화) 268-4410 (팩스) 268-4407

Registered No. 2008-1168



# NOTARIAL CERTIFICATE

Bong-Mook Yoo the Notary Public Ulsan District Prosecutor's Office

583-6, Ok-Dong, Nam-Gu, Ulsan, Korea



Name of Cyanide Production Facility: TAEKWANG Ind., Co., Ltd.

PETROCHEM #3 Plant

Name of Facility Owner TAEKWANG Ind., Co., Ltd.

Name of Facility Operator YONG HAK, SHIN

Name of Responsible Manager : Mr. Jang-Su Seo

Address 88 Bukokdong, Namgu

State/Province Ulsan city

Country South Korea

Telephone 82-52-259-9691

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E-Mail js8316@lycos.co.kr

#### Description of operation:

The PETROCHEM #3 plant of TAEKWANG Ind. Co., Ltd. ("TAEKWANG") is located at the Ulsan Petrochemical Industry Complex. The whole area covered by TAEKWANG is 89,570 m', with its cyanide production facilities (inclusive of subsidiary facilities) accounting for 7,000 mt. The cyanide factory includes all facilities related to production, storage, and consignment. The cyanide produced by TAEKWANG is sodium cyanide used for gold mining. This sodium cyanide is produced using the hydrogen cyanide (HCN) generated from the acrylonitrile process as raw material. The product is available in briquette form. TAEKWANG employs total 118 staff in its production facility. The utilities used at the TAEKWANG plant, i.e. electricity, water, etc., are being provided by the petrochemical support center. TAEKWANG established and maintained safety and environmental policy and procedures with the reflection of Korean laws such as Industrial safety & health Act & Environmental Act. Those are strictly controlled by the relevant supervisory authority because the plant is located at the petrochemical industry complex.

TAEKWANG Inc. Co., Ltd.

PETROCHEM # 3 Plant

Name of Facility

Team Leader

Team Member

#### Auditor's Finding

This operation is

X in full compliance in substantial compliance \*(see below) not in compliance

with the International Cyanide Management Code.

\* 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: BSI Korea

Audit Team Leader: S H Ahn E-mail: <u>sangho.ahn@bsi-global.com</u>
Audit Team Member: C S Chang E-mail: <u>cheolsoon.jang@bsi-global.com</u>

Names and Signatures of Other Auditors: n/a

Date(s) of Audit: 05~06 Dec. 2007

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.

TAEKWANG Inc. Co., Ltd.

PETROCHEM # 3 Plant

Name of Facility

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Team Member

12 March 2008

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. X in full compliance with The operation is ☐ in substantial compliance with Production Practice 1.1 □ not in compliance with Summarize the basis for this Finding/Deficiencies Identified: The plant was constructed during 1996 and operated at April 1997. Before the construction, facility & piping material were tested by competent suppliers. The construction company implemented test and inspection according to quality plan and submit the results to technical team & supervising agency. Technical team & supervising agency reviewed the result reports and concluded that facilities were established according to drawing & specification. The cyanide process has receive the PSM(Process Safety Management) inspection by KOSHA (Korea Safety & Health Agency) & labor agency every year by Korea legal requirement. According to the inspection reports from KOSHA, TAEKWANG Ind. Co., Ltd. continued operation within established parameters and protection against cyanide exposure and release. Inspection records related to QA/QC & inspection were maintained. And also the materials used for construction are compatible with hydrogen cyanide, liquid NaCN and other reagents. ESD(Emergency Shut Down) system and automatic interlock system were established to shut down 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 applied to cyanide process and storage vessels to prevent overfilling & overflow. Secondary containment and dikes were installed enough to contain spilled cyanide & cyanide solution. And also cyanide solution pipelines were covered by outer piping to prevent spillage of cyanide solution. 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 ☐ in substantial compliance with Production Practice 1.2 The operation is  $\square$  not in compliance with Summarize the basis for this Finding/Deficiencies Identified: TAEKWANG Inc. Co., Ltd.

Team Member

Team Leader

PETROCHEM # 3 Plant Name of Facility

2 March 2008

Production Team & Safety Team have established and maintained process operation manual in which standard practices such as operational criteria for pressure, temperature and flow were defined. And also they maintained start-up & shut down manual, preventive maintenance procedure and emergency preparedness to assure safe and sound process operation. And also they established and maintained emergency preparedness plan to control the possible emergency situations such as spillage, HCN leakage, fire & explosion and cyanide exposure. They also tested those emergency preparedness periodically.

TAEKWANG established and maintained change control procedure in which identification and control of change were defined. Facility technical team established and implemented preventive maintenance program.

