
EMERALD TRANSFORMER LOS ANGELES, LLC
Los Angeles, California
EPA ID CAD050806850

TSCA COMMERCIAL STORAGE
PERMIT RENEWAL APPLICATION
Revision 2

MAY 2025



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1.0 PCB COMMERCIAL STORAGE INTRODUCTION

The Emerald Transformer Los Angeles, LLC (ETLA) facility is located at 5756 Alba Street in Los Angeles, California. ETLA is a permitted treatment, storage, and disposal facility (TSDF) for hazardous and non-hazardous wastes. The facility receives wastes for storage, consolidation, and shipment to off-site treatment and disposal facilities.

ETLA has occupied this present site since June of 2017. In 1980, pursuant to new EPA regulations, the previous facility operator notified the EPA that it was operating as a transporter of hazardous wastes. At the same time, the facility began planning a waste processing facility. Hazardous waste management applications were filed with the California Department of Health Services (DOHS) in 1984. The DOHS issued the facility a Hazardous Waste Facility Permit on June 3, 1985. The DOHS issued a revised permit on May 29, 1990. This permit was modified twice since that application. The most recent modification was effective February 28, 1995. The facility submitted a RCRA Part B permit re-application to the Department of Toxic Substances Control (DTSC) in November 1994 to renew the existing permit for a period of ten years. Several RCRA permit renewal applications have been submitted to the Department of Toxic Substances Control (DTSC) over the years as updates were necessary. The most recent RCRA permit renewal application was submitted in April 2022 and approved effective October 10, 2022.

The facility was initially authorized to operate as a commercial storage facility for PCBs on September 10, 1991. The initial authorization allowed for the storage of 6,900 pounds of PCB waste. An amendment dated December 19, 1991 revised the maximum storage capacity to 825 gallons and increased the time that PCB items may be stored outside the designated storage area from three business days to six days. A second amendment, dated May 5, 1994, provided interim authorization to use the additional PCB storage area within the Container Storage Warehouse. The use of this area increased the storage capacity to 8,745 gallons.

Under regulations issued by EPA and codified at 40 CFR Part 761.65(d), each Commercial Storer of PCB waste is required to submit an application to the U.S. EPA. This application is submitted pursuant to this requirement for commercial PCB Storage to cover the storage for disposal of PCBs at concentrations of 50 ppm or greater and PCB Items with PCB concentrations of 50 ppm or greater. Accordingly, the facility wishes to store the PCB items, within a designated storage area, prior to shipment off-site for treatment and/or disposal. No TSCA federally regulated PCB treatment or disposal will be performed on-site. The following are examples of items to be managed:

- PCB Transformers
- PCB Capacitors
- PCB Liquids in drums
- PCB Liquids in bulk
- PCB Soils
- Other PCB Solids
- Other PCB Items and Articles

This application is for storage only. No draining of TSCA federally regulated PCBs will be conducted on-site unless the primary container is compromised. In that event PCB liquids will be repackaged using DOT approved containers to ensure environmental integrity and safe off-site transport. Protocol pertaining to the management/repackaging of a leaking transformer can be found in Appendix H Facility PCB SOP.

Finally, the permitted container storage area will be sampled quarterly, by means of a wipe test, to detect the presence of PCBs and brief hard copy report providing the quarterly wipe sampling results will be submitted to the EPA on an annual basis. The annual analysis report will contain a compilation of the data for all four quarters of wipe sampling for that calendar year. Annual analysis reports will be submitted at the end of the fourth quarter of the calendar year, within 30 days following fourth quarter sampling activities. Additionally, records of the laboratory results for each quarter will be maintained at the Emerald Transformer facility, and will be readily available for EPA inspection.

If, in any given quarter, the PCB concentration in any of the wipe samples exceeds the threshold concentration of $10\mu\text{g}/100\text{cm}^2$, EPA will be promptly notified. A report providing the following information will be sent to EPA:

- Location of sampling
- Dates Samples were collected
- Name of person collecting samples
- Analytical results of the sampling event
- A description of the extent of contamination
- Process used to and clean-up the contaminants

The report will be sent to EPA within 30 days of the sampling event detecting the contamination.

Protocol for collection sampling and management are located in Appendix L.

1.1 **Facility Information**

Facility Name: Emerald Transformer Los Angeles, LLC

Facility Address: 5756 Alba Street
Los Angeles, CA 90058
EPA ID # CAD050806850

2.0 Facility Owner/Operator Qualifications

2.1 Identification of the Owner, Operator, and Officials of the Facility with Direct Management Responsibilities

Property and Business Operation and Ownership

Building and Land Owner: Emerald Transformer Los Angeles, LLC
5756 Alba Street
Los Angeles, California 90058

Business Owner and Operator: Emerald Transformer Los Angeles, LLC
5756 Alba Street
Los Angeles, California 90058

This facility is one of several operating as part of this corporation. Emerald Transformer Los Angeles, LLC is a member organization of Emerald Transformer Western States, LLC, with its headquarters located at:

7850 Collin McKinney Pkwy Ste 200
McKinney, TX 75070

2.2 Identification of the Person Responsible for Overall Operations of the Facility, and the Supervisory Employees Responsible for Operation of the facility

The key employees responsible for the day-to-day operation of the facility are as follows:

Mike Burns	Executive V. P. Operations
Steve Peterson	General Manager
Yolanda Ramirez	Plant Operations Manager
Diego Diaz	Facility Supervisor

Note: Additional affiliations for Michael Burns are the Emerald Transformer Western States, LLC locations. These facilities are identified in Section 2.7.

2.3 **Principal Officers**

The principal officers of Emerald Transformer Western States, LLC. are:

Corporate Executive Officer:	Stuart Prior
Chief Financial Officer:	Mark Newman
Executive V. P. Operations:	Mike Burns
Director of Human Resources:	Meredith Allred
Regional Environmental Compliance Manager:	Shirrell Tingle

2.4 Companies Owned or Operated

Emerald Transformer Los Angeles, LLC is a wholly owned subsidiary of Emerald Transformer Western States, LLC. which does own and operate a number of other companies. The officers do not own or operate any other companies. Affiliations of other key operating employees are shown in Section 2.7. Emerald Transformer Western States, LLC officers own and operate all the related subsidiaries and have or have had some ownership interest in numerous other corporate entities. There are no serious environmental violations within the five previous years that resulted in either a civil penalty or judgement of conviction of which the certifying officer(s) are aware in these other corporate entities. The compliance history in Section 2.6 covers the Emerald Transformer Los Angeles, LLC location.

2.5 Technical Qualifications & Experience of Key Employees

Individuals who are directly responsible for the operation of the facility have extensive training in hazardous waste management and/or engineering. The principal individuals who make decisions related to the facility's operations are: the Facility General Manager, the Facility Operations Manager, and the Senior Vice President of Transformer Services. A summary of their qualifications is included. Complete resumes may be found in Appendix A.

Michael Burns has worked for Emerald Transformer Los Angeles, LLC since becoming the VP of Operations in April 2017. Mr. Burns held several manager positions with the Emerald Transformer Western States, LLC facility located in Florida. Mr. Burns responsibilities include achieving objectives, increasing productivity and maximizing profitability.

Steve Peterson has been facility General Manager for Emerald Transformer, Los Angeles, LLC since June 2017. Steve has held several positions, including General Manager, for the former Clean Harbors Los Angeles, LLC facility for 23 years. Steve possesses a B.S. degree in Chemical Engineering. Steve has also completed a variety of training, which included 40 Hour HAZWOPER, DOT, RCRA, and TSCA Compliance.

Yolanda Ramirez has been the Operations Manager since November 2021. Ms. Ramirez has over 28 years of industry experience. She has a proven working knowledge of the handling and classification of hazardous material.

2.6 Compliance History

The following compliance history details past State and Federal environmental violations for the Facilities described below.

Emerald Transformer Los Angeles, LLC.

Emerald Transformer Los Angeles, LLC regulatory compliance history for the past five years is summarized in the table below.

Date	Agency	Program	Activity	Findings	Result
11/13/2024	EPA	RCRA	Inspection	None	N/A
3/12/2024	DTSC	RCRA	Inspection	Inadequate isle space. Contaminated oil dripping on floor from object. 55 gallon drum missing hazardous waste label Containers holding hazardous waste dented. 55 gallon drum holding PCBs was not tightly closed.	All findings were corrected without penalty
5/21/2023	DTSC	RCRA	Inspection	Staff did not complete all required elements of training program. More than 55 gallons of hazardous waste stored in open container in satellite accumulation area. Hazardous waste containers were stacked more	

Date	Agency	Program	Activity	Findings	Result
				than two containers high.	
3/16/2022	DTSC	RCRA	Inspection	Absorbent material not properly contained; liquid and debris collected in basins need removal. Conditions on inspection log not properly recorded. Emergency system, decontamination and equipment not properly maintained. Contingency Plan contacts not updated and equipment not maintained.	All findings were corrected without penalty.
4/27/2021	DTSC	RCRA	Inspection	None	N/A
11/9/2020	DTSC	RCRA	Inspection	Storage bays not properly marked/labeled	All findings were corrected without penalty.
1/15/2020	DTSC	RCRA	Inspection	< 24" of aisle spacing, housekeeping	All findings were corrected without penalty.
1/30/2019	DTSC	RCRA	Inspection	None	N/A

Emerald Transformer Western States, LLC

The complete environmental history on the corporate entity may be submitted as requested.

2.7 **Affiliation Listing**

Other companies currently owned or operated in the past five years by the principals or key employees directly or indirectly involved with waste handling activities:

Emerald Transformer PPM LLC- Coffeyville, KS
Emerald Transformer PPM LLC- Philadelphia, PA
Emerald Transformer PPM LLC- Tucker, GA
Emerald Transformer PPM LLC- Twinsburg, OH
Florida Transformer LLC- Defuniak Springs, FL
Transformer Decommissioning- Nabb, IN
Emerald Transformer Mississippi LLC- Lexington, MS
Environmental Management Utility Services- Phoenix, AZ
Environmental Transformer Texas LLC- Waco, TX

There have not been any violations resulting in either a civil penalty or judgement of conviction within the past five years.

3.0 Facility Design

3.1 PCB Waste Inventory

The portion of the facility dedicated to PCB storage consists of an existing PCB storage area, as well as existing RCRA storage areas. The storage areas permitted exclusively for RCRA activities are not addressed specifically in this PCB Storage Facility Permit renewal application, although the areas are depicted on the site drawings provided as a reference in Appendix B. The PCB storage area is for container storage only. There are no tanks included in this Application.

The PCB storage area is in the contiguous Bay 1 (consisting of areas DW-1, DW-2, DW-3, DW-4, DW-5 and DW-6) of the Container Storage Warehouse. This bay is separated from other bays in the container Storage Warehouse by intermediate curbs and is currently authorized by the State of California and the EPA for the storage of 144 55-gallon equivalent containers of PCB liquids. PCB warning placards (i.e. ML label) as required by 40 CFR 761.65(c)(3) are displayed at the PCB storage areas.

The facility may at given times (during event business) approach the design capacity but will typically average about half that amount. A tracking system is in place to monitor stored volume and to prevent an exceedance of design/permitted capacity. The tracking system also monitors removal from service dates to make certain the PCB waste is disposed of within one years required by 761.65(a)(1).

The facility will be inspected at least weekly to ensure containers are not leaking. Examples of inspection forms used to ensure the site is operated in a manner so as not to pose a risk to the environment or human health can be found in Appendix C. Inspection forms will consistently contain the minimum amount of information required by the regulations, however, the format and content of the forms may change without notice. The area is also closely monitored in order to prevent birds from entering, foraging, or nesting. The facility will continue to use audio devices and decoys mimicking creatures bird avoid.

To establish the maximum authorized storage capacity for the PCB storage areas, floor plans were developed and are shown in Figure 3-1 included with this renewal application. The PCB storage layout is based on palletized 55-gallon equivalent containers and the arrangements are illustrative. PCB storage areas may contain varied sized containers including transformers, capacitors and other odd-sized containers. PCB storage capacity will not exceed maximum authorized volume (including liquid contents of transformers, drums, capacitors and other PCB articles) and adequate aisle space will be maintained. The floor plans establish an arrangement and maximum total count of 55-gallon equivalent containers that will be stored in each of the container storage areas (see Figure 3-1). Based on the arrangements illustrated, and upon the assumption that all of the containers are full of liquid, a total authorized PCB storage volume is established for each

container area. Table 3-1 lists the maximum authorized storage for the PCB storage area and available containment volume for the area.

Table 3-1: Design Capacities and Containment Provisions for PCB Storage Areas

Location	Maximum Allowed PCB Storage (Gallons)	Containment Volume Required (Gallons)	Containment Volume Available (Gallons)¹
Container Storage Warehouse Bay 1	7,920	3,300	5,423 ²

For the Los Angeles facility, the estimated maximum PCB waste inventory will be 7,920 gallons. The forms this waste will take are as follows:

- PCB Transformers
- PCB Capacitors
- PCB Liquids in drums
- PCB Liquids in bulk
- PCB Soils
- Other PCB Solids
- Other PCB Items and Articles

Transformers come in all sizes and shapes, so all liquid capacity is calculated in gallons. Capacitors follow the same calculation. Drums and containers used for PCB storage will be in accordance with the requirements set forth in 40 CFR 761.65(c)(6) and 761.65(c)(7)(i).

The facility maintains a records management system designed to accurately track all PCB waste materials received, stored, and shipped off site during each calendar year. This system assembles and maintains the annual records and the written annual document log as required in 40 CFR 761.180(b)(1) and (2). Annual Records, including: Manifests, Certificates of Disposal, and Records of Inspections and cleanups will be maintained on-site for a minimum of 3 years after the facility ceases using or storing PCB items.

The Annual Document log will be prepared by July 1 covering the previous calendar year and will be maintained on-site for a minimum of 3 years after the facility ceases using or storing PCB items.

As required by 40 CFR 180(b)(3), the facility will generate and submit a PCB Annual Report on or before July 15th of each year.

¹ -No rainfall allowance is included for the storage area. It has been constructed in an enclosed area not subject to rainfall.

² -Within the Container Storage Warehouse, 13,200 gallons of non-PCB waste are also stored in connecting bays to Bay 1 in addition to the 7,920 gallons of PCB waste. The total containment required is calculated by adding 25% of the maximum volume of PCB waste stored in this area (1,980 gallons) to 25% of a conservative maximum volume of non-PCB waste stored in this area (3,300 gallons, in the event of catastrophic failure). This results in a total containment requirement of 5,281 gallons.

This information is maintained at the facility and is available for review by EPA Representatives.

Pursuant to 40 CFR 761.65(c)(7)(ii), the facility has prepared and implemented a Spill Prevention, Control, and Countermeasures Plan (SPCC). The plan was prepared in accordance with 40 CFR 112. A copy of the plan is included in Appendix D of this application.

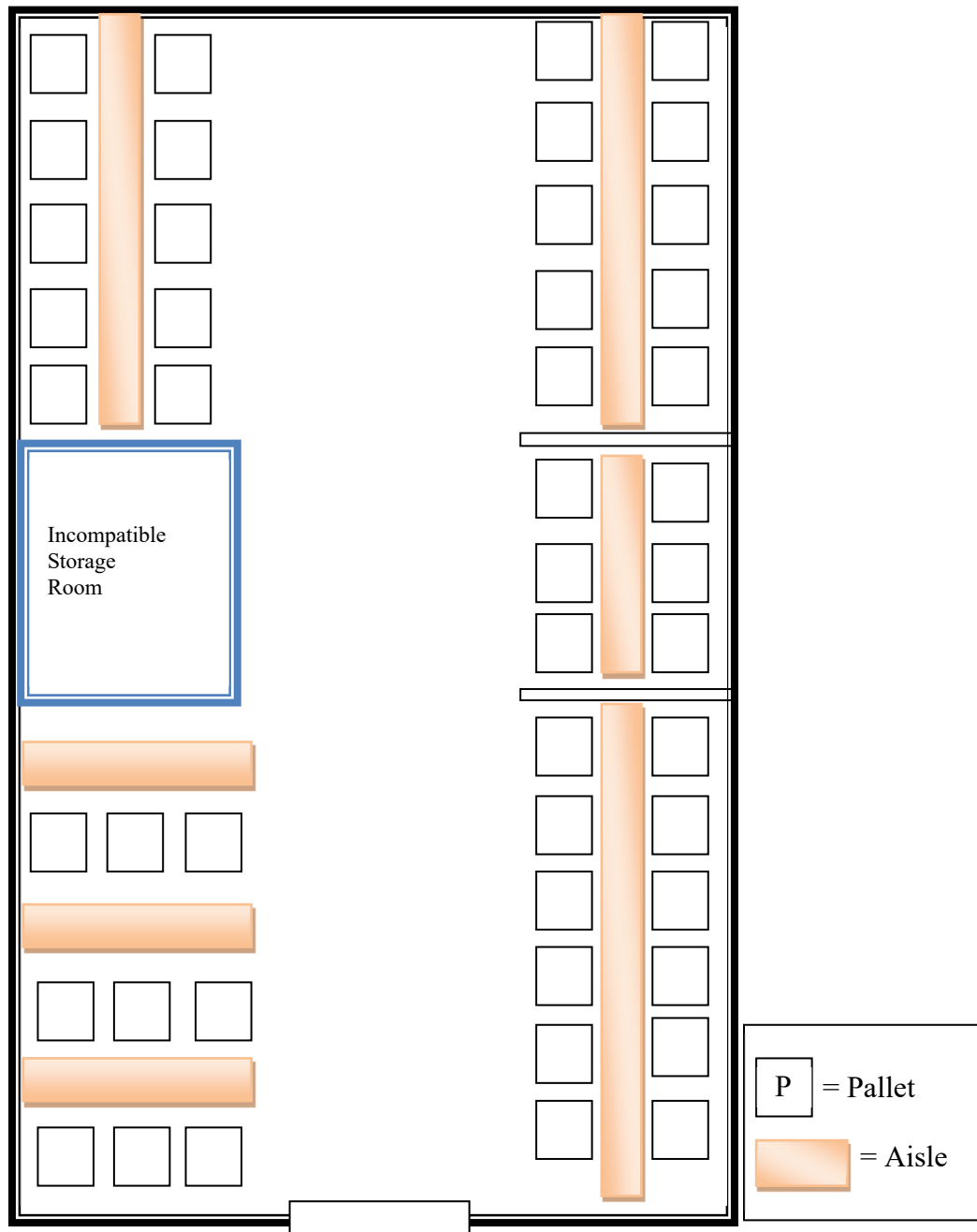


Figure 3-1
Sample Pallet Configuration
Bay 1

3.2 Facility Design Qualifications & Certification

The facility complies with the design and construction standards in 40 CFR 761.65.

The following certification is made for compliance of the existing PCB facilities with facility design standards currently in effect:

Under the civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (18 U.S.C. 1001 and 15 U.S.C. 2615), I certify that the information contained in or accompanying this document is true, accurate, and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification that this information is true, accurate, and complete.

Signature: Steve Peterson

Printed Name: Steven Peterson

Date: September 24, 2025

3.3 Facility Design and Construction Standards

The Container Storage Warehouse consists of three separate storage bays. Bay 1 is a rectangular storage area 54 feet long x 34 feet wide. The structure consists of a smooth concrete, with no expansion joints, surrounded by a 6-inch containment berm. The bay is subdivided into six separate storage areas consisting of open areas separated by 6-inch-high concrete berms and a totally enclosed room. PCBs may be stored anywhere within the storage areas of Bay 1. Specific dimensions and capacities are listed below.

The storage area containment volumes are adequate to contain at least 25 percent of total volume of liquid in PCB containers in the containment areas. The facility's total available containment volume is documented in Appendix E.

A Spill Prevention Control and Countermeasure Plan has been prepared and implemented and is included as Appendix D. This plan includes all of the TSCA containers and non-TSCA liquid in tanks and containers that are also present at the facility.

3.3.1 Roof and Walls

The roof and walls are constructed of concrete filled masonry block and steel. The roof is sloped and served by gutters and downspouts to convey rainfall to drainage on the exterior to the building. Doors and other openings in the building have been designed and installed to resist wind-blown rainfall.

3.3.2 Floor and Curbing

A concrete floor with an impervious surface coating has been provided for all PCB storage areas inside the building. The curbing is at least six inches high. The containment volume available is 5,423 gallons for the area, which stores PCB containers and/or other articles. This exceeds the combined requirements for a containment volume of 25 percent of the maximum authorized storage volume of PCBs or two hundred percent of the internal volume of the largest PCB article or PCB container, whichever is greater, and a containment volume of 25 percent (using worst case scenario) of the maximum authorized storage volume of RCRA waste or one hundred percent of the internal volume of the largest RCRA container, whichever is greater. Floors are sealed and coated with epoxy coating such as STEEL-SEAM® FT910 Epoxy (Part A), White, STEEL-SEAM® FT910 Epoxy (Part B), Black Hardener (see Appendix F).

3.3.3 Floor Penetrations

There are no drain valves, floor drains, sewer lines, expansion joints, or other openings that would permit liquids to drain from the curbed areas. The floor and curbing are constructed of continuous smooth and impervious materials (concrete, sealed with epoxy-type coatings) to prevent or minimize penetration of PCBs. Copies of the Material Safety Data Sheets for the coatings are in the Appendix F.

3.3.4 Floor Construction

The floors and curbs are constructed of smooth and impervious Portland cement concrete which prevents or minimizes penetration of PCBs. A surface coating of an epoxy sealer was last applied to all exposed concrete surfaces (including containment sumps and trenches) to further seal the surface and retard any potential penetration of the surface by PCBs in 2018. The floors are currently in the process of being re-coated and will be completed in 2024. The product data sheet for the epoxy coating is in Appendix F. The floor is inspected regularly and maintained to ensure the surface coating is intact.

