



**Chemours™**

**ICMI International Cyanide Management Code  
Summary Audit Report**

**Chemours Canada  
Sodium Cyanide  
Bulk Transloading Facility  
Certification Audit**

**Submitted to:**

**The International Cyanide Management Institute  
1400 I Street, NW – Suite 550  
Washington, DC 20005  
USA**

*2019 Audit Cycle*



**Management System Solutions, Inc.  
P.O. Box 780 999  
Orlando, FL 32878  
[www.mss-team.com](http://www.mss-team.com)**

---

## Chemours Canada Bulk Transloading Summary

### Company Names & Contact Information:

<b>Names and locations of Operations Audited:</b>	Chemours Canada Bulk Transloading Facility 80 Route 117 Malartic, QC JOY 1Z0
<b>Name and contact information for Chemours:</b>	Brian Morris Cyanide Business Global Product Stewardship Manager Email: <a href="mailto:Brian.R.Morris@chemours.com">Brian.R.Morris@chemours.com</a>
<b>Information for Companies in Supply Chain:</b>	<b>Octium Solutions</b> Rosanna Aurello Director; Quality & Sustainability Octium Solutions 80 Route 117 Malartic, QC JOY 1Z0 T: (450) 424-0161

### Operational Overview

The Chemours Canada Bulk Transloading facility in Malartic, Quebec is operated by Octium Solutions. Chemours produces sodium cyanide for use in the gold mining sector at their Memphis, Tennessee plant in the United States. Sodium cyanide briquettes are received at the Chemours Canada Bulk Transloading facility in Malartic, Quebec where they are re-packed from rail hopper cars into isotainers (iso tanks) mounted on chassis. The facility has been in operation since 2015. The facility was previously certified as an interim storage facility using the International Cyanide Management Code (ICMC) Transportation Protocol as part of the Chemours Canada Supply Chain in 2016. Since 2016, a rail to ISO tank transloading facility was built and put into operation. This certification audit of the solid sodium cyanide storage and transloading practices was performed using the ICMC “Cyanide Production Verification Protocol”.

Chemours Canada Bulk Transloading Facility  
Name of Operation

*Nicole Juy*  
Lead Auditor

August 12, 2019  
Date

---

## Audit Implementation

The audit was performed at the Chemours Canada Bulk Transloading facility located in Malartic, Quebec. The audit was performed by an independent third-party auditor who was pre-approved by the ICMI as a Lead Auditor for all types of Code audits and as a technical expert for ICMC audits of cyanide production facilities.

The Octium-operated facility was previously certified as an interim storage facility using the International Cyanide Management Code (ICMC) Transportation Protocol as part of the Chemours Canada Supply Chain in 2016. Since 2016, a rail to ISO tank transloading facility was built and put into operation. This certification audit of the solid sodium cyanide storage and transloading practices was performed using the ICMC “Cyanide Production Verification Protocol”.

The transloading process and associated areas of the organization were evaluated on-site in accordance with the agreed audit plan. Chemours and Octium Solutions personnel were included in this ICMC Certification Audit. The assessment was based on random samples and therefore nonconformities may exist which have not been identified.

Cyanide handling and management practices at the facility were evaluated against ICMC requirements, the organization’s procedures, and supporting documents. The audit was conducted through discussions and interviews with management, production, and packaging personnel. Additionally, records since the last ICMC audit in 2016 were reviewed and observations of current practices were made. The auditor used the ICMI “Cyanide Production Verification Protocol” to evaluate the operation.

The results of the audit demonstrated that the operation is in FULL COMPLIANCE with ICMC requirements.

