United States Environmental Protection Agency
Office of Enforcement and Compliance Assurance
Office of Criminal Enforcement, Forensics and Training

National Enforcement Investigations Center

NEIC

NEICVP1465E01

NEIC CIVIL INVESTIGATION REPORT
Clean Earth Environmental Solutions, Inc.
Tacoma, Washington

Investigation Dates:
July 18-22, 2022

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APPENDICES (*NEIC-created)

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INVESTIGATION OVERVIEW

PROJECT OBJECTIVE

U.S. Environmental Protection Agency (EPA) Region 10 (Region) requested that EPA's National Enforcement Investigations Center (NEIC) conduct a multimedia compliance investigation of the Clean Earth Environmental Solutions, Inc. (Clean Earth - Tacoma) facility located at 1701 East Alexander Avenue in Tacoma, Washington 98421. The investigation assessed Clean Earth - Tacoma's compliance with federal environmental statutes and permit requirements. Table 1 lists the project team members.

Table 1. PROJECT TEAM MEMBERS

Team Member	Organization	Project Role
Jacquelyn Vega	NEIC	Project manager
Armando Bustamante	NEIC	Field team member
Brian Kennedy	NEIC	Field team member
Zachary Schlachter	NEIC	Field team member
Bradley W. Miller	NEIC	Analytical project manager
Erick Zacher	NEIC	Laboratory analyst

FACILITY CONTACT INFORMATION

Table 2 lists the primary facility contacts.

Table 2. FACILITY CONTACT INFORMATION

Name, Title	Phone No.	Email Address
Katey Potter, Permitting Compliance Manager	(253) 245-2189	kpotter@harsco.com
John Carpenter, General Manager/Interim Plant Manager	(253) 720-8017	jcarpenter@harsco.com
Guadalupe Montes, Operational EHS Manager	(253) 219-3681	gmontes1@harsco.com
Kris Iverson, Regional Operations Manager	(360) 772-3761	

FACILITY OVERVIEW

Clean Earth - Tacoma is a dangerous waste management facility. Washington state uses the term "dangerous waste" rather than the federal law's term of "hazardous waste." (The definition of "dangerous waste" is similar to "hazardous waste" as defined under the Resource Conservation and Recovery Act [RCRA], but dangerous waste may be broader than the federal hazardous waste definition.) The facility conducts the following operations: treatment by stabilization; fuel blending for boilers and industrial furnaces (BIFs); wastewater treatment; container management, including lab pack processing; and managing a 10-day dangerous waste transportation operation (10-day transfer facility).

According to the RCRA Part B permit renewal application Clean Earth - Tacoma submitted on September 22, 2021, Burlington Environmental, LLC, is the legal owner of the facility. Burlington Environmental, LLC, a Clean Earth Environmental Solutions, Inc. company, is identified as the

facility operator and is a wholly owned subsidiary of PSC Environmental Services, LLC, which is a wholly owned subsidiary of Clean Earth Environmental Solutions, Inc. This facility was previously known as Stericycle Environmental Services, LLC. Files, permits, and other regulatory documents for this location may be found under the following names: Stericycle, Burlington Environmental, or Clean Earth.

Clean Earth - Tacoma is located in the Port of Tacoma industrial park, approximately 5 miles east of Tacoma and 3 miles north of Fife, Washington. The Clean Earth - Tacoma facility covers approximately 17 acres, with permitted dangerous waste operations occurring on approximately 4 acres. Wastes are received on-site in containers and in bulk loads, for storing and/or processing on-site. The facility operates a dangerous waste transfer facility within the permitted area. Processing includes consolidation and repacking of wastes, stabilization, shredding, and treatment of wastewaters. Treated wastewater is managed using a discharge authorization and is piped to the city of Tacoma publicly owned treatment works (POTW). Michael Galvan resigned from his position as plant manager in January 2021. John Carpenter filled the position as plant manager beginning in February 2021.

According to the EPA Enforcement and Compliance History Online (ECHO) database, this facility has the following North American Industry Classification System (NAICS) codes (**Table 3**):

Table 3. INDUSTRY CLASSIFICATION

NAICS Code	Description
562211	Hazardous Waste Treatment and Disposal
562119	Other Waste Collection
562112	Hazardous Waste Collection
562	Waste Management and Remediation Services

RCRA Applicability

Clean Earth - Tacoma (EPA ID No. WAD020257945) is a treatment, storage, or disposal facility (TSDF) and a large quantity generator of hazardous waste. Clean Earth - Tacoma has been permitted by the state of Washington Department of Ecology (Ecology) for container storage and tank storage and treatment. The facility also operates the 10-day dangerous waste transportation facility that is included in its permit.

Ecology issued a $1.9 million penalty to Clean Earth - Tacoma for significant RCRA hazardous waste management violations. According to ECHO, the facility is a significant noncomplier under RCRA. A RCRA-focused compliance inspection conducted by Ecology in August 2020 identified several compliance issues.

CAA Applicability

Clean Earth is a minor source of volatile organic compounds (VOCs), hazardous air pollutants, and criteria pollutants. Emission sources at the facility include waste stabilization processes, compactor and bailer operations, lab pack processes, and storage tank emissions. The Puget Sound Clean Air Agency (PSCAA) has issued Clean Earth - Tacoma notices of construction (NOCs) to construct, install, or establish these emission sources. The NOCs contain restrictions and conditions on how the emission sources are operated, including emission controls. Emission controls for emission sources include a baghouse for particulate emissions control from waste stabilization activities; carbon adsorption for hydrocarbon emissions control from compactor, bailer, and lab pack room activities; and a closed-vent system to direct emissions to carbon adsorption for storage tanks requiring greater control. In addition to the NOC requirements, emissions from storage tanks and equipment associated with the storage tanks, such as valves, connectors, and pumps, are also subject to the RCRA air emission standards of 40 Code of Federal Regulations (CFR) Part 264, Subparts BB and CC.

FACILITY OPERATIONS SUMMARY

Clean Earth - Tacoma is a commercial dangerous waste storage and treatment facility. Dangerous wastes (DW) received at the facility are managed in tanks, process equipment, and containers. Non-hazardous wastes that are only regulated in Washington, including moderate risk waste (MRW), non-DW, and non-MRW solid wastes are also managed in the facility but are managed the same as fully regulated DW. The facility manages the following U.S. Department of Transportation (DOT) hazard classes or divisions: Compressed Gases (2.1, 2.2, and 2.3); Flammables (3, 4.1, and 4.2); Dangerous When Wet (4.3); Oxidizers/Organic Peroxides (5.1 and 5.2); Poisons/Toxics (6.1); Corrosives – Acids and Bases (8); and Class 9 – Miscellaneous (9).

Wastes received at Clean Earth - Tacoma can be managed in the following ways: fuel blending, wastewater treatment, stabilization, solidification, shredding, baling, waste consolidation, lab pack unpacking and consolidation, container pass-through, and 10-day transfer facility.

All wastes must go through pre-acceptance before they are approved to be received on-site. The facility's materials management group, which includes a corporate-wide central profiling group, evaluates whether to accept or reject each waste stream. A waste profile sheet is developed and then signed and dated by the generator.

Each inbound manifest or waste shipment received from off-site is recorded on a check-in sheet and given a unique number. This number is used to track the waste as it is processed through the facility. Waste shipments arriving at the facility are directed to the appropriate unloading area, which can be one of the following: main truck dock for non-lab pack and retail containerized loads; lab pack truck dock for lab pack and retail containerized loads; west

load/unload area for bulk wastewater loads, east load/unload area for bulk fuels/organic loads; or the stabilization building for bulk loads destined to be stabilized/solidified.

Inbound trailers are offloaded immediately or parked in the 10-day transfer facility. Inbound loads parked in the 10-day transfer facility are received and checked in within 24 hours of arrival. The arrival time is recorded on the drop sheet. When a container is unloaded, it is assigned a unique tracking number associated with the manifest. At least 10 percent of the containers for each waste stream are sampled and analyzed. Mandatory verification analyses include the following for all waste streams sampled: physical description, ignitability screen, pH determination, halogen screen, specific gravity determination, radiation screen, cyanide screen, sulfide screen, compatibility screen, and water compatibility screen. Some of the waste streams also are screened for VOCs and/or acid/alkaline concentrations.

For bulk load shipments, each shipment is sampled for the mandatory verification analysis. The manifest is signed once the weight is confirmed to be within 10 percent of the manifested weight and the verification analysis demonstrates the load is acceptable.

If there is a discrepancy between the generator's waste designation, or a parameter value is outside the range of values provided on the waste profile, containers are placed in "drum jail" and bulk loads are moved to the 10-day transfer facility and segregated. Both container and bulk loads are marked with a discrepancy label. If the discrepancy for bulk loads cannot be resolved within the 10-day limit, the waste is rejected back to the generator or sent to an alternate TSD facility. Container discrepancies must be resolved within 15 days, or the facility is required to submit documentation to Ecology.

Processing forms are filled out each time a container is processed. The unique tracking number of the container and the process being performed is recorded on a waste process form. When a new container of waste is produced during processing, a unique tracking number is also recorded on the form and marked on the container.

Stabilization/Solidification Processes

In-ground tanks 61 and 62 are located in the stabilization building. Tank 61 is used for stabilizing dangerous wastes to meet the land disposal restriction (LDR) treatment standards. According to John Carpenter, only characteristic wastes are treated, not listed dangerous wastes. Lime kiln dust is the main treatment reagent used for stabilization. A treatment batch is created from combining containers into the tank, which is usually a combination of liquid and solid wastes. The reagent is added in stages and mixed using a track hoe, while the reaction temperature is monitored. After treatment is complete, a sample is collected to check for free liquids. Then the track hoe is used to empty the tank into roll-off containers. Facility personnel take a composite sample of the treated waste by collecting ten 100-milliliter aliquots from the excavator bucket as the waste is transferred out of the stabilization tank into a roll off. Those aliquots are

combined in a 5-gallon bucket and the 1-liter sample is sent to an off-site laboratory for Toxicity Characteristic Leaching Procedure (TCLP) metals analysis to determine if it meets LDR treatment standards. The roll-off containers are stored until the analytical results are received from the off-site laboratory. If the treated waste is below LDR treatment standards, it is shipped to a Subtitle C landfill as Washington-state regulated waste that does not require treatment. If the treated waste exceeds any LDR treatment standards, it is shipped to a Subtitle C landfill as hazardous waste with an LDR notification that the waste does not meet LDR treatment standards and requires further treatment. Clean Earth - Tacoma does not re-treat waste to meet LDR treatment standards.

Tank 62 is currently used for solidification of Washington-only regulated dangerous wastes and to deactivate corrosive-only dangerous wastes. Sawdust and vermiculite are used for solidification.

Fuel Blending

Clean Earth - Tacoma brings in ignitable dangerous waste to blend into alternative hazardous waste fuels for use in boilers and industrial furnaces. Five of Clean Earth - Tacoma's permitted hazardous waste tanks (164, 250, 901, 902, and 903) currently are used to blend and store several different blends of hazardous waste-derived fuels. The blended fuels are typically manifested as hazardous waste to cement kilns.

Baler, Compactor, and Shredder

Clean Earth - Tacoma uses various processing equipment (baler, compactor, and shredder) to reduce waste volume and prepare wastes for further treatment and/or disposal. The processing equipment is not covered as RCRA units under the permit. According to Clean Earth - Tacoma's RCRA permit, "Process equipment units are tools that assist in the processing of the waste. These units do not contain waste in the same way as a tank contains waste, and therefore, they are not considered to be tanks."