3.3.5 100-Year Flood Water Elevation

The entire site, including the Container Sludge Warehouse, is above the 100-year flood water elevation (see Figure 3-2).

3.3.6 Storage Capacities

The maximum PCB storage capacity and the maximum PCB storage inventory are the same volume of 7,920 gallons. This corresponds to the equivalent of 144 55-gallon equivalent containers. Items other than 55 gallons in size may be accepted for storage, but maximum internal liquid volume in storage at any one time will not exceed the stated value.

3.3.7 Loading/Unloading

Loading/unloading operations typically take place at the unloading bay adjacent to the container storage warehouse. In the event transformers are too large for this area, they are loaded/unloaded in the Receiving Area located just inside and North of the main gate. PCB items/PCB waste ≥ 50 will be moved to the PCB storage area before the end of the shift. As previously noted, the entire site is contained. The leased property west of the facility is only used to store the trucks. Waste is not stored or staged in the area. All waste is removed from the trucks before parked on the leased property for parking.

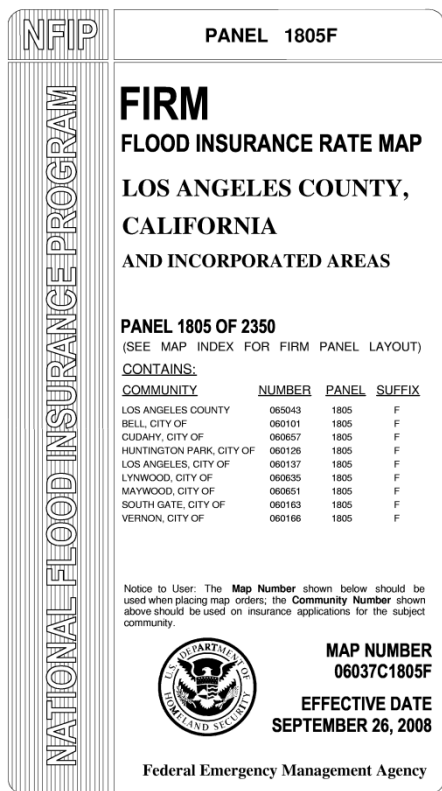
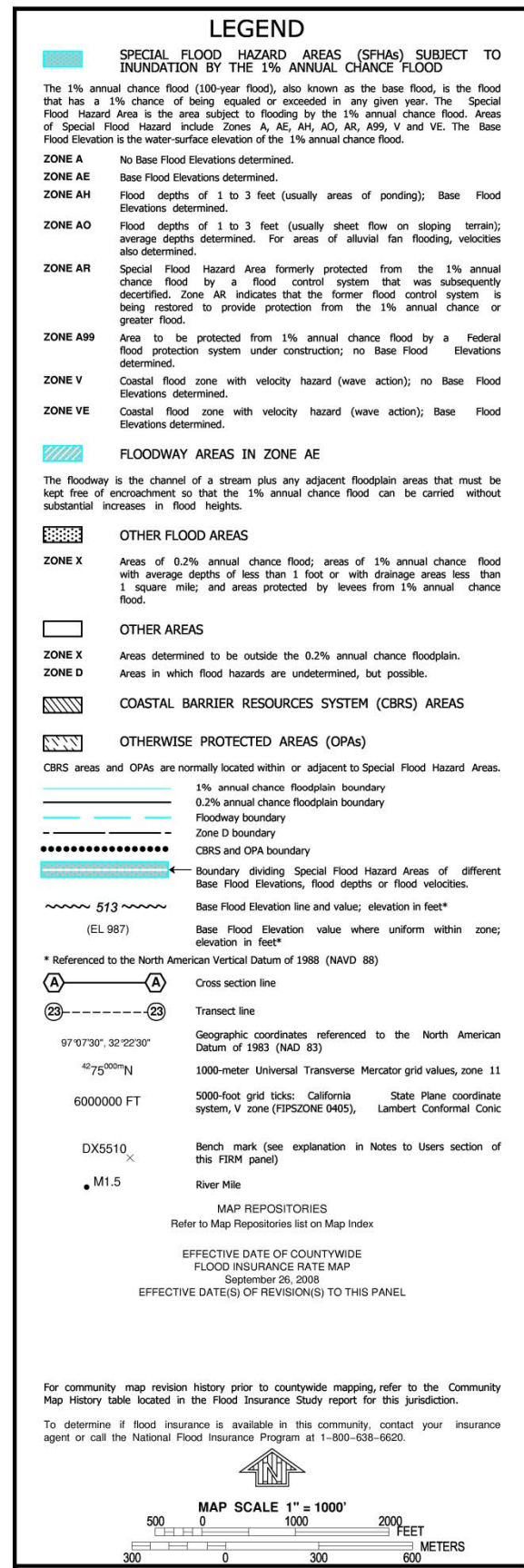


Figure 3-2 Flood Insurance Rate (FIR) Map



3.4 Jurisdiction

This facility is located on approximately 2.3 acres and approximately 4 miles south of downtown Los Angeles on the northwest corner of the intersection of Slauson Avenue and Alameda Street. This facility is currently regulated by and/or files reports with the following public agencies, committees, commissions and/or departments:

AGENCY	PHONE NUMBER
National Response Center	(800) 424-8802
U.S. EPA Region 9	(415) 947-8000
California Department of Toxic Substances Control	(818) 717-6500
State Office of Emergency Services (OES)	(800) 852-7550
Los Angeles Fire Department	911 or (213) 485-6185
Los Angeles Police Department	911 or (323) 846-6547

Other public agencies also have jurisdiction, at the federal and state level, including OSHA and the Department of Labor.

3.5 Written Description and Topography

3.5.1 PCB Storage Facility

The portion of the facility dedicated to PCB storage consists of an existing PCB storage area, as well as existing RCRA storage areas. The PCB storage area is for container storage only. The Storage area is shown in the drawings located in Appendix B.

3.5.2 Hazardous Waste Management Unit

The Emerald Transformer Los Angeles LLC facility is a permitted treatment, storage, and disposal facility (TSDF) for hazardous and non-hazardous wastes. The facility receives wastes for storage, consolidation, and shipment to off-site treatment and disposal facilities.

3.5.3 Lab Area

The facility has an on-site laboratory that supports its operations. Standard Operating Procedures for sample receiving and storage are outlined in Appendix G.

3.5.4 Flood Plain

The Los Angeles facility is not located in the 100-year flood plain (see Figure 3-2).

3.5.5 Adjacent Surface Waters or Wetlands

There are no adjacent surface waters or wetlands.

3.5.6 Surrounding Land Uses

The Los Angeles Facility is immediately surrounded by businesses that are involved in auto dismantling; paint manufacturing; and furniture manufacturing. The streets are paved for heavy traffic and sidewalks run directly from the street to the building.

3.5.7 Traffic Flow

There are two entrances for traffic. The main entrance located on Alba Street is manned and operated 24 hours per day by facility staff or contractor services. The entrance on Alameda Street is a locked, secured gate to be opened in the event of an emergency and/or use requirement. There are two employee emergency exits in addition to the truck entrances. Those are located on Alba Street and also on Alameda Street. These gates would be unlocked in the event of an emergency for evacuation of plant personnel. All roadways within the facility associated with routine waste movement activities are paved with concrete or asphalt.

3.5.8 Underground Storage Tanks

There are no underground storage tanks at this facility.

3.5.9 Security Systems and Procedures

The perimeter of the Los Angeles Facility is a combination block wall and/or corrugated galvanized fence. The wall and/or fence is six (6) to eight (8) feet high, topped with barbed wire, and completely surrounds the facility. The fence and wall are maintained in good repair. There are warning signs posted in English and Spanish at the entrance of the facility. There is one main gate designated as an entrance/exit route used by employees or visitors requiring access to the facility. The gate is set up with remote controls so that they can be opened or closed from the Security Office or the Main Office. All other gates are secured by lock and chain and are only used in cases of emergency or maintenance. Remote cameras are used to monitor the most active areas from the Main Office. Daily inspections of the perimeter are performed to ensure that fences and gates are intact and secure.

The facility has an internal paging system that is utilized both indoors and outdoors. Alarms are in place at specific locations and are there to monitor equipment. Employees have been trained on how to use the methods of communication available at the facility.

3.5.10 Signs

There are warning signs posted in English and Spanish at the entrance of the facility. All signs meet the requirements prescribed in 40 CFR 264.14(c). These signs read: "Danger-Unauthorized Personnel Keep Out". Additional warning signs are also posted at each entrance that meet the requirements of 40 CFR 761.45(a). These signs read: "Caution contains PCBs (Polychlorinated Biphenyls). A toxic environmental contaminant requiring special handling and disposal in accordance with U S Environmental Protection Agency Regulations 40 CFR 761-For disposal Information Contact the nearest U S EPA Office. In case of accident or spill, call toll free the US Coast Guard National Response Center 800-424-8802. Also Contact: ___Emerald Emergency Response___ at Telephone No. __844-576-1321___."

3.5.11 Closed PCB Units

Containment Bay E was a TSCA storage area that was closed and removed in March of 2014. The closure certification report can be found in Appendix M of this application.

3.6 Environmental Conditions

3.6.1 Surface Water Proximity

There are no surface water bodies located within one mile of the site. Rainfall run-off and run-on are not a problem since the PCB storage facilities are located indoors within bermed areas.

3.6.2 Drinking Water Proximity

Drinking water, water for sanitary needs, and water for fire control are supplied by the local municipality.

3.6.3 Sewers

There is no process water released to the POTW.

3.6.4 Ground Water Location Issues

Records on file with the California Geological Survey indicate that there are ground water wells located within 1 mile of the site. The locations of record are shown on the Well Location Map in Figure 4-1.

4.0 PCB Closure Plan

4.1 Facility Description

4.1.1 General Description

Emerald Transformer Los Angeles LLC is a RCRA permitted treatment and storage facility that receives waste for storage, consolidation, and shipment to off-site treatment and disposal facilities. One area is designated for storage of PCBs pending off-site treatment and disposal. No TSCA federally regulated PCB treatment or disposal is conducted on-site. No draining of TSCA federally regulated PCBs will be conducted on-site unless the primary container is compromised. In that event PCB liquids will be repackaged using DOT approved containers to ensure environmental integrity and safe off-site transport.

4.1.2 Facility Location

The facility located in an industrial area of Los Angeles, California, in U.S. EPA Region IX. The address of the facility is 5756 Alba Street, Los Angeles, California 90058.

4.1.3 Site Specific Information

The facility is located in a heavily industrialized area and occupies approximately 2.3 acres. The perimeter is completely fenced by an 8-foot corrugated steel fence topped by approximately 18-inches of concertina wire. The entire site is electronically monitored by protection equipment 24 hours per day. The property is relatively flat and paved. The site is bounded on the south by a city street and railroad tracks, on the west by a city street, on the north by an industrial property, and on the east by a city street and railroad tracks.

The site is currently operating as a permitted RCRA and State of California hazardous and industrial waste storage facility. Tanks for storage as well as analytical laboratory facilities are present on the property. These facilities are totally separate from the PCB storage areas that are the subject of this PCB Closure Plan.

The Container Storage Warehouse, Bay 1, is the sole permitted location for storage of TSCA regulated PCBs. The locations are separate from the other containment bays within the Container Storage Warehouse.

The site is located greater than one mile from any surface water body and is above the 100-year flood plain.

Traffic enters from Alba Street through a secured gate. Internal traffic is limited to parking areas and loading and unloading areas.

4.1.4 Environmental Conditions of the Site

There are no surface water bodies located within one mile of the site. Rainfall run-off and run-on are not a problem since the PCB storage facilities are located indoors within bermed areas.

Records on file with the California Geological Survey indicate that there are ground water wells located within 1 mile of the site. The locations of record are shown on the Well Location Map in Figure 4-1

Groundwater Well Location Map

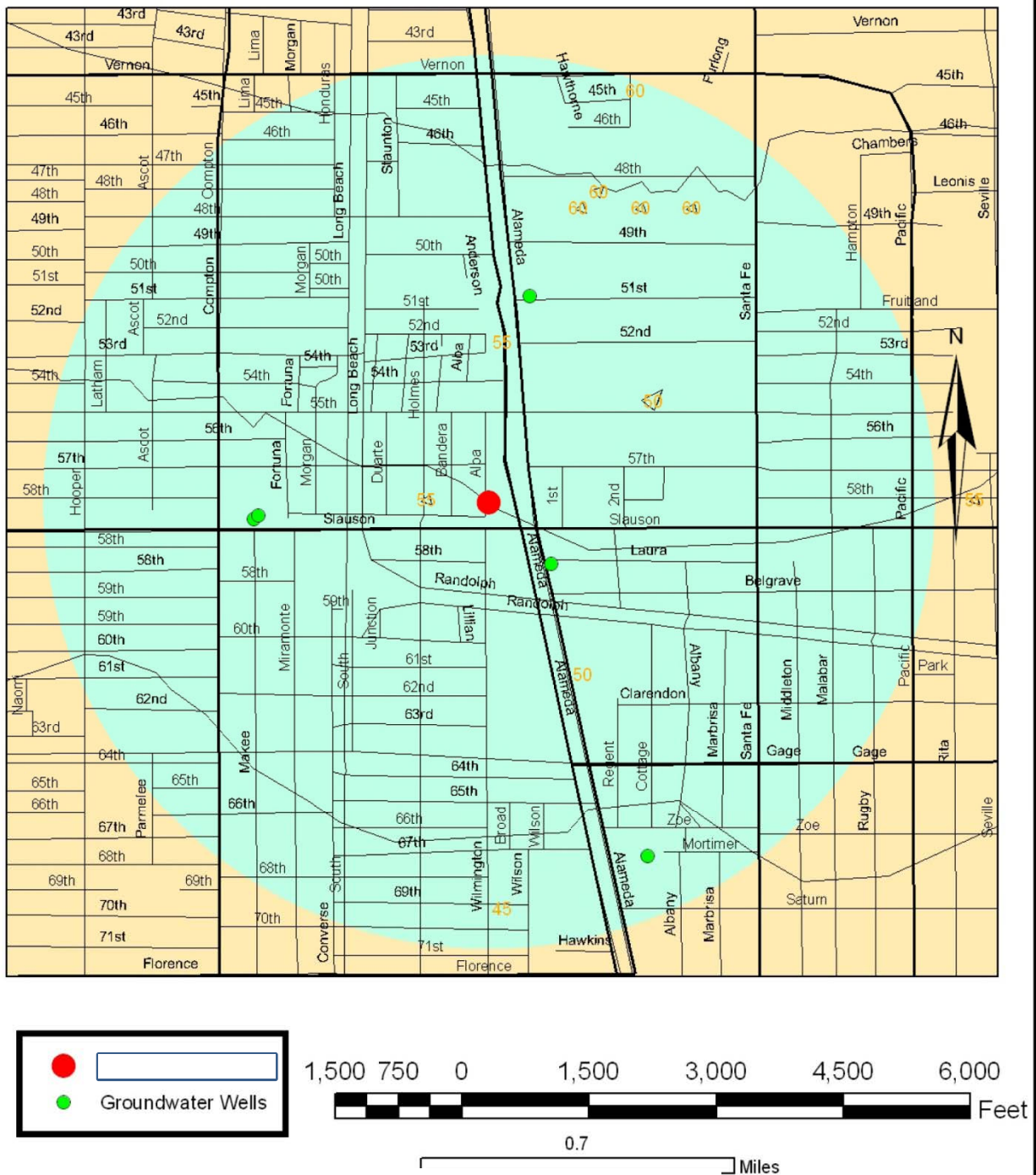


Figure II-4: Well Location Map

Reference: U.S.G.S.

Figure 4-1: Well Location Map

4.1.5 PCB Waste Storage Facility Design

The Container Storage Warehouse consists of three separate storage bays. The first bay, Bay 1 (consisting of areas DW-1, DW-2, DW-3, DW-4, DW-5 and DW-6) is a rectangular storage area 54 feet long x 34 feet wide. The structure consists of a concrete slab surrounded by a containment berm. The bay has six discrete storage areas consisting of open areas separated by 6-inch high concrete berms and a totally enclosed room (Incompatible Storage Room (DW-2)). PCBs may be stored in any area of Bay 1. For purposes of containment calculations, all of the storage areas are considered. Specific dimensions and capacities are listed below. Detailed calculations, including displacement, can be found in Appendix E. Please note that the Incompatible Storage Room (DW-2) is utilized for storage of incompatible wastes or miscellaneous PCB contaminated equipment. This structure was included in containment calculations and closure sampling.

Table 4-2: Bay 1 (consisting of areas DW-1, DW-2, DW-3, DW-4, DW-5 and DW-6) – Dimensions and Capacities

Container Storage Warehouse Bay 1	Dimensions And Capacities
Overall Interior Dimensions Floor Area	54 Feet x 34 Feet 1,836 Square Feet
Containment Berm Height	6 Inches
Contained Storage Area Trench and Sump Area	1,639 Square Feet 53 Square Feet
Gross Containment Volume Trench and Sump Volume	6,134 Gallons 97 Gallons
Design Storage Capacity – PCB Design Storage Capacity – RCRA Maximum Liquid Volume – PCB Maximum Liquid Volume - RCRA	144 x 55-Gal Containers 240 x 55-Gal Containers 7,920 Gallons 13,200 Gallons
Required Containment Volume PCB Requirements at 25% RCRA Requirements at 25% ³ Total Requirements	1,980 Gallons 3,300 Gallons 5,280 Gallons
Net Containment Volume ⁴	5,423 Gallons

³ - RCRA secondary containments are required at 10%. However 25% secondary containment was used in the event of catastrophic failure (e.g. earthquake or fire) assuming entire containment contents were to become commingled

⁴ -Net available area and volume after correction for containers and berm displacements. Trench and sump area is included.

4.2 Disposal of PCB Waste Inventory

As specified in 40 CFR 761.65, the PCB Closure Plan is based on the disposal of the maximum PCB storage capacity of the facility. This section will describe the maximum storage capacity of various types of PCB items and the disposal methods for the different types of PCB items.

4.2.1 Maximum Inventory

The maximum inventory in storage is indicated below.

Table 4-3: Maximum Inventory

Waste Type	Estimated Maximum Quantity
Liquids in Drums	7,920 Gallons
Pallets	36

4.2.2 Disposal of Inventory

Disposal of all PCB items will follow the guidelines set forth in 40 CFR 761.60. The maximum volume of waste as described in Section 4.2.1 will be disposed. Methods of disposal and processing procedures required for closure are discussed below. The designated PCB waste disposal facility is Clean Harbors Aragonite, LLC located in Aragonite, Utah. The secondary facility is Veolia Environmental Services, Inc. located in Port Arthur, Texas.

PCB liquids in drums will be transported off-site to an approved incineration facility and pallets used for transportation purposes will become the responsibility of the disposal company and is so reflected in the closure cost estimate.

Any miscellaneous equipment (e.g. pumps, hoses etc.) contaminated with PCB will be disposed in accordance with the disposal of subpart D. Larger equipment (such as a contaminated forklift) will be decontaminated by swabbing surfaces in accordance with 40 CFR 761.79(c) to a concentration of 10 µg/100cm² or less as measured by standard wipe tests.

4.2.3 Detailed Building Description

The Building roof and walls are constructed of concrete filled masonry block and steel. The roof is sloped and served by gutters and downspouts to convey rainfall to drainage on the exterior to the building. Doors and other openings in the building have been designed and installed to resist wind-blown rainfall. Floors are sealed and coated with epoxy coating such as STEEL-SEAM® FT910 Epoxy (Part A), White, STEEL-SEAM® FT910 Epoxy (Part B), Black Hardener (see Appendix F).

4.3 **PCB Closure Plan Sampling, Decontamination, and Spill Cleanup Policy**

A detailed description of the activities that will be carried out to identify, remove and decontaminate PCB contaminated containment system components is provided in this subsection. It is the ultimate responsibility for the Project Manager to initiate facility closure, assign tasks, review and validate sample data, delegate responsibilities, and otherwise coordinate closure activities. Specific items to be addressed are:

- Area Classifications
- Numerical Cleanup Levels
- Statistical Sampling Program
- Decontamination Procedures
- Post Cleanup Verification Procedures

4.3.1 **Area Classifications**

The facility will pursue cleanup standards designated for High Occupancy Areas for the closure of TSCA management units and other potentially affected areas of the facility. A High occupancy area means any area where PCB remediation waste has been disposed of on-site and where occupancy for any individual not wearing dermal and respiratory protection for a calendar year is: 840 hours or more (an average of 16.8 hours or more per week) for non-porous surfaces and 335 hours or more (an average of 6.7 hours or more per week) for bulk PCB remediation waste. Examples could include a residence, school, day care center, sleeping quarters, a single or multiple occupancy 40 hours per week work station, a school class room, a cafeteria in an industrial facility, a control room, and a work station at an assembly line.

Building Areas Porous Surfaces

Indoor solid surfaces which are porous will be sampled by means of chip and core and cleaned to a level of 1 ppm or less for high occupancy areas without further restrictions. This is based on the regulatory standard set forth in 40 CFR 761.61(a)(4), *Cleanup Levels for PCB Remediation Waste*.

Prior to core sampling of the “porous” concrete, the epoxy coating will be removed by means of scarification. This will ensure that the facility can accurately evaluate and measure potential contamination. Further discussion on dust control and PPE can be found in section 4.3.4.1 of this plan.