Main process parameters as flow rate, temperature and level were monitored by DCS and monitoring equipment was calibrated according to calibration procedure. Cyanide solution and cyanide contaminated water shall be treated in WWT and prevented unauthorized/unregulated discharge according to waste control procedure. The solid waste were collected and dispatched to qualified sub-contractor according to waste control procedure.

The cyanide products were filled and packed in drum and wooden box and stored in warehouse in which ventilation fans were installed and operated to prevent exposure of moisture according to packaging procedure in which the IMDG(International Maritime Dangerous Goods) code reflected. And also public can not 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.

The operation is	X in full compliance with  ☐ in substantial compliance with ☐ not in compliance with	Production Practice 1
•	☐ not in compliance with	

Summarize the basis for this Finding/Deficiencies Identified:

The main facilities including reactor, tank, valve & pipeline were inspected periodically according to self inspection procedure. And also detail inspections were implemented by special inspection contractors every 5 years. The secondary containments and deterioration and leakage were checked and results were recorded daily by production team and safety team. Inspection frequency for reactor, tank etc. was defined from the decision of critical item control rule according to self inspection procedure and maintenance procedure. Inspection results including inspection date, inspector and deficiency were recorded. And also corrective actions for identified deficiency were implemented according to corrective action procedure.

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

TAEKWANG Inc. Co., Ltd. PETROCHEM # 3 Plant\_ Name of Facility

2 March 2008 Date

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

X in full compliance with

The operation is  $\Box$  in substantial compliance with

Production Practice 2.1

□ not in compliance with

Summarize the basis for this Finding/Deficiencies Identified:

TAEKWANG employee, visitor and contractor were protected from exposure of cyanide during normal, abnormal & emergency operation, maintenance and overhaul activities according to safety control procedure and PPE control procedure. And also each team develop & maintain work instructions for processes including raw material control, production, packing & shipping in those work instructions detail control & handling method of cyanide defined. TAEKWANG Ind. Co., Ltd develop & maintain work permit procedure for out-sourced repair & maintenance works. Training for precaution & handling of cyanide shall be implemented before

maintenance works. Training for precaution & handling of cyanide shall be implemented before repair & maintenance works and pre-action & PPE wearing are mandatory for workers according to work permit procedure.

TAEKWANG review operational changes and modifications for their impacts on employee health and safety.

TAEKWANG employee participate safety committee to develop health and safety procedures. Working environment was inspected by sub contractor twice per year for such items as the concentration of hydrogen cyanide, dust & etc. The inspection result of NaCN etc. were usually "non-detected" comply with ICMC and legal requirement. TAEKWANG also use monitoring device to detect the leakage of hydrogen cyanide. The fixed monitoring equipment and portable detectors for hydrogen cyanide were calibrated every year.

Employee, contractor & visitor shall wear clothing provided by TAEKWANG and exchange when they are leaving cyanide process according to safety & health procedure.

TAEKWANG 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.

TAEKWANG maintained buddy system for dangerous works as patrol, maintenance and repair works. And also during those works, employee and contractor use 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.

TAEKWANG Inc. Co., Ltd.

PETROCHEM # 3 Plant

Name of Facility

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Team Leader

Team Member

42 March 200

The operation is	X in full compliance wit  ☐ in substantial complia  ☐ not in compliance wit	nce with	Production Pra	actice 2.2
Summarize the basis for this Finding/Deficiencies Identified:  TAEKWANG has developed and maintained self prevention plan in which detail emergency preparedness including cyanide exposure case were defined.  First aid equipment such as low pressure eye wash station, air shower and fire extinguisher were maintained in process and packaging areas. First aid kits such as water, oxygen, resuscitator and antidote were maintained in cabinets installed in process area and office. Safety team inspected the first aid equipment & kits by monthly basis and replaced the equipment & kits not effective any more according to safety procedure. TAEKWANG maintained the MSDS, first aid procedure, emergency plan and cyanide handling method written in Korean in process and control room area. 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. TAEKWANG implemented control procedure for entrance and leaving from process area. According to that procedure, employee, contractor and visitor shall exchange clothing and pass the air shower before leaving the process.  TAEKWANG employed nurse and maintained first aid kits and ambulance in plant. TAEKWANG nominated Good Morning Hospital in Ulsan city and informed about potential need to treat employee exposed to cyanide. The Good Morning Hospital understand TAEKWANG' 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. TAEKWANG established and maintained incident evaluation procedure in which detail investigation and evaluation for cyanide exposure incidents were defined.				
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 wit  ☐ in substantial complia  ☐ not in compliance wit	nce with	Production Pra	actice 3.1
Summarize the basis for the Waste water from was trooperated by Ulsan Metrop TAEKWANG Inc. Co., Lapetrochem # 3 Plant Name of Facility	eated in in-house WWT a politan City. Monitoring r	and then disc esults of final	l discharged wa	