The baler is used to reduce waste volume, which facilitates handling of solid materials with no free liquids before it is placed into DOT packaging to be shipped off-site for disposal. The baler is located in cell B of process area 1. Materials to be processed in the baler are removed from containers using a forklift and placed onto a table attached to the baler. Material from roll-off boxes may be transferred using an excavator, which scoops and drops the material onto the attached table. A forklift ram attachment is used to push the material into the baling chamber. A hydraulic ram piston is activated and lowered into the baling chamber, compacting the material inside. This process is repeated until the desired bale size is reached. Baled materials are removed by forklift, placed into a DOT cardboard container, and prepared for storage or shipment off-site. According to the facility's RCRA permit, the baler can process wastes that

exceed 500 parts per million (ppm) VOCs. Emissions from the baler are collected in a ventilation hood and are routed to two carbon cannisters operated in series. The air control system is located north of process area 1. Emissions are monitored weekly after the first carbon unit to test for breakthrough. Clean Earth - Tacoma determines breakthrough of the carbon when VOC contaminants leaving the first carbon vessel exceed 500 ppm VOCs. When breakthrough occurs, the second carbon unit is put in the front and a fresh carbon unit is put second.

The compactor is located in cell A of process area 1. The compactor is used to reduce the volume of solid materials before they are disposed of at an off-site facility. Compaction is performed by removing the lid from a 55-gallon container that contains compatible solid materials with no free liquids (e.g., rags, paper, plastic, debris, small containers) and placing the container into the compactor. A hydraulic ram piston is lowered into the container, compacting the material inside. Additional waste is added to the container, the process is repeated until the container is full, then the lid is placed back onto the container and the waste is prepared for storage or shipment off-site. The compactor is allowed under the RCRA permit to process wastes that exceed 500 ppm VOCs. Emissions from the compactor are collected in a ventilation hood and are routed to the same two carbon vessels used for the baler emissions.

The shredder is located in cell C of process area 1. The shredder is used to reduce the size of solid wastes with no free liquids (e.g., manufacturing debris, personal protective equipment, rags, cardboard, empty containers, or similar materials). The shredder shreds containers and their contents using low-speed, high-torque cutting teeth. Covers are removed from containers to be processed, which are lifted by a forklift and rotated to empty the contents into the shredder hopper. The waste materials that pass through the shredder fall into a 2-cubic yard steel tub skid that is within a secondary containment tray. Shredded material is containerized for shipment off-site or transported to the stabilization building for additional processing. The shredder is not permitted to process flammable, reactive, or incompatible wastes or any wastes containing greater than 500 ppm VOCs.

Wastewater Treatment

The wastewater treatment system at Clean Earth - Tacoma is subject to the requirements of 40 CFR § 437, Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards for the Centralized Waste Treatment (CWT) Point Source Category. The CWT rule identifies four different categories of wastewaters: Subpart A (metal-bearing wastewaters), Subpart B (oily wastewaters), Subpart C (organic wastewaters), and Subpart D (multiple wastewaters). The Tacoma facility is permitted by city of Tacoma Environmental Services Division to manage all four CWT-regulated wastewater categories. Wastewaters received at the facility are designated as one of the CWT categories to determine treatment. The tank farm is divided into two main containment areas; these areas are separated by a

concrete berm. One area of the tank farm is used to store, treat, and discharge Subpart A (metals treatment and recovery) waste and wastewater. The other area is used to manage Subpart B (oils treatment and recovery) and Subpart C (organics treatment and recovery) wastes.

A filter press is located on the east load/unload pad. A combination of dedicated hard piping and soft hoses from inorganic treatment or storage tanks is used to pump sludges into the filter press, where solids are separated from the wastewater. The solids are filtered and pressed out, forming a cake, which is then released through the bottom of the filter press into an open-top bulk container (e.g., roll-off, end dump, half-high or similar). Liquids pass through the filter press membranes and are pumped to an appropriate tank for further processing. Solids are collected below the press in a lined shipping container. Materials containing more than 500 ppm VOCs are not processed in the filter press. The filter press cake is stabilized on-site in tank 61. According to John Carpenter, the filter press cake is not analyzed prior to treatment and is stabilized by itself, without the addition of any other wastes. A composite sample of the treated filter press cake is collected. If the treated waste is below LDR treatment standards, it is shipped to a Subtitle D landfill for disposal. If the treated waste exceeds any LDR treatment standards, it is shipped to a Subtitle C landfill as hazardous waste with a notification that it requires treatment to meet LDR treatment standards.

Several wastewater tanks were shut down at the time of the NEIC inspection: some were being replaced, and some were being removed. Tanks 51, 501, 1213, and the 100-series tanks were off-line. Tanks 51, 501, and 1213 were out of service but are scheduled to be replaced. Clean Earth - Tacoma is still evaluating the status of the 100-series tanks.

FIELD ACTIVITIES SUMMARY

The NEIC field team was joined by Elizabeth Walters and Brendan Whyte of EPA Region 10 and Andy Rippert from Ecology during the on-site inspection. On July 18, 2022, NEIC inspectors conducted an opening meeting and presented credentials to Kris Iverson, Clean Earth regional operations manager.

NEIC performed the following activities to accomplish the investigation objectives:

- Met with facility personnel to discuss process operations, including waste acceptance/ tracking, screening, treatment/storage practices, verification testing, and waste shipment procedures.

- Conducted walk-through tours of the facility to observe process operations, waste acceptance procedures, treatment procedures, and compliance monitoring and sampling procedures. Photographs were taken as part of the inspection and are included in **Appendix A**.

- Walked through the on-site laboratory to evaluate sampling and analysis of incoming wastes and other waste streams to assist in determining compliance with RCRA.
- Conducted leak detection and repair (LDAR) monitoring and a forward-looking infrared camera survey (FLIR) of regulated process areas and equipment.
- Reviewed and copied (as appropriate) facility documents, including operating plans, procedures, and records. Specifically, NEIC reviewed Clean Earth - Tacoma's facility-specific procedures or protocols and discussed them with facility personnel responsible for implementing the plans and procedures.
- Collected samples of stabilized waste certified for disposal to determine compliance with LDR treatment standards. Samples were split with Clean Earth - Tacoma.
- Analyzed collected samples at the NEIC laboratory.
- Reviewed the following documents: Subpart BB and CC documentation**,** waste determination documentation, waste profiles, select treatment packets for hazardous wastes that were treated on-site, select incoming and outgoing manifests, and the permit renewal application.

Measurement and/or Sampling Activities

The NEIC field team provided support to this investigation by conducting LDAR monitoring and a FLIR camera survey of regulated process areas and equipment. The NEIC field team collected samples of stabilized waste for LDR treatment verification purposes. **Table 4** summarizes field measurement and field sampling activities. A copy of the chain of custody record is provided in **Appendix B**.

NEIC collected and analyzed samples of treated hazardous wastes. NEIC collected four grab samples from one treated batch, batch No. 2B102. The treated waste had been placed in two roll-off containers, designated as WMXU008598 and WMXU008802. NEIC collected two samples from roll-off container WMXU008598 (S01-S02; **Appendix A**, photos 20-23 and 26-30) and two samples from roll-off container WMXU008802 (S03-S04; **Appendix A**, photos 31-37).

All field sampling, field measurements/monitoring (except for the MSA Altair multiple gas meter monitoring), and laboratory measurements described in this report are within the scope of NEIC's ISO/IEC 17025 accreditation issued by the ANSI National Accreditation Board (certificate No. FT-0303). Results of all field measurements are contained in the project file.

Table 4. FIELD MEASUREMENT AND FIELD SAMPLING ACTIVITIES						
Location Identifier	**Date(s)**	**Method, and/or Procedure[1], and Equipment**				**Measurer Name**
MEASUREMENTS						
Tank farm	July 20-21, 2022	**Method:** EPA Method 21: Determination of Volatile Organic Compound Leaks **NEIC procedure:** *Toxic Vapor Analyzer (TVA)*, NEICPROC/00-016 **Equipment:** Thermo Scientific TVA 2020 toxic vapor analyzer, NEIC ID No. B24213				Armando Bustamante
Tank farm	July 20-21, 2022	**NEIC procedure:** *Optical Gas Imaging Infrared Cameras*, NEICPROC/11-005 **Equipment:** FLIR® GF320 infrared camera, serial No. (S/N) 4402571				Armando Bustamante Brian Kennedy
Stabilization building	July 20, 2022	**NEIC procedure:** *Safety and Sample Screening Instruments,* NEICPROC/17-002 **Instrument guides:** • *RadEye B20-ER – Radiation Detection Equipment* • *MSA Altair 5X Multi-Gas Monitoring Equipment* **Equipment:** • RadEye survey meter, S/N S84633 • MSA Altair multiple gas meter, SN2419				Zachary Schlachter Brian Kennedy
SAMPLING						
Station No.	**Sample Location**	**Appendix A Photo Nos.**	**Date(s) and Time**	**Sampling Technique**	**Method, and/or Procedure, and Equipment**	**Sampler Name**
S01	Stabilization building, roll-off container WMXU008598	20-23, 26, 27, 38, 39	July 20, 2022, 9:52 a.m.	Plastic disposable scoops	**Method:** ASTM D5633: Standard Practice for Sampling with a Scoop **NEIC procedure:** *Soil and Solid Sampling/Scoops*, NEICPROC/00-052 **Equipment:** Pre-cleaned single-use plastic disposable scoops, appropriately sized	Zachary Schlachter
S02	Stabilization building, roll-off container WMXU008598	20-23, 28, 29, 30, 40, 41	July 20, 2022, 10:03 a.m.	Plastic disposable scoops	**Method:** ASTM D5633: Standard Practice for Sampling with a Scoop **NEIC procedure:** *Soil and Solid Sampling/Scoops*, NEICPROC/00-052 **Equipment:** Pre-cleaned single-use plastic disposable scoops, appropriately sized	Zachary Schlachter

Table 4. FIELD MEASUREMENT AND FIELD SAMPLING ACTIVITIES						
S03	Stabilization building, roll-off container WMXU008802	31-35, 42, 43	July 20, 2022, 10:17 a.m.	Plastic disposable scoops	**Method:** ASTM D5633: Standard Practice for Sampling with a Scoop **NEIC procedure:** *Soil and Solid Sampling/Scoops*, NEICPROC/00-052 **Equipment:** Pre-cleaned single-use plastic disposable scoops, appropriately sized	Zachary Schlachter
S04	Stabilization building, roll-off container WMXU008802	31, 32, 33, 36, 37, 44, 45	July 20, 2022, 10:25 a.m.	Plastic disposable scoops	**Method:** ASTM D5633: Standard Practice for Sampling with a Scoop **NEIC procedure:** *Soil and Solid Sampling/Scoops*, NEICPROC/00-052 **Equipment:** Pre-cleaned single-use plastic disposable scoops, appropriately sized	Zachary Schlachter
[1] The current version of each procedure, at the time of the investigation, was followed.						

Activities were documented in field records. Samples collected during the field activities were shipped via UPS to the NEIC laboratory in Denver, Colorado, for analysis.

LABORATORY ACTIVITIES SUMMARY

Bradley W. Miller (Miller) of the laboratory team received the samples at the NEIC laboratory via UPS (tracking No. 1Z A42 01T 84 9327 2408) from Jackie Vega's custody on July 25, 2022. Miller performed sample physical descriptions following NEIC operating procedure *Physical Description/Phase Separation*, NEICPROC/00-045R4. Miller then prepared the samples for laboratory technical support. Miller reduced the particle size of the entire sample so that it could be passed through a 9.5-millimeter (0.375-inch) sieve. The samples were then systematically subsampled by taking approximately 50 two-gram aliquots to generate an approximately 100-gram subsample for leaching by EPA *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (SW-846) Method 1311: Toxicity Characteristic Leaching Procedure. Each sample was leached in duplicate, generating a total of four subsamples tested for each roll-off container. Therefore, subsamples S01-1, S01-2, S02-1, and S02-2 were leached for roll-off container WMXU008598. Subsamples S03-1, S03-2, S04-1, and S04-2 were leached for roll-off container WMXU008802. **Table 5** summarizes analytical objectives, techniques, and methods.