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

*Nicole Jung*  
Lead Auditor

August 12, 2019  
Date

## Auditor's Finding

Cyanide handling and management practices at the facility were evaluated against ICMC “Cyanide Production Verification Protocol” requirements, the organization’s procedures, and supporting documents. The audit was conducted through discussions and interviews with management, production, and loading personnel at the facility. Chemours and Octium Solutions personnel were included in this ICMC Certification Audit. Additionally, records were reviewed and observations of current practices were made. Particular focus was paid to the evaluation of records since the last certification audit in 2016. The auditor used the ICMI “Cyanide Production Verification Protocol” to confirm that records demonstrated continued ICMC compliance since the previous certification audit in 2016.

The auditor found that the overall level of preparedness and understanding of ICMC requirements was excellent. Management systems were found to be very mature, personnel demonstrated excellent operational discipline, the facility was very well maintained and organized, and records were readily available for review.

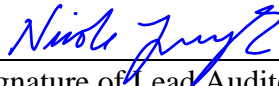
The operation has not experienced any significant cyanide spills or releases since it began operations in 2015.

The results of the audit demonstrated that the operation continues to be in FULL COMPLIANCE with ICMC requirements.

Audit Company:	MSS Code Certification Service, A Division of Management System Solutions, Inc. <a href="http://www.mss-team.com">www.mss-team.com</a>
Lead / Technical Auditor:	Nicole Jurczyk E-mail: <a href="mailto:njurczyk@mss-team.com">njurczyk@mss-team.com</a>
Date(s) of Audit:	May 15-16, 2019

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Certification 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 the audit reports accurately describe the findings of the certification audit. I further attest that the certification 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.

Chemours Canada Bulk Transloading Facility		August 12, 2019
Name of Operation	Signature of Lead Auditor	Date

Chemours Canada Bulk Transloading Facility		August 12, 2019
Name of Operation	Lead Auditor	Date

**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.*

**The operation is**  **in full compliance with Production Practice 1.1**

*Summarize the basis for this Finding:*

The transloading facility was built using sound, accepted engineering practices. A report detailing the inspection of the transloading facility by a qualified individual was reviewed and the report confirmed its suitability for cyanide transloading.

Process equipment is constructed of materials that are compatible with solid cyanide and cyanide solutions. All process equipment, piping and tanks are indoor and are built on or over concrete and there are appropriate drainage and containment systems to ensure full containment. The transloading operation is contained completely within a building. Interlock systems and alarms were included in the design of the facility.

Preventive maintenance systems are implemented including routine inspections of equipment for leaks.

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

*Nicole Jung*  
Lead Auditor

August 12, 2019  
Date

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

**The operation is**  **in full compliance with Production Practice 1.2**

*Summarize the basis for this Finding:*

The facility has procedures in place that enable them to operate in a safe and environmentally responsible manner. Procedures also detail what steps must be taken in case of an upset condition or emergency.

Changes to site conditions or operating practices must all be reviewed and approved by Facility Management. Changes are controlled in accordance with a management of change (MOC) procedure. No significant changes have been made to the facility since it started up.

Preventive maintenance programs are in place and regularly scheduled maintenance is performed on all process equipment and instrumentation.

There are no unauthorized or unregulated discharges of cyanide-containing water from the site. Appropriate practices are in place to control process wash-down and other potentially contaminated water. Interviews and a review of records were used to confirm that formal wash water management practices are in place and that they are protective of the environment.

The operation maintains a procedure entitled “Disposition of Hazardous Materials” that addresses the handling of cyanide-contaminated wash water and solids. Contaminated solids are decontaminated. Any solids that cannot be decontaminated appropriately are disposed of as hazardous waste. Interviews confirmed this practice.

Transloading of cyanide happens entirely within a building in which the ventilation is designed and operated to protect against the buildup of HCN gas. Security was found to be acceptable at the facility. Access to the site, process and storage areas is highly controlled. Facility security plans include assessment of hazards and controls for unauthorized access and personnel risks. Employees interviewed understood their responsibilities to support security functions.

Procedures address loading, packing and labeling requirements needed to meet local shipping requirements for sodium cyanide.