Building Areas Non-Porous Surfaces

Indoor solid surfaces which are non-porous or porous surfaces covered with a non-porous surface will be cleaned to a concentration of 10 µg/100cm² or less as measured by standard wipe tests. This is based on the regulatory standard in 40

CFR 761.125(c)(4), *Requirements for decontaminating spills in nonrestricted access areas.*

The Container Storage Warehouse Bay 1 (consisting of areas DW-1, DW-2, DW-3, DW-4, DW-5 and DW-6) can be classified as “Other Restricted Access Locations (Non-Substation)” according to 40 CFR 761.123. The classification is justified because all areas that could potentially be contaminated are enclosed within secure buildings, on a site surrounded by a security fence, and located greater than 0.1 kilometers from any nearby residential or commercial areas.

Other areas of potential impact at the facility include PPE donning/doffing areas, bathrooms adjacent to PCB areas, loading/unloading areas, temporary storage area, and areas where spills have been noted in the past will be included in closure sampling.

4.3.1.1 Facility Structure Components

As mentioned previously, the PCB storage area consists of a totally enclosed concrete containment area inside a concrete block building. Although the concrete surfaces have been treated with an epoxy coating and can be classified as “low contact indoor, impervious solid surfaces,” according to 40 CFR 761.123 they will be sampled and evaluated, at closure, with the porous surface standards. Interior walls and doors below 6 feet can be classified as “high contact solid surfaces” according to 40 CFR 761.123. Interior walls above 6 feet will not be sampled, because there are no splash hazards at this facility, and PCBs do not readily volatilize, thus there is no reason to expect that PCBs will be present above 6 feet.

4.3.1.2 Containment System

The containment system at this facility consists of epoxy coated concrete berms and slabs. The concrete berms and slabs can be classified as “low contact indoor impervious solid surfaces” according to 40 CFR 761.123 but will be sampled and evaluated, at closure, with the porous surface standard.

4.3.2 Numerical Standards

In the previous subsection, the various building components at the ETLA facility that performed PCB service were classified according to the criteria in 40 CFR 761.125(c)(3). Table 4-1 describes the various building component classifications and the corresponding cleanup level specified in 40 CFR 761.125(c)(3).

Table 4-4: Component Classifications and Specified Cleanup Levels

Cleanup Category Per 40 CFR 761.61(a)(4) and 761.125 (c)(4)	Building Components in this Category	Cleanup Criteria
Porous Surfaces	Any surface that allows PCBs to	1 ppm

	penetrate or pass into itself	
Non-Porous Surfaces	smooth un-corroded metal; smooth glass	10µg/100 cm ²

4.3.3 Statistical Sampling Program

A statistical sampling program will be initiated as part of the closure of this facility in order to ensure that the facility will be properly decontaminated upon closure. Specific topics to be addressed in the statistical sampling program are:

- Safety Plan
- Initial Facility Inspection
- Field Sampling Plan.

4.3.3.1 Safety Plan

According to 40 CFR 1910.120(b), a site specific safety plan shall be prepared for all work to be performed at a site that has the potential for employee exposure to a hazardous or toxic substance. Since employee exposure to such substances is possible during PCB closure activities at this facility, a safety plan conforming to the requirements set forth in 40 CFR 1910.120(b), shall be prepared for the PCB closure activities at ETLA at the time of closure. This safety plan will be prepared by the contractors at the time of closure and will be contractor specific.

4.3.3.2 Initial Facility Inspection

The purpose of the Initial Facility Inspection is to gather data that will assist in deciding where to collect samples from, and to provide an overall assessment of the site. This will include locating areas of potential PCB contamination, identifying any potential hazards or items causing a safety concern, and assessing the overall structural integrity of the facility. The Project Manager will primarily coordinate these activities. The following areas will be addressed when performing the Initial Facility Inspection:

- Review of Plant and Regulatory Agency Records
- Interviews with Site Personnel
- Visual Site Inspection.

Review of Plant and Regulatory Agency Records

The purpose for reviewing plant and regulatory agency records will be to gather any data that may exist concerning previous PCB spills, accidents,

or clean up actions. Plant records will be reviewed first, followed by regulatory agency records.

Interviews with Site Personnel

Available employees of the current owner, and any employees of previous owners that can be readily located, will be interviewed as part of the Initial Facility Inspection. The purpose of the interviews will be to determine if any PCB spills occurred at the facility that were not reported, or that may have occurred in a location that was outside the normal operating areas.

Visual Site Inspection

The Visual Site Inspection will involve a survey of the PCB storage area, including the immediately adjacent roads and surrounding land. The area where PCBs were stored will be entered and will be observed for any obvious spills, coating degradation, cracks in containment, any building materials that might require special sampling, and any apparent structural defects or potential hazards.

4.3.3.3 Field Sampling Plan

This Field Sampling Plan presents a description of the activities planned for the pre-cleanup sampling at ETLA. The sampling plan includes the following items.

- Field Investigation Objectives
- Sampling Locations and Rationale
- Decontamination Procedures
- Sample Handling and Documentation
- QA/QC Procedures

Field Investigation Objectives

The overall objective of the Field Investigation is to determine if there is PCB contamination at the PCB storage facility in order to develop a cleanup plan so the PCB storage area can be effectively remediated and closed.

Sampling Locations and Rationale

As was mentioned in Section 4.3.1 Area classifications, all PCB storage will be conducted indoors, in an area surrounded with containment berms. For this reason, unless the Initial Facility Inspection reveals any potential PCB spill areas outside of the area identified in Section 4.3.1, no soil or groundwater samples will be collected during the Field Investigation. Sampling will be performed, however, in the bay described in Section

4.3.1. In each location, two sampling methodologies will be used: judgmental and systematic sampling.

Judgmental sampling will involve collecting samples in places where the Initial Facility Inspection found evidence of a release, or where use patterns indicate the possibility of PCB contamination. Judgmental sampling will incorporate chip, core and wipe sampling (depending on the particular area) as a means of evaluation. A minimum of one judgmental sample will be collected from the concrete of each containment area and will be collected from a low point, sump, epoxy wear, or evident staining.

Systematic sampling (chip, core or wipe) will be performed on each wall and floor area in accordance with the standards set forth in 40 CFR 761, Subpart N. This will involve establishing a grid system for each affected wall and floor area, and collecting samples at the grid nodes. Typical sampling grids for walls are shown on Figure 4-2 and floor sampling grids for the Container Storage Warehouse are shown on Figure 4-3. Sampling grids will be laid out in the field and sample locations will be marked with masking tape or other suitable marking device. An EPA guidance document on sampling has been attached (Appendix K), as reference, with regard to sampling porous surfaces.

Cracks in the flooring or distressed areas within secondary containment will be evaluated to determine the likelihood for residual contamination. Cracks in the flooring will be evaluated by coring to determine the potential for the crack to have penetrated the entire depth of the floor. In those cases where a crack does penetrate the floor, the sub-base will be tested for PCBs. Otherwise, the depth of the distress plus one inch will be tested for PCBs. If no penetration beyond the surface is apparent then core samples will be taken in these areas at a depth of up to 1.25cm and a diameter of 2 to 3 cm.

Finally, considering the large quantity of samples and the relatively small area subject to TSCA closure, the number of samples available for analysis is more than adequate to address quality control. However, one field blank will be taken for each of the two sample types being utilized (concrete core and wipe) to establish background.

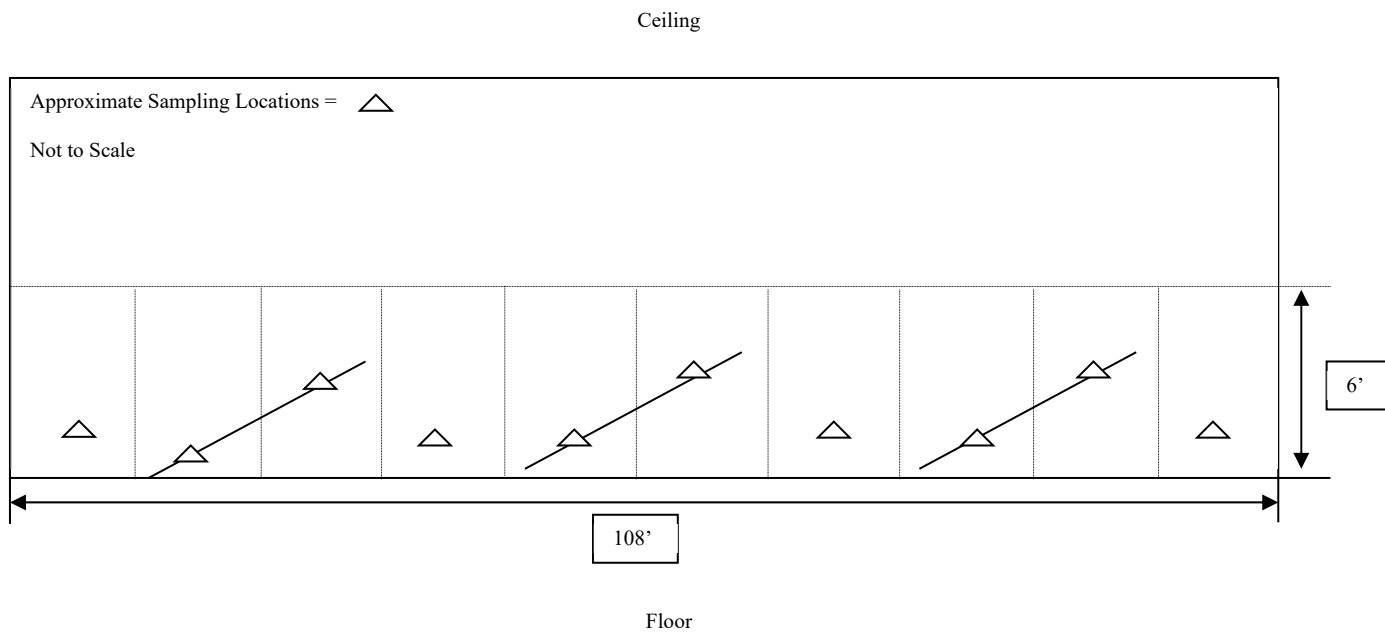
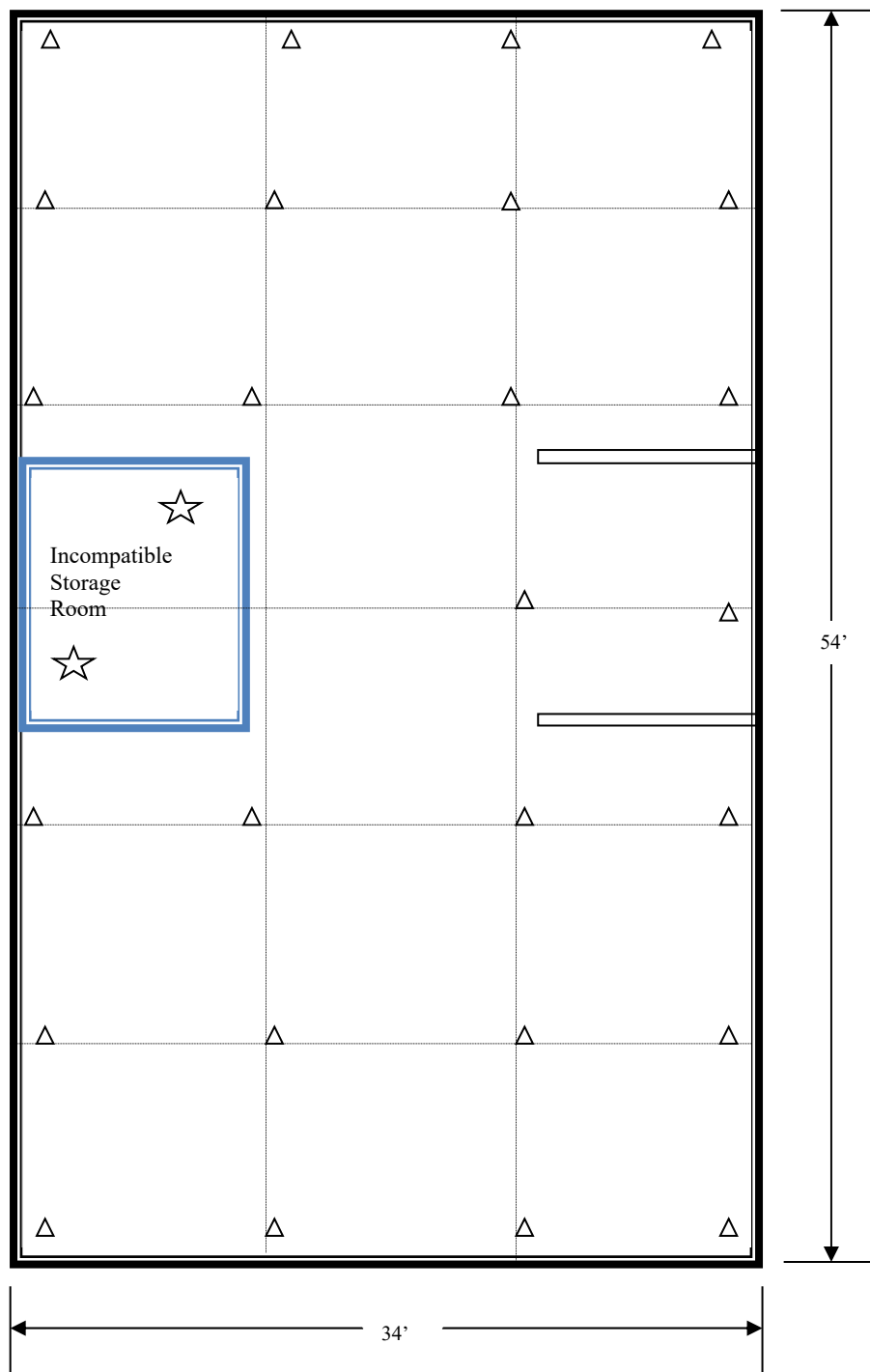


Figure 4-2: Typical Sampling Grid for Wall



Note: Sample marked as ☆ deviates from the grid pattern but is included to accurately represent the area

Figure 4-3: Grid Sampling Locations – Container Storage Warehouse

Sampling Activities and Analytical Requirements

Samples collected from concrete surfaces will be chip or core samples. Samples from other areas (bathroom doorjambs and bathroom floors) will be wipe sampled, if the surface is non-porous. Samples to evaluate other areas of potential impact at the facility include PPE donning/doffing areas, bathrooms adjacent to PCB areas, loading/unloading areas, and areas where spills have been noted in the past.

Wipe Samples will be taken in accordance with the requirements outlined in 40 CFR 761, Subpart P.

Core samples (if no penetration beyond the surface is apparent) will be taken at a depth of up to 1.25 cm and a diameter of 2 to 3 cm.

All samples collected will be analyzed using EPA SW-846 Method 8082 or the current equivalent method. Samples will be analyzed upon receipt so the proper decision can be made regarding any additional decontamination activities.

Prior to collecting the pre-cleanup samples, individual sampling grid maps will be prepared for each wall and floor. The maps for the walls will be drawn on an 8 ½ x 11 sheet of paper and will depict all necessary dimensions and sampling locations needed to lay out the sampling grid. These maps will also be used as part of the sample documentation. The map for the floor shall use those shown in Figure 4-3.

Decontamination Procedures

All sampling equipment that is not disposable shall be decontaminated after each sample by washing twice with hexane and allowing to air dry. Disposable sampling equipment, decontaminations fluids, and PPE will be appropriately packaged and disposed. Personnel decontamination is addressed in the Site Safety Plan.

Sample Handling and Documentation

Proper handling and documentation of samples is important to assure that the data will be legally defensible and reproducible. Field logs will be used to record information concerning sample identification, evacuation, field analysis, and other aspects of the sampling effort for each sample. Specifically, the field log when completed will provide the following information:

- Sample location
- Sampling date and time
- Name of samplers
- Time of sampling
- A description of the material sampled and the presence of any unusual odors or visible contamination

- Types of samples collected
- Field analysis data
- Weather conditions
- Any other field observations, such as problem with equipment, or any other aspect of sampling conditions that might have an effect on the outcome of sampling results.

These procedures are expected to be followed at all times. Deviations from the plan should be noted on the field log.

A jar label as shown in Figure 4-4 will be completed and placed on each sample jar. The lid will then be taped shut a custody seal similar to shown in Figure 4-4 will be placed around the lid. Each jar will be individually wrapped in bubble wrap plastic and placed in a cooler. The cooler shall be lined with Styrofoam packing material to protect the samples. Enough room will be left in the coolers to allow ice packs to be placed in the cooler to preserve the samples at or near 4 degrees C. Once a cooler is full, a Chain-of-Custody form similar to shown in Figure 4-5 will be completed in triplicate. The Chain-of-Custody will assure samples are always under the supervision of a qualified individual or organization. One copy of the Chain-of-Custody will be retained and the other two copies will be sealed in the cooler with the samples. The cooler will then be taped shut using strapping tape, sealed on three sides with custody seals, and transported to the lab by express shipment or the Project Manager/designee.

CUSTODY SEAL

DATE _____

SIGNATURE _____

Project/Client Name:		Sample ID:	
DATE:	TIME:	COLLECTED BY:	
☐ Grab	☐ Composite	Matrix: ☐ Soil	☐ Water ☐ Other _____
TESTS/METHOD REQ:			PRESERVATIVE
COMMENTS:			
C & G Containers, Inc. 800-396-7123			

Figure 4-4: Jar Label and Sample Seal

CHAIN-OF-CUSTODY

[illegible]

Figure 4-5: Chain of Custody Form

4.3.3.4 QA/QC Procedures

Data Management

Certified data received from the laboratory will be evaluated and validated by the Project Manager with regard to sample integrity and concentrations. Samples that are at or above the clean-up levels (> 1 mg/kg for porous surfaces or $10\mu\text{g}/100\text{cm}^2$ or non-porous surfaces) described in Table 4-4 will be noted and the corresponding areas, where the samples were taken, will be identified and designated for further decontamination and sampling in accordance with section 4.3.4.

It is anticipated that data from certain samples may not be usable (e.g. lost samples, broken bottles, instrument failure, lab mistakes, etc.). In that event the data set will be evaluated to ensure that a minimum of 90% of the data is complete so that determinations of contaminants can be evaluated. Based on this criterion, the Project Manager will then decide if additional samples are warranted.

Laboratory Selection and Validation

Although the facility has an on-site laboratory, for the purpose of this closure plan, it is assumed that an off-site lab will be utilized for sample analysis. In that regard, a Quality Assurance Plan (QAP), prepared in accordance with accepted industry practices and as a commitment to the quality of its environmental testing and the law, is included in Appendix I.

Prior to data validation at closure, the Project Manager will work with the lab to define performance criteria for the following QA/QC samples:

- Method blanks
- Surrogate recoveries
- Matrix spikes
- Laboratory spikes
- Laboratory or matrix spike duplicates
- Retention time window
- Method detection limits

The Project Manager will then ensure the following information is provided for data validation:

- Case narrative
- Chain-of-custody documentation
- Summary of results (listing samples with quantitation limits including dilutions and re-analyses, and reported in dry weight basis, moisture content percent recovery)
 - QA/QC results summaries including initial calibration, continuing calibration, method blanks, surrogate recoveries, matrix spike, laboratory spike, laboratory duplicate or

matrix spike duplicates, and laboratory QC check samples (as applicable)

The data validator will assess the laboratory analytical data package for completeness of data, and compliance of the sample conditions (adherence of field sampling activities to appropriate sampling procedures) and QC results (laboratory quality control samples and results) with acceptance criteria as described in QAPP or National Functional Guidelines (in the absence of site or lab-specific QC performance criteria, National Functional Guidelines will be utilized).

Detection Limits

In order to determine whether a sample is contaminated above the levels specified in 40 CFR 761.125(c)(3) it will be necessary for the laboratory to detect PCBs at levels below the specified cleanup levels. As described in Table 4-4, the cleanup level for exposed surfaces of this facility is 10µg/100 cm². Therefore, it will be necessary for the laboratory to detect PCBs at concentrations in the range of 1 µg/100 cm² for wipe samples and 33 µg/kg for solids (e.g. core samples).

PCBs-8082 (wipe)

Compound	RL	Units	MDL	Units	LCL	UCL	RPD
Aroclor 1016	1	µg/wipe	0.25	µg/wipe	45	107	50
Aroclor 1221	1	µg/wipe	0.33	µg/wipe			
Aroclor 1232	1	µg/wipe	0.25	µg/wipe			
Aroclor 1242	1	µg/wipe	0.25	µg/wipe			
Aroclor 1248	1	µg/wipe	0.25	µg/wipe			
Aroclor 1254	1	µg/wipe	0.25	µg/wipe			
Aroclor 1260	1	µg/wipe	0.25	µg/wipe	50	127	43
Surrogates							
Decachlorobiphenyl					65	137	NA
Tetrachloro-m-xylene					54	126	NA

PCBs-8082 (solids)

Compound	RL	Units	MDL	Units	LCL	UCL	RPD
Aroclor 1016	33	µg/kg	3.4	µg/kg	81	114	20
Aroclor 1221	33	µg/kg	5.2	µg/kg			
Aroclor 1232	33	µg/kg	6.4	µg/kg			
Aroclor 1242	33	µg/kg	7.4	µg/kg			
Aroclor 1248	33	µg/kg	5.7	µg/kg			
Aroclor 1254	33	µg/kg	2.7	µg/kg			
Aroclor 1260	33	µg/kg	2.9	µg/kg	85	123	30
Surrogtes							
Decachlorobiphenyl					77	123	
Tetrachloro-m-xylene					64	139	

4.3.4 Decontamination

After all the data has been validated, and the areas of PCB contamination above cleanup levels have been identified, cleanup of these areas can be initiated. As part of this PCB closure plan, cleanup methods listed below will be selected for the various items to be decontaminated. Areas that will potentially need to be decontaminated may include facility structure components and containment systems.

