



# Sentinel Transportation

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

**Sentinel Transportation  
Re-Certification Audit**

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

*2016 Audit Cycle*





## Sentinel Transportation - Carlin Terminal Operational Summary

### Company Names & Contact Information

<b>Name and address of Operation:</b>	Sentinel Transportation, L.L.C. Carlin Sodium Cyanide Terminal 3 mi. E. of Carlin, Old Hwy 40 Carlin, NV 89822
<b>Name and contact information for Sentinel:</b>	Rick Van Gemert Safety Director Sentinel Transportation, L.L.C. <a href="mailto:R.VanGemert@sentineltrans.com">R.VanGemert@sentineltrans.com</a>

### Operational Overview

Sentinel Transportation, L.L.C. is a hazardous material bulk trucking company that has operated in the US and Canada for over 50 years. The Sentinel sodium cyanide operation is located in Carlin, Nevada, and is a dedicated cyanide transporter for Chemours at this location. The terminal is one of 45 Sentinel truck terminals located across the US. In Carlin, Sentinel occupies approximately 7 acres of a site that adjoins a sodium cyanide packaging operation that was certified to the ICMI Cyanide Code in mid-2006 and re-certified every three years since. Cyanide loading and packaging takes place at the packaging operation and was audited during the aforementioned certification process.

Sentinel headquarters is located in Wilmington, Delaware. Although only the Carlin terminal was within scope of the audit, upper level Sentinel management is very involved with the operation of the terminal. In addition to the Carlin Terminal personnel, the Corporate Safety Director was very involved in the audit and is very involved in corporate governance and oversight of safety programs at all terminals. Carlin personnel involved in the audit included the Terminal Manager, Mechanic, Dispatcher, and Drivers.

Sodium Cyanide that is loaded by the adjoining packaging facility is delivered by Sentinel to gold mining operations in the Rocky Mountain region and in western North America (including

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Canada). Sentinel has been the carrier providing this service from the Chemours's Carlin sodium cyanide packaging operation since 1989.

Sentinel is responsible for route determination, shipment scheduling and tracking, inventory control, truck inspections, preventive maintenance, training, safety program management, and emergency response planning. The sodium cyanide is transported in bulk cargo tanks and semi-bulk metal bins to mine sites.

## Audit Implementation

This report contains information regarding the on-site International Cyanide Management Code (ICMC) re-certification audit of the Sentinel Transportation L.L.C. – Carlin Terminal operations. The Sentinel Carlin Terminal is a terminal that is dedicated to the transport of sodium cyanide for Chemours.

The audit was conducted on April 20-21, 2016. Interviews were conducted with Sentinel personnel, policies and procedures were reviewed, records were evaluated, operations were observed, and equipment and facilities were inspected. Records from the re-certification period (2013-2016) were evaluated.

The audit was conducted according to the ICMI Cyanide Transportation Protocol. 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 International Cyanide Management Code (ICMC) audits and as a technical expert for ICMC audits of cyanide transportation and production operations.

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## Auditor's Finding

Cyanide management practices for the Sentinel Transportation – Carlin Terminal were evaluated for ICMC compliance using the *ICMI Cyanide Cyanide Transportation Protocol*. Sentinel internal policies, standards, and procedures, regarding the management of the Cyanide Transportation were reviewed. Records from the re-certification period (2013-2016) were also evaluated and found to be acceptable during this audit.

The audit was conducted through discussions and interviews with Sentinel personnel. Operations, facilities, and equipment were physically evaluated. Records regarding shipment tracking, security measures, shipping documentation, community involvement, operational procedures, training, maintenance, and emergency response records were randomly sampled during the audit and were also found to be acceptable. All personnel were very well prepared for the audit. The auditor found that the overall level of preparedness and understanding of ICMC requirements was excellent.

One minor cyanide environmental spill involving mal-functioning mine equipment occurred during the re-certification period. The spill was contained and there was no environmental impact. Although precautionary steps were taken to treat and monitor the driver, a full incident investigation concluded that there had been no cyanide exposure. Corrective actions following the incident were completed and verified effective by Sentinel, Chemours, and mine personnel.

**The Sentinel - Carlin sodium cyanide transportation operations were found to be in FULL COMPLIANCE with the ICMI International Cyanide Management Code requirements.**

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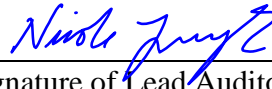



## Auditor's Attestation

Audit Company:	MSS Code Certification Service <a href="http://www.mss-team.com">www.mss-team.com</a>
Lead / Technical Auditor:	Nicole Jurczyk E-mail: <a href="mailto:CodeAudits@mss-team.com">CodeAudits@mss-team.com</a>
Date(s) of Audit:	April 20-21, 2016

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 Certification Auditors.