The TCLP leachates were digested following EPA Method 200.2: Sample Preparation Procedure for Spectrochemical Determination of Total Recoverable Elements. Elemental analysis was performed by SW-846 Test Method 6010D: Inductively Coupled Plasma-Optical Emission

Spectrometry. Mercury, from the TCLP leachates, was digested and analyzed by EPA Method 245.1: Determination of Mercury in Water by Cold Vapor Atomic Absorption Spectrometry.

Table 5. ANALYTICAL OBJECTIVE, TECHNIQUE, AND METHOD; ANALYST; AND DATE PERFORMED

Analytical Objective, Technique, and Method[1]	NEIC Analyst	Samples Analyzed by Method (Station Nos.)	Date(s) Performed
Sample physical description: *Physical Description/Phase Separation* (NEICPROC/00-045R5	Bradley W. Miller	S01-S04	July 27, 2022
Preparatory method: • SW-846 Test Method 1311: Toxicity Characteristic Leaching Procedure • EPA Method 200.2: Sample Preparation Procedure for Spectrochemical Determination of Total Recoverable Elements **Metals:** • Inductively Coupled Plasma-Optical Emission Spectrometry, Method 6010D modified, Revision 5, July 2018, Update VI to the Third Edition of the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* EPA publication SW-846 • *Elemental Analyses*, NEICGUID/18-001	Bradley W. Miller	S01-S04	July 28-August 24, 2022
Mercury: • Cold vapor atomic absorption by EPA Method 245.1: Determination of Mercury in Water by Cold Vapor Atomic Absorption Spectrometry • *Elemental Analyses,* NEICGUID/18-001 • *Nippon RA-3420 and RA-4500 Mercury Analyzers, Cold Vapor Atomic Absorption* instrument guide	Erick Zacher	S01-S04	8/23/2022

[1] Data quality summaries, including uncertainty measurements, for all laboratory measurements are maintained in the project file.

ANALYTICAL RESULTS

Laboratory observations are summarized in **Table 6**. The TCLP results and 40 CFR § 268.48 universal treatment standards for non-wastewater samples are summarized in **Table 7**. Laboratory observations, method modifications, and other information are documented in the project file. A copy of the chain of custody record is provided in **Appendix B**. Laboratory photographs showing the TCLP sample preparation are found in **Appendix C**.

Table 6. SUMMARY OF LABORATORY OBSERVATIONS					
Station No.	**Station Location/ Description of Sample Location**	**Appendix C Photo Nos.**	**Laboratory Sample Physical Description**	**TCLP Leachate Solution**	
				Subsample	**Leachate Color**
S01	Stabilization building, roll-off container WMXU008598	IMG_0758.JPG IMG_0759.JPG IMG_0760.JPG IMG_0761.JPG IMG_0762.JPG IMG_0763.JPG IMG_0764.JPG IMG_0769.JPG	Fine gray powder, pebble size (and larger) aggregates with white speckles	S01-1	Clear
				S01-2	Clear
S02		IMG_0758.JPG IMG_0759.JPG IMG_0765.JPG	Fine gray powder, pebble size (and larger) aggregates with white speckles	S02-1	Green
				S02-2	Clear
S03	Stabilization building, roll-off container WMXU008802	IMG_0758.JPG IMG_0759.JPG IMG_0766.JPG IMG_0767.JPG	Fine gray powder, pebble size aggregates and larger with white speckles	S03-1	Clear
				S03-2	Clear
S04		IMG_0758.JPG IMG_0759.JPG IMG_0768.JPG	Fine gray powder, pebble size (and larger) aggregates with white speckles	S04-1	Clear
				S04-2	Clear

Table 7. TCLP ELEMENTAL RESULTS AND 40 CFR § 268.48 UNIVERSAL TREATMENT STANDARDS FOR NONWASTEWATER SAMPLES														
Station No.[1]	TCLP (milligrams per liter [mg/L])													
	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Lead	Mercury	Nickle	Silver	Selenium	Thallium	Vanadium	Zinc
S01-1	< 0.012	< 0.0525	0.406	< 0.0015	< 0.0015	0.082	< 0.069	< 0.005	0.00529	< 0.006	< 0.039	<0.0045	0.0123	< 0.110
S01-2	< 0.012		0.396			0.221	< 0.069		0.00838		< 0.039		0.0151	
S02-1[2]	0.0283		0.416			1.99	2.29		0.00322		< 0.039		0.0035	
S02-2	< 0.012		0.407			0.151	0.187		0.00327		< 0.039		0.0135	
S03-1	0.0125		0.381			0.145	< 0.069		0.00691		< 0.039		0.0155	
S03-2	< 0.012		0.369			0.159	< 0.069		0.00773		0.0699		0.0174	
S04-1	< 0.012		0.397			0.259	0.254		< 0.003		0.0400		0.0138	
S04-2	0.0178		0.394			0.348	0.307		< 0.003		< 0.039		0.0123	
Universal treatment standard	1.15	5	21	1.22	0.11	0.6	0.75	0.025	11	0.14	5.7	0.2	1.6	4.3

[1] Values for these subsamples are an average of a measurement replicate (n=2).
[2] Value for this subsample is an average of laboratory digestion triplicate (n=3).

INVESTIGATION OBSERVATIONS

NEIC made the following observations during the RCRA and Clean Air Act (CAA) compliance inspection. NEIC field team members had a closeout meeting with facility representatives, where some observations were discussed. TVA and FLIR monitoring information were shared with facility representatives during the closeout meeting, and it was indicated that additional findings may be added from NEIC sample analytical results and review of facility records.

These observations are not final compliance determinations. EPA Region 10 will make the final compliance determinations based on its review of this report and other technical, regulatory, and facility information.

Observation 1 RCRA
Observation Summary: Clean Earth - Tacoma's treatment of dangerous waste by stabilization does not ensure that the treated waste meets the LDR treatment standards, which resulted in the off-site disposal of a treated waste batch, a portion of which did not meet the standard. NEIC analyzed grab samples from batch No. 2B102 of treated dangerous waste to determine compliance with LDR treatment standards. One of the subsamples analyzed exceeded the LDR treatment standards for lead and chromium. Two roll-offs of treated waste were shipped to Chemical Waste Management in Arlington, Oregon, as a Washington state dangerous waste (federal non-hazardous waste) that could be disposed of without further treatment.
Citation: **Land Disposal Restrictions, Washington Administrative Code (WAC) 173-303-140(2)(a) [40 CFR § 268.40(a)]** *Land disposal restrictions for wastes designated in accordance with WAC 173-303-070 (3)(d)(i) through (iii) are the restrictions set forth by the Environmental Protection Agency in 40 C.F.R. Part 268 which are incorporated by reference into this regulation, as modified in (c) through (f) of this subsection, and the restrictions set forth in subsections (3) through (7) of this section…* **40 CFR § 268.40(a)** *A prohibited waste identified in the table "Treatment Standards for Hazardous Wastes" may be land disposed only if it meets the requirements found in the table...* *D007…Chromium (Total)…Nonwastewaters…0.60 mg/l TCLP and meet §268.48 standards…* *D008…Lead…Nonwastewaters…0.75 mg/l TCLP and meet §268.48 standards.* **General Waste Analysis, WAC 173-303-300(1) [40 CFR § 264.13(a)(1)]** *This section requires the facility owner or operator to confirm his knowledge about a dangerous waste before he stores, treats, or disposes of it. The purpose for the analysis is to insure that a dangerous waste is managed properly.*
Evidence: **Appendix A** – Field Photographs **Appendix D** – Clean Earth - Tacoma Analytical Report Batch No. 2B102 **Appendix E** – Stabilization Process Documentation for Batch No. 2B102 **Appendix F** – Incoming Documentation for Batch No. 2B102 **Appendix G** – Shipment Documentation for Treated Batch No. 2B102

Observation 1 RCRA

Description of Observation: Clean Earth - Tacoma's treatment of dangerous waste by stabilization does not ensure that the treated waste meets LDR treatment standards. As a result, a treated waste batch was disposed of off-site, a portion of which did not meet the standard. NEIC analyzed samples of treated dangerous waste to determine compliance with LDR treatment standards. On July 20, 2022, NEIC collected four grab samples from one treated batch, batch No. 2B102. The treated waste had been placed in two roll-off containers, designated as WMXU008598 and WMXU008802. NEIC collected two samples from roll-off container WMXU008598 (S01-S02; **Appendix A**, photos 20-23 and 26-30) and two samples from roll-off container WMXU008802 (S03-S04; **Appendix A**, photos 31-37). NEIC laboratory analytical results indicate that one subsample of the four grab samples collected from treatment batch No. 2B102 exceeds the LDR treatment standard limits for lead and chromium. As shown in Table 7, sample S02-1 showed 2.29 mg/L lead by TCLP (0.75 mg/L TCLP lead treatment standard for waste code D008) and 1.99 mg/L chromium by TCLP (0.60 mg/L chromium treatment standard for waste code D007). Sample S02 was subsampled into two samples, S02-1 and S02-2. Each subsample was leached separately, and metals analyses were conducted on each subsample TCLP leachate digestion. Since subsample S02-1 TCLP leachate exceeded the LDR treatment standards for lead and chromium, the leachate was analyzed in triplicate, as shown in Table 7. Subsample S02-2 did not exceed the LDR treatment standards, which shows the heterogeneity of the treated waste within a grab sample.

Batch No. 2B102 had been sampled and analyzed by Clean Earth - Tacoma and was determined by the facility to have met the LDR treatment standards for waste codes D004 through D011. The analytical report for the facility's composite sample of the batch is included in **Appendix D**. Clean Earth - Tacoma stabilized the batch in tank 61 on July 1, 2022, and the stabilization process form shows that 30,000 pounds of lime kiln dust was added to 3,000 gallons of wastes. The stabilization process form shows that 20 different wastes were combined into the batch (**Appendix E**). The wastes combined in the batch included the following waste codes: D002, D003, D004, D005, D006, D007, D008, and D011. Incoming manifests and waste profiles for batch No. 2B102 are included in **Appendix F**. One of the waste streams added in treatment batch No. 2B102 is listed on the profile as "lead contaminated debris," and the process is listed as "scraps of vinyl-coated lead medical aprons" containing 1 to 10 percent lead (**Appendix F**, page 16). The accompanying manifest shows that 2140 pounds of the lead-contaminated debris was added into the batch (**Appendix F** page 15). This type of waste stream would be difficult to treat by stabilization and may cause hot spots of lead contamination. Following storage of the treated wastes until laboratory analyses were received, Clean Earth - Tacoma shipped the two roll-offs of treated waste to Chemical Waste Management in Arlington, Oregon, as a Washington state dangerous waste (federal non-hazardous waste) that could be disposed of without further treatment. The two manifests and waste profile for the treated waste are included in **Appendix G**.

One subsample exceeding the treatment standards for lead and chromium shows that the batch was not properly treated and is in noncompliance with the LDR treatment requirements. The waste batch was heterogeneous after treatment, as shown by comparing analytical results of the grab samples and subsamples throughout the batch. When the treatment standards were designed, EPA took into account the variability of the waste

Observation 1 RCRA

streams, and established treatment standards that are expected to be achievable 99 percent of the time [June 23, 1989, *Federal Register* (54 FR 26605)]. Furthermore, the waste analysis plan should ensure that the treatment standards have been met and does not shield the facility from having to meet the standard. As stated in the June 1, 1990, *Federal Register* (55 FR 22539):

> *[A] disposal facility might violate the land disposal restrictions while at the same time comply with the provisions of its waste analysis plan…In any case, enforcement of the land disposal restrictions is based on grab samples …and analysis of all constituents regulated by the applicable treatment standards, not on the facility's waste analysis plan.*

Additionally, since LDR treatment standards are set as a not-to-exceed requirement, waste should be treated so not only a particular sample meets LDR treatment standards, but also to be so well-mixed that all portions will pass. As stated in the LDR Phase IV Rule preamble in the May 26, 1998, *Federal Register* (63 FR 28567):

> *While a statistical evaluation is used to determine if a waste is hazardous, all parts of the waste must be treated to meet the applicable standards, not just a representative sample. Thus, if results show that ''hot spots'' remain, this is presumptive evidence that treatment was not effective and there is noncompliance with the LDR treatment requirements.*

Observation 2 RCRA

Observation Summary: Stabilization of restricted waste by adding non-restricted waste materials that do not contribute to treatment is impermissible dilution of the treatment residue. Clean Earth - Tacoma combines a variety of wastes into the same treatment batch, including non-hazardous waste that does not contribute to stabilization of the restricted wastes.