Since the closure plan specifies a Subpart N grid for determining initial sampling points; a one grid square (half-way between the contaminated sample location, and the next 'clean' sampling point'), as specified in 40 CFR 761, Subpart O (40 CFR 761.283(d)) will be utilized, for the purpose of decontamination, if contaminants are found above the action level.

Items to be discussed in this section include:

- Evaluation of Cleanup Methods.
- Description of Selected Cleanup Methods
- Decontamination of Cleanup Equipment
- Health and Safety Considerations
- Disposal of Cleanup Derived Waste

4.3.4.1 Evaluation of Cleanup Methods

Currently, there are several methods in use for cleanup of PCBs. For porous surfaces, such as concrete, contamination will be removed by scarification (if the contaminate is localized to the surface area or by cutting and removal of the concrete if contamination has shown penetration. For non-porous surfaces, the solvent clean method and various proprietary aqueous solvent or foam methods.

Scarification/Cutting and Removal

For porous surfaces the facility will concentrate on removal of contaminants. Since these areas have been coated (and maintained) with epoxy it is anticipated that there is a low likelihood of contamination. However, if contamination is discovered the area will be evaluated to determine what method would be most effective for contaminant removal. Surface contamination (e.g. no apparent gaps or cracks) will be scarified to remove the top layer of concrete and core samples of the affected area will be utilized to verify contaminant removal. If gaps or cracks are discovered the cleanup coordinator may alternately select cutting and removal of the affected concrete followed by verification sampling of the underlying material.

Equipment and support facilities needed for the Scarification/Cutting process are a Scarifier and Concrete saw. Additionally, rags, solvents, wire brushes, buckets, pumps, and other small items will be used to decontaminate scarification unit using the solvent clean method described below.

Solvent Clean Method

This method can be used to decontaminate both exposed surfaces and PCB containers as specified in 40 CFR 761.79. Acceptable solvents include, but are not limited to, terpene hydrocarbons, kerosene, aqueous and diesel fuel. For exposed surfaces, sufficient volume of solvent is applied to cover the entire contaminated surface, the excess solvent is absorbed with rags, and the contaminated area is wiped with a clean rag. If the surface is porous, scrubbing may be required using a wire brush. The process is then repeated and all solvent is absorbed with rags and granular absorbent.

The Solvent Clean Method is the most common cleanup method for PCBs. This method has been proven to be effective on most types of materials. It does not work as well on porous surfaces because the solvent tends to increase the mobility of the PCBs and allow them to penetrate further into the porous surface.

Equipment and support facilities needed for the solvent clean method are minimal. The only equipment needed is: rags, solvents, wire brushes, buckets, pumps, and other small items.

The solvent clean method is a simple procedure to implement and should not require any special time requirements. Since this method involves the use of flammable solvents, special precautions would need to be taken to prevent ignition of the solvents.

The relative cost of the Solvent Clean Method is expected to be low. As mentioned previously, this method does not involve any sophisticated equipment, so the main costs will be for labor, solvent, rags, and other miscellaneous equipment.

Health and Safety Considerations

Persons performing closure operations will be trained in proper chemical handling and safety procedures. They will be under the direct supervision of persons who are familiar with the process and understand the hazard potential of the stored material. Management personnel in conjunction with an independent engineer will oversee closure, will be familiar with this closure plan, and will ensure that all closure personnel are properly trained to safely perform the cleaning operation. The supervisor will have health and safety training provided through ETLA's corporate health and safety program.

During the cleaning process, personnel will be equipped with the appropriate protective equipment. They will also utilize head protection and chemical resistant gloves and boots. The clothing will be designed so that both sleeves and pant legs can be taped at the wrists and ankles respectively, to protect against upward or inward splash of water during cleaning.

Additionally, when utilizing scarification or cutting equipment of concrete, personnel will wear respirators and the area will be wetted with water to minimize dust generation.

Disposal of Cleanup Derived Waste

Waste material generated during the PCB closure activities will fall into the two categories of contaminated and non-contaminated. Contaminated material will include liquid waste from the solvent clean process, miscellaneous sampling equipment, personnel protective equipment, and other items. These items will be segregated into liquids and solids and stored in 55-gallon drums. Both liquids and solids will be transported, in accordance with 40CFR 761.61(a)(5)(v) PCB Remediation- Cleanup Waste, to an approved disposal facility.

Non-contaminated material generated during closure activities will be disposed of at the local sanitary landfill.

4.3.5 Post Cleanup Verification Procedures

In order to verify that cleanup has been effective in reducing PCB contamination below acceptable levels and to satisfy the requirements of 40 CFR 761.125, post cleanup sampling will be performed as described below. Sample collection, analytical, and management will be in accordance with the standards previously outlined in section 4.3.3.3.

4.3.5.1 Sampling Methods, Locations, and Rationale

The methods used for post cleanup sampling will be the same as those used for the pre-cleanup sampling. This will consist of chip, core, and wipe samples as described in section 4.3.3.3

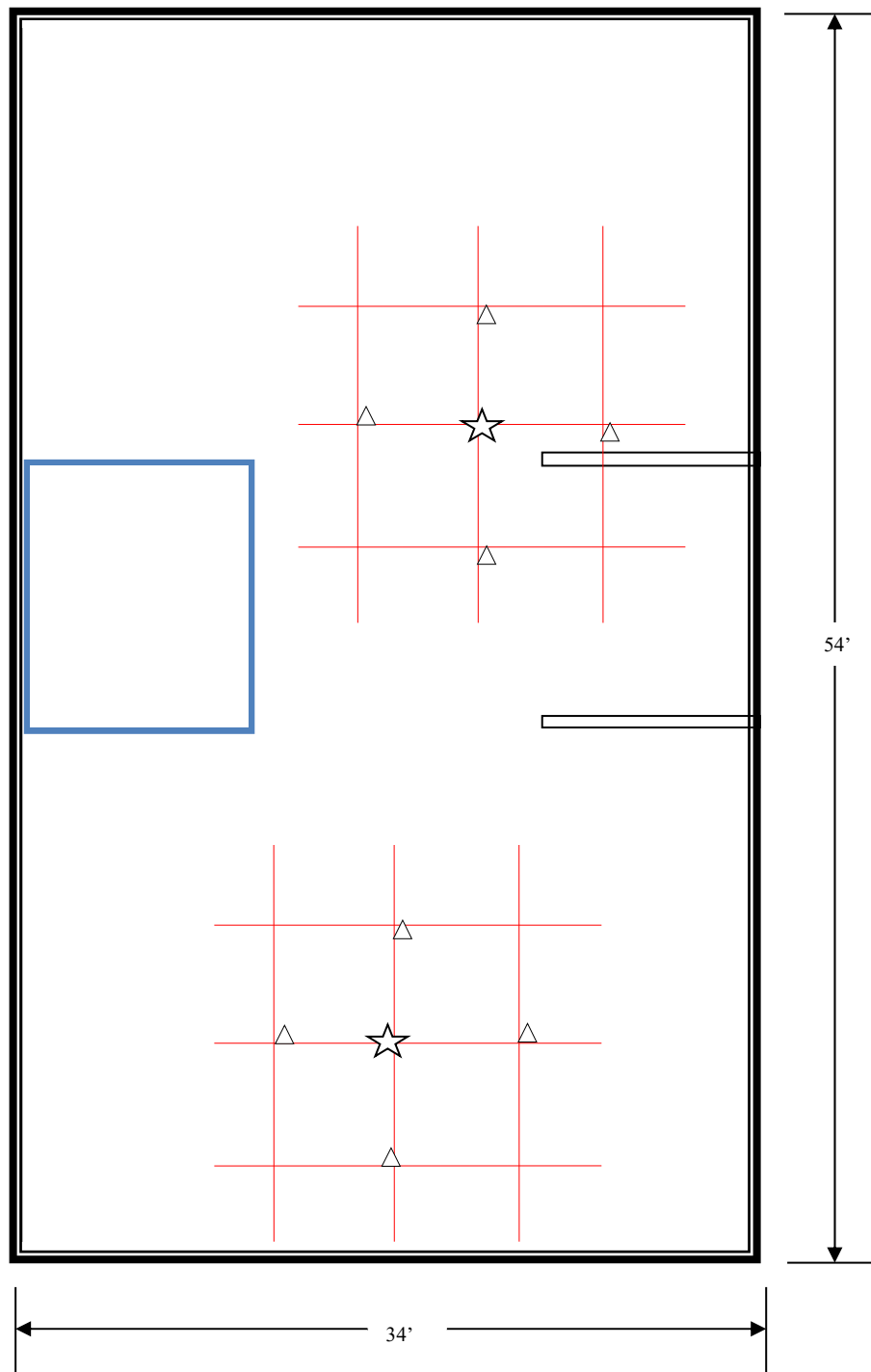
Before any post cleanup sampling begins, the records from the previous sampling will be reviewed to identify areas where elevated levels of PCBs were found. Samples will be taken, based on this review in accordance with a step out fashion, utilizing a 1.5 meter spacing grid, reorienting it, and collecting a sample at each point where the grid falls in the cleanup area (See Figure 4-6). Bias samples will be collected if any evident stains exist based upon visual inspections.

4.3.5.2 Analytical Procedures

Samples collected during post cleanup sampling will be analyzed using the same analytical methods described in the pre-cleanup analytical procedures. After the results are returned and validated as described previously, any sampling locations with PCB concentrations above the established cleanup levels will be decontaminated again using the same procedures as previously specified.

4.3.5.3 Waste Collection

All waste generated during the post cleanup sampling will be collected, containerized, and disposed in accordance with all Federal (40 CFR 761.65(e)(7)), State, and Local regulations.



- ☆ - Hypothetical contamination location
- △ - Clean-up verification sample location

Figure 4-6: Verification Grid Sampling Locations

4.4 Other Closure Activities

Because of the way the facility is laid out, other closure activities such as groundwater monitoring, run-on/run-off treatment and control, and additional security devices will not be necessary after cleanup is completed.

4.5 **Closure Schedule**

Closure activities for the ETLA facility will be subject to the schedule described in Table 4-6. The estimated date of closure will be March 1, 2065. Prior to closure Emerald Transformer Los Angeles, LLC will petition EPA, in accordance with 40 CFR 761.65(e)(6)(i), that the closure plan is up to date or submit a permit modification with an update closure plan.

Table 4-6: Closure Activity Schedule

Date	Closure Activity Schedule	Duration	
		Days	Hours
Dec. 31, 2064	Owner to notify EPA of intent to close facility.	0	0
Jan. 31, 2065	Facility to receive final shipment of PCB waste.	0	0
Mar. 1, 2065	Closure of facility begins.	0	0
	Removal of inventory (Section 4.2.2).	1	8
	Initial facility inspection (Section 4.3.3.2).	2	4
	Facility sampling (Section 4.3.3.3).	1	4
	Receive analytical results and perform validation and statistical analyses (Section 4.3.3.3).	30	4
	Decontaminate facility (Section 4.3.4).	5	14
	Submit closure certification to U.S. EPA.	30	8

A timeline showing the required activities before and after closure is presented in Figure 4-7. The times indicated are illustrative and actual duration of each task is expected to be much less.

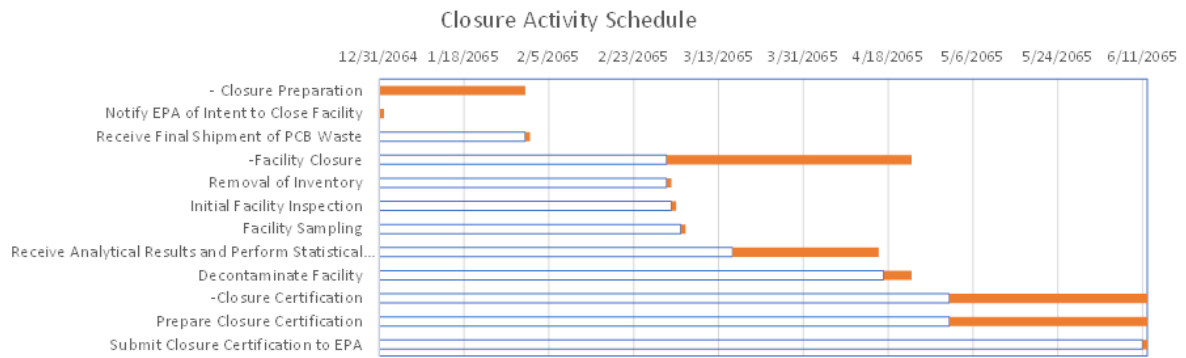


Figure 4-7 TSCA Closure Schedule

4.6 Modifications to the PCB Closure Plan

This PCB Closure Plan will be amended and resubmitted to the U.S. Environmental Protection Agency for approval when certain specified events or conditions occur. These items are listed below.

4.6.1 Operating and /or Design Changes

When a change in operating plans or in facility design affect the PCB Closure Plan, an amended plan will be prepared and submitted to the U.S. EPA for approval. Examples of specific items, which are considered under this subsection, include:

- Increases in facility size or capacity.
- Increases in the estimate of maximum inventory.
- Changes in the regulatory requirements that affect closure activities.
- Changes in the surrounding land use.

4.6.2 Unexpected Events During Final Closure

If during final closure, unexpected events occur which could affect the existing PCB Closure Plan; an amended PCB Closure Plan will be prepared and submitted to the U.S. EPA for approval. Unexpected events would include a release during closure activities, unavailability of planned disposal facilities or other occurrences, which were not anticipated.

4.6.3 Change in Expected Year of Closure

The year 2065 was selected as the closure year for this Plan. If closure is expected to occur at a different time, an amended PCB Closure Plan will be prepared and submitted to the U.S. EPA for approval.

4.6.4 Change in Financial Status

If a change in the facility's financial status occurs which may result in the inability to adequately pay for closure, an amended PCB Closure Plan will be submitted to the U.S. EPA for approval.

4.7 Closure Plan Checklist

A closure plan checklist is attached on the following pages. The checklist is taken from the TSCA Guidance Manual for Commercial PCB Storage Facility Application dated October 18, 1989. Specific subsections of this PCB Closure Plan are identified on the checklist to aid in compliance review.

Exhibit 4-1: Closure Plan Checklist for Commercial PCB Storage Facilities

	<u>Provided</u>	<u>Not Applicable</u>	<u>Comments</u>
1.0 <u>Facility Description:</u>			
1.1 General Description:	4.1.1		
1.2 Jurisdiction in which facility is located:	4.1.2		
1.3 Written description as well as topographic map detailing information on:			
• PCB Storage facilities	4.1.3		
• PCB treatment and disposal facilities		X	
• Hazardous waste management units (if RCRA permitted also)	4.1.3		
• All buildings and structures	4.1.3		
• Any 100-year floodplain	4.1.3		
• Adjacent surface waters or wetlands	4.1.3		
• Surrounding land uses	4.1.3		
• Other key topographic features	4.1.3		
• Traffic patterns	4.1.3		
• Location and status of underground storage tanks		X	
• Location and nature of security systems	4.1.3		
• Closed PCB Units (or hazardous waste management units if RCRA permitted)		X	
1.4 Description of environmental conditions on-site:			
• Proximity to surface waters including			

ponds, lagoons, wetlands and storage reservoirs	4.1.4		
• Proximity to public or private drinking water sources	4.1.4		
• Sewer location and design which could result in contamination of sewage treatment systems from PCB spills		X	
• Location of nearby grazing lands, farms, and vegetable gardens		X	
• Presence of a shallow well, ground water near the surface, or which poses a high potential for ground-water contamination	4.1.4		

1.5 Detailed description with engineering drawings of facility design:

	Design Capacity	Monitoring	Containment Systems
• Roof and walls	4.1.5		
• Flooring	4.1.5		
• Curbing and its containment volume	4.1.5		
• Drain valves, floor drain, etc.			
• Storage pallets outside of storage buildings (including locations and numbers)	4.1.5		
• Bulk tanks	N/A	N/A	N/A

	<u>Provided</u>	<u>Not Applicable</u>	<u>Comments</u>
2.0 Disposal of PCB Waste Inventory:			
2.1 Maximum inventory:			
• Provide design capacity	4.2.1		
• Estimate of maximum types and Quantities of:			
PCB Articles	4.2.1		
PCB Article Containers	4.2.1		
PCB Liquids in Bulk Tanks	4.2.1		
PCB Containers	4.2.1		
PCB Capacitors	4.2.1		
PCB Transformers	4.2.1		
PCB Contaminated Electrical Equipment	4.2.1		
Other PCBs	4.2.1		
Total PCB Inventory	4.2.1		
2.2 Disposal of inventory:			
• Details to ensure compliance as a PCB waste generator	4.2.2		
• Estimate of maximum inventory to be sent off-site	4.2.2		
• Description of any treatment prior to transport, if applicable		X	
• Methods and arrangements used for PCB waste removal and transportation off-site to approved storage and disposal facilities	4.2.2		
• Description of treatment and disposal methods at the final treatment or disposal facilities	4.2.2		
• Bulk tank removal, transport, tracking, and off-site disposal of tank capacity		X	

- Proposed schedule to complete disposal within 90 days from closure commencement

4.5

3.0 Closure Plan Sampling, Decontamination, and Compliance with the Spill Cleanup Policy:

3.1 Identification and classification of items to be decontaminated:

		Structures & Equipment Construction Materials	Spill Cleanup Policy Classification of Materials, Structures, and Equipment	Numerical Cleanup Levels Applicable from the Spill Cleanup Policy
• Facility structure components (roof, wall, etc.)	<u>4.3.1</u>			
• Surrounding soil, pavement and vegetation	<u>N/A</u>			
• Containment systems and piping	<u>4.3.1</u>			
• Equipment	<u>N/A</u>			
• Pallets	<u>N/A</u>			
• Bulk tanks	<u>N/A</u>			
• OTHER	<u>N/A</u>			

	<u>Provided</u>	<u>Not Applicable</u>	<u>Comments.</u>
3.2 Pre-cleanup survey and sampling:			

a) Visual inspection to ascertain sampling boundaries includes detailed discussion of inspection for PCB contaminated residues or particulate matter on:

• Tanks		<u>X</u>	
• Valves and piping		<u>X</u>	
• Equipment		<u>X</u>	
• Containment areas	<u>4.3.3</u>		
• Soil		<u>X</u>	
• OTHER	<u>4.3.3</u>		

b) Sampling survey should include:

• Discussion of methods for soil and aqueous materials		<u>X</u>	
• Discussion and maps of proposed grid sampling	<u>4.3.3</u>		
• Sampling plan for solid surfaces	<u>4.3.3</u>		

• Sampling for the penetration and contamination of PCBs into solid surfaces	4.4.4.2		
• Discussion of validity of statistical sampling plan	4.3.3		
• QA/QC	4.3.3		

4.0 Decontamination:

4.1 Cleanup methods for each contaminated component should be described in detail:

	Description of Decontamination Method	Description of Worker Protection Measures
• Facility walls	4.3.4	
• Facility floors	4.3.4	
• Facility roof	4.3.4	
• Soil	N/A	
• Containment systems and valves	4.3.4	
• Equipment	N/A	
• Pallets	N/A	
• Bulk tanks	N/A	
• OTHER	N/A	

4.2 A description of the criteria used to choose each decontamination method for the components listed below:

	Effective- ness	Equip- ment	Support Facilities Needed	Time Require- ments	Safety Require- ments	Amounts of Wastes Generated
• Facility walls	4.3.4					
• Facility floors	4.3.4					
• Facility roof	4.3.4					
• Soil	N/A					
• Containment systems and valves	4.3.4					
• Equipment	N/A					
• Pallets	N/A					
• Bulk tanks	N/A					
• OTHER	N/A					

4.3 Decontamination should also detail post-cleanup verification sampling – especially visually contaminated areas:

<u>Provided</u>	<u>Not</u>	<u>Comments .</u>
<u>4.3.4</u>	<u>Applicable</u>	

4.4 Decontamination, containerization, and disposal of both PCB and non-PCB wastes produced in facility decontamination, including solvents, rags and equipment:

• Estimates of wastes produced from:		X	
➤ Decontamination of equipment	4.3.5		
➤ Decontamination of structures		X	
➤ Decontamination of grounds	4.3.5		
➤ Post cleanup verification	4.3.5		
• Estimates of transportation of above wastes	4.3.5		
• Estimates of disposal facilities that would take these wastes	4.3.5		

5.0 Other Activities Covered in the Closure Plan:

5.1 Ground-water monitoring plan: 4.4

5.2 Treatment, removal, and disposal of run-on and run-off to decontamination procedures: 4.4

5.3 Security measures to prevent unintentional or unpermitted access to the site: 4.4

6.0 Schedule for Closure Detailing the Above Activities: 4.5

5.0 CLOSURE COST ESTIMATE

5.1 Initial Closure Cost Estimate

The closure of the Emerald Transformer Los Angeles, LLC PCB storage facility is described in Section 4- PCB Closure Plan. The date of closure has arbitrarily been set for March 1, 2065. This date has been selected solely to develop a closure plan, and may be revised in the future based on business decisions.

The estimated cost for the PCB storage area closure based on dollars is listed in Table 5-2. Table 5-1 illustrates the costs by separate areas. The basis of the various costs is summarized below.

5.1.1 Certification

The closure cost has been certified by the person responsible for the closure cost preparation and uses the prescribed working. This certification is located in Section 6.

5.1.2 Closure Activities Included

The closure cost estimate is intended to cover all the activities described in the PCB Closure Plan. Specific activities are listed in Table 5-1 along with the estimated cost to complete each activity.

5.1.3 Cost Basis

The cost presented have been calculated utilizing annual inflation factors from 2017 to 2022. The cost were adjusted from previously closure cost estimate approved in 2017.

