SUMMARY AUDIT REPORT

AUSTRALIAN GOLD REAGENTS PTY LTD
SODIUM CYANIDE PRODUCTION FACILITY
CSBP KWINANA WORKS

ICMI CYANIDE PRODUCTION VERIFICATION PROTOCOL
RECERTIFICATION AUDIT
SEPTEMBER 2010

AGR Pty Ltd.
Production Facility

Signature of Lead Auditor

18 November 2010
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APPROVAL & CHANGE HISTORY

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1. DESCRIPTION OF FACILITIES

Name of Cyanide Production Facility: Kwinana Sodium Cyanide Facility
Name of Facility Owner: Australian Gold Reagents Pty. Ltd. (AGR)
Name of Facility Operator: CSBP Limited
Name of Responsible Manager: Lee Barker
Address: Kwinana Beach Road, Kwinana,
State/Province: Western Australia, 6966
Country: Australia
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Fax: (+61 8) 9439 3455
E-Mail: lee.barker@csbp.com.au

Location detail and description of operation:

Australian Gold reagents Pty. Ltd. (AGR) is the management company of the unincorporated joint venture between CSBP Limited (CSBP) (75%) and Coogee Chemicals Pty. Ltd. (Coogee) (25%). CSBP, forms part of the Wesfarmers Ltd. group of companies and is the major participant in the venture and acts as both plant operator and sales agent. Coogee is a local manufacturer and distributor of industrial chemicals.

The AGR cyanide production facility is located within CSBP’s fertiliser and chemicals complex at Kwinana, some 40Km south of Perth within the state of Western Australia.

AGR manufactures and transports two different forms of sodium cyanide from its Kwinana production facility, namely solution and solids. Sodium cyanide solution is produced as a 30%w/w liquid and solid sodium cyanide as >97% white briquette.

Sodium cyanide manufactured at the Kwinana site is used in gold mining operations within Australia, South East Asia, Africa and South America.
2 AUDIT TEAM FINDINGS

This operation is

☐ in full compliance
☒ in substantial compliance with the International Cyanide Management Code
☐ not in compliance

A copy of the agreed Corrective Action Plan to bring the production facility into full compliance with the protocol is included within this Summary Audit Report. The plan must be fully implemented within one year of the date of this audit.

Audit Company: Michael Sputore & Associates Pty. Ltd
Date(s) of the Audit 13th to 17th September 2010 inclusive
Audit Team Leader: Michael Sputore
E-mail: msa@iinet.net.au
Names and Signatures of Other Auditors: Santino Zanotti

18th November 2010

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.

Signature of Lead Auditor: Michael Sputore

18th November 2010
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

Basis for this Finding:
The two liquid plants and the solids plant were designed by Shedden - UDHE. The liquid plants were commissioned in 1988 and 1996 respectively with the solids plant being commissioned in 2002. Since commissioning, modifications and upgrades have been undertaken in all three plants. Comprehensive QA/QC documentation for all three plants was available in the Chemicals East Technical and Project Engineering libraries.

AGR can demonstrate that quality control and quality assurance programmes have been implemented during the construction of its cyanide production and storage facilities. Suitable engineering documents were available for review by the auditors.

AGR can also demonstrate that quality control and quality assurance programmes were implemented in the replacement of the Maxitherm incinerator, which is the only substantial change that has been made to the process since the last audit.

Materials of construction used in the facilities, including the replacement Maxitherm incinerator, were considered to be adequate, both in terms of those facilities used for the storage and movement of cyanide as well as those facilities used to catch and trap cyanide spills e.g. concrete surfaces were in good condition, sealed, etc.

Potential routes of release of cyanide from the plant are from the incinerator stack, solids plant stack, through waste water, through storm water from the liquids plant and from the solids plant. All of the above other than storm water are protected by interlocks and emergency shutdowns. Storm water is pumped to ponds and tested before release.

Spill containment measures were in place at the production facility but, in addition, any cyanide spill or waste water is ultimately transferred to the waste water management facilities at the CSBP Limited site, and this provides an additional level of control in relation to cyanide discharge.