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

  
Lead Auditor

August 12, 2019  
Date

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

**The operation is**  **in full compliance with Production Practice 1.3**

*Summarize the basis for this Finding:*

The facility has a thorough inspection program to ensure the integrity of process equipment and prevent accidental releases of cyanide. A review of records confirmed that tanks, valves, pipelines, and containments are routinely checked for integrity, closure of drains, presence of fluids, and deterioration. Vehicle inspections are conducted routinely as part of the formal PM program for all equipment. Inspection frequencies were found to be appropriate for the site.

Inspections are documented with the date, inspector, and results of inspection captured on the forms. Deficiencies are noted in an action list and corrections are made. Records from 2016-2019 were reviewed and were found to be complete.

**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.*

**The operation is**  **in full compliance with Production Practice 2.1**

*Summarize the basis for this Finding:*

Worker exposure to cyanide is minimized through the use of personal protective equipment (PPE) and through the safe operation of equipment. The minimum PPE requirements are defined in a documented procedure and are also included in the operating procedures, as appropriate. Emergency procedures are defined in the site Emergency Response Plan and in a series of procedures that define the steps to be taken in the event of an upset condition.

The site uses the buddy system. No personnel are allowed to work alone in the transloading building. The site maintains very detailed emergency response procedures that include PPE requirements to ensure the risk of human exposure to cyanide is minimized. Work Permits are used for non-routine activities, and managers participate in the detailed planning of non-routine tasks to ensure that all hazards and precautions are evaluated prior to the commencement of work. Maintenance activities are done following standard procedures. Maintenance PPE requirements are defined in the procedures and/or in the individual work permit for a task.

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

*Nicole Jung*  
Lead Auditor

August 12, 2019  
Date

Changes to site conditions or operating practices must be reviewed and approved by Facility Management. MOC processes are used to evaluate any changes that will be made to the operating processes. Examples of use of the MOC process were evident during the audit.

Employees are involved in the development and periodic review of health and safety procedures. Periodic safety meetings are held to communicate and obtain input on working safely. The site uses a corrective action and improvement process for employees to provide improvement suggestions and communicate with the management team on items that need to be corrected.

Stationary cyanide detectors and personal cyanide detectors are used by the operation to ensure cyanide concentrations are below 4.7 ppm. Procedures define the location of the stationary monitors and use requirements for personal HCN monitors. Stationary and personal hydrogen cyanide monitoring equipment is calibrated routinely as part of the facility maintenance program. Records are retained for at least one year. Records available during the audit were for the entire recertification period and were acceptable.

Operations where cyanide exposure may be elevated have been identified and additional PPE is required. Areas that could potentially have elevated cyanide concentrations in the air were determined by the operation through testing and information on past experiences from Chemours. Operational procedures define PPE requirements and additional PPE is required for wet or dusty operations.

Practices designed to protect workers at the facility include the use of the buddy system, regular health assessments, and defined change of clothing policies. Eating, drinking, and smoking restrictions are established at the facility. Interviews confirmed that there is an excellent understanding of these restrictions. PPE signs and “Authorized Personnel Only” signs were posted throughout. Areas with cyanide have strict access control and posted PPE requirements.

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

**The operation is  in full compliance with Production Practice 2.2**

*Summarize the basis for this Finding:*

The facility has detailed emergency plans and procedures available for use during a cyanide exposure incident. Commercially supplied combination shower / low-pressure eye wash stations and non-acidic fire extinguishers are strategically located at the site. The facility has water, oxygen, resuscitators, antidote, and a means of communication readily available. Antidote is appropriately managed to ensure it does not go out of date. All emergency equipment was found to be in good condition and readily available. The site appropriately maintains their equipment

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

*Nicole Jung*  
Lead Auditor

August 12, 2019  
Date



and their medicines to ensure their availability during an emergency. A program for regular equipment maintenance, inspection, and testing was confirmed.