The initial costs utilized were based on cost quotations for outside vendors, contractors, and service agencies. Labor rates include provisions for contractor overhead and profit, and are based on the use of third party cleanup contractors. Costs include the certification of closure by an independent, professional engineer. Disposal rates are those charged by the disposal sites listed in the PCB Closure Plan. The costs include a factored transportation rate based upon a full load trip rate of \$5.90 per loaded mile. Costs also include a 10% contingency.

5.1.4 Inventory on Hand

The closure cost estimate is based on the inventory specified in the PCB Closure Plan. This inventory consists of the maximum possible inventory of 7,920 gallons of PCB waste.

5.1.5 Off-site Disposal

All disposal of existing inventory and closure derived waste is intended to be at an approved off-site disposal facility. No on-site treatment or disposal is proposed.

5.1.6 Third Party Participation

PCB storage area closure costs, including disposal of inventory and closure derived wastes, are based on the use of third parties and do not include use of parent companies or subsidiaries of the owner/operator of the Emerald Transformer Los Angeles, LLC facility.

5.1.7 Salvage Value

No credit has been taken for possible salvage value of any component of the facility or inventory.

5.2 Review of Cost Estimate Adjustments

Adjustments to the closure cost estimate are required in two situations:

- After certain modifications to the PCB Closure Plan
- Annually to account for inflation

5.2.1 Adjustments for Closure Plan Modifications

A revised closure cost estimate is required to be prepared within 30 days of approval by the Regional Administrator of a closure plan modification. The revised cost estimate will be requested by the U.S. EPA when notification of approval of a closure plan modification is made.

The following changes in facility conditions or activities could increase closure cost estimates:

- An increase in facility size or capacity
- An increase in the estimate of maximum inventory
- Changes in regulatory requirements affecting the cost of closure
- Contingencies over the facility life that may affect future closure costs
- Changes in surrounding land use that may affect closure activities

Changes in facility conditions may also be the basis for a reduction in the closure cost estimate. A request for a reduction may be made as long as the closure activities continue to meet regulatory requirements.

5.2.2 Annual Inflation Adjustments

Closure cost estimates must be adjusted annually to account for inflation. This adjustment must be made prior to the anniversary date of the financial assurance instrument.

Annual inflation adjustments to the closure cost estimate may be made by either recalculating the closure cost using the current year's costs, or by multiplying the previous estimate by an inflation factor that measures the general trend in prices in the economy.

Use of the inflation factor will require regulatory review of only the inflation factor calculation. Re-estimating the closure costs will require a level of review similar to an initial closure cost estimate.

The source for inflation factor data is based upon standard practices accepted by the U.S. Department of Commerce.

The inflation factor used in the revision of the closure cost estimate is obtained by dividing the most recent annual deflator by the previous year's deflator factor. The previous closure cost estimate is then multiplied by this quotient to derive the new closure cost estimate.

Table 5-1: Closure Costs – Container Storage Warehouse – PCB Area

CONTAINER STORAGE WAREHOUSE				
INVENTORY DISPOSAL Drums: Liquid/Solid + Miscellaneous PCB Equipment/Solids				
	79,400	lbs	0.59	lbs
				\$46,846
Transportation				
	3,276	Mile	5.90	Mile
				\$19,328
INVENTORY DISPOSAL SUB-TOTAL				
				\$66,176
DECONTAMINATION (Floor Area = 1,836 ft², Wall Area to 6 ft = 462 ft²)				
<u>Records Review & Interviews –</u> Manager <u>Inventory Removal</u>	4	Hours	64.93	Hour
				\$260
Laborers	36	Hours	53.12	Hour
				\$1,912
Foreman	36	Hours	76.73	Hour
				\$2,762
<u>Initial Sampling</u>				
Laborers	12	Hours	53.12	Hour
				\$637
Manager	12	Hours	76.73	Hour
				\$921
Equipment Rental (Scarifier)	1	Week	1062.46	Week
				\$1,062
Grid (core) Samples (Note 1)	37	Each	67.29	Each
				\$2,490
Wipe Samples (Note 1)	15	Each	67.29	Each
				\$1,009
Field Blanks (one wipe, one core)	2	Each	67.29	Each
				\$135
Discretionary Samples (Note 1)	5	Each	67.29	Each
				\$336

Sample Shipment	2	Each	59.03	Each	\$118
<u>Surface Decontamination (Floor Area= 1,836 ft²)</u>					
Laborers	20	Hours	53.12	Hours	\$1,062
Foreman	20	Hours	76.73	Hours	\$1,535
Safety Manager	10	Hours	76.73	Hours	\$767
Solid Waste	4	Drum	472.20	Drum	\$1,889
<u>Confirmation Sampling</u>					
Grid (core) Samples (Note 1)	36	Each	67.29	Each	\$2,442
Sample Shipment	2	Each	59.03	Each	\$118
Discretionary Samples (Note 1)	3	Each	67.29	Each	\$202
Laborers	5	Hours	53.12	Hours	\$266
Foreman	5	Hours	76.73	Hours	\$384
<u>Certification</u> – 3 rd Party Engineer	4	Hours	112.15	Hours	\$449
<u>Miscellaneous</u>					
Expendable Supplies	1	Lot	590.25	Lot	\$590
Equipment Decon Fluid (forktruck, sacrifier) (Note 2)	10	Gal	5.31	Gal	\$53
Safety Equipment	20	Sets	59.03	Sets	\$1,181
Project Management	32	Hours	65.93	Hours	\$2,078
Per Diem Expenses	5	Days	147.56	Days	\$738

Utilities	20	Days	11.81	Days	\$236
Rental Equipment	4	Lot	295.13	Lot	\$1,181
DECONTAMINATION SUB-TOTAL	\$26,793				
CONTAINER STORAGE WAREHOUSE-PCB AREA TOTAL	\$66,203				
CONTINGENCY	\$ 9,300				
GRAND TOTAL	\$102,225				

Note 1 – Sample cost includes sampling supplies.

Note 2 – Diesel fuel cleaning agent is absorbed into solids (rags, brushes, etc.) and is disposed of as a solid.

6.0 PCB CLOSURE COST ESTIMATE CERTIFICATION

The following certification is made by the person responsible for preparation of the PCB Closure Cost Estimate presented in Table 5-1.

Under the civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (18 U.S.C. 1001 and 15 U.S.C. 2615), I certify that the information contained in or accompanying this document is true, accurate, and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification that this information is true, accurate, and complete.

Signature: Shirrell Tingle

Printed Name: Shirrell Tingle

Date: September 24, 2025

7.0 DEMONSTRATION OF FINANCIAL ASSURANCE

761.65(d)(3)(x) specifies that a PCB storage application must include a demonstration of financial assurance for facility closure. This demonstration is provided in this section and Appendix J.

The Closure Plan for the PCB storage portion of the facility is contained in Section 4 of the application. The Cost Estimate is contained in Section 5. The estimated cost for closing the PCB storage portion of the facility is \$102,225.

It should be noted that separate closure costs and a financial assurance demonstration are in place for the closure of the RCRA portions of the facility.

APPENDIX A – RESUMES



Curriculum Vitae (CV)

Contact Information

Name –

Address –

Telephone –

Cell Phone –

Email –

Employment History

List in chronological order, include position details and dates

Work History

Academic Positions –

Research and Training –

Education

Include dates, majors, and details of degrees, training and certification

Professional Qualifications

Memberships, Certifications and Accreditations

Computer Skills

04/2017-Present EVP-Operations: Emerald Transformer, McKinney, Texas
Villanova University - Lean Six Sigma Black Belt, 08/2016

06/2016-04/2017 General Manager; Emerald Transformer, Defuniak Springs, Florida
University - University of New Hampshire, Durham NH, 03824; Attended, not completed.

06/2015–06/2016 District Manager; Emerald Transformer, Defuniah Springs, Florida
 Microsoft Office
 High School Diploma; Laconia Senior High School, Laconia NH, 03246; High School Diploma; 06/1994
 Advanced Word, Outlook, Excel Software Development
 06/2015–06/2016 District Manager; Emerald Transformer, Defuniah Springs, Florida

04/2009 – 12/2013 Plant Manager; Professional Products, Inc., Defuniak Springs, Florida

05/2002–06/2009: Production Manager; Professional Products, Inc., Defuniak Springs, Florida

Melvin D. Barsh, Transf. McKinsey, TX 75076 | chael.2010@gmail.com

Awards

Books–

Interests –

N/A

Running, Half Marathons with a Full Marathon goal. Long term goal of training for an Iron Man. I enjoy animals. I have three dogs, two rescues, and a cat. I, also, enjoy going to the movies with my wife and family.

N/A



PROFESSIONAL RESUME

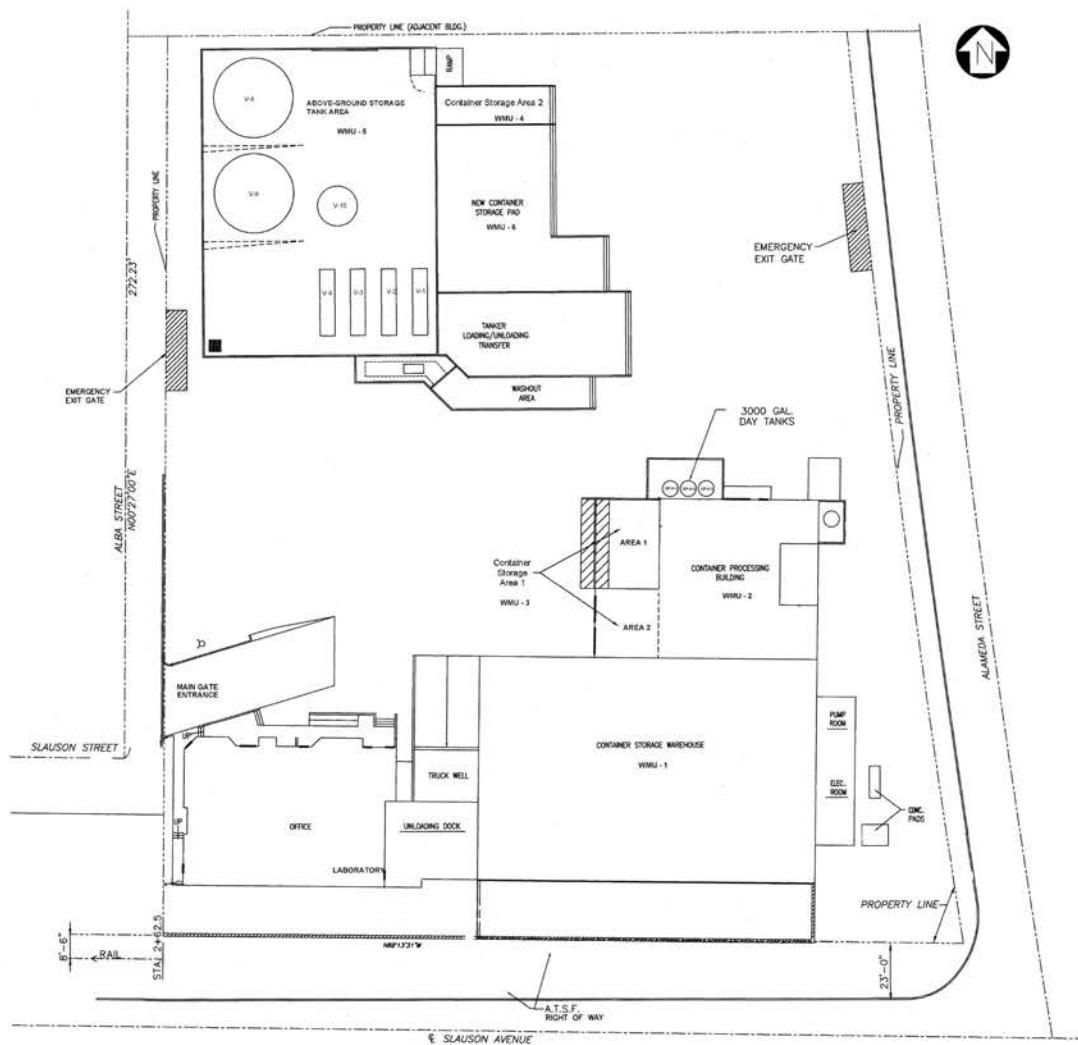
a.	Name, Title & Local Company Address:				
	Steve Peterson Facility Manager Emerald Transformer Los Angeles, LLC 5756 Alba Street Los Angeles, CA 90058				
b.	Corporate Address:				
	Emerald Transformer Western States, LLC 7850 Collin McKinney Parkway Suite 200 McKinney, TX 75070				
c.	Years Experience – With This Firm:	6	With Other Firms:	29	
d.	Education: Degree(s) / Specialization & Licenses / Registrations				
	B.S. Chemical Engineering – 1992 Brigham Young University				
e.	Other Experience and Qualifications:				
f.	Environmental & Health and Safety Training:				
	40 Hour OSHA DOT Hazmat RCRA Training				



PROFESSIONAL RESUME

a.	Name, Title & Local Company Address:				
	Yolanda Ramirez Facility Operations Manager Emerald Transformer Los Angeles, LLC 5756 Alba St Los Angeles, Ca 90058				
b.	Corporate Address:				
	Emerald Transformer Western States, LLC 7850 Collin McKinney Parkway Suite 200 McKinney, TX 75070				
c.	Years Experience – With This Firm:	11	With Other Firms:	27	
d.	Education: Degree(s) / Specialization & Licenses / Registrations				
	Paramount High School, Paramount Ca Compton Community College				
e.	Other Experience and Qualifications:				
	- Proactive leader with over 28 years of experience in Environmental Compliance and Hazardous Waste Management. 28 years Working knowledge of organic and inorganic chemistry, hazardous materials, the toxicity of hazardous materials, hazardous classifications and chemical incompatibilities, chemical handling procedures and personal protective equipment. - Good understanding of all Hazardous Waste Shipping documents such as Manifest, TSCA Continuations, LDR in State, Federal, Recycle, Disposal, Incineration and landfill.				
f.	Environmental & Health and Safety Training:				
	40-hour HAZWOPER Training 8 -hour Refresher Training - DOT Training - First Aid/CPR Certificate - RCRA Training - Lock out Tag Out Training - Environmental Health and Safety Training - PCB Training				

APPENDIX B – FACILITY DRAWINGS



SCALE (ft.)
0 25 50



FACILITY DIAGRAM

RCRA Hazardous Waste Permit Renewal Application
Emerald Transformer Los Angeles, LLC, Los Angeles, California
EPA ID No. CAD050806850

GSI Job No.	5546	Drawn By:	CDM
Map ID	V_001_08	Chk'd By:	JMM
Issued:	29-Sep-2020	App'd By:	JMM
Scale:	As Shown	FIGURE D-1	

APPENDIX C – INSPECTION FORMS



Report Id:

PCB Inspection

Compliance Header	
Inspector Name	
Area of Inspection	WMU1 Cont. Storage Warehouse TSCA
Inspection Date and Time	
CO PCB Inspection Instructions	
Note condition of inspection items. If item does not apply to an area mark N/A. All unsatisfactory findings must be explained below. Include any repairs, changes or other remedial actions required or performed.	
CO PCB Inspection Items	Pass or Fail
Are all PCB Articles and PCB Containers properly marked with storage date and PCB label?	
Are all PCB Articles and PCB Containers stored in approved bermed areas?	
Are the roof and walls in good condition to prevent rainwater from reaching PCBs (i.e., not leaking)?	
Are the floors and berms in good condition where PCB's are stored (i.e. no cracks)?	
Are all moveable pieces of equipment that are used for handling PCB's in the storage area?	
Have all pieces of equipment that have been removed from the PCB storage area been decontaminated per 40 CFR 761.79?	
Are all PCB Articles and PCB Containers free from leaks?	

Do all containers holding liquid PCB's meet 40 CFR 761.65 criteria?	
Do all containers holding non-liquid PCB's meet 40 CFR 761.65?	
Is there enough aisle space to allow movement of personnel, fire protection, spill control, and decontamination equipment?	

Are all containers of PCB waste closed except for the ones being processed?	
Do all PCB articles and PCB containers have unique Clean Harbors numbers assigned to them?	
Inspector Signature	
Inspection Overall Assessment	Inspection Passed or Failed

APPENDIX D – SPCC PLAN



Spill Prevention, Control, and Countermeasures Plan (SPCC)

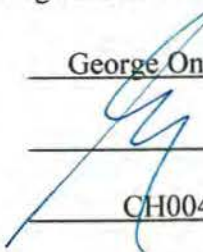
Facility: Emerald Transformer Los Angeles, LLC
5757 Alba Street
Los Angeles, CA 90058
(323) 277-2500

Owner: Emerald Transformer Western States, LLC
4509 State Hwy 83
De Funiak Springs, Florida 32435
800-908-8800

Facility Contact: Steve Peterson, Facility Manager

CERTIFICATION [40 CFR Part 112.3(d)]: I hereby certify that I am familiar with the requirements of 40 CFR Part 112; that I or my designated agent have visited and examined the facility; that this SPCC Plan has been prepared in accordance with good engineering practices, including consideration of applicable industry standards, and in accordance with 40 CFR Part 112 requirements; that procedures for required inspections and testing have been established; and, that the plan is adequate for this facility.

Engineer: George Oney, P.E.

Signature: 

Registration Number: CH004494

State: California

Date: 11/15/2022



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SPCC PLAN REVIEW – 40 CFR Part 112.5(b)

In accordance with 40 CFR Part 112.5(b), a review and evaluation of this SPCC Plan is conducted at least once every five years. As a result of this review and evaluation, Emerald Transformer Los Angeles, LLC will amend the SPCC Plan within six months of the review to include more effective prevention and control technology if: (1) such technology will significantly reduce the likelihood of a spill event from the facility, and (2) if such technology has been field-proven at the time of review.

By signing below, I have completed the review and evaluation of the SPCC plan for Emerald Transformer Los Angeles, LLC. The plan will/will not be amended as a result and is indicated below.

Review Dates

Signature

Amend the Plan? (circle one)

1.	11/15/2022		<u>will</u> / will not
2.			will / will not
3.			will / will not
4.			will / will not
5.			will / will not
6.			will / will not
7.			will / will not
8.			will / will not
9.			will / will not
10.			will / will not

TECHNICAL AMENDMENTS – 40 CFR Part 112.5(c)

Any technical amendment to the SPCC Plan shall be certified by a Professional Engineer in accordance with 40 CFR 112.3(d) within six months after a change in the facility design, construction, operation, or maintenance occurs which materially affects the facility's potential for the discharge of oil into or upon the navigable water of the United States or adjoining shorelines.

MANAGEMENT APPROVAL – 40 CFR 112.7

This SPCC plan is fully approved by the management of Emerald Transformer Los Angeles, LLC and has been implemented as described.

Steve Peterson, Facility Manager

11/16/2022

Date

1. Statement of Facility Conformance – 40 CFR 112.7(a)(1)

Emerald Transformer Los Angeles, LLC is committed to the preservation of the environment and prevention of adverse environmental impact, which might result from our operations. Environmental protection encompasses air quality, water quality, and proper disposition of all waste products. Our PCB hazardous wastes are managed according to the U.S. Environmental Protection Agency's 40 CFR Part 761 regulations.

As a result, Emerald Transformer Los Angeles, LLC declares that it has fulfilled the requirements and obligations of U.S. EPA's July 17, 2002 revised SPCC regulations for oil pollution prevention.

A. Facility Owner and Operator

- i. Facility Owner, Address, and Telephone:
Emerald Transformer Western States, LLC
4509 State Hwy 83
De Funiak Springs, Florida 32435
800-908-8800
- ii. Facility Operator, Address, and Telephone:
Emerald Transformer Los Angeles, LLC
5757 Alba Street
Los Angeles, CA 90058
(323) 277-2500

B. Facility Contacts(s)

<u>Name</u>	<u>Title</u>	<u>Telephone</u>
Steve Peterson	Plant General Manager	(323) 277-2500
Yolanda Ramirez	Operations Manager	(323) 277-2500
Diego Diaz	Facility Supervisor	(323) 277-2500

2. Facility Description – 40 CFR 112.7(a)(3)

A. Facility Layout

The Emerald Transformer Los Angeles, LLC facility is located at 5756 Alba Street in Los Angeles, California. ETLA is a permitted EPA/DTSC for TSCA (PCB dielectric fluid (mineral oil)) and RCRA storage facility for hazardous and non-hazardous wastes. The facility receives wastes for storage, consolidation, and shipment to off-site treatment and disposal facilities.

The facility began operations in 1985 and is situated approximately 4 miles south of downtown Los Angeles on the northwest corner of the intersection of Slauson Avenue and Alameda Street. The property encompasses 2.3 acres.

The facility consists of the following main areas: An Administration Building containing an onsite Laboratory, a Container Storage Warehouse, a Container Processing Building, a Truck Parking Area, a New Container Storage Pad, and an Aboveground Storage Tank Area. A diagram of the facility is provided (Figure 1) and includes the locations of existing waste management units at the Los Angeles Facility.

The perimeter of the Los Angeles Facility is a combination block wall and/or corrugated galvanized fence. The wall and/or fence is six (6) to eight (8) feet high, topped with barbed wire, and completely surrounds the facility. The fence and wall are maintained in good repair. There are warning signs posted in English and Spanish at the entrance of the facility. The entire facility is paved with a continuous slope from all areas to centralized collection points.

There are no known surface waters bodies located on the facility or within one mile of the facility.

B. Facility Storage – 40 CFR 112.7(a)(3)(i)

Aboveground Storage Tanks (Stationary)

There are a total of seven stationary aboveground storage tanks in use at the Los Angeles facility located in the Aboveground Storage Tank Area (WMU-5). The locations of the tanks are shown on the SPCC Plan map (Figure 1). Of the seven tanks at the tank farm, six are used for the storage of oils. The remaining tank is used for storm water management.