Citation:

Land Disposal Restrictions, WAC 173-303-140(2)(a) [40 CFR § 268.3(a)]

Land disposal restrictions for wastes designated in accordance with WAC 173-303-070 (3)(d)(i) through (iii) are the restrictions set forth by the Environmental Protection Agency in 40 C.F.R. Part 268 which are incorporated by reference into this regulation, as modified in (c) through (f) of this subsection, and the restrictions set forth in subsections (3) through (7) of this section…

40 CFR § 268.3(a) *Except as provided in paragraph (b) of this section, no generator, transporter, handler, or owner or operator of a treatment, storage, or disposal facility shall in any way dilute a restricted waste or the residual from treatment of a restricted waste as a substitute for adequate treatment to achieve compliance with subpart D of this part, to circumvent the effective date of a prohibition in subpart C of this part, to otherwise avoid a prohibition in subpart C of this part, or to circumvent a land disposal prohibition imposed by RCRA section 3004.*

Evidence:

Appendix E – Stabilization Process Documentation for Batch No. 2B102

Appendix F – Incoming Documentation for Batch No. 2B102

Observation 2 RCRA

Description of Observation: Clean Earth - Tacoma combines a variety of wastes into the same treatment batch, which results in dilution of the restricted waste to meet the LDR treatment standards. Review of the documents for one of the batches treated by stabilization showed the following incidences of dilution: addition of non-hazardous waste that does not contribute to stabilization of the restricted wastes, addition of hazardous wastes that do not contain metals and for which stabilization is not the preferred treatment, and the addition of extra lime kiln dust (LKD) to treat the acidic waste in the batch.

The stabilization process form for batch No. 2B102 shows that 20 different wastes were combined into the batch (**Appendix E**). The batch was treated in tank 61 on July 1, 2022, and the stabilization process form shows that 30,000 pounds of lime kiln dust was added to 3,000 gallons of wastes. Incoming manifests and waste profiles for batch No. 2B102 are included in **Appendix F**. Review of these documents show that the following wastes were added to this batch:

- Hydrogen peroxide product – not regulated; pH 2-4
- Unused salts – waste code D001, oxidizing solid
- Lead contaminated debris – waste code D008
- Oil and cutting water with metals – waste codes D004, D005, D006, D007, D008, D011
- Phosphoric, acetic, nitric acid blend – waste codes D002, D007; pH <2
- Alkaline cleaning solution – waste codes D002, D003; pH >12.5
- Acid loose pack of retail wastes – waste code D002; pH <2, no metals indicated
- Acidic, organic (oxalic acid, glycolic acid) loose pack of retail wastes – waste code D002; pH <2, no metals indicated
- Rinse of tank 51

The hydrogen peroxide product is a non-hazardous waste that is not providing any type of treatment in the batch and would dilute the batch to meet the LDR treatment standards. The acidic retail loose packs (both acid loose pack and acidic, organic loose pack) need to be deactivated for LDR, but stabilization does not appear to be the best treatment option available since no metals are present in the waste. Additionally, adding acidic waste streams during stabilization would increase the volume of reagent LKD needed to increase the pH of the batch and affect the solubility of the metals. This action of adding additional acidic waste streams is causing additional dilution without contributing to the pozzolanic reaction needed for stabilization of the metals. The unused salts and rinse of tank 51 are also non-metal waste streams that are added and that may be causing impermissible dilution of the batch. Clean Earth - Tacoma did not provide adequate information for the rinse of tank 51; the amount of rinse added to the batch or properties of this waste stream were not provided.

In the preamble to the LDR Third Third Rule, EPA recommends avoiding impermissible dilution by ensuring aggregation of wastes is only applied to wastes and waste constituents legitimately amenable to the same type of treatment. As stated in the June 1, 1990, *Federal*

Observation 2 RCRA

Register (55 FR 22666):"…treatment units would have to be treating wastes that are amenable to treatment in that type of unit or by that type of treatment …"

In the LDR Phase IV Rule preamble (May 26, 1998, *Federal Register* [63 FR 28566]), EPA states that treatment with reagents that cause an irreversible chemical or pozzolanic reaction when mixed, or do not permanently bind the metals in a non-leachable matrix is impermissible dilution.

Observation 3 RCRA

Observation Summary: Clean Earth - Tacoma operates a baler, compactor, and shredder to treat dangerous wastes. These treatment units are not covered by the facility's dangerous waste permit, and instead are listed as processing units without specific requirements. The baler, compactor, and shredder treat hazardous wastes and should be subject to tank requirements under or miscellaneous unit requirements. The baler and compactor may also be subject to RCRA Subpart CC air emission standards.

Citation:

Clean Earth - Tacoma RCRA Permit, 1.1.2. STANDARD CONDITIONS, Effect of Permit *Any storage, treatment, or disposal of dangerous waste that requires a permit under Chapter 173-303 WAC is prohibited at this facility unless that activity is authorized by this Permit, including any temporary authorization by the Department under WAC 173-303-830(4)(e).*

Clean Earth - Tacoma RCRA Permit, B.1.5.3. FACILITY OPERATIONS, Dangerous Waste Process Equipment *Process equipment units are tools that assist in the processing of the waste. These units do not contain waste in the same way as a tank contains waste, and therefore, they are not considered to be tanks.*

Definitions. WAC 173-303-040 *"Treatment" means the physical, chemical, or biological processing of dangerous waste to make such wastes nondangerous or less dangerous, safer for transport, amenable for energy or material resource recovery, amenable for storage, or reduced in volume, with the exception of compacting, repackaging, and sorting as allowed under WAC 173-303-400(2) and 173-303-600(3).*

Evidence:

Appendix A – Field Photographs
Appendix H – Clean Earth - Tacoma Dangerous Waste Permit
Appendix I – August 5, 2022, Follow-up Response from Clean Earth - Tacoma

Description of Observation: Tacoma operates a baler, compactor, and shredder for treatment of dangerous wastes; this equipment is not included in the permit as RCRA treatment units (**Appendix A**, compactor in photo 6). Descriptions of the operations for these units are summarized in the "Facility Operations Summary" section of this report and are described as "processing equipment" in the facility's dangerous waste permit (**Appendix H**). The only reference to processing equipment in the Washington dangerous waste regulations is in the definition of "recycling unit," which these units do not meet. These units conduct treatment by reducing the volume of dangerous waste to make it more amenable for treatment or disposal off-site. (Note: The exception for compacting in the WAC regulations is only for generators that are compacting cans, rags, and bottles in a container.) Each unit should be evaluated to determine whether the tank system requirements under WAC 173-

Observation 3 RCRA

303-640 or miscellaneous unit requirements under WAC 173-303-680 would be the most appropriate.

Both the baler and compactor process waste with VOCs over 500 ppm. These units should be subject to air emission standards, whether through RCRA Subpart CC applicability for tanks or through the dangerous waste permit as required by Subpart X. Emissions from the baler and compactor are collected in ventilation hoods located above each unit, which are both routed to two carbon cannisters operated in series. In the follow-up response from Clean Earth, inspection records for the carbon cannisters show that the carbon for process area 1 was last changed out on October 24, 2017 (**Appendix I**, page 219).

Observation 4 RCRA

Observation Summary: Clean Earth - Tacoma failed to mark a satellite container accumulating hazardous waste condensate with the words "Hazardous Waste" and an indication of the hazards of the contents.

Citation:

Satellite accumulation area regulations for medium quantity generators and large quantity generators, WAC 173-303-174(1)(f) [40 CFR § 262.15(a)(5)]

(1) A generator may accumulate as much as fifty-five gallons of dangerous waste or either one quart of liquid acutely hazardous waste or 2.2 lbs. of solid acutely hazardous waste (as defined in WAC 173-303-040) in containers at or near any point of generation where waste initially accumulates (defined as a satellite accumulation area in WAC 173-303-040)…A generator may accumulate waste without a permit, or without complying with WAC 173-303-400, 173-303-600, 173-303-692, and 173-303-800, provided that all the conditions for exemption in this section are met…The conditions for exemption for satellite accumulation are:

(f) Container labeling or marking. A generator must clearly label or mark each container of dangerous waste with the following:

(i) The words "Dangerous Waste" or "Hazardous Waste." Except for containers one gallon (or four liters) and under, the lettering must be legible from a distance of twenty-five feet or the lettering size is a minimum of one-half inch in height.

(ii) An indication of the hazards of the contents (examples include, but are not limited to, the applicable dangerous waste characteristic(s) and criteria of ignitable, corrosive, reactive and toxic and the applicable hazard(s) identified for listed dangerous wastes). The label or marking must be:

(A) Legible and/or recognizable from a distance of twenty-five feet or the lettering size is a minimum of one-half inch in height; and

(B) Include descriptive word(s) and/or pictogram(s) that identifies the hazards associated with the contents of the containers for the public, emergency response personnel, and employees; for containers one gallon (or four liters) and under the label, marking or lettering can be appropriate for the size of the container.

Evidence:

Appendix J – Appendix D-10 of 2021 Permit Renewal, Air Quality Program

Observation 4 RCRA

Appendix K – Hazardous Waste-Derived Fuel Waste Profiles
Appendix A – Field Photographs

Description of Observation: Clean Earth - Tacoma maintains five permitted hazardous waste tanks in its tank farm that are subject to Level 2 air emission controls under RCRA Subpart CC: 164, 250, 901, 902, and 903 (**Appendix J**). The tanks are used to blend and store several different blends of hazardous waste-derived fuels. Profiles for the hazardous waste fuels indicate the presence of F, K, and U-listed hazardous wastes (**Appendix K**).

To comply with Level 2 controls, the tanks are equipped with a closed-vent system that conveys organic vapors to a control device consisting of two carbon adsorption cannisters (**Appendix J**). The closed-vent system has a condenser, and condensate that forms within the unit drains from the condenser into a 55-gallon drum near tank 903. Clean Earth - Tacoma representatives stated during the inspection that the condensate drum is emptied approximately three times a year and its contents are placed back into the 900-series tanks.

At the time of NEIC's inspection, the condensate drum had a heavily damaged "Hazardous Waste" label that was difficult to read and not legible from a distance of 25 feet (**Appendix A**, photo 46). The drum was also not labeled or marked with an indication of the hazards of the contents.

Observation 5 RCRA

Observation Summary: Clean Earth - Tacoma did not maintain and operate the facility to minimize the possibility of a sudden or non-sudden release of hazardous waste or hazardous waste constituents. Specifically, NEIC inspectors observed hazardous waste residues in the secondary containment area of tank 902 directly underneath the tank's sampling port.

Citation:

Preparedness and prevention, WAC 173-303-340 [40 CFR § 264.31] *Facilities must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment.*

Evidence:
Appendix K – Hazardous Waste-Derived Fuel Waste Profiles
Appendix A – Field Photographs

Description of Observation: Tank 902 is a permitted hazardous waste storage tank in Clean Earth - Tacoma's tank farm. The tank is used to store several different blends of hazardous waste-derived fuels. Profiles for the hazardous waste fuels indicate the presence of F, K, and U-listed hazardous wastes (**Appendix K**). At the time of NEIC's inspection, inspectors observed a liquid sampling port on tank 902's exterior wall (**Appendix A**, photo 48). The sampling port was capped, and liquid waste was visible on the cap. Inspectors observed waste residue and staining directly beneath the sampling port on the concrete secondary containment (**Appendix A**, photo 49).