I attest that the Audit Reports accurately describe the findings of the re-certification audit. I further attest that the re-certification audit was conducted in a professional manner in accordance with the International Cyanide Management Code Verification Protocol for Cyanide Transportation Operations and using standard and accepted practices for health, safety and environmental audits.

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**1. TRANSPORT:**        ***Transport cyanide in a manner that minimizes the potential for accidents and releases.***

Transport Practice 1.1:        *Select cyanide transport routes to minimize the potential for accidents and releases.*

The operation is                   in full compliance with  
     in substantial compliance with    Transport Practice 1.1  
     not in compliance with

*Summarize the basis for this Finding:*

Sentinel to use a formal documented routing selection method that takes into account population density, infrastructure, pitch & grade, proximity to water bodies, and prevalence and likelihood of poor weather and resulting poor driving conditions. The Sentinel cyanide truck route assessment procedure was reviewed during the audit. Records and interviews with the drivers, Terminal Manager, and Corporate Safety Director were used to confirm that all necessary considerations were made during the determination of all cyanide transportation routes.

Community input regarding the transport of cyanide is gathered through the use of the U.S. Department of Transportation (DOT) web site that indicates whether communities have restricted use of specific roadways for the transportation of hazardous materials. Interviews also demonstrated that individual community and/or specific road hazard information was discussed with the Terminal Manager and was incorporated into the driver instructions for the routes (e.g., acceptable overnight parking location, or timing of travel through areas).

Truck routes are reviewed by multiple levels of the organization on a regular basis. Records were available to demonstrate that procedures were consistently followed during the re-certification period (2013-2016). The most recent review of all cyanide trucking routes used by Sentinel was in 2015. Records were found to be complete and well-organized. Sentinel is a registered hazardous materials transporter through the U.S. DOT Pipelines and Hazardous Material Safety Administration (PHMSA). As such, fees paid by the company are partially allocated to the training of a national emergency response network. Sentinel does work together with its customers to ensure that emergency responder roles are understood. Additionally, drivers carry emergency response information with them, including the widely accepted North American Emergency Response Guidebook (ERG). Sentinel does not subcontract any portion of their cyanide transportation operations. ICMC requirements pertaining to subcontractors are, therefore, not applicable to the organization.

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Transport Practice 1.2:      *Ensure that personnel operating cyanide handling and transport equipment can perform their jobs with minimum risk to communities and the environment.*

The operation is                       in full compliance with  
   in substantial compliance with      Transport Practice 1.2  
   not in compliance with


*Summarize the basis for this Finding:*

Sentinel uses a robust third-party compliance system to monitor driver qualifications and ensure that all driver credentials remain valid and up-to-date. All drivers have a U.S. DOT Class A Commercial Drivers License (CDL) with a Hazardous Materials / Tanker endorsement. The records were reviewed during the audit and were found to be acceptable. Interviews indicated that drivers are trained for over 100 hours prior to delivering a load alone. Training records from the re-certification period were sampled. Records were complete and readily available for all drivers.

All drivers have a Class A Commercial Drivers License (CDL) with a Hazardous Materials endorsement. Annual Mine Safety and Health Administration (MSHA) training is also given. Drivers were interviewed and were found to have an excellent level of knowledge and safety awareness.

In addition to training required by law, internal training is given at defined intervals to ensure that all personnel operating and handling cyanide transportation equipment is trained in a manner that minimizes the potential for cyanide releases and exposures. The training is carried out using videos, computer-based training, and classroom sessions. Internal training records were reviewed and found to be complete.

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Transport Practice 1.3:      *Ensure that transport equipment is suitable for the cyanide shipment.*

The operation is                       in full compliance with  
   in substantial compliance with      Transport Practice 1.3  
   not in compliance with

*Summarize the basis for this Finding:*

All Sentinel tractors and trailers, as well as Chemours cargo tank semi-trailers at Carlin have been checked and all are rated for weights that exceed maximum loaded weights. Drivers drive over a third-party certified scale for flo-bin loads and Excel 2 trailers – checking axle and gross weights.

Sentinel transports cyanide using equipment designed by U.S. manufacturer engineers to meet U.S. DOT weight rating standards. Gross Vehicle Weight Rating (GVWR) is certified by the manufacturer and documented on each vehicle with a label. Equipment labels were reviewed during the audit.

Office personnel and drivers all showed excellent awareness of weight capacities and regulatory requirements pertaining to maximum truck weight allowed in each State. Product volumes and weights are confirmed by Chemours when the trucks are loaded. A review of shipping records from 2013-2016 confirmed that the axle and gross weights were compliant with requirements and that the equipment is capable of transporting the loads.