maximum cyanide concentration is 0.4ppm and comply with Code's requirement and Korea legal requirements. The discharged water is mixed and diluted in Yongyeon WWT, so the cyanide concentration is far below the 0.022mg/l. TAEKWANG do not need to monitor the free cyanide concentration in mixing zone, because the WWT is operated by Ulsan Metropolitan city. TAEKWANG do not have indirect discharge to surface water. Because all cyanide process were covered by dike and spilled cyanide, chemical & rain water were collected and dispatched to WWT. The capacity of secondary tank is enough to collect initial water poured into cyanide process area. TAEKWANG Plant is in Ulsan city. In Ulsan city, there is no designated beneficial use of ground water, no regulatory point of compliance and no actual beneficial use of the ground water. So TAEKWANG do not monitor the quality of ground water. Only conduct the monitoring of land contamination biannually to preserve land & soil. The result of recent test implemented during September 2006. The result was that the cyanide was not detected.

TAEKWANG limited the hydrogen cyanide gas emissions maximum 10ppm according to Korean legal requirement to protect the health of employee and local community. Monitoring result of hydrogen cyanide concentration is 0.575ppm.

Monitoring frequency for air emission of hydrogen cyanide and water discharge was defined according to Korea legal requirements. With the analysis of monitoring results, TAEKWANG 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 cyanic	de exposures and releases.	
The operation is.	X in full compliance with  ☐ in substantial compliance with  ☐ not in compliance with	Production Practice 4.1

Summarize the basis for this Finding/Deficiencies Identified:

TAEKWANG recruits those candidates who have been trained in the fields of chemistry and chemical engineering. TAEKWANG Training policy, procedure and program was established effectively to meet the legal requirements and international standards including this ICMC code. Based on the company training program and training needs of each personnel, training has been provided regularly to all workers. Training materials are prepared well and contained all information such as hazards of cyanide, MSDS, use of PPE and emergency preparedness. The trainings have been provided by manager and HSE team members qualified according to training procedure. All operators, maintenance staffs affecting the risk of cyanide are qualified as required by company training & qualification procedure. Also,

TAEKWANG Inc. Co., Ltd.

PETROCHEM # 3 Plant
Name of Facility

Team Leader

Team Member

Date

training effectiveness has been evaluated once per year by testing and observation. The evaluation results are reflected on training programs.

In addition, all new employees prior to perform their job should be trained on safety and health for 16 hours at the time of joining the company and for 2 hours per month thereafter.

Production Practice 4.2: Train employees to respond to cyanide exposures and releases.				
The operation is.	X in full compliance with  ☐ in substantial complian  ☐ not in compliance with  ☐ not subject to		Production Pr	ractice 4.2
Summarize the basis for this Finding/Deficiencies Identified: All employees are well aware of the emergency response actions against cyanide exposures and releases through repeated education, training and emergency drills. The emergency response plans specify all the employees' duties such as safety representative, first-aid responder or firemen, etc. Related mock situation drills are regularly conducted to ensure that the employees are familiar with their duties and roles. The results of the mock situation drills are evaluated and analyzed. Any and all areas for improvement found are immediately improved. The results of education or training are recorded.				
5. EMERGENCY RESPONSE: Protect communities and the environment through the development of emergency response strategies and capabilities.				
Production Practice 5.1: I releases.	Prepare detailed emergenc	y response	plans for poter	ntial cyanide
The operation is.	X in full compliance with ☐ in substantial compliand ☐ not in compliance with		Production Pr	ractice 5.1
Summarize the basis for this Finding/Deficiencies Identified: Five emergency response plans and scenarios for potential cyanide releases are developed effectively and revised to improve company's response capabilities. Detail methods to control the release at their source, containment, mitigation and future prevention including cyanide supply shut down, prevention of cyanide spread, collection of spilled cyanide & preventive action were defined in emergency procedure. The emergency plans and scenarios include all the				
TAEKWANG Inc. Co., Lt PETROCHEM # 3 Plant Name of Facility	Team Leader	Mu Team Mer	. (/	March 2008 Date

necessary actions covering emergency communication, rescue, evacuation, relief, pollution prevention, assessment, communication among relevant institutions, etc.

Job description responsibility & authority were defined in emergency response plans and scenarios. Also, the plans describes use of cyanide antidotes and first aid measures for cyanide exposure. Production team and HSE team conducted drills according to the emergency plan and scenarios. They review the result of each drill and update the emergency response scenario.