Observation 6 RCRA

Observation Summary: The instrument Clean Earth - Tacoma uses to monitor components subject to RCRA Subpart BB and the closed-vent system subject to RCRA Subpart CC is not being calibrated with a mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 ppm methane or n-hexane.

Citation:

Air emission standards for equipment leaks, WAC 173-303-691

(2) 40 C.F.R. 264.1051 through 1065 (Subpart BB) is incorporated by reference.

Air emission standards for equipment leaks, 40 CFR § 264.1063

(a) Each owner or operator subject to the provisions of this subpart shall comply with the test methods and procedures requirements provided in this section.

(b) Leak detection monitoring, as required in §§ 264.1052-264.1062, shall comply with the following requirements:

(4) Calibration gases shall be:

(i) Zero air (less than 10 ppm of hydrocarbon in air).

(ii) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 ppm methane or n-hexane.

Air emission standards for tanks, surface impoundments, and containers, WAC 173-303-692

(2) 40 C.F.R. Parts 264.1081 through 264.1091 (Subpart CC) is incorporated by reference.

Air emission standards for tanks, surface impoundments, and containers, 40 CFR § 264.1087

(a) This section applies to each closed-vent system and control device installed and operated by the owner or operator to control air emissions in accordance with standards of this subpart.

(b) The closed-vent system shall meet the following requirements:

(2) The closed-vent system shall be designed and operated in accordance with the requirements specified in § 264.1033(k) of this part.

(4) The closed-vent system shall be inspected and monitored by the owner or operator in accordance with the procedure specified in § 264.1033(l).

Standards: Closed-vent systems and control devices, 40 CFR § 264.1033

(k) A closed-vent system shall meet either of the following design requirements:

(1) A closed-vent system shall be designed to operate with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background as determined by the procedure in § 264.1034(b) of this subpart, and by visual inspections;

Test methods and procedures, 40 CFR § 264.1034

(b) When a closed-vent system is tested for compliance with no detectable emissions, as required in § 264.1033(l) of this subpart, the test shall comply with the following requirements:

(4) Calibration gases shall be:

(i) Zero air (less than 10 ppm of hydrocarbon in air).

Observation 6 RCRA

(ii) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 ppm methane or n-hexane.

Evidence:
Appendix L – PID Calibration Records

Description of Observation: Clean Earth - Tacoma uses a MiniRAE 3000 photoionization detector (PID) to monitor equipment subject to RCRA Subpart BB and the closed-vent system subject to RCRA Subpart CC. Through a contract with Clean Earth - Tacoma, National Safety, Inc. calibrates the PID once a month. NEIC inspectors reviewed the PID calibration records for January-June 2022 (**Appendix L**). The calibration records indicate that National Safety, Inc. is calibrating the PID with a mixture of 100 ppm isobutylene and air, and not a mixture of approximately 10,000 ppm methane or n-hexane and air.

Observation 7 RCRA

Observation Summary: The instrument Clean Earth - Tacoma uses to monitor components subject to RCRA Subpart BB and the closed-vent system subject to RCRA Subpart CC is not always calibrated each day before use.

Citation:

Air emission standards for equipment leaks, WAC 173-303-691

(2) 40 C.F.R. 264.1051 through 1065 (Subpart BB) is incorporated by reference.

Air emission standards for equipment leaks, 40 CFR § 264.1063

(a) Each owner or operator subject to the provisions of this subpart shall comply with the test methods and procedures requirements provided in this section.

(b) Leak detection monitoring, as required in §§ 264.1052-264.1062, shall comply with the following requirements:

(3) The instrument shall be calibrated before use on each day of its use by the procedures specified in Reference Method 21.

Air emission standards for tanks, surface impoundments, and containers, WAC 173-303-692

(2) 40 C.F.R. Parts 264.1081 through 264.1091 (Subpart CC) is incorporated by reference.

Air emission standards for tanks, surface impoundments, and containers, 40 CFR § 264.1087

(a) This section applies to each closed-vent system and control device installed and operated by the owner or operator to control air emissions in accordance with standards of this subpart.

(b) The closed-vent system shall meet the following requirements:

(2) The closed-vent system shall be designed and operated in accordance with the requirements specified in § 264.1033(k) of this part.

(4) The closed-vent system shall be inspected and monitored by the owner or operator in accordance with the procedure specified in § 264.1033(l).

(c) The control device shall meet the following requirements:

(3) The owner or operator using a carbon adsorption system to comply with paragraph (c)(1) of this section shall operate and maintain the control device in accordance with the following requirements:

Observation 7 RCRA

(i) Following the initial startup of the control device, all activated carbon in the control device shall be replaced with fresh carbon on a regular basis in accordance with the requirements of § 264.1033(g) or § 264.1033(h) of this part.

Standards: Closed-vent systems and control devices, 40 CFR § 264.1033

(h) An owner or operator using a carbon adsorption system such as a carbon canister that does not regenerate the carbon bed directly onsite in the control device shall replace the existing carbon in the control device with fresh carbon on a regular basis by using one of the following procedures:

(1) Monitor the concentration level of the organic compounds in the exhaust vent stream from the carbon adsorption system on a regular schedule, and replace the existing carbon with fresh carbon immediately when carbon breakthrough is indicated. The monitoring frequency shall be daily or at an interval no greater than 20 percent of the time required to consume the total carbon working capacity established as a requirement of § 264.1035(b)(4)(iii)(G), whichever is longer.

(k) A closed-vent system shall meet either of the following design requirements:

(1) A closed-vent system shall be designed to operate with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background as determined by the procedure in § 264.1034(b) of this subpart, and by visual inspections;

Test methods and procedures, 40 CFR § 264.1034

(b) When a closed-vent system is tested for compliance with no detectable emissions, as required in § 264.1033(l) of this subpart, the test shall comply with the following requirements:

(3) The instrument shall be calibrated before use on each day of its use by the procedures specified in Reference Method 21.

Evidence:
Appendix J – Appendix D-10 of 2021 Permit Renewal, Air Quality Program
Appendix L – PID Calibration Records
Appendix M – RCRA Subparts BB and CC Monitoring Records

Description of Observation: Clean Earth - Tacoma uses a MiniRAE 3000 PID to monitor equipment subject to RCRA Subpart BB and the closed-vent system subject to RCRA Subpart CC. The equipment subject to RCRA Subpart BB includes flanges, connectors, pumps, and valves associated with hazardous waste tanks 801-805, 901-903, 1211, 1212, 4603, 4604, and 4606. Certain pieces of equipment subject to RCRA Subpart BB, including valves and connectors, are monitored monthly with the PID (**Appendix J**, Table 1. Monitoring Schedule). Tanks 901-903 are equipped with a closed-vent system subject to RCRA Subpart CC. The closed-vent system leads to a control device consisting of two carbon canisters operated in series. Clean Earth - Tacoma monitors the carbon canisters weekly for breakthrough and the closed-vent system every 6 months.

The PID is calibrated on a monthly basis by National Safety, Inc. NEIC inspectors reviewed the calibration records for January-June 2022 (**Appendix L**) and compared calibration dates to the

Observation 7 RCRA

dates when equipment subject to RCRA Subparts BB and CC was monitored (**Appendix M**). The results are provided in the table below:

PID Calibration Dates	Monthly RCRA Subpart BB Monitoring Dates	Weekly RCRA Subpart CC Carbon Cannister Monitoring Dates	Semiannual RCRA Subpart CC Closed-Vent System Monitoring Dates
1/21/2022	**1/15/2022**	**1/6/2022**	N/A
		1/10/2002	
		1/18/2022	
		1/24/2022	
		1/31/2022	
2/22/2022	**2/25/2022**	**2/7/2022**	
		2/14/2022	
		2/21/2022	
		2/28/2022	
3/24/2022	**3/23/2022**	**3/7/2022**	
		3/14/2022	
		3/21/2022	
		3/28/2022	
4/27/2022	**4/13/2022**	**4/4/2022**	
		4/11/2022	
		4/18/2022	
		4/25/2022	
5/27/2022	5/27/2022	**5/2/2022**	
		5/9/2022	
		5/16/2022	
		5/23/2022	
		5/31/2022	
6/28/2022	6/28/2022	**6/6/2022**	**6/29/2022**
		6/13/2022	
		6/20/2022	
		6/27/2022	

The monitoring dates bolded in the table above indicate days when the PID was not calibrated before use. Based on these records, Clean Earth - Tacoma did not meet the performance standards of EPA Method 21.

Observation 8 RCRA

Observation Summary: Clean Earth - Tacoma failed to conduct quarterly precision testing on the instrument used to monitor components subject to RCRA Subpart BB and the closed-vent system subject to RCRA Subpart CC.

Citation:

Air emission standards for equipment leaks, WAC 173-303-691

(2) 40 C.F.R. 264.1051 through 1065 (Subpart BB) is incorporated by reference.

Observation 8 RCRA

Air emission standards for equipment leaks, 40 CFR § 264.1063

(a) Each owner or operator subject to the provisions of this subpart shall comply with the test methods and procedures requirements provided in this section.

(b) Leak detection monitoring, as required in §§ 264.1052-264.1062, shall comply with the following requirements:

(1) Monitoring shall comply with Reference Method 21 in 40 CFR part 60.

Air emission standards for tanks, surface impoundments, and containers, WAC 173-303-692

(2) 40 C.F.R. Parts 264.1081 through 264.1091 (Subpart CC) is incorporated by reference.

Air emission standards for tanks, surface impoundments, and containers, 40 CFR § 264.1087

(a) This section applies to each closed-vent system and control device installed and operated by the owner or operator to control air emissions in accordance with standards of this subpart.

(b) The closed-vent system shall meet the following requirements:

(2) The closed-vent system shall be designed and operated in accordance with the requirements specified in § 264.1033(k) of this part.

Standards: Closed-vent systems and control devices, 40 CFR § 264.1033

(k) A closed-vent system shall meet either of the following design requirements:

(1) A closed-vent system shall be designed to operate with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background as determined by the procedure in § 264.1034(b) of this subpart, and by visual inspections;

Test methods and procedures, 40 CFR § 264.1034

(b) When a closed-vent system is tested for compliance with no detectable emissions, as required in § 264.1033(l) of this subpart, the test shall comply with the following requirements:

(1) Monitoring shall comply with Reference Method 21 in 40 CFR part 60.

Method 21 – Determination of Volatile Organic Compound Leaks

Section 8.1.2 Calibration Precision. The calibration precision test must be completed prior to placing the analyzer into service and at subsequent 3-month intervals or at the next use, whichever is later.

Evidence:

Appendix L – PID Calibration Records

Appendix I – August 5, 2022, Follow-up Response from Clean Earth - Tacoma

Description of Observation: Clean Earth - Tacoma uses a MiniRAE 3000 PID to detect leaks from equipment subject to RCRA Subpart BB and the closed-vent system subject to RCRA Subpart CC. Through a contract with Clean Earth - Tacoma, National Safety, Inc. calibrates the PID once a month. NEIC inspectors reviewed the previous 6 months of PID calibration records (**Appendix L**). The calibration records make no mention of quarterly precision testing. In discussions following the inspection, Clean Earth - Tacoma representatives stated the facility does not conduct quarterly precision testing on the PID and requested information from National Safety, Inc. to determine if the company conducted the testing (**Appendix I**, page 3).

Observation 8 RCRA

As of the date of this report, there is no information to indicate that National Safety, Inc. conducts quarterly precision testing.