The Malartic facility has an English-French-speaking workforce. Safety Data Sheets (SDSs) were readily available at the site and they were observed to be in English and French. Awareness and the ability to access SDSs was confirmed with personnel. While there was limited piping at the facility, it was clearly identified and showed the direction of flow. The one tank at the facility was also appropriately marked.

The facility has a decontamination/clothing change area. Decontamination procedures for employees and visitors are established. There are employees on-site who have been trained in CPR and first aid. The antidote can only be administered by a doctor or nurse in Canada. In case of a cyanide exposure event requiring the transport of a person to a hospital, emergency procedures require that 911 be called to arrange for an ambulance. Procedures call for firefighters to decontaminate the victim on-site and then the ambulance brings the person to the hospital. Site personnel provide the emergency responders with the antidote. The local hospital has been contacted to verify its capability for treating a cyanide exposure victim and the availability of the antidote at the hospital (in addition to the antidote provided by the site). Employee awareness of emergency procedures in the event of a cyanide exposure was excellent.

The site conducts mock emergency drills, holds a drill critique, and evaluates the need for further training or adjustment to the emergency procedures. Drill records were reviewed, and it was confirmed that drills are being conducted and evaluations completed. The site has a procedure for investigations of incidents. There have been no cyanide-related emergencies or incidents at this facility.

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

*Nicole Jung*  
Lead Auditor

August 12, 2019  
Date

**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**  **in full compliance with Production Practice 3.1**

*Summarize the basis for this Finding:*

There are no direct or indirect discharges of process water to surface water from the facility. All cyanide operations are conducted within a building and the wash water from the operation is shipped off-site for re-use. As an additional protection for the environment, the facility has an engineered membrane barrier under the entire site.

Groundwater monitoring is performed at the facility twice per year as required by the Quebec Ministry of Environmental and Wildlife. The analytical testing results from 2016-2019 reviewed during the audit confirmed non-detectable levels of cyanide.

There are no cyanide air emissions from the facility and no government-related air permits. Indoor air cyanide concentrations are monitored using stationary HCN detectors and operators use personal cyanide monitors.

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

*Nicole Jung*  
Lead Auditor

August 12, 2019  
Date

**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**  **in full compliance with Production Practice 4.1**

*Summarize the basis for this Finding:*

Employees receive initial training and refresher training to enable them to operate the facility in a manner that minimizes the potential for cyanide exposure and releases. The training includes information on the hazards of cyanide, operating procedures, the proper use of PPE, observation and testing. Training is done for procedures covering activities from the receipt of material through transloading and maintenance activities. The training elements for each job are contained in the training materials.

Training is given by appropriately qualified personnel, generally experts from Chemours provide the on-site training on cyanide awareness. There is also an annual computer-based training that is given to all personnel. The operational training is given by highly experienced Staff. The local Fire Department was asked to give emergency response-related training such as the proper donning of emergency personal protective equipment. Employees are trained prior to working with cyanide and undergo classroom training, job shadowing, supervised work and testing. The facility evaluates the effectiveness of cyanide training through testing and observation. Performance evaluations are conducted on a routine basis.

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

**The operation is**  **in full compliance with Production Practice 4.2**

*Summarize the basis for this Finding:*

Employees are trained on how to respond to cyanide releases and exposures upon hire and when changes to procedures are made. The training addresses the actions to be taken in the event of a spill or leak of cyanide including the first aid to be given. Employees participate in “man-down” drills which are conducted on a periodic basis to simulate a cyanide exposure event. The evaluation of the training of personnel is part of the drill critique process and is incorporated into the identification of corrective actions and improvement opportunities. Detailed training records are retained for employees for at least as long as the employee is working at the site. All records pertaining to cyanide safety were sufficiently detailed to be found compliant.

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

  
Lead Auditor

August 12, 2019  
Date

**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.*

**The operation is**  **in full compliance with Production Practice 5.1**

*Summarize the basis for this Finding:*

The site has a detailed Emergency Response Plan (ERP) to address a potential release of cyanide. The plan considers the potential failure scenarios appropriate for the site-specific environmental and operating circumstances. The ERP was found to be comprehensive, up to date, and appropriate for the operation. A review of the ERP confirms that ICMC requirements are fulfilled.