Transport Practice 1.4:      *Develop and implement a safety program for transport of cyanide.*

The operation is                       in full compliance with  
   in substantial compliance with      Transport Practice 1.4  
   not in compliance with

*Summarize the basis for this Finding:*

Excel II trailers, solution tank trailers, and Flo Bins are inspected before starting a trip to ensure product is properly secured and all lines, valves and caps are closed. Flo Bins are secured to flat bed trailers to ensure they do not move or tip over during transportation. Appropriate placards are displayed on all four sides of the transport vehicles. Pre-defined checklists showing the required

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maintenance tasks are used to record actions. The incoming and outgoing condition of the equipment is recorded on the checklists and associated repair orders.

The Safety Program includes limitations on drivers' hours in accordance with Federal Motor Carrier Safety Regulations (FMCSR). Through the Driver Fatigue Management Program, drivers are informed of legal requirements, encouraged to stop driving if they become too tired (empowerment), provided with fatigue training, and monitored monthly for adherence to driving hour limitations through spot checks done at the terminal and monthly audits performed by an external company.

Procedures show a Flo Bin / flatbed truck strapping diagram and detail the instructions on how the task is to be done. Drivers were aware of procedures. The Safety Manual details how drivers are empowered and directed to pull over whenever weather, fatigue or other conditions are unsafe to continue trip. A drug abuse prevention program is established and computer-based annual refresher training is part of the internal required training. Safety Program records for 2013-2016 were reviewed and were very well maintained. Compliance was demonstrated for all 1.4 Code requirements.

Transport Practice 1.5:      *Follow international standards for transportation of cyanide by sea and air.*

The operation is       in full compliance with      Transport Practice 1.5  
   in substantial compliance with  
   not in compliance with

*Summarize the basis for this Finding:*

Sentinel does not ship cyanide by sea or by air. This section of the ICMI Cyanide Code does not apply to the operation.



Transport Practice 1.6:      *Track cyanide shipments to prevent losses during transport.*

The operation is                       in full compliance with  
   in substantial compliance with      Transport Practice 1.6  
   not in compliance with

*Summarize the basis for this Finding:*

Sentinel has installed and implemented a robust satellite-based communication and tracking system on all its transport vehicles. This system provides constant real-time recording and communication of information between drivers and the Carlin Terminal. All drivers have been trained on this on-board recording, messaging and locator system. The auditor observed the system in use by the Terminal Manager to monitor drivers through remote areas and over long distances. A driver also demonstrated the communication features on his vehicle. The shipment tracking and two-way communication technology used for these shipments is state-of-the-art and Sentinel practices in this area demonstrated compliance with ICMC requirements

Detailed shipping documentation, signatures showing receipt of the materials, driver call-in procedures, and GPS tracking systems are used to ensure that the amounts of cyanide in each shipment and the actual movements of the load are tracked at all times.

Drivers have multiple methods of communication and there are no significant black out areas along any of the routes traveled. Material management practices were found to be appropriate. Material Safety Data Sheets are shipped with every shipment. Additionally, each driver has detailed information with him or her at all times regarding cyanide hazards and emergency response. Records and interviews confirmed that Sentinel has appropriate control over the chain of custody and tracking of cyanide shipments.

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**2. INTERIM STORAGE:** *Design, construct and operate cyanide trans-shipping depots and interim storage sites to prevent releases and exposures.*

Transport Practice 2.1: *Store cyanide in a manner that minimizes the potential for accidental releases.*

The operation is  in full compliance with  
in substantial compliance with Transport Practice 2.1  
not in compliance with

*Summarize the basis for this Finding:*

Storage at the Sentinel site is limited to pre-shipment storage in trailers prior to a delivery. All vehicles are parked within a secure perimeter fence. Additionally, the site is secured through the use of multiple security measures including cameras and alarm systems.

There are signs that warn people not to come on-site. Visual contact is maintained with all visitors after they enter the gate. Once they reach the office, they are escorted at all times. Several different systems are used to secure the vehicles while they are parked and when they are in transit. The transportation equipment is designed to securely contain the contents. A checklist is used by the packaging facility to confirm that the secondary containment on the cargo tank is secure. Loading of cyanide is done within secondary containment at the adjoining packaging operation. No other materials or chemicals are stored at this location and there is no storage within any buildings.