Observation 9 RCRA

Observation Summary: The instrument Clean Earth - Tacoma uses to monitor components subject RCRA Subpart BB and the closed-vent system and control device subject to RCRA Subpart CC cannot detect certain compounds present in the hazardous waste.

Citation:

Air emission standards for equipment leaks, WAC 173-303-691

(2) 40 C.F.R. 264.1051 through 1065 (Subpart BB) is incorporated by reference.

Air emission standards for equipment leaks, 40 CFR § 264.1063

(a) Each owner or operator subject to the provisions of this subpart shall comply with the test methods and procedures requirements provided in this section.

(b) Leak detection monitoring, as required in §§ 264.1052-264.1062, shall comply with the following requirements:

(1) Monitoring shall comply with Reference Method 21 in 40 CFR part 60.

Air emission standards for tanks, surface impoundments, and containers, WAC 173-303-692

(2) 40 C.F.R. Parts 264.1081 through 264.1091 (Subpart CC) is incorporated by reference.

Air emission standards for tanks, surface impoundments, and containers, 40 CFR § 264.1087

(a) This section applies to each closed-vent system and control device installed and operated by the owner or operator to control air emissions in accordance with standards of this subpart.

(b) The closed-vent system shall meet the following requirements:

(2) The closed-vent system shall be designed and operated in accordance with the requirements specified in § 264.1033(k) of this part.

Standards: Closed-vent systems and control devices, 40 CFR § 264.1033

(h) An owner or operator using a carbon adsorption system such as a carbon canister that does not regenerate the carbon bed directly onsite in the control device shall replace the existing carbon in the control device with fresh carbon on a regular basis by using one of the following procedures:

(1) Monitor the concentration level of the organic compounds in the exhaust vent stream from the carbon adsorption system on a regular schedule, and replace the existing carbon with fresh carbon immediately when carbon breakthrough is indicated…

(k) A closed-vent system shall meet either of the following design requirements:

(1) A closed-vent system shall be designed to operate with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background as determined by the procedure in § 264.1034(b) of this subpart, and by visual inspections;

Observation 9 RCRA

Test methods and procedures, 40 CFR § 264.1034

(b) When a closed-vent system is tested for compliance with no detectable emissions, as required in § 264.1033(l) of this subpart, the test shall comply with the following requirements:

(1) Monitoring shall comply with Reference Method 21 in 40 CFR part 60.

Method 21 – Determination of Volatile Organic Compounds Leaks

Section 6.1 The VOC instrument detector shall respond to the compounds being processed. Detector types that may meet this requirement include, but are not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization.

Evidence:

Appendix M – RCRA Subparts BB and CC Monitoring Records
Appendix J – Appendix D-10 of 2021 Permit Renewal, Air Quality Program
Appendix K – Hazardous Waste-Derived Fuel Waste Profiles
Appendix N – MiniRAE Guidance on PID Instrument Response

Description of Observation: Clean Earth - Tacoma uses a MiniRAE 3000 PID with a 10.6 electron volt (eV) lamp to detect leaks from equipment subject to RCRA Subpart BB and the closed-vent system and control devices subject to RCRA Subpart CC. The equipment subject to RCRA Subpart BB includes flanges, connectors, pumps, and valves associated with hazardous waste tanks 801-805, 901-903, 1211, 1212, 4603, 4604, and 4606. This equipment is monitored on a monthly basis with the PID. Tanks 901-903 are equipped with a closed-vent system subject to RCRA Subpart CC. The closed-vent system leads to a control device consisting of two carbon canisters operated in series. Clean Earth - Tacoma monitors the carbon canisters weekly for breakthrough and the closed-vent system every 6 months with a PID (**Appendix M**).

Tank inventory records and statements by Clean Earth - Tacoma representatives indicate that several different blends of hazardous waste-derived fuels are currently stored, or were recently stored, in tanks 801-805, 901-903, 1211, 1212, 4603, 4604, and 4606 (**Appendix J**). NEIC inspectors reviewed the profiles of four of the hazardous waste-derived fuels (**Appendix K**) and made the following observations:

- Profile ZEC2396-00 has a chemical composition including “ethanol, isobutanol, methanol (5-20%)” and lists the EPA hazardous waste Nos. F002 and U080 (methylene chloride) and D019 (carbon tetrachloride).

- Profile Z190507018F-00 lists the EPA hazardous waste Nos. F002 and U080 (methylene chloride) and D019 (carbon tetrachloride).

- Profile ZAG1265C-02 has a chemical composition including “ethanol, isobutanol, methanol (0-40%)” and lists the EPA hazardous waste Nos. F002 and U080 (methylene chloride) and D019 (carbon tetrachloride).

- Profile ZQF13023002-01 lists the EPA hazardous waste Nos. F002 and U080 (methylene chloride) and D019 (carbon tetrachloride).

Observation 9 RCRA

Instrument guidance issued by the MiniRAE 3000 manufacturer notes which chemicals will not register a response (and therefore not be detectable) based on PID lamp energy. The guidance states that methanol, methylene chloride, and carbon tetrachloride will not be detectable in a PID equipped with a 10.6 eV lamp (**Appendix N**). As a result, Clean Earth - Tacoma is not using a VOC instrument detector that responds to compounds present in the hazardous waste it is monitoring and is not meeting the performance standards of EPA Method 21.

Observation 10 RCRA

Observation Summary: Clean Earth - Tacoma failed to operate the closed-vent systems associated with RCRA Subpart CC Level 2 hazardous waste tanks with no detectable emissions. NEIC inspectors recorded organic vapor emissions from conservation vents on the closed-vent systems of hazardous waste tanks 164, 250, 902, and 903.

Citation:

Air emission standards for tanks, surface impoundments, and containers, WAC 173-303-692

(2) 40 C.F.R. Parts 264.1081 through 264.1091 (Subpart CC) is incorporated by reference.

Air emission standards for tanks, surface impoundments, and containers, 40 CFR § 264.1084

(d) Owners and operators controlling air pollutant emissions from a tank using Tank Level 2 controls shall use one of the following tanks:

(3) A tank vented through a closed-vent system to a control device in accordance with the requirements specified in paragraph (g) of this section;

(g) The owner or operator who controls air pollutant emissions from a tank by venting the tank to a control device shall meet the requirements specified in paragraphs (g)(1) through (g)(3) of this section.

(1) The tank shall be covered by a fixed roof and vented directly through a closed-vent system to a control device in accordance with the following requirements:

(iv) The closed-vent system and control device shall be designed and operated in accordance with the requirements of § 264.1087 of this subpart.

Standards: Closed-vent systems and control devices, 40 CFR § 264.1087

(a) This section applies to each closed-vent system and control device installed and operated by the owner or operator to control air emissions in accordance with standards of this subpart.

(b) The closed-vent system shall meet the following requirements:

(2) The closed-vent system shall be designed and operated in accordance with the requirements specified in § 264.1033(k) of this part.

Standards: Closed-vent systems and control devices, 40 CFR § 264.1033

(k) A closed-vent system shall meet either of the following design requirements:

(1) A closed-vent system shall be designed to operate with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background as determined by the procedure in § 264.1034(b) of this subpart, and by visual inspections;

Observation 10 RCRA

Evidence:
Appendix J – Appendix D-10 of 2021 Permit Renewal, Air Quality Program
Appendix O – TVA Monitoring Results
Appendix P – FLIR Videos and Photos
Appendix I – August 5, 2022, Follow-up Response from Clean Earth - Tacoma

Description of Observation: Tanks 164, 250, 901, 902, and 903 are permitted hazardous waste storage tanks in Clean Earth - Tacoma's tank farm. Clean Earth - Tacoma operates the tanks with Level 2 air emission controls under RCRA Subpart CC (**Appendix J**). Tanks 164, 250, 901, 902, and 903 are equipped with a closed-vent system to convey organic vapors to a control device consisting of two carbon canisters operated in series.

On July 20, 2022, using a TVA, NEIC inspectors detected a leak from a conservation vent in the closed-vent system of tank 902. The TVA recorded a leak of 21,000 ppm. Facility personnel recorded a reading of 764 ppm from the conservation vent using a PID (**Appendix O**). Using an FLIR camera, NEIC inspectors observed organic vapors from the conservation vent (**Appendix P**, MOV_0302). Using a TVA, NEIC inspectors also detected a leak from the conservation vent in the closed-vent system of tank 903. The TVA recorded a leak of 900 ppm. Using a PID, facility personnel recorded a reading of 44 ppm from the conservation vent (**Appendix O**). Using a FLIR camera, NEIC inspectors observed organic vapors from the conservation vent (**Appendix P**, MOV_0301 and MOV_0303).

On July 21, 2022, using a TVA, NEIC inspectors detected a leak from the conservation vent in the closed-vent system of tank 164. The TVA recorded a leak of 1,500 ppm. Facility personnel recorded a reading of 349 ppm from the conservation vent using a PID. Using a TVA, NEIC inspectors also detected a leak from the conservation vent in the closed-vent system of tank 250. The TVA recorded a leak of 2,100 ppm. Using a PID, facility personnel recorded a reading of 456 ppm from the conservation vent (**Appendix O**).

Clean Earth - Tacoma did not operate the closed-vent systems on tanks 164, 250, 902, and 903 with no detectable emissions.

On August 5, 2022, Clean Earth - Tacoma representatives stated that the conservation vents on tanks 164, 250, 901, 902, and 903 would be replaced within 90 days (**Appendix I**).

Observation 11 RCRA

Observation Summary: Clean Earth - Tacoma failed to operate closure devices on the fixed roofs of RCRA Subpart CC Level 2 hazardous waste tanks with no detectable emissions. NEIC inspectors recorded organic vapor emissions from closure devices on the roofs of hazardous waste tanks 901 and 902.

Citation:
Air emission standards for tanks, surface impoundments, and containers, WAC 173-303-692

(2) 40 C.F.R. Parts 264.1081 through 264.1091 (Subpart CC) is incorporated by reference.

Air emission standards for tanks, surface impoundments, and containers, 40 CFR § 264.1084

(d) Owners and operators controlling air pollutant emissions from a tank using Tank Level 2 controls shall use one of the following tanks:

Observation 11 RCRA

(3) A tank vented through a closed-vent system to a control device in accordance with the requirements specified in paragraph (g) of this section;

(g) The owner or operator who controls air pollutant emissions from a tank by venting the tank to a control device shall meet the requirements specified in paragraphs (g)(1) through (g)(3) of this section.

(1) The tank shall be covered by a fixed roof and vented directly through a closed-vent system to a control device in accordance with the following requirements:

(i) The fixed roof and its closure devices shall be designed to form a continuous barrier over the entire surface area of the liquid in the tank.

(ii) Each opening in the fixed roof not vented to the control device shall be equipped with a closure device. If the pressure in the vapor headspace underneath the fixed roof is less than atmospheric pressure when the control device is operating, the closure devices shall be designed to operate such that when the closure device is secured in the closed position there are no visible cracks, holes, gaps, or other open spaces in the closure device or between the perimeter of the cover opening and the closure device. If the pressure in the vapor headspace underneath the fixed roof is equal to or greater than atmospheric pressure when the control device is operating, the closure device shall be designed to operate with no detectable organic emissions.

Waste determination procedures, 40 CFR § 264.1083

(d) The procedure for determining no detectable organic emissions for the purpose of complying with this subpart shall be conducted in accordance with the procedures specified in 40 CFR 265.1084(d).

Waste determination procedures, 40 CFR § 265.1084

(d) Procedure for determining no detectable organic emissions for the purpose of complying with this subpart:

(8) The arithmetic difference between the maximum organic concentration indicated by the instrument and the background level shall be compared with the value of 500 ppmv…If the difference is less than 500 ppmv, then the potential leak interface is determined to operate with no detectable organic emissions.