Tanks V-1 thru V-4 (horizontal tanks) and V8 thru 10 (vertical tanks) are aboveground steel tanks located inside a concrete lined and diked containment basin. All tanks are kept closed except when material is being added or removed. The tank design capacities of the tanks are provided in Table 1.0 below.

Table 1.0 - Tank/Equipment Detail Summary

Tank/Equipment Number	Description	Primary & Secondary Use	Volume (Gallons)	Tank Location
V-1	Wastewater Treatment	Oily water, <5ppm PCB	10,000	Wastewater Treatment (WMU-5)
V-2	Wastewater Treatment	Oil storage, <2ppm PCB	10,000	Wastewater Treatment (WMU-5)
V-3	Wastewater Treatment	Oil storage, <2ppm PCB	10,000	Wastewater Treatment (WMU-5)
V-4	Wastewater Treatment	Oil storage, <2ppm PCB	10,000	Wastewater Treatment (WMU-5)
V-8	Wastewater Treatment	Oil storage, <2ppm PCB	100,000	Wastewater Treatment (WMU-5)
V-9	Storm water Collection	Storm water	100,000	Wastewater Treatment (WMU-5)
V-10	Low BTU Liquids Storage and Cal PCBs	Oil storage, 2-49ppm PCB	20,000	Wastewater Treatment (WMU-5)

Various types of pumps and valves will be utilized in the tank systems at the facility. All pumps and valves used will be constructed of a material compatible with the contents transferred in order to minimize corrosion and erosion effects. Practices that minimize accidental releases are:

- Pump, valve, and hose connections are located inside of areas with secondary containment where possible. In the rare case where this is not possible, the connection is monitored on a continuous basis by an operations technician.
- Seal less pumps are utilized where possible to prevent releases.
- Valves are mounted in the horizontal position where possible to minimize valve stem leakage.
- Flanged connections are used in preference to screwed connections, where not precluded by existing equipment connections

Containers (Drums, Roll-offs)

The Los Angeles facility has several locations where containers may be found as follows (see Figure 1): Container Storage Warehouse (WMU-1), Container Processing Building (WMU-2), Container Storage Area 1 (WMU-3), Container Storage Area 2 (WMU-4), and New Container Storage Pad (WMU-6). **Note:** All containers are kept closed unless material is being sampled, added, or removed. Containers are inspected as per the facility Inspection Plan to ensure they are intact and non-leaking.

The Container Storage Warehouse (WMU-1) is a permitted hazardous waste storage unit. This area is constructed of reinforced concrete base, concrete curbs, and located under a roof. Wastes stored include solid and liquid RCRA hazardous, non-hazardous, TSCA PCBs, California PCBs, PCBs less than 5ppm, and Universal wastes in drums, boxes and/or other DOT approved containers from off-site generators and site generated waste. Two 55 gallon drums of diesel fuel for the forklift along with a 35 gallon fuel tank associated with the emergency generator are located in this area.

The Container Process Building (WMU-2) is a permitted hazardous waste container processing unit constructed of reinforced concrete base, concrete curbs and located under a roof. Operations can include RCRA, non-hazardous, California Hazardous PCBs, PCBs less than 5ppm, and Universal waste liquids bulking, repackaging of solids/sludges, solids dispersion and blending, solidification, labpack sorting, bulking, blending, treating, dissolving and empty container crushing.

Container Storage Area 1 (WMU-3) is permitted hazardous waste storage and container processing unit used for receiving, sampling, storage, consolidation, and processing of containers and roll-off boxes. This area is constructed of a reinforced concrete base and curbs/walls to provide the required containment. Wastes accepted include solid and liquid RCRA Hazardous, non-Hazardous, California Hazardous PCBs, PCBs less than 5ppm, and Universal wastes in drums, boxes, and other DOT approved containers from off-site generators and site generated waste.

Container Storage Area 2 (WMU-4) is a permitted hazardous waste storage and processing area. This area is constructed of a reinforced concrete base and curbs/walls to provide the required containment. WMU-4 is utilized for receiving, sampling, storing, consolidating and processing of containers and roll-offs. WMU-4 may receive solid and liquid RCRA Hazardous, non-hazardous, California Hazardous PCBs and PCBs less than 5ppm waste in drums, boxes and other DOT approved containers from off-site generators.

The New Container Storage Pad (WMU-6) is a permitted hazardous waste storage unit, constructed of reinforced concrete base and curbs to provide the required containment. WMU-6 is used for receiving, sampling, storing, consolidating and processing of containerized waste for storage. Containers will be received and stored based upon their hazard classification. WMU-6 may store solid and liquid RCRA hazardous wastes, non-hazardous wastes, California Hazardous PCBs, PCBs <5ppm, and Universal Waste in drums, boxes and/or other DOT approved containers from off-site generators and site generated waste.

Truck (Loading/Unloading Operations)

A tanker truck loading/unloading area is located immediately east of and abuts the Aboveground Storage Tank Area. The truck loading and unloading area measures approximately 30 feet by 75 feet long.

A truck trailer (container) loading/unloading area is provided adjacent to the Container Storage Warehouse (WMU-1). This area measures approximately 22 feet by 52 feet long.

C. Discharge Prevention Measures – 40 CFR 112.7(a)(3)(ii)

All operations are performed within secondary containment. The Container Storage Warehouse (WMU-1) and the Container Processing Building (WMU-2) have walls and a roof and thus are protected from precipitation run-on. The New Container Storage Pad (WMU-6) is roofed and has curbs taller than the surrounding grade to prevent run-on. Container Storage Area 1 (WMU-3), Container Storage Area 2, (WMU-4), and the Aboveground Storage Tank Area (WMU-5) have secondary containment capacity which exceeds 10% of the volume of all containers plus run-off from a 25 year, 24-hour storm. Additionally the units have curbs higher than the surrounding area to prevent run-on. The Tank Truck and Tank Trailer Loading/Unloading Areas are constructed of concrete and are surrounded by a concrete containment wall or a roll-off curb designed to contain any spills. Trucks are only in the area temporarily and Tank Trucks would not be loaded/unloaded during inclement weather (e.g. 25-year, 24-hour rain event).

In addition to the above design standards, the Los Angeles facility utilizes a combination of training and inspections to address discharge prevention and proper oil handling methods. The facility Training Plan is designed to promote efficient and safe performance of all facility-related operations, to ensure rapid and effective response to emergency events, and to protect facility employees, the environment and the public. It is the facility's policy to emphasize accident prevention through training employees in the use of safe management practices. All plant personnel are trained in the proper operation and maintenance of the plant equipment, proper waste transfer procedures, and in spill prevention, control and clean-up procedures. The training program consists of pre-employment classroom training in personnel protection, safety and chemical properties (part of the OSHA 40-hour hazmat training), on-site training in the Facility's SPCC/Contingency Plans, spill response procedures and equipment locations, and proper loading/unloading procedures. Annual refresher training is provided on site-specific topics.

The facility Inspection Plan is intended to provide a comprehensive program to prevent and detect system malfunctions, equipment deterioration, and operator errors which, if allowed to continue without remedial action, could ultimately lead to a release to the environment or create a threat to human health. The inspection program is designed to provide an early warning of the potential for such events in order that corrective and preventive actions may be taken in a timely manner.

i. Container Storage Units

The container storage units are designed to safely store containers of solids and/or liquids. All containers are kept on pallets. Pallets are arranged in rows to permit adequate access for emergency equipment and personnel and visual inspection of containers.

Prevention of spills in the container storage units is an established facility practice. Personnel assigned to these areas are expected to:

- Verify visually that containers placed into storage are not leaking.
- Overpack any leaking or heavily creased, dented, or corroded containers into a salvage drum or transfer the container contents into a new container prior to placing the material into the containment area.
- Maintain a minimum aisle space, which allows for quick access to any container in case a leak is detected.
- Ensure that inspections of the container storage units are carried out and documented.
- Report any detected leakage to the supervisor and then overpack or re-package the leaking containers.
- Operate forklift vehicles or handcarts in a safe responsible manner in accordance with facility safety regulations and maintenance schedules.
- Ensure that debris including discarded personal protective equipment (PPE), pallet scraps, dirt, broken glass, hydraulic oil, or any other material, which could cause an accident is picked up when discovered and placed into an approved container.
- Report any unsafe conditions not previously mentioned to the area supervisor.

ii. Container Transfer Areas

The container transfer areas are defined as the dock locations and staging zones where containers are either loaded to or unloaded from transport trailers. These facilities are curbed and diked to prevent run-on and are secondarily contained. Facility personnel who work in these locations follow the standard company health and safety rules/regulations when handling hazardous waste materials.

Prevention of spills in the container transfer facilities is an established facility practice. Personnel assigned to these locations prevent spills by:

- Requiring truck drivers backing in trailers to check for and remove any obstacles in their path prior to moving the trailer.
- Requiring drivers to place wheel chocks on rear trailer wheels and extend landing legs properly for stable parking of the trailer on the floor.
- Checking the containers on the trailer for leaks and overpacking or re-packaging any leaking containers prior to storage.
- Inspecting the pallets on which containers are placed to ensure proper positioning prior to lifting on or off the trailer and to ensure that the pallet will maintain its integrity during transfer.
- Ensuring that the forklift truck lift bars are in operating condition.

- Keeping non-essential personnel and equipment out of the transfer zone when containers are being loaded to or unloaded from a trailer.
- Keeping the transfer zone free of debris including discarded personal protective equipment, pallet scraps, dirt, broken glass, empty containers, oil, or any other material, which could cause an accident.
- Report any unsafe conditions not previously mentioned to the area supervisor.

iii. Tanker Truck Transfer Area

The Tanker truck transfer area is for waste transfers between tanker trucks and storage tanks. This unit is located immediately east of and abuts the Aboveground Storage Tank Area, is constructed of concrete, and is surrounded by a concrete containment wall or a roll-off curb designed to contain any spills. The area is surrounded by a berm to prevent run-on and is secondarily contained. Tank trucks are only in the area temporarily and would not be loaded/unloaded during inclement weather (e.g. 25-year, 24-hour rain event). Accumulated storm water in the secondary containment areas will be tested prior to discharge. Storm water requiring treatment will be held until appropriate treatment has taken place.

Prevention of spills in the truck transfer area is an established facility practice. Personnel assigned to these locations prevent spills by:

- Requiring truck drivers backing in trailers to check for and remove any obstacles in their path prior to moving the trailer.
- Requiring drivers to place wheel chocks on rear trailer wheels and extend landing legs properly for stable parking of the trailer on the floor.
- All transfer operations are supervised by a trained operator who attends the transfer operation and maintains visual observation throughout the loading/unloading process.
- No storage tank or tanker truck will be filled without first Checking that it is suitable for use, and has adequate storage capacity to hold the load being transferred. No hoses/pumps/valves will be used if they are not in satisfactory condition.
- Placing containment pans under the quick connect fitting manifold used to load or unload the storage tank.
- Double check that valves have been opened or closed correctly prior to turning on the transfer pumps.
- Checking fluid flow through the transfer line by observing normal meter operation, nominal pump discharge pressure, and tank filling/emptying by gauge movement.
- Shutting down the pump if the discharge pressure exceeds the upper or lower limits, a leak is noticed in the transfer line, or if the tank capacity will be exceeded if incoming fluid is transferred into the tank.
- Ensuring that tank valves are closed after transfer is complete and the retained fluid within the line is drained into an approved container before the manifold connection is opened using the drain valves provided for this purpose.

- Removing and capping the hoses and manifold connections used to transfer fluids.
- Storing the transfer hoses in a secure place within the storage berms.
- Tank trucks are not to be filled to such an extent that sudden bumps or swerves will cause oil spillage.
- Prior to filling and departure of any transport vehicle, the lowermost drain and all outlets of the vehicle will be closely examined for leakage and, if necessary, tightened, adjusted or replaced to prevent liquid leakage while in transit. Drivers will check the status of valves and manways, as well as verify that the load is secure, if any material is spilled, it will be immediately cleaned up using absorbents (e.g., speedi-dri). In the event of a spill or overfill involving significant quantities of waste oil, the liquid will be pumped directly into the bulk storage tank.

iv. Bulk Storage Facilities (includes waste transfers from containers)

The facility storage tanks were manufactured in accordance with good engineering practices. The Aboveground Storage Tank Area (WMU-5) has secondary containment capacity which exceeds the 10% of the volume of all containers plus run-off from a 25 year, 24-hour storm. Additionally the unit has curbs higher than the surrounding area to prevent run-on. All storage tanks are aboveground and subject to annual integrity testing, taking into account the tank design and using such techniques as hydrostatic testing, visual inspection, or a system of non-destructive shell thickness testing. All inspections and record keeping are done under the supervision of the Operations Manager.

Valves to and from the storage tanks are operated manually and are kept in the closed position unless the tank is being filled or emptied. This practice prevents the unintentional release of tank contents through valves left open after a fluid transfer.

Facility personnel assigned to the bulk storage locations prevent spills by:

- Inspecting pipe transfer lines, valves, couplings, and pumps prior to transferring liquids for evidence of leakage, corrosion, or cracking.
- Determining whether or not the storage tank is full or near capacity by noting the level gauge location (outside level gauges).
- Placing containment pans under the quick connect fitting manifold used to load or unload the storage tank.
- Double check that valves have been opened or closed correctly prior to turning on the transfer pumps.
- Checking fluid flow through the transfer line by observing normal meter operation, nominal pump discharge pressure, and tank filling/emptying by gauge movement.
- Shutting down the pump if the discharge pressure exceeds the upper or lower limits, a leak is noticed in the transfer line, or if the tank capacity will be exceeded if incoming fluid is transferred into the tank.

- Ensuring that tank valves are closed after transfer is complete and the retained fluid within the line is drained into an approved container before the manifold connection is opened using the drain valves provided for this purpose.
- Removing and capping the hoses and manifold connections used to transfer fluids.
- Storing the transfer hoses in a secure place within the storage berms.

vi. Truck Trailer Approach Lanes and Parking Zones

Truck drivers are required to observe plant safety regulations including speed limits and communicate with the main office for directions prior to proceeding into the facility.

Spill prevention for independent operated waste hauling vehicles on facility property is addressed by:

- Inspecting incoming waste hauling vehicles at the unloading station by visually checking the discharge valves and undercarriage for signs of leakage.
- Immediately notifying the supervisor if a waste-hauling vehicle is suspected of leaking liquids or solids.
- Keeping docks and truck approach zones free of any debris that could cause a tanker to leak or a trailer to overturn.
- Inspecting the containers on van or flatbed trailers for leakage prior to unloading the material into a storage area.
- Parking waste hauling vehicles carrying waste solids or liquids on a flat and level surface with sufficient load bearing capacity to support a fully loaded trailer on its landing legs.

D. Discharge or Drainage Controls – 40 CFR 112.7(a)(3)(iii)

The Container Storage Warehouse (WMU-1) and the Container Processing Building (WMU-2) have walls and a roof and thus are protected from precipitation run-on. The New Container Storage Pad (WMU-6) is roofed and has curbs taller than the surrounding grade to prevent run-on. Container Storage Area 1 (WMU-3), Container Storage Area 2, (WMU-4), and the Aboveground Storage Tank Area (WMU-5) have secondary containment capacity which exceeds 10% of the volume of all containers plus run-off from a 25 year, 24-hour storm. Additionally the units have curbs higher than the surrounding area to prevent run-on. The Tank Truck and Tank Trailer Loading/Unloading Areas are constructed of concrete and are surrounded by a concrete containment wall or a roll-off curb designed to contain any spills. Trucks are only in the area temporarily and Tank Trucks would not be loaded/unloaded during inclement weather (e.g. 25-year, 24-hour rain event). All tanks and containers are located within a secondary containment system consisting of continuous curbing with no drain valves, no floor drains, no expansion joints, no sewer lines, or other openings that would permit liquids to flow from the curbed area. All loading/unloading occurs within secondary containment, as well. Finally, the facility is not located below the 100-year floodwater elevation.

In addition to the infrastructure described above, the site is entirely contained. All storm water is directed to a discrete location, pumped into a storm water holding tank, and is sampled prior to discharge to the local POTW.

E. Discharge Discovery, Response, and Clean-Up – 40 CFR 112.7(a)(3)(iv)

Daily inspections are performed in each area of the facility in accordance with the facility's permits and approvals. Daily inspections are performed to discover any leaks or spills for a timely response.

Each waste containment area at the facility has at least one spill control station located nearby. Each station contains oil spill absorbent, equipment for spill cleanup, personal protective gear, containers for storage of absorbed waste. The facility operations staff regularly inspects the stations to ensure adequate stocking of supplies.

In the event of a spill, facility operations personnel are trained to notify their supervisor(s) and then use the contents of the spill control station to contain and clean-up the spilled liquid or solid waste. Should a large spill occur, the facility has portable pumps and sufficient tank capacity to collect and store spilled liquids.

The facility has designated certain personnel as Emergency Coordinators. These persons are authorized to mobilize and direct available facility personnel and equipment in the task of spill cleanup. The Emergency Coordinator or his/her designee will notify the Environmental Manager of the spill event giving him/her detailed event information. The Environmental Manager or his/her designee will make the determination on which agencies or regulatory bodies must be notified of the spill event.

F. Methods of Disposal – 40 CFR 112.7(a)(3)(v)

As much as possible, contaminated oil from spills will be collected and stored in existing storage tanks for decontamination. In cases where recovery is not possible or impractical, the oil will be collected in bulk containers and manifested for shipment to another offsite facility for decontamination or incineration.

Any solids generated from spills will be collected and stored in bulk containers or approved disposal drums. The spill residue will be properly labeled and manifested for shipment to another offsite facility for landfill or incineration.

3. Contact List and Phone Numbers for Spills – 40 CFR 112.7(a)(3)(vi)

A. Emergency Coordinators for Emerald Transformer Los Angeles, LLC

NAME	WORK PHONE	CELL PHONE	HOME PHONE
Steve Peterson	(323) 277-2500	(323) 216-0436	(323) 216-0436
Yolanda Ramirez	(323) 277-2500	(310) 627-7115	(310) 627-7115
Shirrell Tingle	(832) 744-7420	(832) 744-7420	(832) 744-7420

B. Emergency Response Contractors

COMPANY	
Clean Harbors Environmental Services	(800) 645-8265 (24hr)

C. External Contacts

AGENCY	PHONE NUMBER
National Response Center	(800) 424-8802
U.S. EPA Region 9	(415) 947-8000
California Department of Toxic Substances Control	(818) 717-6500
State Office of Emergency Services (OES)	(800) 852-7550
U.S. Healthworks Medical Group	(323) 585-7162
Los Angeles Fire Department	911 or (213) 485-6185
Los Angeles Police Department	911 or (323) 846-6547

4. Reporting a Discharge – 40 CFR 112.7(a)(4)

If 1,000 U.S. gallons of oil are spilled at the facility, or if there are two spill events that are greater than 42 U.S. gallons each within a 12-month period, the facility must inform the U.S. EPA Regional Administrator.

If any oil leaves the secondary containment and reaches the storm drain or off-site soil and/or contains 1 pound or more of PCBs, it must be reported to the National Response Center, the US EPA Regional Administrator, the California Department of Toxic Substances Control, and the State Office of Emergency Services (OES).

List of information to provide a regulator when reporting a discharge:

- Exact address and phone number of the facility
- Date and time of the discharge
- Type of material discharged
- Estimate of total quantity discharged
- Source and cause of the spill
- Description of the areas affected by the spill
- Any damage or injuries, caused by the discharge
- Actions used to stop, remove, and mitigate the effects of the discharge
- Whether an evacuation may be needed
- Names of individuals and/or organizations who have also been contacted

5. Procedures to Use During a Spill – 40 CFR 112.7(a)(5)

In the event of a spill, facility operations personnel are trained to notify their supervisor(s) and then use the contents of the spill control station to contain and clean-up the spilled liquid or solid waste. The following steps are taken:

1. The leak is stopped by closing off a valve or plugging it.
2. The area is cordoned off by tape or rope to prevent the spill from being spread by traffic.
3. Other trained operators and plant personnel are called to help in the cleanup.
4. Spill cleanup starts by isolating the spillage area with absorbent material. The absorbent is applied directly to the spilled liquid and sufficient time is allowed for the absorbent to fully absorb the spill.
5. The absorbed liquid is transferred to an approved disposal container using scoops or shovels.
6. The spillage area is triple rinsed and washed or another appropriate method.
7. After the spill is removed from the surface, sampling and testing methodologies are determined to ensure that clean up is within regulatory guidelines.
8. The source of the leak is repaired.
9. Equipment is decontaminated, if necessary.
10. Contaminated cleanup materials and protective clothing are containerized for shipment to an EPA approved disposal facility.
11. Normal operation is restored once the area is completely decontaminated.

If notification of the spill is required, the Emergency Coordinator will contact the National Response Center; the US EPA Regional Administrator; the Department of Toxic Substances Control, and the State Offices of Emergency Services (OES) immediately with the information listed in previous section.