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**3. EMERGENCY RESPONSE: *Protect communities and the environment through the development of emergency response strategies and capabilities***

Transport Practice 3.1: *Prepare detailed emergency response plans for potential cyanide releases.*

The operation is  in full compliance with  
in substantial compliance with Transport Practice 3.1  
not in compliance with

*Summarize the basis for this Finding:*

Sentinel has a detailed emergency response plan (ERP) for the corporation and a Carlin Terminal addendum that addresses all of the additional requirements for the transportation of cyanide. Both documents were reviewed in detail and were found to be appropriate. Records were available to show that the ERP was reviewed for adequacy at defined intervals and that several minor updates have been processed since the previous ICMC audit in 2012. The emergency plans were found to be up-to-date and accurate.

Drivers have the following information with them at all times: the ERP and the ERP Addendum, emergency response fact sheets from Chemours, Safety Data Sheet (SDS), and the North American Emergency Response Guidebook (ERG). Sentinel only transports cyanide via truck. Different chemical and physical forms of cyanide, roadway infrastructure differences, and the roles of the different emergency responders are discussed in the plan. The roles of internal personnel and external responders are clearly defined in the Sentinel emergency response documentation. The ERP and Carlin Terminal Addendum were both found to be appropriate for the operation.

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Transport Practice 3.2: *Designate appropriate response personnel and commit necessary resources for emergency response.*

The operation is  in full compliance with  
in substantial compliance with      Transport Practice 3.2  
not in compliance with

*Summarize the basis for this Finding:*

Training on the emergency response plan including the Addendum was given to all employees. Records were reviewed. Training is refreshed annually and records from the re-certification period were found to be complete, well-organized, and compliant with ICMC and internal requirements.

Drivers were interviewed and awareness of emergency procedures and documentation was excellent. The roles and responsibilities of the driver, Carlin Terminal personnel, local terminal supervisor, and the corporate office personnel are described clearly in the ERP Addendum.

Sentinel maintains a list of the emergency equipment that is to be maintained on the trucks at all times. Drivers confirm that emergency equipment is available for use and is in good working order during their pre-trip inspections. Records, as well as auditor inspection of emergency equipment, and the results of driver interviews confirmed that emergency equipment is appropriately maintained on each of the cyanide transport vehicles and that drivers clearly understand their responsibilities in this area.

Transport Practice 3.3:      *Develop procedures for internal and external emergency notification and reporting.*

The operation is  in full compliance with  
in substantial compliance with      Transport Practice 3.3  
not in compliance with

*Summarize the basis for this Finding:*

Notification procedures are described in detail within the Emergency Response Plan (ERP) Addendum and the Manager's checklist. In the event of an emergency, the notification actions of the driver, local manager, regional, and national safety managers are detailed and are practiced or discussed during a table top drill at least once per year. The notification call list is checked for accuracy at least once per year when the plan is reviewed and tested. The Chemours Cyanide

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Hotline offers support in determining further notification needs. CURA is a service provider that is contracted by Sentinel to manage all regulatory notifications following an emergency or release. The phone numbers for the Chemours Cyanide Hotline and for CURA are both part of the ERP Addendum. The phone numbers in the ERP and Addendum are checked for accuracy during the general review of the plans, at least once per year.

*Transport Practice 3.4: Develop procedures for remediation of releases that recognize the additional hazards of cyanide treatment chemicals.*

The operation is  in full compliance with  
in substantial compliance with Transport Practice 3.4  
not in compliance with

*Summarize the basis for this Finding:*

In the event of a spill, Sentinel would coordinate with CURA to ensure appropriate clean up and remediation of contaminated solids or soils. Chemours personnel are available for additional technical expertise, as necessary. Chemours maintains detailed remediation procedures for solid and liquid spills. This was confirmed during the 2016 audit of Chemours. Remediation of soils is not addressed specifically in the Sentinel documentation, but this was found to be acceptable by the auditor.

The Sentinel Emergency Response Plan (ERP) Addendum does address the requirement that none of the chemicals such as sodium hypochlorite, ferrous sulfate, or hydrogen peroxide be used to treat a release to surface water.


*Transport Practice 3.5: Periodically evaluate response procedures and capabilities and revise them as needed.*

The operation is  in full compliance with  
in substantial compliance with Transport Practice 3.5  
not in compliance with

*Summarize the basis for this Finding:*

The Emergency Response Plan (ERP) including the Carlin Terminal Addendum and the notification call list are reviewed and / or tested on at least an annual basis. An ERP refresher training is also given annually. A combination of hands-on emergency response practice drills,

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security drills, drills with mine sites, and table top drills are used to train personnel and confirm that emergency plans are appropriate and up-to-date.

The last drill conducted with a mine was in 2014 and the records from several drills and exercises were available from 2015. Evidence was available to show that the ERP is being reviewed and updated on an appropriate frequency. The telephone numbers on the call list were reviewed and checked for accuracy during the audit. The Emergency Response Plan's performance is reviewed after actual emergencies and after the annual drill. Changes are made to the plan, as needed.

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