Evidence:
Appendix J – Appendix D-10 of 2021 Permit Renewal, Air Quality Program
Appendix O – TVA Monitoring Results
Appendix P – FLIR Videos and Photos

Description of Observation: Tanks 164, 250, 901, 902, and 903 are permitted hazardous waste storage tanks in Clean Earth - Tacoma's tank farm. Clean Earth - Tacoma operates the tanks with Level 2 air emission controls under RCRA Subpart CC (**Appendix J**). Tanks 164, 250, 901, 902, and 903 are equipped with a closed-vent system to convey organic vapors to a control device consisting of two carbon canisters operated in series.

On July 20, 2022, using a TVA, NEIC inspectors detected a leak from the tank level indicator on the roof of tank 901. The TVA recorded a leak of 800 ppm. Using a TVA, NEIC inspectors also detected a leak from the tank level indicator on the roof of tank 902. The TVA recorded a

Observation 11 RCRA

leak of 35,000 ppm (**Appendix O**). Using a FLIR camera, NEIC inspectors observed organic vapors from the tank level indicator on tank 902 (**Appendix P**, MOV_305).

On July 21, 2022, using a TVA, NEIC inspectors detected a leak from the main access point on the roof of tank 902. The TVA recorded a leak of 4,300 ppm. Using a PID, facility personnel recorded a reading of 543 ppm from the access point (**Appendix O**).

The tank level indicators on tanks 901 and 902 and the access point on tank 902 are not part of the closed-vent system and must be equipped with, or operate as, closure devices. Closure devices must be operated with no detectable emissions on tanks with Level 2 controls. Clean Earth - Tacoma was not operating the closure devices on tanks 901 and 902 with no detectable emissions.

Observation 12 RCRA

Observation Summary: Clean Earth - Tacoma failed to minimize the exposure of hazardous waste to the atmosphere from a closure device on a RCRA Subpart CC Level 1 tank. NEIC inspectors recorded organic vapor emissions from a tank level indicator on hazardous waste tank 1211.

Citation:

Air emission standards for tanks, surface impoundments, and containers, WAC 173-303-692

(2) 40 C.F.R. Parts 264.1081 through 264.1091 (Subpart CC) is incorporated by reference.

Air emission standards for tanks, surface impoundments, and containers, 40 CFR § 264.1084

(c) Owners and operators controlling air pollutant emissions from a tank using Tank Level 1 controls shall meet the requirements specified in paragraphs (c)(1) through (c)(4) of this section:

(2) The tank shall be equipped with a fixed roof designed to meet the following specifications:

(i) The fixed roof and its closure devices shall be designed to form a continuous barrier over the entire surface area of the hazardous waste in the tank. The fixed roof may be a separate cover installed on the tank (e.g., a removable cover mounted on an open-top tank) or may be an integral part of the tank structural design (e.g., a horizontal cylindrical tank equipped with a hatch).

…

(iii) Each opening in the fixed roof, and any manifold system associated with the fixed roof, shall be either:

(A) Equipped with a closure device designed to operate such that when the closure device is secured in the closed position there are no visible cracks, holes, gaps, or other open spaces in the closure device or between the perimeter of the opening and the closure device;

(iv) The fixed roof and its closure devices shall be made of suitable materials that will minimize exposure of the hazardous waste to the atmosphere, to the extent practical, and will maintain the integrity of the fixed roof and closure devices throughout their intended service life. Factors to be considered when selecting the materials for and designing the fixed roof and closure devices shall include: Organic vapor permeability, the effects of any contact with the

Observation 12 RCRA

hazardous waste or its vapors managed in the tank; the effects of outdoor exposure to wind, moisture, and sunlight; and the operating practices used for the tank on which the fixed roof is installed.

Evidence:
Appendix J – Appendix D-10 of 2021 Permit Renewal, Air Quality Program
Appendix O – TVA Monitoring Results
Appendix P – FLIR Videos and Photos

Description of Observation: Tank 1211 is a permitted hazardous waste storage tank in Clean Earth - Tacoma's tank farm. Clean Earth - Tacoma operates the tank with Level 1 air emission controls under RCRA Subpart CC (**Appendix J**).

On July 20, 2022, using a TVA, NEIC inspectors detected organic vapor emissions from the tank level indicator on the roof of tank 1211. The TVA recorded a reading of 10,100 ppm (**Appendix O**). Using a FLIR camera, NEIC inspectors observed organic vapors from the tank level (**Appendix P**, MOV_304).

The tank level indicator on the roof of tank 1211 is an opening that must be equipped with, or operate as, a closure device. Because organic vapor emissions were detected from the tank level indicator, Clean Earth - Tacoma was not operating this closure device to form a continuous barrier over the hazardous waste in the tank and was not minimizing the exposure of hazardous waste to the atmosphere.

Observation 13 RCRA

Observation Summary: The methods that Clean Earth - Tacoma uses for ignitability and halogen screening as part of its mandatory verification analyses may not be appropriate for determining profile conformance and appropriate management of incoming waste streams. Specifically, the ignitability screen is used to make numerical flash point determinations using a nonquantitative method.

Citation:
Sampling, testing methods, and analyses, WAC 173-303-110
(1) Purpose. This section sets forth the testing methods to be used to comply with the requirements of this chapter. Quality control procedures specified by the testing method or an approved equivalent method must be followed for the analytical result to be considered valid for designation. All methods and publications listed in this section are incorporated by reference.
(c) Chemical Test Methods for Designating Dangerous Waste, Department of Ecology Publication #97-407, the latest revision, describing methods for testing:
(i) Ignitability;
(h) The following publications:
(v) ASTM Standard Test Methods for Flash Point of Liquids by Setaflash Closed Tester, ASTM Standard D3278-96 (2004)e1, available from American Society for Testing and Materials.
(vi) ASTM Standard Test Methods for Flash Point by Pensky-Martens Closed Tester, ASTM Standard D93-06.

General Waste Analysis, WAC 173-303-300(3) [40 CFR § 264.13(a)(4)] - *The owner or operator of an off-site facility must confirm, by analysis if necessary, that each dangerous*

Observation 13 RCRA

waste received at the facility matches the identity of the waste specified on the accompanying manifest or shipping paper.

General Waste Analysis, WAC 173-303-300(5) [40 CFR § 264.13(b)(1)] – *Waste analysis plan. The owner or operator must develop and follow a written waste analysis plan which describes the procedures he will use to comply with the waste*
analysis requirements of subsections (1), (2), (3), and (4) of this section. He must keep this plan at the facility, and the plan must contain at least:
(a) The parameters for which each dangerous waste, or nondangerous waste if applicable under WAC 173-303-610(4)(d), will be analyzed, and the rationale for selecting these parameters (i.e., how analysis for these parameters will provide
sufficient information on the waste's properties to comply with subsections (1) through (4) of this section);

Clean Earth - Tacoma RCRA Permit, Appendix C-2, Analytical Test Methods, MANDATORY VERIFICATION ANALYSES
Ignitability Screen: (This procedure is based on ASTM Method D4982; see last page of this appendix for complete reference).
A small amount of material is passed through a flame at a controlled rate of approximately one foot/second. For liquid samples the flash point is recorded as less than 70°F, if the sample ignites prior to reaching the flame. If the liquid sample ignites while passing through the flame, the flash point is recorded as 70-99°F. If ignition does not occur until the sample passed through the flame a second time, the flash is recorded as 100-139°F. The flash point is recorded as 140-199°F if it must be passed through the flame a third time before it ignites. If the liquid sample ignites only after more sustained heating is observed, the flash point is recorded as >200°F. Halogenated solvents typically give off vapors that burn but do not sustain combustion when not directly in contact with the flame. Wastes exhibiting these characteristics are reported as having no flash and are checked for chlorinated solvents.

Evidence:
Appendix H – Clean Earth - Tacoma Permit
Appendix Q – ASTM Method D4982, Flammability Potential in Wastes

Description of Observation: As part of its mandatory verification analyses, Clean Earth - Tacoma conducts an ignitability screen by passing a couple drops of the sample on a spatula over a flame supplied by a propane torch. If the sample ignites prior to reaching the flame, the flash point is recorded as less than 70 degrees Fahrenheit (°F). If the liquid sample ignites while passing through the flame, the flash point is recorded as 70-99 °F. If the sample ignites while passing through the flame a second time, the flash is recorded as 100-139 °F. If the sample ignites while passing through the flame a third time, the flash point is recorded as 140-199 °F. If the liquid sample ignites only after more sustained heating is observed, the flash point is recorded as >200 °F. This procedure for the ignitability screen is described in the permit (**Appendix H**, page 226). The facility's waste analysis plan states that the ignitability screen procedure is based on ASTM Method D4982 (**Appendix Q**). The ASTM method is titled "Flammability Potential Screening Analysis of Waste" and describes the scope of the method as:

> *1.4 These test methods are designed and intended as preliminary tests to complement quantitative analytical techniques that are useful to determine flammability. These*

Observation 13 RCRA

test methods offer the option and the ability to screen waste for hazardous flammability potential when the analytical techniques are not available or the total waste composition is unknown.

The significance and use of the method are described as:

5.1 These test methods are intended for use by those in the waste management industries to aid in identifying the flammability potential or waste materials. In addition to the test methods described here, flash points specific to liquid waste can be determined according to Test Method D8174 or D8175.

Additionally, the method states that the precision and bias for the methods presented are:

15.1 Precision—No information is presented about either the precision or bias of Test Methods D4982 for measuring flammability potential because the test result is nonquantitative.

Clean Earth - Tacoma is making numerical flash point determinations using a method that is only for flammability potential and is nonquantitative. The NEIC field team observed another instrument in the laboratory used for flash point testing, which Joe Bitetto, chemist in the facility laboratory, described as a small-scale closed cup flash point tester. The instrument did not appear to be used routinely.

The Washington dangerous waste regulations specify the test methods to be used to demonstrate compliance with chapter 173-303. To test for ignitability either the Setaflash or the Pensky-Martens closed cup test methods should be used. These test methods would provide actual quantitative flash point results as opposed to the subjective flash point screening method that Clean Earth - Tacoma currently performs. As stated in the method that Clean Earth – Tacoma uses for the ignitability screen, the test results for ASTM Method D4982 are nonquantitative.

SUGGESTIONS FOR CLEAN EARTH - TACOMA'S PERMIT RENEWAL

Observation 1: RCRA Permit
Observation Summary: Clean Earth - Tacoma operates a baler, compactor, and shredder for treatment of dangerous wastes; this equipment is not included in the permit as RCRA treatment units.
Citation: **Clean Earth - Tacoma RCRA Permit Application, B.1.5. FACILITY OPERATIONS, Dangerous Waste Process Equipment** *Process equipment units are tools that assist in the processing of the waste. These units do not contain waste in the same way as a tank contains waste, and therefore, they are not considered to be tanks.* **Definitions. WAC 173-303-040** *"Treatment" means the physical, chemical, or biological processing of dangerous waste to make such wastes nondangerous or less dangerous, safer for transport, amenable for* *energy or material resource recovery, amenable for storage, or reduced in volume, with the exception of compacting, repackaging, and sorting as allowed under WAC 173-303-400(2) and 173-303-600(3).*
Evidence: **Appendix R** – Clean Earth - Tacoma Permit Renewal Application (September 2021)
Description of Observation: Tacoma operates a baler, compactor, and shredder for treatment of dangerous wastes; this equipment is not included in the permit as RCRA treatment units. Descriptions of the operations for these units are summarized in the "Facility Operations Summary" section of this report and detailed in the permit application (**Appendix R**). Both the baler and compactor process wastes with VOCs over 500 ppm. Units that are being used to treat hazardous (dangerous) wastes should be covered by the permit and should have specific permit requirements, either as tanks or miscellaneous equipment. (Note: The exception for compacting in the WAC regulations is only for generators that are compacting cans, rags, and bottles in a container.)