Production Practice 5.2: Involve site personnel and stakeholders in the planning process.				
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Summarize the basis for this Finding/Deficiencies Identified:  The emergency response plan deals with not only those factory workers assigned to their respective duties but also those concerned with the company. TAEKWANG prepared and established emergency communication networks to contact nearby factories at the petrochemical complex and potentially affected communities. Communities such as local government and environment authorities, fire stations, police and hospitals are included and they have knowledge of the risks related to the cyanide production facility. TAEKWANG engages in regular consultation and communication with relevant stakeholders.				
Production Practice 5.3: Designate appropriate personnel and commit necessary equipment and resources for emergency response.				
Summarize the basis for this Finding/Deficiencies Identified: All employees have been tasked with their respective duties to be performed during an emergency. TAEKWANG nominates HSE team leader as emergency response coordinator and plant manager as general controller for emergency situation. The emergency response organization consists of 8 functional units inclusive of those for control, security, medical firefighting, CBR (chemical, biological, radiological), recovery, etc. The responsibility and				
TAEKWANG Inc. Co., Ltd.  PETROCHEM # 3 Plant Name of Facility  Team Leader  Team Member  Date				

duty of emergency teams including command center, personnel rescue part, excavation lead part, communication part etc. defined in emergency organization chart.

Detail training such as personnel rescue, lead excavation, control of facility and etc. were required and provided to emergency responders. And also HSE team tested the call-out response and feedback the results to responders. The equipment for emergency response actions is maintained in a ready state through regular check and repair. A list of such equipment is also maintained. Moreover, a cooperative system with outside entities has been established effectively. The outside entities are participated in the mock situation drills and following evaluation and review of effectiveness for emergency response plans.

Production Practice 5 notification and repor	i.4: Develop procedures for internal and ting.	external emergency
The operation is.	X in full compliance with  in substantial compliance with  not in compliance with	Production Practice 5.4
The emergency common response plan. The invertical report system release and up the charesponse manager. The personnel. External necessions of the charesponse manager.	for this Finding/Deficiencies Identified: unication network is prepared for prompternal communication system is made u covers the person who discovers an emergin of command to the plant manager who he other is the site alarm system, whico tifications with affected communities sud by phone & mobile phone as per emergence.	p of 2 sub-systems. First, the gency accident such as cyanide serves as the chief emergency h simultaneously notifies site ich as nearby companies and
	5.5: Incorporate into response plans and hat account for the additional hazards of	
The operation is.	X in full compliance with  in substantial compliance with  not in compliance with	Production Practice 5.5
TAEKWANG Inc. Co PETROCHEM # 3 Plants  Name of Facility		2a 12 March 2008 ember Date

Summarize the basis for this Finding/Deficiencies Identified:

Hazards associated with the use of cyanide treatment solution and its handling methods are detailed in Material Safety Data Sheets (MSDS) and TAEKWANG 's remedial action process documented in the emergency response plans. Detailed methodologies for remediation, neutralization, decontamination and control of contaminated material were defined in the cyanide handling manual. The plan defines that sodium hypochlorite, ferrous sulfate and hydrogen peroxide shall not be used to prevent release of hydrogen cyanide to surface water. According to simulation result for cyanide release, TAEKWANG prepared the emergency plan addressed the potential needs for environmental monitoring.

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The operation is.	X in full compliance with  in substantial compliance with  not in compliance with	Production Practice 5.6
TAEKWANG conductor reviewed, evaluated for states that the results procedure. In addition training to emergen	for this Finding/Deficiencies Identified:  ts periodically emergency response exerce or their appropriateness and revised ev be evaluated and analyzed and used a on, TAEKWANG implement regular ag to check the state of the communication cy procedure, emergency plan shall be ency cases and also the plan is revised as n	ery year. The plan expressly as data for improving of the mock situation emergency a system. evaluated it's appropriateness

TAEKWANG Inc. Co., Ltd. PETROCHEM # 3 Plant
Name of Facility

Team Leader

12 March

Team Member

등부 2008년 제 1168 호

Registered No. 2008-1168

## 인 증

## Notarial Certificate

위 감사 요약 보고서 — 에 기재된 촉탁인 안상호, 동 장철순——

attorney in fact of

MR. J. S. SEO-

MR. S.H, AHN & MR. C. S. CHANG-

의 대리인 **서장수** 은 본직의 면전에서 위 본인이 서명한—— 것임을 확인하였다.

appeared before me and admitted said principal's subscription to the attached "SUMMARY AUDIT—

REPORT."-

This is hereby attested on this 28 day of Mar. 2008 at this office

2008년 03월 28일

이 사무소에서 위 인증한다.

울산광역시 남구 옥동 583-6 울산지방검찰청소속 공증인 유봉묵 사무소

공증인 목 년

Bong-Mook Yoo the Notary Public Ulsan District Prosecutor's Office 583-6, Ok-Dong, Nam-Gu, Ulsan, Korea

Signature of the Notary Rublic

## Bong-Mook Yoo

This office has been authorized by the Minister of Justice, the Republic of Korea, to act as Notary Public Since, Feb. 27, 1997 Under Law No. 4745