6. Potential Discharge Volumes & Rates – 40 CFR 112.7(b)

SPILL SOURCE	FAILURE MODE(S)	LARGEST CONTAINER (GALLONS)	TOTAL QUANTITY (GALLONS)	FLOW RATE	DIRECTION OF FLOW	CONTAINMENT
Container Storage Warehouse (WMU-1)	Complete Failure (rupture)	220	71,280 (all containers)	Instantaneous	To Secondary Containment	Secondary Concrete dike (16,980 gal containment)
	Partial Failure (rupture)			Gradual to Instantaneous (1 to 220 gal)	To Secondary Containment	
Container Processing Building (WMU-2)	Complete Failure (rupture)	220	5,500 (all containers)	Instantaneous	To Secondary containment of WMU-2 or WMU-3	WMU-1 and WMU-3 both have at least 605 gallons of additional capacity to absorb the required volume from 10% staged containers in WMU-2.
	Partial Failure (rupture)			Gradual to Instantaneous (1 to 220 gal)	To Secondary containment of WMU-2 or WMU-3	

SPILL SOURCE	FAILURE MODE(S)	LARGEST CONTAINER (GALLONS)	TOTAL QUANTITY (GALLONS)	FLOW RATE	DIRECTION OF FLOW	CONTAINMENT
Container Storage Area 1 (WMU-3)	Complete Failure (rupture)	9,400	28,270	Instantaneous	To Secondary Containment	Secondary Concrete dike (6,687 gal containment)
	Partial Failure (rupture)			Gradual to Instantaneous (1 to 9,400 gal)	To Secondary Containment	
Container Storage Area 2 (WMU-4)	Complete Failure (rupture)	220 (note: Roll-offs contain solids only)	3,080	Instantaneous	To Secondary Containment	Secondary Concrete dike (2,738 gal containment)
	Partial Failure (rupture)			Gradual to Instantaneous (1 to 220 gal)	To Secondary Containment	
Aboveground Storage Tank Area (WMU-5)	Complete Failure Tank (rupture)	100,000	260,000	Instantaneous	To Secondary Containment	Secondary Concrete dike (250,148 gal containment)
	Partial Failure Tank (rupture)			Gradual to Instantaneous (1 to 100,000 gal)	To Secondary Containment	
	Tank overfill			Gradual to (1 to 10,000 gal)	To Secondary Containment	
	Pipe failure			Gradual to Instantaneous (1 to 100,000 gal)	To Secondary Containment	
	Pump Rupture			Gradual to Instantaneous (1 to 5,000 gal)	To Secondary Containment	
New Container Storage Pad (WMU-6)	Complete Failure (rupture)	220	25,750	Instantaneous	To Secondary Containment	Secondary Concrete dike (9,679 gal containment)
	Partial Failure (rupture)			Gradual to Instantaneous (1 to 220 gal)	To Secondary Containment	
	Hose failure			Gradual to Instantaneous (1 to 220 gal)	To Secondary Containment	
	Pump Rupture			Gradual to Instantaneous (1 to 220 gal)	To Secondary Containment	
Truck (container transfer)	Complete Failure (rupture)	220		Instantaneous	To Secondary Containment	Secondary Concrete dike (17,114 gal containment)
	Partial Failure (rupture)			Gradual to Instantaneous (1 to 220 gal)	To Secondary Containment	

SPILL SOURCE	FAILURE MODE(S)	LARGEST CONTAINER (GALLONS)	TOTAL QUANTITY (GALLONS)	FLOW RATE	DIRECTION OF FLOW	CONTAINMENT
Truck (bulk liquid transfer)	Complete Failure (rupture)	6,000	12,000	Instantaneous	To Secondary Containment	Secondary Concrete dike (6,732 gal containment)
	Partial Failure (rupture)			Gradual to Instantaneous (1 to 6,000 gal)	To Secondary Containment	
	Hose failure			Gradual to Instantaneous (1 to 6,000)	To Secondary Containment	
	Pump Rupture			Gradual to Instantaneous (1 to 6,000)	To Secondary Containment	

7. Containment and Diversionary Structures – 40 CFR 112.7(c)

The Container Storage Warehouse (WMU-1) and the Container Processing Building (WMU-2) have walls and a roof and thus are protected from precipitation run-on. The New Container Storage Pad (WMU-6) is roofed and has curbs taller than the surrounding grade to prevent run-on. Container Storage Area 1 (WMU-3), Container Storage Area 2, (WMU-4), and the Aboveground Storage Tank Area (WMU-5) have secondary containment capacity which exceeds 10% of the volume of all containers plus run-off from a 25 year, 24-hour storm. Additionally the units have curbs higher than the surrounding area to prevent run-on. The Tank Truck and Tank Trailer Loading/Unloading Areas are constructed of concrete and are surrounded by a concrete containment wall or a roll-off curb designed to contain any spills. Trucks are only in the area temporarily and Tank Trucks would not be loaded/unloaded during inclement weather (e.g. 25-year, 24-hour rain event). All tanks and containers are located within a secondary containment system consisting of continuous curbing with no drain valves, no floor drains, no expansion joints, no sewer lines, or other openings that would permit liquids to flow from the curbed area.

All tanks and containers are located within a secondary containment system consisting of continuous curbing with no drain valves, no floor drains, no expansion joints, no sewer lines, or other openings that would permit liquids to flow from the curbed area. All loading/unloading occurs within secondary containment, as well. The containment berms are constructed with seamless concrete floors that are coated with chemically resistant coatings. The berms are monolithic poured concrete with the floor. Each secondary containment area provides a containment volume equal to at least two times the internal volume of the largest 10% for RCRA and/or 25% for TSCA of the total internal volume of all Containers stored there, whichever is greater.

Each waste containment area at the facility has at least one spill control station located nearby. Each station contains oil spill absorbent, equipment for spill cleanup, personal protective gear, containers for storage of absorbed waste, wipe test kits, and labels. The facility operations staff regularly inspects the stations to ensure adequate stocking of supplies.

In addition to the infrastructure described above, the site is entirely contained. All storm water is directed to a discrete location, pumped into a storm water holding tank (V9), and is sampled prior to discharge to the local POTW.

8. Alternative Containment/Diversionary Structures – 40 CFR 112.7(d)

All oil containers and aboveground tanks are all located within secondary containment; therefore the alternative containment/diversionary structure requirements do not apply.

9. Inspections, Tests, and Records – 40 CFR 112.7(e)

Daily visual inspections of the facility are conducted. Inspection logs are signed and stored at least three years in the facility's operating record. In addition, safety equipment and SPCC spill kits are inspected and restocked as necessary every month. A monthly inspection log sheet is signed and stored for at least three years in the facility's operating record.

The facility storage tanks were manufactured in accordance with good engineering practices. All storage tanks are located within bermed secondary containment and thus are protected from precipitation run-on. All storage tanks are aboveground and subject to annual integrity testing, taking into account the tank design and using such techniques as hydrostatic testing, visual inspection, or a system of non-destructive shell thickness testing. All inspections and record keeping are done under the supervision of the Operations Manager.

10. Personnel, Training, and Discharge Prevention Procedures – 40 CFR 112.7(f)

A. Personnel and Training – 40 CFR 112.7(f)(1)

Facility operations personnel are trained in the operation and maintenance of equipment to prevent discharges, discharge procedure protocols, applicable pollution control laws, rules, and regulations, general facility operations, and the contents of the facility's SPCC Plan.

Operations personnel assigned to a particular plant location are required to attain a high level of familiarity with the containment design and the waste storage/treatment equipment located therein. Periodic maintenance of operating equipment is mandatory at the facility and helps ensure that waste transfer equipment is not operated when key systems are defective or failing.

B. Person Accountable for Spill Prevention – 40 CFR 112.7(f)(2)

The Operations Manager is accountable for discharge prevention at Emerald Transformer Los Angeles, LLC – Los Angeles, CA facility.

C. Discharge Prevention Briefings – 40 CFR 112.7(f)(3)

Employees are trained annually on the contents of the facility's SPCC plan to assure adequate understanding. Training includes oil discharge prevention, containment, and retrieval methods; highlight any past discharge events or failures, and recently developed precautionary measures. Operations personnel assigned to a particular plant location are required to attain a high level of

familiarity with the containment design and the waste storage/treatment equipment located therein. Periodic maintenance of operating equipment is mandatory at the facility and helps ensure that waste transfer equipment is not operated when key systems are defective or failing. Record of this training is kept in each employee's training file.

11. Security – 40 CFR 112.7(g)

The perimeter of the Los Angeles Facility is a combination block wall and/or corrugated galvanized fence. The wall and/or fence is six (6) to eight (8) feet high, topped with barbed wire, and completely surrounds the facility. The fence and wall are maintained in good repair. There are warning signs posted in English and Spanish at the entrance of the facility. There is one main gate designated as entrance/exit ways used by employees or visitors requiring access to the facility. The gate is set up with remote controls so that they can be opened or closed from the Security Office or the Main Office. All other gates are secured by lock and chain and are only used in cases of emergency or maintenance. Remote cameras are used to monitor the most active areas from the Main Office. Daily inspections of the perimeter are performed to ensure that fences and gates are intact and secure.

All personnel at the facility have been identified and issued company picture IDs. Company issued badges distinguishes Emerald's employees from an intruder or other unauthorized person. All persons, other than Emerald's employees, entering and exiting the facility are required to log in and wear an appropriately designated badge while on-site.

The facility has an internal paging system that is utilized both indoors and outdoors. Alarms are in place at specific locations and are there to monitor equipment. Employees have been trained on how to use the methods of communication available at the facility.

The starter control on all oil pumps will be in the "off" position during non-operating or non-standby periods. Emerald Transformer employees use the identification badge system to identify all persons at the facility, no unauthorized personnel are allowed in operational areas without escort.

Employees are trained to ensure that flow and drain valves remain in a closed position when not in service, that each pump is in the "off" position when not in service, and that loading/unloading connections are securely capped when not in service.

The facility utilizes high-pressure sodium vapor, high-pressure mercury vapor, or similar lighting systems throughout the plant to provide adequate illumination during hours of darkness. The lighting system provides sufficient illumination to all necessary plant areas by strategically locating individual lights to prevent acts of vandalism.

12. Facility Tank Truck Loading/Unloading Rack – 40 CFR 112.7(h)

All tank truck loading/unloading occurs within secondary containment. Curbing is installed and designed to contain 6,732 gallons of liquid which exceeds both: (1) 110% of the volume of the largest single tank inside the containment structure; and, (2) 10% of the total liquid volume inside the containment structure.

A warning sign is posted in the containment area while tank bucks are positioned for loading/unloading. This warning sign is to prevent departure before complete disconnect of flexible or fixed transfer lines. Additionally, chock blocks on rear trailer wheels, and extend landing legs properly for stable parking of the trailer are required to prevent premature vehicular departure.

The lower most drain and all outlets on tank trucks are inspected and tightened prior to filling and disconnection of oil transfer lines, and prior to vehicle departures. Hoses and manifold connections used to transfer fluids are removed and capped the.

All transfer operations are supervised by a trained operator who attends the transfer operation and maintains visual observation throughout the loading/unloading process.

13. Brittle Fracture Evaluation – 40 CFR 112.7(i)

The two largest tanks at the facility V8 and V9 are field constructed tanks. However, there has been no repair, alteration, reconstruction, or a change in service that might affect the risk of a discharge or failure of these tanks. In the event one or both of these tanks does undergo any of the scenarios described above; a brittle fracture evaluation will be conducted.

14. Conformance to Applicable Guidelines – 40 CFR 112.7(j)

California ABOVEGROUND STORAGE TANKS CH & SC 25270.1 to 25270.13 generally follows the federal regulations for spill prevention, control, and countermeasure (SPCC) plans, with some additional requirements for aboveground petroleum storage tanks. However the Emerald Transformer facility is exempted from any “additional” requirements by virtue of rule CH & SC 25270.3 since any tanks in question are “Properly permitted hazardous waste storage tanks”

This SPCC plan was written in conformance with the requirements of 40 CFR 112.

15. Qualified Oil-Filled Operational Equipment - 40 CFR 112.7(k)

The facility has no Oil-filled operational equipment and all operations are located within areas that have full secondary containment.

40 CFR Part 112, Subpart B – Spill Prevention, Control, and Countermeasures Plan requirements for onshore facilities

SPCC PLAN REQUIREMENTS – 40 CFR 112.8

1. General Requirements – 40 CFR 112.8(a)

The general requirements for the Plan under the regulation have been met.

Emerald Transformer Los Angeles, LLC is an onshore, non-production, facility and, therefore, is required to comply with the discharge prevention and containment procedure requirements of 40 CFR 112.8, in addition to the 40 CFR 112.7 requirements described in Section 5.0 of this SPCC Plan.

Per 40 CFR 112.7(a)(2), a facility may deviate from the requirements of Subpart B of 40 CFR 112 (which includes 40 CFR 112.8), except for 112.8(c)(2) and 112.8(c)(11), as long as equivalent environmental protection is provided by some other means of spill prevention, control, or countermeasure

Emerald Transformer Los Angeles, LLC is in compliance with Subpart B of 40 CFR 112 and there are no deviations from the regulatory requirements.

2. Facility Requirements – 40 CFR Part 112.8(b)

A. Drainage from Diked Storage Areas – 40 CFR 112.8(b)(1) & (2)

All oil is stored within a concrete containment system. The concrete containment system does not have any valves or pumps, which could accidentally release oil into the environment.

B. Drainage from Undiked Storage Areas – 40 CFR 112.8(b)(3)

The facility does not have drainage from undiked areas. In addition to the primary secondary containments, the site is entirely contained. All storm water is directed to a discrete location, pumped into a storm water holding tank (V9), and is sampled prior to discharge to the local POTW.

C. Drainage Engineering – 40 CFR 112.8(b)(4) & (5)

Facility is adequately engineered to prevent oil from leaving the facility in the event of equipment failure or human error.

3. Bulk Storage Containers – 40 CFR Part 112.8(c)

A. Container Compatibility – 40 CFR 112.8(c)(1):

The bulk storage containers utilized for waste oils and oil products are of materials and construction that are compatible with the oils and the conditions of storage. The facility will not use a container for the storage of oil unless its material and construction are compatible with the material stored and with conditions of storage such as pressure and temperature.

B. Secondary Containment – 40 CFR 112.8(c)(2):

All aboveground containers have impervious concrete dikes for secondary containment with a capacity to hold a discharge from the largest single container. All secondary containment systems are closed systems without any means for rainwater or oils to be accidentally released to the environment. In all cases, rainwater or spilled oil must be pumped from the containment areas using vacuum tank trucks or portable pumps.

C. Discharge of Uncontaminated Rainwater – 40 CFR 112.8(c)(3):

All operations are conducted inside secondary containment. All oil is stored within a secondary containment system. In addition to the primary secondary containments, the site is entirely contained. All storm water is directed to a discrete location, pumped into a storm water holding tank (V9), and is sampled prior to discharge to the local POTW. Because the facility does not discharge rainwater, the criteria that must be met under 40 CFR 112.8(c)(3)(i) through (iv) in order to discharge stormwater do not apply.

D. Underground Storage – 40 CFR 112.8(c)(4) & (5):

The facility does not have any underground storage.

E. Integrity Testing – 40 CFR 112.8(c)(6):

All storage tanks are aboveground and subject to annual integrity testing using such techniques as hydrostatic testing, visual inspection, or a system of non-destructive shell thickness testing. Container supports and foundations are also inspected.

Daily inspections are performed in each area of the facility in accordance with the facility's permits and approvals. Daily inspections are performed to discover any leaks or spills for a timely response. All inspections are kept with the facility's operating record.

F. Leakage from Internal Heating Coils – 40 CFR 112.8(c)(7):

There are no internal heating coils at this facility.

G. Discharge Prevention Devices – 40 CFR 112.8(c)(8):

Each storage tank is equipped with a direct-reading level gauge and a high level alarm system. A person is always present to monitor gauges and the overall filling of bulk storage containers and there is direct communication between the container gauger and the pumping station. Additionally, an automatic shut off is in place for any materials pumped to a fixed tank to prevent overfilling. Instrumentation is inspected regularly to ensure proper function.

H. Effluent – 40 CFR 112.8(c)(9):

This facility does not produce effluent from any process. It does, however, pump stormwater to a holding tank where it tested on a batch basis prior to discharge.

I. Visible Discharge Management – 40 CFR 112.8(c)(10):

Operators are trained to clean up any spill or loss of oil from bulk storage tanks and the associated piping and valves. All spills and leaks are cleaned up within 24 hours of discovery. Areas where spills and leaks are common such as, hose connections and sample valves, spill pans and absorbent material are utilized to immediately catch leaks or drips.

J. Portable Oil Containers – 40 CFR 112.8(c)(11):

Operators are trained to clean up any spill or loss of oil from portable storage containers and the associated piping and valves. Portable storage containers are always stored inside and in

containment areas with sufficient freeboard to contain precipitation with ample capacity to contain the volume of the largest single container.

4. Transfer Operations, Pumping, and In-Plant Processes – 40 CFR Part 112.8(d)

A. Buried Piping – 40 CFR 112.8(d)(1):

The facility does not have any buried piping.

B. Unused Pipelines – 40 CFR 112.8(d)(2):

Pipelines not in service or in standby for an extended period are capped or blank flanged and marked as to their origin.

C. Pipe Design – 40 CFR 112.8(d)(3):

All pipe supports are properly designed to minimize abrasion and corrosion and to allow for expansion and contraction.

D. Pipe Inspections – 40 CFR 112.8(d)(4):

All pipelines, valves, and appurtenances are aboveground and examined weekly to assess their condition. This visual inspection checks the general condition of flanges, joints, valve bodies, catch pans, piping supports, locking valves, and metal surfaces. Any deviations in the condition of the piping systems are identified in the inspection record and corrected as soon as possible.

E. Pipe Protection – 40 CFR 112.8(d)(5):

No warning regarding pipelines and transfer operations is necessary because there are no pipelines that are accessible by traffic. As for the flexible vacuum hose lines used to transfer wastes from tanker trucks to the tanks or from drums, they are not connected to the appropriate flanges/hookups until the delivery vehicle is properly positioned, parked and shut-off. When flexible hosing is connected to tanker trucks, it is kept behind the tanker trucks and out of the way of traffic. If a truck must park next to an on-going transfer operation, the equipment involved in the transfer (hoses, trucks, drums, pumps, etc) will normally not be in their way, but if the potential exists for the truck to interfere with the transfer and/or come into contact with any of the equipment, the driver shall be warned/directed by the transfer personnel so that he/she can park without incident.

SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN REQUIREMENTS FOR ONSHORE OIL PRODUCTION FACILITIES – 40 CFR 112.9

This section is not applicable to this facility.

SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN REQUIREMENTS FOR ONSHORE OIL DRILLING AND WORKOVER FACILITIES – 40 CFR 112.10

This section is not applicable to this facility.

**SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN
REQUIREMENTS FOR OFFSHORE OIL DRILLING AND WORKOVER FACILITIES –
40 CFR 112.11**

This section is not applicable to this facility.

40 CFR 112, SUBPART C – Requirements for Animal Fats and Oils and Greases, and Fish and Marine Mammal Oils; and for Vegetable Oil, Including Oils from Seeds, Nuts, and Fruits and Kernels

This section is not applicable to this facility.

40 CFR 112, SUBPART D – Response Requirements

This section is not applicable to this facility. A Certification of Substantial Harm Determination Form is included in Appendix A.

APPENDIX A - CERTIFICATION OF SUBSTANTIAL HARM DETERMINATION

Facility Name: Emerald Transformer Los Angeles, LLC
Facility Address: 5756 Alba Street
Los Angeles CA 90058

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42, 000 gallons?

YES _____ NO XX
2. Does the facility have a total oil storage capacity of greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground storage tank area?

YES _____ NO XX
3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in Appendix C-III, Appendix C, 40 CFR 112 or a comparable formula) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? For further description of fish and wildlife and sensitive environment, see Appendices, I, II, and II to DOC/NOAA's "Guidance for Facility and Vessel Response Plan" Fish and Wildlife and Sensitive Environments" (see Appendix E to this part, Section 10, for availability) and applicable Area Contingency Plan.

YES _____ NO XX
4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula (Appendix C-III, Appendix C, 40 CFR 112 or a comparable formula) such that a discharge from the facility would shut down a public drinking water intake?

YES _____ NO XX
5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil discharge in an amount greater than equal to 10,000 gallons within the last 5 years?

YES _____ NO XX

CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document. Based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

_____ Signature	_____ Facility Manager Title
_____ Name	_____ Date

APPENDIX B - PLANT STORAGE VOLUME and CONTAINMENT

AREA	LARGEST CONTAINER (GALLONS)	TOTAL QUANTITY (GALLONS)	SECONDARY CONTAINMENT
Container Storage Warehouse (WMU-1)	220	71,280 (all containers)	Secondary Concrete dike (16,980 gal containment)
Container Processing Building (WMU-2)	220	5,500 (all containers)	WMU-1 and WMU-3 both have at least 605 gallons of additional capacity to absorb the required volume from 10% staged containers in WMU-2.
Container Storage Warehouse B (WMU-3)	9,400	28,270	Secondary Concrete dike (6,687 gal containment)
Roll-off Container Area (WMU-4)	220 (note: Roll-offs contain solids only)	3,080	Secondary Concrete dike (2,738 gal containment)
Wastewater Treatment Plant tank farm (WMU-5)	100,000	260,000	Secondary Concrete dike (250,148 gal containment)
New Container Storage Pad (WMU-6)	220	25,750	Secondary Concrete dike (9,679 gal containment)
Truck (container transfer)	220		Secondary Concrete dike (17,114 gal containment)
Truck (bulk liquid transfer)	6,000	12,000	Secondary Concrete dike (6,732 gal containment)

FIGURE 1 – GENERIC SITE MAP

APPENDIX E – STORAGE CONTAINMENT CALCULATIONS

Container Storage Warehouse Section Bay 1 (consisting of areas DW-1, DW-2, DW-3, DW-4, DW-5 and DW-6)

a. Overall interior floor area: 1,836 SF

$$54 \text{ Ft.} \times 34 \text{ Ft.} = 1836 \text{ SF}$$

b. Incompatible storage room dimensions floor area: 132 SF

$$12 \text{ Ft.} \times 11 \text{ Ft.} = 132 \text{ SF}$$

c. Trench and sump dimensions floor area: 53 SF

Trench dimensions: 6" wide 94 Linear Ft. length (2" deep)

Sump dimensions: 12" x 12" (10" deep)

Note: there are 6 sumps within the Bay 1 area

$$\text{Trench area: } 94\text{Ft.} \times 6/12 \text{ Ft.} = 47 \text{ SF}$$

$$\text{Sump area: } 1 \times 1 \times 6 = 6 \text{ SF}$$

$$\text{Total Trench \& Sump area; } 47 \text{ SF} + 6 \text{ SF} = 53 \text{ SF}$$

d. Curb dividers area: 12 SF

There are two curb dividers within area: 12 Ft. x 6" wide

$$2 (12 \text{ Ft.} \times 6/12 \text{ Ft.}) = 12 \text{ SF}$$

e. Area available (contained storage): 1639 SF

$$e = a - (b + c + d)$$

$$e = 1836 - (132 + 53 + 12)$$

$$e = 1639 \text{ SF}$$

f. Number of drums¹:

PCB: 144 (55gal. drums on two levels)

72 (55gal. drums on floor level)

RCRA: 240 (55gal. drums on two levels)

120 (55gal. drums on floor level)

g. Number of pallets on floor level: 48 (4"high)

$$72 \text{ drums} + 120 \text{ drums} = 192 \text{ drums}$$

$$192 \text{ drums} / 4 \text{ drums per pallet} = 48 \text{ pallets}$$

¹ -For ease of calculation, anticipating worst case, area is described in drum equivalents.

h. Floor area occupied by drums 553 SF

$$\text{Area} = \pi R^2$$

$$\text{Drum area: } 3.14 \times (11.5 \text{ Ft.} / 12 \text{ Ft.})^2 = 2.88 \text{ SF/drum}$$

$$192 \text{ drums} \times 2.88 \text{ SF} = 553 \text{ SF}$$

i. Containment curb height: 6 inches

j. Volume occupied by pallets: 16 CF or 120 gal.

$$48 \text{ pallets} \times 0.33 \text{ CF/pallet} = 16 \text{ CF or 120 gal.}$$

k. Volume occupied by 192 drums: 92 CF or 699 gal.