The exception is the Knock Out Pots, associated drain piping and level control/indication legs on the John Zinc and Maxitherm incinerators which operate under low pressure and contain weak cyanide solution, which do not have obvious cyanide containment measures. The auditors have however assessed that there is no immediate or substantial risk to health or the environment as CSBP has a robust maintenance, inspection and Work Permit system in place to ensure the integrity of the Knock Out Pots, and to minimise the risk of the valves being inadvertently opened.
**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 Production Practice 1.2

☐ in substantial compliance with

☐ not in compliance with

**Basis for this Finding**

The facility has extensive documentation in place in relation to the operation of the facility. These documents were controlled documents and available within an electronic document retrieval system.

Suitable preventative maintenance programmes were in place for general maintenance and also proof testing of critical process trips and alarms.

Procedures were in place to prevent unauthorised or unregulated discharge to the environment and, as noted, there is an additional level of control through intervention at the CSBP operation.

In addition, a management of change process was in place to ensure that any changes to the facilities underwent appropriate reviews.

Cyanide is stored in suitable locations with appropriate security controls to prevent public access.

Evidence was also available to indicate that procedures were in place to ensure that cyanide is packaged and transported in a manner that is consistent with the requirements of the destination jurisdiction.

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

☐ in full compliance with

✓ in substantial compliance with Production Practice 1.3

☐ not in compliance with

**Basis for this Finding:**

Preventive Maintenance routines are established for servicing, inspection and testing of storage tanks, pipelines, and associated pumps and valves in accordance with maintenance planning procedures to ensure their integrity and containment properties. Plant inspection frequencies are based on statutory requirements, Australian Standards and as-found condition of equipment. Preventive Maintenance routines may be reviewed and updated in response to as-found condition of equipment. Equipment inspections are also based on manufacturer's requirements and manuals.

For pressure equipment and pipelines containing hazardous substances, comprehensive Plant Inspection Reports and test records are maintained for each plant item. When corrective actions are identified, Plant Inspection Recommendations are generated and tracked through a PIR Register. These recommendations are followed up and closed out. For other equipment, Work Orders define what needs to be done and what records are to be generated. Records are retained in the Work History.

However, planned inspections for secondary containment trays and sleeves on sodium cyanide pipelines have not been conducted over the past three years as an inspection system for these is not in place. The auditors have however assessed that there is no immediate or substantial risk to health or the environment, as CSBP has in place a robust maintenance and inspection system to ensure risk of pipeline failure is minimised, and a Preventive Maintenance routine was created for a six monthly inspection period with the first inspection due in March 2011, as an immediate response to this audit finding.

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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
- [✓] in substantial compliance with Production Practice 2.1
- [ ] not in compliance with

**Basis for this Finding:**

Standard operating procedures have been written for cyanide related tasks from receipt of ammonia, natural gas and caustic soda, through to packaging and storage of solid sodium cyanide to shipping of liquid and solid sodium cyanide. Emergency procedures have also been developed.

Worker input and involvement in developing and evaluating health and safety procedures is achieved through consultation through participation in safety committees, development of Job Safety Analyses, representation in process improvement teams and participation in Team Based Risk Assessments.

Portable and personal gas detection equipment were available in the control room. Fixed gas detectors are also installed in the solid sodium cyanide plant. The personal and portable units have docking stations where the calibration and the instrument condition is monitored and an electronic log is maintained. Personal monitoring of the workforce in relation to cyanide exposure is undertaken and suitable evidence was available. Additionally a programme of swabbing working surfaces in offices, control rooms and lunchrooms was being undertaken to ensure that there was no contamination by sodium cyanide. However the fixed, portable and personal gas detectors which monitor exposure are set to alarm at 5.0ppm HCN, while the production protocol specifies a value of 4.7ppm. The auditors have assessed that after consultation with the CSBP Hygienist that there is no immediate or substantial increased risk to health, and the deficiency is readily correctible.

Controls and communications systems have been incorporated to include requirements for an observer to be present during loading of liquid cyanide into rail and road isoliners, man down alarms located throughout the two liquid plants, safety shower alarms installed throughout the facility, two-way radio communication between workers, control room and first aid post, and the confined space permit system.

All new employees undergo mandatory health assessments.

Decontamination facilities are available at the site and warning signs are present and information included in inductions in relation to the wearing of Personal Protective Equipment (PPE) and controls on smoking, eating and drinking.