Observation 2: RCRA Permit
Observation Summary: Clean Earth - Tacoma operates a baler that is used to prepare hazardous waste debris over 500 ppm VOCs for macroencapsulation at off-site landfills. Macroencapsulation is not an appropriate treatment technology for organics.
Citation: **Clean Earth - Tacoma RCRA Permit Application, D.6.2. PROCESS AREAS, Mechanical consolidation/compaction with a baler – Solids** *Wastes processed in the baler may exceed 500 ppm VOCs.* **Land Disposal Restrictions, Washington Administrative Code (WAC) 173-303-140(2)(a) [40 CFR § 268.45(a)]** *Land disposal restrictions for wastes designated in accordance with WAC 173-303-070 (3)(d)(i) through (iii) are the restrictions set forth by the Environmental Protection Agency in 40 C.F.R. Part 268 which are incorporated by reference into this regulation, as modified in (c) through (f) of this subsection, and the restrictions set forth in subsections (3) through (7) of this section…*

Observation 2: RCRA Permit

40CFR 268.45(a) ***Treatment Standards.*** *Hazardous debris must be treated prior to land disposal as follows …* ***(1) General.*** *Hazardous debris must be treated for each "contaminant subject to treatment" defined by paragraph (b) of this section using the technology or technologies identified in Table 1 of this section.*
Table 1. Section C.1. *Immobilization Technologies:*
1. Macroencapsulation
Performance and/or design and operating standard *Encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other wastes, microbes).*

Evidence:
Appendix R – Clean Earth - Tacoma Permit Renewal Application (September 2021)

Description of Observation: Clean Earth - Tacoma operates a baler, which is used to reduce volume and facilitate handling of solid materials with no free liquids before it is placed into DOT packaging for shipment off-site for disposal. One of the main purposes of the baler is to prepare hazardous waste debris for macroencapsulation at off-site landfills. The baler is used to process wastes with VOCs over 500 ppm (**Appendix R**). Even though some Subtitle C landfills are permitted to macroencapsulate debris that contain wastes with over 500 ppm VOCs, this is not an appropriate treatment method for organic wastes, since organics can degrade the polymer encapsulants that are normally used for macroencapsulation.

Macroencapsulation is not an appropriate treatment technology for organic contaminants. As stated in the January 9, 1992, *Federal Register* [57 FR 1041]: "… immobilization technologies are not appropriate for organic contaminants because the organic compounds may degrade the encapsulating coat or diffuse through the encapsulating coat provided by macroencapsulation…"

EPA has addressed the concern that organics are not listed in Table 1 under the contaminant restrictions in the June 19, 2000, *Federal Register*, which provides notice of issues regarding implementation of the LDR program for treating hazardous waste. As stated at 65 FR 37951:

> *The response to comment's document for the final rule addresses the change in the alternative treatment standards table. We stated that the final rule did not prohibit encapsulation of any specific debris type because the design and operating parameters and the performance standards were sufficient to ensure effective treatment of hazardous debris using encapsulation. Basically, we regard the performance standards as thorough enough to prevent inappropriate treatment. The technical support document for the final rule mentions that certain situations, such as using organic polymer encapsulants to encase organic solvents, would obviously not meet the performance standard. We therefore find no compelling reason to propose a revision to the current macroencapsulation standard in today's notice.*

Observation 3: RCRA Permit

Observation Summary: Breakthrough of the two carbon vessels used to capture VOC emissions from the baler and compactor is determined by an exceedance of 500 ppm VOCs leaving the first carbon vessel, as measured by a PID. The carbon vessels are used as control devices for the baler and compactor, which are used to process wastes with VOCs greater

Observation 3: RCRA Permit

than 500 ppm. A measurement of greater than 500 ppm of VOC emissions from the outlet of the carbon is not an appropriate value to indicate breakthrough.

Citation:

Clean Earth - Tacoma RCRA Permit Application, D.6.2. PROCESS AREAS, Air Controls for Process Equipment *On a weekly basis, emissions will be monitored after the first carbon unit for breakthrough.*
Breakthrough is achieved when VOC contaminants leaving the first carbon vessel exceed 500 ppm VOC, as measured by PID/FID. When breakthrough occurs, the first carbon unit will be replaced.

Air emission standards for tanks, surface impoundments, and containers, WAC 173-303-692
(3) 40 C.F.R. Parts 264.1081 through 264.1091 (Subpart CC) is incorporated by reference.

Air emission standards for tanks, surface impoundments, and containers, 40 CFR § 264.1087(c)(3)(i) *Following the initial startup of the control device, all activated carbon in the control device shall be replaced with fresh carbon on a regular basis in accordance with the requirements of §264.1033(g) or §264.1033(h) of this part.*

Standards: Closed-vent systems and control devices, §264.1033(h) *An owner or operator using a carbon adsorption system such as a carbon canister that does not regenerate the carbon bed directly onsite in the control device shall replace the existing carbon in the control device with fresh carbon on a regular basis by using one of the following procedures:*

(1) Monitor the concentration level of the organic compounds in the exhaust vent stream from the carbon adsorption system on a regular schedule, and replace the existing carbon with fresh carbon immediately when carbon breakthrough is indicated. The monitoring frequency shall be daily or at an interval no greater than 20 percent of the time required to consume the total carbon working capacity established as a requirement of §264.1035(b)(4)(iii)(G), whichever is longer.
(2) Replace the existing carbon with fresh carbon at a regular, predetermined time interval that is less than the design carbon replacement interval established as a requirement of §264.1035(b)(4)(iii)(G).

Evidence:

Appendix R – Clean Earth - Tacoma Permit Renewal Application (September 2021)
Appendix I – August 5, 2022, Follow-up Response from Clean Earth - Tacoma

Description of Observation: Breakthrough of the two carbon vessels used to capture VOC emissions from the baler and compactor is determined by an exceedance of 500 ppm VOC leaving the first carbon vessel, as measured by a PID (**Appendix R**). Two carbon cannisters operated in series are used as a control device for the baler and compactor, which are used to process wastes with VOCs greater than 500 ppm. The air control system is located north of process area 1. If the baler and compactor were regulated as RCRA-regulated tanks or miscellaneous units under the permit, they would need to meet 40 CFR Part 264, Subpart CC requirements. Control devices for Subpart CC tanks are required to be designed and operated to reduce the total organic content of the inlet vapor stream vented to the control device by at least 95 percent by weight. When a carbon cannister is used as a control device, it needs to meet the breakthrough requirements determined by the regulations.

Observation 3: RCRA Permit

In the follow-up response from Clean Earth, inspection records for the carbon cannisters show that the carbon for process area 1 was last changed out on October 24, 2017 (**Appendix I**, page 219). This is especially a concern since the PID used at Clean Earth - Tacoma is not calibrated as required and does not monitor for all the constituents that may be present. One of the regulatory options for replacing carbon cannisters is to change them at predetermined design intervals.

Observation 4: RCRA Permit

Observation Summary: The methods that Clean Earth - Tacoma uses for its ignitability and halogen screening as part of its mandatory verification analyses may not be appropriate for determining profile conformance and appropriate management of incoming waste streams. Specifically, the ignitability screen used by Clean Earth - Tacoma is used to make numerical flash point determinations using a nonquantitative method. The halogen screen does not appear to be sufficient for a commercial TSD for verification of hazardous wastes that may be treated and managed on-site.

Citation:

Clean Earth - Tacoma RCRA Permit Application, Appendix 4, Analytical Test Methods, MANDATORY VERIFICATION ANALYSES

Ignitability Screen: (This procedure is based on ASTM Method D4982; see last page of this appendix for complete reference).
A small amount of material is passed through a flame at a controlled rate of approximately one foot/second. For liquid samples the flash point is recorded as less than 70°F, if the sample ignites prior to reaching the flame. If the liquid sample ignites while passing through the flame, the flash point is recorded as 70-99°F. If ignition does not occur until the sample passed through the flame a second time, the flash is recorded as 100-139°F. The flash point is recorded as 140-199°F if it must be passed through the flame a third time before it ignites. If the liquid sample ignites only after more sustained heating is observed, the flash point is recorded as >200°F. Halogenated solvents typically give off vapors that burn but do not sustain combustion when not directly in contact with the flame. Wastes exhibiting these characteristics are reported as having no flash and are checked for chlorinated solvents.

Halogen Screen (containerized waste and bulk shipments) by Beilstein Screen "Prudent Practices for Disposal of Chemicals from Laboratories," (page 97), National Academy of Sciences, National Academy Press, 1983

General Waste Analysis, WAC 173-303-300(5) [40 CFR § 264.13(b)(1)] – *Waste analysis plan. The owner or operator must develop and follow a written waste analysis plan which describes the procedures he will use to comply with the waste analysis requirements of subsections (1), (2), (3), and (4) of this section. He must keep this plan at the facility, and the plan must contain at least:*
(a) The parameters for which each dangerous waste, or nondangerous waste if applicable under WAC 173-303-610(4)(d), will be analyzed, and the rationale for selecting these parameters (i.e., how analysis for these parameters will provide sufficient information on the waste's properties to comply with subsections (1) through (4) of this section);

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Evidence:
Appendix R – Clean Earth - Tacoma Permit Renewal Application (September 2021)
Appendix Q – ASTM Method D4982, Flammability Potential in Wastes

Description of Observation: As part of its mandatory verification analyses, Clean Earth - Tacoma conducts an ignitability screen by passing a couple drops of the sample on a spatula over a flame supplied by a propane torch. If the sample ignites prior to reaching the flame, the flash point is recorded as less than 70 °F. If the liquid sample ignites while passing through the flame, the flash point is recorded as 70-99 °F. If the sample ignites while passing through the flame a second time, the flash is recorded as 100-139 °F. If the sample ignites while passing through the flame a third time, the flash point is recorded as 140-199 °F. If the liquid sample ignites only after more sustained heating is observed, the flash point is recorded as >200 °F. This procedure for the ignitability screen is also described in the permit renewal application (**Appendix R**, page 308). The waste analysis plan states that the ignitability screen procedure is based on ASTM Method D4982 (**Appendix Q**). The method is titled "Flammability Potential Screening Analysis of Waste" and describes the scope of the method as:

1.4 These test methods are designed and intended as preliminary tests to complement quantitative analytical techniques that are useful to determine flammability. These test methods offer the option and the ability to screen waste for hazardous flammability potential when the analytical techniques are not available or the total waste composition is unknown.

The significance and use of the method are described as:

5.1 These test methods are intended for use by those in the waste management industries to aid in identifying the flammability potential or waste materials. In addition to the test methods described here, flash points specific to liquid waste can be determined according to Test Method D8174 or D8175.

Additionally, the method states that the precision and bias for the methods presented are:

15.1 Precision—No information is presented about either the precision or bias of Test Methods D4982 for measuring flammability potential because the test result is nonquantitative.

Clean Earth - Tacoma is making numerical flash point determinations using a method that is only for flammability potential and is nonquantitative. Another piece of equipment was observed in the lab for flash point testing, which Joe Bitetto, chemist in the facility laboratory, described as a small-scale closed cup flash tester. It did not appear to be used routinely.

As part of its mandatory verification analyses, Clean Earth - Tacoma conducts a halogen screen using the Beilstein test. This test is conducted by heating a piece of copper wire until red in a flame. The wire is cooled in distilled or deionized water, and then the wire is dipped into the sample of incoming waste. The wire is then reheated in the flame. The presence of halogen is indicated by a green color around the wire in the flame. Clean Earth - Tacoma's permit renewal application refers to "Prudent Practices for Disposal of Chemicals from

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Laboratories" (page 97), National Academy of Sciences, National Academy Press, 1983 (**Appendix R**, page 308). This publication states that "This volume was prepared primarily for those who use chemicals in laboratories, ranging from researchers and students to a broad array of technicians." The Beilstein test is not an ASTM method, and the referenced publication is for unknown materials generated in a laboratory. It does not appear to be applicable to a commercial TSD for verification of hazardous wastes that may be treated at Clean Earth - Tacoma.