Specific response actions are detailed for each type of emergency scenario, including the need to evacuate. In Canada the antidote can only be administered by a licensed medical professional. The emergency procedures detail the need for decontamination and the provision of the antidote to the emergency responders. The Cyanokit - hydroxocobalamin infusion solution is the registered solution in Canada. This was the antidote available at the terminal. Confirmation was made that the local hospital also has the Cyanokit and the capabilities for managing a cyanide exposure victim. Two oxygen bottles are maintained on-site for treatment of an exposure victim prior to the arrival of medical assistance. The use of the oxygen is addressed in the emergency response plan. Chemours has determined that medical assistance can arrive to the site in approximately 7-10 minutes. Spills are controlled at their source by shutting down the equipment and stopping the transload process. Procedures are in place for containment, assessment, mitigation and future prevention of releases.

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

**The operation is**  **in full compliance with Production Practice 5.2**

*Summarize the basis for this Finding:*

Employees and external responders are involved in the emergency response planning process. The site meets with Fire Department and the ambulance response team regularly and they conduct tabletop exercises. Current conditions and risks are assessed, and the response plan is updated as appropriate. Employees participate in regular safety meetings where safety and emergency response are topics.

Chemours Canada Bulk Transloading Facility  
Name of Operation

*Nicole Jung*  
Lead Auditor

August 12, 2019  
Date

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

**The operation is**  **in full compliance with Production Practice 5.3**

*Summarize the basis for this Finding:*

The site has clearly designated roles and responsibilities in their response plan including the identification of a team leader and a backup. These roles have explicit authority necessary to implement the plan. Emergency Response Team members are identified for the site. Members are trained on the emergency response procedures. The operation, however, relies on external responders such as the fire department and ambulance in the event of an emergency. Periodic meetings with the Fire Department and the ambulance response team are used to confirm their involvement and evaluate the response systems through drills and tabletop exercises.

24-hour call-out information is included for internal and external contacts. Duties and responsibilities are included in the ERP for multiple personnel. The roles of external emergency responders are also detailed in the plan. The ERP includes a list of emergency equipment that should be available. This equipment is checked regularly to assure it is available when required. Confirmation was made during the audit that the equipment is available and is maintained in good condition.

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

**The operation is**  **in full compliance with Production Practice 5.4**

*Summarize the basis for this Finding:*

The ERP and site procedures include a list of internal and external personnel and organizations to be notified in the case of an emergency. The contact information is updated regularly to ensure appropriate information is available should an emergency situation arise. The information was last reviewed and updated in 2019. Roles for communication with the media are also identified.

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

  
Lead Auditor

August 12, 2019  
Date

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

**The operation is  in full compliance with Production Practice 5.5**

*Summarize the basis for this Finding:*

In the event of a spill that requires remediation, a professional remediation resource would be brought in to consult with Chemours experts on the remediation options. Site procedures prohibit the use of incompatible chemicals such as sodium hypochlorite, ferrous sulfate and hydrogen peroxide to treat cyanide spills. Personnel confirmed that environmental monitoring needs would be determined together with Chemours subject matter experts and authorities.

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

**The operation is  in full compliance with Production Practice 5.6**

*Summarize the basis for this Finding:*

The site reviews the adequacy of its emergency response plan regularly and conducts routine drills to test the emergency response procedures and training. Tabletop drills and hand-on drills (including an exposure and release drill) are conducted on a defined frequency. Records of the emergency response reviews and drills were available for review and were found to be acceptable. Drill critiques are used to identify areas for improvement in the procedures and response. Action items are identified and tracked to completion.

---

Chemours Canada Bulk Transloading Facility  
Name of Operation

*Nicole Jung*  
Lead Auditor

August 12, 2019  
Date