All vessels and pipelines containing cyanide were suitably identified.

The facility has implemented a clothing change policy for operators, visitors and contractors.

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

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

**Basis for this Finding:**

The AGR sodium cyanide production facility is part of the larger CSBP production facility located at Kwinana. In addition to the production of sodium cyanide, a range of other dangerous goods is produced at the works. Therefore, the overall strategy in relation to emergency response is that there

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is an emergency response team that is formed by the works, i.e. the parent company. This response team is devoted to dealing with and addressing emergencies at any location on the works and for any of CSBP's and AGR's products off site.

In addition to the overall emergency response procedures, combined safety showers and low-pressure eye wash stations are located throughout the facility. The procedures, reagents and apparatus required for cyanide poisoning are held at the plant control room. Oxiviva and Oxiports are located throughout the plant site. An independent contractor maintains the oxyviva/port units. Units examined were found to be in good condition and maintenance records were available.

There is a registered Occupational Health and Safety nurse, three occupational first aid personnel and designated trained personnel on call. Additional support is available from the Occupational Physician. Specialist occupational physicians have reviewed the medical procedures. There is also a process of annual meetings between the company Occupational Physician and the nearby hospital emergency department.

Local "man down" and exposure to cyanide emergency drills are undertaken in the plant. The overall CSBP Emergency Plan addresses larger scale hazardous materials emergencies.

A permit to work system is in place to minimize the risk of exposure of personnel to contents within pipes, tanks, etc. In addition, tanks and most pipelines are labelled and there is an ongoing programme of improvement of the quality of labelling.

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 Production Practice 3.1

☐ in substantial compliance
☐ not in compliance with

Basis for this Finding:

There is no direct discharge to surface water. There are two discharge streams from the cyanide production process, effluent and storm water. Effluent water treated in a cyanide destruction plant is analysed and, if the cyanide level is 1.0 ppm or less, it is pumped to whole of site storage ponds. Storm water is pumped to storage ponds. The regulator sets a license for discharge of effluent to Cockburn Sound. This discharge includes other materials from the CSBP site. The company has a license to discharge water directly to surface water but has elected not to do so.

All operations are conducted on concrete surfaces. Free cyanide levels are analysed in the production and monitor bores. The last monitoring results revealed that all free cyanide concentrations in groundwater were within jurisdictional compliance levels. The plant has a Water and Rivers Commission Licence to use ground water for irrigation and plant water. There is no evidence that seepage has caused exceedance.

The solids plant has scrubber and HCN monitors. The liquid plant emissions are from the unreacted gases. The energy potential of these gases is realized through combustion in incinerators. External consultants undertake stack monitoring every 3 months. All results are within compliance to the license limits.

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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.

✓ in full compliance with Production Practice 4.1

The operation is

☐ in substantial compliance
☐ not in compliance with

Basis for this Finding:

AGR has a structured training programme for all operators. This is split into three competencies, Introductory, Field, and Lead Operator. For maintenance personnel, competency levels are A, B and C.

Operators are trained through induction and establishing a “Learner Agreement” to undergo training in a particular training module for a specific process. Assessment for competency is conducted according to a documented assessment process.

At lower competency levels, the operator is given lesser scope for activity and there is greater level of peer review, mentoring and “buddy system”. In order to transition from one level to another, the operator must demonstrate competency to the next level operator, complete appropriate assessments and have the overall process reviewed and signed off by the Technical Superintendent.

Refresher training is also undertaken when operating procedures change.

Worker training with selection and use of PPE is achieved through local area inductions; on the job training associated with operator competency training programs; statutory training courses conducted including SCBA, gas testing, forklift operation, confined space entry; and through tool box meetings.

Training records for each employee are generated from the time of employment. Paper records for specific skills and qualifications are held in Personnel Files by Human Resources.

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

✓ in full compliance with Production Practice 4.2

The operation is

☐ in substantial compliance
☐ not in compliance with
☐ not subject to

Basis for this Finding:

Plant operators are trained in an “initial response” to an emergency. The initial response concentrates on making the process safe and raising the alarm to initiate the works emergency plans. These requirements are addressed in operator training and emergency drills.

Operators are briefed on basic emergency response requirements as part of the site induction and there is first aid trained operators on every shift.

“Man down” alarms are available in the plant and operators are expected to respond to these. Emergency drills have been undertaken to test the application of the “man down” alarms and exposure to cyanide, and an ongoing programme of drills and reviews was sighted. Emergency response kits are also available within the control room.

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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.

✓ in full compliance with Production Practice 5.1

The operation is
- [ ] in substantial compliance
- [ ] not in compliance with

**Basis for this Finding:**

The AGR sodium cyanide production facility is part of the larger CSBP production facility located at Kwinana. In addition to the production of sodium cyanide, a range of other dangerous goods is produced at the works. Therefore, the overall strategy in relation to emergency response is that there is an emergency response team that is formed by the works, i.e. by the parent company, and this response team is devoted to dealing with and addressing emergencies at any location in the works and for any of CSBP’s and AGR’s products off site.

Overall the works operates a tiered emergency response system with corresponding documentation. All of these documents were controlled documents.

Potential hazardous releases have been addressed as part of the requirements of the Major Hazard Facility Legislation. In addition Standard Operating Procedures and the AGR Transport Emergency Response Plan addresses spillages of solid or liquid cyanide.

The suite of documented procedures, Standard Operating Procedures and AGR Transport Emergency Response Plan are referenced by the CSBP Emergency Response Documentation and is used for responding to both on site and off site emergencies.

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

✓ in full compliance with Production Practice 5.2

The operation is
- [ ] in substantial compliance
- [ ] not in compliance with

**Basis for this Finding:**

Consultation is a mandatory requirement under the Major Hazard Facility Legislation. This has occurred in several ways; inclusion of product specialists in the emergency response process, attendance and participation in the Kwinana Mutual Aid Group, liaison with the State Emergency Services, presentation of safety reports to relevant stakeholders. Communities have been made aware and consulted as per mechanisms noted above and through the CSBP involvement in the Kwinana Industries Council.

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

✓ in full compliance with Production Practice 5.3

The operation is
- [ ] in substantial compliance
- [ ] not in compliance with

**Basis for this Finding:**

CSBP has defined emergency response teams and incident controllers. Rosters are available and were sighted as part of the audit. Emergency response documentation was also available.

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Emergency responders are trained. A training programme for 2009/2010 for each team was sighted. This training includes application of the Standard Operating Procedures and AGR Transport Emergency Response Plan, which, as noted previously, together with a suite of procedures defining the Emergency Response Plan are the primary reference point for responding to an onsite cyanide emergency.

Equipment lists were available. Testing of emergency response and communications equipment also occurs and records were sighted.

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

- ✓ in full compliance with Production practice 5.4
- □ in substantial compliance
- □ not in compliance with

**Basis for this Finding:**

Emergency response documentation contains specific flow charts, detailed checklists and contact numbers. A mutual aid system is also in place for Kwinana Industries, and radio communication tests between the various parties are conducted and documented.

**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 Production Practice 5.5
- □ in substantial compliance
- □ not in compliance with

**Basis for this Finding:**


The requirements outlined in these documents apply equally to the Kwinana manufacturing and storage facilities and so provide specific guidance for dealing with specific cyanide related situations. The Standard Operating Procedures and the Plan addresses use of chemicals for remediation and ongoing monitoring.

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

- ✓ in full compliance with Production Practice 5.6
- □ in substantial compliance
- □ not in compliance with

**Basis for this Finding:**

Six monthly reviews of the safety report are conducted with the regulator, as required by relevant legislation. The major emergency management documentation is reviewed on every 2 years. General reviews also occur at the Kwinana Industry's mutual aid meetings.
Post incident analysis occurs as part of the mock emergency drills in accordance with defined procedures and any improvement actions are entered in a tracking system to ensure implementation.

Post incident analysis for an actual incident is conducted by the Emergency Services Team Leader using the “Post Incident Analysis Form” and any actions arising from the review is entered in a tracking system to ensure implementation.

Incident management team drills are generally conducted on a monthly basis for the CSBP Emergency Response Teams. Crisis management drills have also been conducted.

Tests of the AGR Transport Emergency Response Plan are undertaken on an annual basis. Local man down drills to respond to cyanide emergency scenarios are also conducted.

3 ATTACHMENT A CORRECTIVE ACTION PLAN