Height considered = containment curb height – pallet height

$$\text{Height considered} = 6'' - 4'' = 2'' \text{ drum in liquid}$$

$$553 \text{ SF} \times 2/12 \text{ Ft.} = 92 \text{ CF}$$

l. Net containment volume available: 725 CF or 5,423 gallons

Gross volume = contained storage area SF x containment curb height

$$\text{Gross volume} = 1,639 \text{ SF} \times 6/12 \text{ Ft.} = 820 \text{ CF or 6,134 gallons}$$

$$\text{Less: Volume of Pallets: } 16 \text{ CF}$$

$$\text{Volume of drums in liquid: } 92 \text{ CF}$$

$$\text{Add: Volume of trenches: } 8 \text{ CF or 60 gallons}$$

$$47 \text{ SF} \times 2/12 \text{ Ft.} = 8 \text{ CF}$$

$$\text{Volume of sumps: } 5 \text{ CF or 37 gallons}$$

$$6 \text{ SF} \times 10/12 = 5 \text{ CF}$$

$$\text{Net volume available} = V \text{ Gross} - (V \text{ pallets} + V \text{ drums}) + (V \text{ trench} + V \text{ drums})$$

$$820 \text{ CF} - (16 \text{ CF} + 92 \text{ CF}) + (8 \text{ CF} + 5 \text{ CF}) = 725 \text{ CF or 5,423 gallons}$$

$$\text{Net volume available} = \underline{725 \text{ CF}} \text{ or } (725 \text{ CF} \times 7.48) = \underline{5,423 \text{ gallons}}$$

m. Maximum liquid volume

Maximum liquid volume - PCB

$$144 \text{ drums} \times 55 \text{ gal/drum} = 7,920 \text{ gallons. or 1,059 CF}$$

Maximum liquid volume – RCRA

$$240 \text{ drums} \times 55 \text{ gal/drum} = 13,200 \text{ gallons or 1,765 CF}$$

n. Require containment volume

PCB requirement at 25%: 1,980 gallons or 265 CF
 $7920 \text{ gal.} \times 0.25 = 1,980 \text{ gallons}$

RCRA requirements at 25%²: 3,300 gallons or 441 CF
 $13,200 \text{ gal.} \times 0.25 = 3,300 \text{ gallons}^2$

Minimum containment volume required: 706 CF or 5,281 gallons

Bay 1 is constructed with a secondary containment capacity of 725 CF or 5,423 gallons which exceeds the minimum volume required of 706 CF of 5,241 gallons.

² -RCRA secondary containments are required at 10%. However 25% secondary containment was used in the event of catastrophic failure (e.g. earthquake or fire) assuming entire containment contents were to become comingled

APPENDIX F – SAFETY DATA SHEETS

SELECTION & SPECIFICATION DATA

Generic Type	Cycloaliphatic Amine Epoxy
Description	Highly chemical resistant epoxy mastic coating with exceptionally versatile uses in all industrial markets. Self-priming and suitable for application over most existing coatings, and tightly adherent to rust. Carboguard 890 VOC serves as stand-alone system for a variety of chemical environments.
Features	• Excellent chemical resistance • Surface tolerant characteristics • Self-priming and primer/finish capabilities • Very good abrasion resistance • VOC compliant to current AIM regulations • Suitable for use in USDA inspected facilities
Color	C900 (Black), S800 (White), C703 (Grey), C705 (Light Grey), 0500 (Tile Red), 5555 (Safety Red), 0200 (Tan), 6666 (Safety Yellow), 1675 (Ignition Yellow) A wide range of colors is available upon request using Carboline's Rapid Tint System (RTS). Contact your Carboline representative for RTS color availability.
Finish	Semi-Gloss
Primer	Self-priming. May be applied over inorganic and organic zinc primers and other tightly adhering coatings. A mist coat may be required to minimize bubbling over inorganic zinc primers.
Dry Film Thickness	4 - 6 mils (102 - 152 microns) per coat 6 - 8 mils (152 - 203 microns) over light rust and for uniform gloss over inorganic zincs Don't exceed 10 mils (250 microns) in a single coat. Excessive film thickness over inorganic zincs may increase damage during shipping or erection.
Solids Content	By Volume 75% +/- 2%
Theoretical Coverage Rate	1203 ft²/gal at 1.0 mils (29.5 m²/l at 25 microns) 301 ft²/gal at 4.0 mils (7.4 m²/l at 100 microns) 150 ft²/gal at 8.0 mils (3.7 m²/l at 200 microns) Allow for loss in mixing and application.
VOC Value(s)	Per EPA Method 24: 0.8 lbs/gal (100 g/l) Thinner 236 E: 0.8 lbs/gal (100 g/l) These are nominal values and may vary slightly with color. This product contains US EPA VOC-exempt solvent(s).
Dry Temp. Resistance	Continuous: 300°F (149°C) Non-Continuous: 350°F (177°C) Discoloration and loss of gloss occurs above 200°F (93°C) but does not affect performance.
Under Insulation Resistance	Continuous: 300°F (149°C) Discoloration and loss of gloss occurs above 200°F (93°C) but does not affect performance.
Limitations	Do not apply over latex coatings. Epoxies may lose gloss, discolor and chalk when exposed to sunlight. For immersion projects use only factory made material in special colors. Consult Technical Service for specifics.

SELECTION & SPECIFICATION DATA

Topcoats | May be coated with Acrylics, Epoxies, or Polyurethanes depending on exposure and need.

SUBSTRATES & SURFACE PREPARATION

General | Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.

Steel | **Non-immersion:** SSPC-SP6 1.5-3.0 mils (38-75 microns). SSPC-SP2 or SP3 are suitable cleaning methods for mild environments.
Immersion: SSPC-SP10 1.5-3.0 mils (38-75 microns)

Galvanized Steel | Prime with specific Carboline primers as recommended by your Carboline Sales Representative. Refer to the specific primer's Product Data Sheet for substrate preparation requirements.

Concrete or CMU | Concrete must be cured 28 days at 75°F (24°C) and 50% relative humidity or equivalent. Prepare surfaces in accordance with ASTM D4258 Surface Cleaning of Concrete and ASTM D4259 Abrading Concrete. Voids in concrete may require surfacing. Mortar joints should be cured a min of 15 days. Prime with itself, Carboguard® 1340, or suitable filler/sealer.

Drywall & Plaster | Joint compound and plaster should be fully cured prior to coating application. Prime with Carbocrylic® 120 or Carboguard® 1340.

Previously Painted Surfaces | Lightly sand or abrade to roughen surface and degloss the surface. Existing paint must attain a minimum 3B rating in accordance with ASTM D3359 "X-Scribe" adhesion test.

MIXING & THINNING

Mixing | Power mix separately, then combine and power mix. DO NOT MIX PARTIAL KITS.

Thinning | Spray: Up to 13 oz/gal (10%) w/ #236E
Brush: Up to 16 oz/gal (12%) w/ #236E
Roller: Up to 16 oz/gal (12%) w/ #236E
Use of thinners other than those supplied or recommended by Carboline may adversely affect product performance and void product warranty, whether expressed or implied.

Ratio | 890 VOC 1:1 Ratio (A to B)

Pot Life | 890 VOC 3 Hours at 75°F (24°C)
Pot life ends when coating loses body and begins to sag. Pot life times will be less at higher temperatures.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Spray Application (General) | This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers such as Binks, DeVilbiss and Graco.

Conventional Spray | Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, .070" I.D. fluid tip and appropriate air cap.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Airless Spray	Pump Ratio: 30:1 (min.)* GPM Output: 3.0 (min.) Material Hose: 3/8" I.D. (min.) Tip Size: .017"-.021" Output PSI: 2100-2300 Filter Size: 60 mesh *Teflon packings are recommended and available from the pump manufacturer.
Brush & Roller (General)	Multiple coats may be required to obtain desired appearance, recommended dry film thickness and adequate hiding. Avoid excessive re-brushing or rerolling. For best results, tie-in within 10 minutes at 75°F (24°C).
Brush	Use a medium bristle brush.
Roller	Use a short-nap synthetic roller cover with phenolic core

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	50°F (10°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	90°F (32°C)	125°F (52°C)	110°F (43°C)	80%
Optimum	75°F (24°C)	75°F (24°C)	75°F (24°C)	50%

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.

CURING SCHEDULE

Surface Temp.	Dry to Recoat	Dry to Recoat & Topcoat w/ other finishes	Final Cure General
50°F (10°C)	12 Hours	24 Hours	3 Days
60°F (16°C)	8 Hours	16 Hours	2 Days
75°F (24°C)	4 Hours	8 Hours	1 Day
90°F (32°C)	2 Hours	4 Hours	16 Hours

Based on 4-8 mils, 100-200 microns dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. During high humidity conditions, it is recommended that the application be done while temperatures are increasing.

Maximum recoat/topcoat times are 30 days for epoxies and 90 days for polyurethanes at 75°F (24°C).

If the maximum recoat times have been exceeded, the surface must be abraded by sweep blasting or sanding prior to the application of additional coats.

CLEANUP & SAFETY

Cleanup	Use Thinner #2 or Acetone. In case of spillage, absorb and dispose of in accordance with local applicable regulations

Carboguard[®] 890 VOC

PRODUCT DATA SHEET



CLEANUP & SAFETY

Safety	Read and follow all caution statements on this product data sheet and on the SDS for this product. Employ normal workmanlike safety precautions. Hypersensitive persons should wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.
Ventilation	When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.
Caution	This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

PACKAGING, HANDLING & STORAGE

Shelf Life	Part A: 36 months at 75°F (24°C) Part B: 15 months at 75°F (24°C) *Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.
Storage Temperature & Humidity	40° -110°F (4°-43°C) 0-100% Relative Humidity
Storage	Store Indoors
Shipping Weight (Approximate)	2 Gallon Kit - 29 lbs (13kg) 10 Gallon Kit - 145 lbs (66kg)
Flash Point (Setaflash)	89°F (32°C) for Part A 73°F (23°C) for Part B

WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated.

EMERALD TRANSFORMER LABORATORY LOS ANGELES STANDARD OPERATING PROCEDURE-SAMPLE RECEIVING

1.0 SCOPE AND APPLICATION

- 1.1** This method describes a procedure for sample receiving and control. Samples are taken and are received at the laboratory for initial analysis, quality control and when information on a waste stream is insufficient to make proper determinations on waste management.

2.0 SUMMARY OF METHOD

- 2.1** A chemist or lab technician, when functioning as sample custodian, is responsible for samples received at Emerald Transformer Los Angeles Laboratory. Upon receipt, the samples are checked to ensure sample integrity and verified for consistency of information with the Chain of Custody. Any inconsistency shall be resolved with operation's sampling personnel or the client and corrective action should be initiated. Samples are assigned unique laboratory identification before sample preparation and analysis. When samples are transferred to other destination, chain of custody protocols are followed.

3.0 SAFETY

- 3.1** Use all personal protective equipment (PPE) while performing laboratory procedures to protect employee safety and prevent cross contamination of constituents to other areas of the lab or equipment. Applicable Safety Data Sheets (SDS) shall be read before performing this procedure.
- 3.2** Used PPE is properly managed and disposed in accordance with all applicable regulations

4.0 PROCEDURE

- 4.1** When receiving samples, the following are checked and/or inspected:
- 4.1.1** Condition of samples and corresponding labels.
 - 4.1.2** Chain of Custody are properly filled out and signed.
 - 4.1.3** Information on the samples' labels consistent with the Chain of Custody.
 - 4.1.4** Turn Around Time request.

APPENDIX G - ON-SITE LAB SOP

**EMERALD TRANSFORMER LABORATORY
LOS ANGELES
STANDARD OPERATING PROCEDURE-SAMPLE RECEIVING**

- 4.2** If there is any discrepancy, it should be resolved with the Operations' sampling personnel or the client and corrective action should be initiated.
- 4.3** The receiving personnel must sign and date the Chain of Custody on the "Received By:" portion.
- 4.4** Samples received are recorded in the logbook and assigned unique laboratory Identifications and written down on the Chain of Custody.
- 4.5** Generate the Lab ID labels and affix to the sample containers which should be matched to the corresponding client's ID.
- 4.6** The facility stormwater samples shall be immediately analyzed or subcontracted to another certified laboratory and shall be preserved as needed for each test. The corresponding Chain of Custody shall be filled in completely and accurately.
- 4.7** When shipping out samples, packing materials should be used when samples are packed in a cooler to prevent bottle breakage. Samples shall be properly preserved and chilled during shipment between 2-6°C by placing enough ice into the cooler along with the samples. Samples and ice should be packed inside the sealed plastic bag or liner to avoid spillage of melted ice while in transit. Samples are shipped in accordance with all applicable regulatory requirements

5.0 SAMPLE STORAGE AND DISPOSAL

- 5.1** Samples are stored in a designated area of the lab. The area and samples for PCB samples are marked in accordance 761.40(a)(10) and will be maintained, in plastic bins, in the storage refrigerator or staging area in the laboratory prior to sample preparation and analysis. Storage refrigerators are maintained at 4°C+/- 2°C. Temperature of the refrigerator is monitored daily and recorded in a log sheet posted on the refrigerator. Samples must be stored away from the standards and other potentially contaminating sources.
- 5.2** Analyzed oil samples will be kept in the satellite storage area for 60 days or for longer duration upon client's request or other purpose (e.g. until conclusion of a court case or enforcement action where further testing of the sample may be necessary). The satellite storage for analyzed oil samples should have a temperature between 70°F and 90°F to prevent damage to the sample container due to freezing and pressure buildup. Analyzed stormwater samples will be stored in the refrigerator and disposed after 30 days.
- 5.3** In accordance with 40 CFR 761.65(i)(4), when the concentration of a PCB sample has been determined, and its use is terminated, the sample will be properly disposed. Samples will be manifested to a disposer or commercial storer, as required under §761.208, retain a copy of each manifest, as required under

**EMERALD TRANSFORMER LABORATORY
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§761.209, and follow up on exception reporting, as required under §761.215 (a)
and (b)

6.0 PROVENANCE

12.1 This SOP is written for Emerald Transformer Los Angeles, LLC laboratory use only.

**EMERALD TRANSFORMER LABORATORY
LOS ANGELES
STANDARD OPERATING PROCEDURE-SAMPLE RECEIVING**

Prepared By : Bitin Velasco, Laboratory Senior Chemist

Signature _____ Date _____

Approved By : Edgar Militar, Laboratory Manager

Signature _____ Date _____

APPENDIX H
– FACILITY PCB SOP
– WASTE MANAGMENT TRAINING PROGRAM

ENV SOP PR-19.2 Page 1 of 6	Title: SOP – Emerald Transformer Los Angeles Waste Receiving
Effective Date: May 1, 2025	Supersedes: September 24, 2019
Department: Environmental	
APPROVALS	S Tingle _____ Emerald Transformer Regional Environmental Manager J. Pennington _____ Emerald Transformer Director of Safety and Environmental Compliance

Revision/Review Section:

- September 2019 revision/review to include specific process for ensuring items rendered “empty” (i.e. double draining process and marking to indicate completion of double draining).
- May 2025 revision/review to include process for management/repackaging of TSCA regulated PCB waste.

1. Scope and Purpose

Emerald Transformer Los Angeles, LLC (ETLA or facility) is a hazardous and non-hazardous waste management facility that currently provides treatment, storage, and transfer for a variety of hazardous and non-hazardous waste from a variety of industries. ETLA also manages TSCA-Regulated PCB waste.

The purpose of this Standard Operating Procedure (SOP) is to ensure that hazardous wastes and TSCA-regulated PCB wastes are received into the ETLA facility in accordance with the facility's Hazardous Waste Permit Application, permitted conditions outlined in the facility's Department of Toxic Substance Control (DTSC) Part B Hazardous Waste Facility Permit (HWFP), and EPA Region 9 TSCA Commercial Storage Permit.

The facility manages four categories of hazardous waste:

- California PCB Hazardous Waste (i.e., waste containing PCBs with a concentration greater than or equal to 5 ppm and less than 50 ppm);
- Additional California Hazardous Waste (e.g., waste oil containing PCBs with a concentration less than 5 ppm and other non-RCRA hazardous wastes);
- RCRA Hazardous Waste (i.e., wastes that are hazardous under federal law); and
- TSCA-Regulated PCB Waste (waste containing PCB's 50 ppm or greater).

2. Responsibilities

Facility General Manager (GM) – Ensure that this SOP is being adhered to by all facility operators.

Operations Manager (OM) – Oversee day to day operations to ensure that the SOP is being implemented daily. Also, notifying the GM, Compliance Manager and / or Health and Safety Manager if there is a need to alter the SOP.

Environmental Compliance Manager (CM) – Ensure that all facility operations personnel are trained on the SOP. Perform audits of the receiving process to document that the SOP is being implemented. Review regulatory changes which may affect the SOP.

3. Procedure for Hazardous Waste

- A. Hazardous waste is received at the facility upon arrival. ETLA requires waste profiles for each shipment. The facility also adheres to a Waste

Analysis Plan. Acceptance of waste is contingent upon both being complete and accurate.

1. Waste shipments that arrive at the facility are considered to be in the receiving process until such time that the Facility makes a final acceptance decision.

Upon arrival, while the waste remains on the transport truck, the receiving staff will review manifest and accompanying paper work for completeness to verify that the waste has an acceptable profile at the Facility and that the waste codes are consistent with the information on the profile.

2. Wastes that are subject to the Land Disposal Restriction contained in 40 CFR 268 and 22 CCR 66268 must be accompanied with a form or document from the generator (or treatment facility) including a complete list of the appropriate treatment standards and all applicable prohibitions which must be met.
3. If this completeness review shows that information is needed (e.g., waste profile number, waste codes, LDR form, signatures, etc.), the generator will be contacted. If the generator cannot provide the necessary information, the load will be rejected.
4. Once it has been determined that the shipping documents (e.g., manifests, LDRs, etc.) appear to be consistent with the profile information, the transporter will be instructed to proceed to the appropriate waste loading/unloading receiving area identified on the site maps, attached hereto. Each container will then be removed from the transportation vehicle. A barcode for waste tracking purposes, will then be affixed onto each container.
5. Waste analytical results are then confirmed in accordance with the facility's WAP. Waste shall remain in the appropriate waste loading/unloading receiving area during the analytical confirmation process. Waste shall remain in the receiving area only as necessary and incidental to determining acceptability, but in no event, shall this exceed 24 hours from receipt.
6. Once the acceptance process is complete, acceptability is documented in the facility's company data tracking system known as Traverse.
7. All containers are to be tracked via barcode during movement throughout the facility's permitted waste storage and processing areas. A record of this movement shall be readily assessable. Refer to ENV SOP PR-19.1 Waste Tracking TRAVERSE MOBILE.

- B.** The following refers to the receiving of California Hazardous Waste containing PCBs with concentrations greater than or equal to 5 ppm and less than 50 ppm.
1. After an acceptability determination is complete, the California Hazardous wastes are to be moved into the storage bays designated under the HWFP.
 2. Containers or electrical equipment containing California Hazardous transformer oil may be drained in the storage bays as authorized by the HWFP.
 3. The California Hazardous Waste transformer oil may be pumped into drums or compatible, permitted tanks.
 4. The California Hazardous waste transformer oil is pumped using dedicated pumps, hoses, and piping systems.
 5. The draining of electrical equipment that contained California Hazardous waste transformer oil is to occur in the storage bays and the electrical equipment rendered “empty” consistent with 22 CCR 66261.7.
To achieve this, an initial pumping process is performed on the unit to remove the majority of its oil content. After the initial pumping and while the unit is still inside of the storage bay, the unit’s core will be prepared for removal (i.e. bolts removed etc.). After the core removal preparation is done, the second pumping takes place to remove the remaining liquid. After the second pumping, the letters “PP” should be written on the equipment / container to indicate that it has been pumped twice and no longer contains standing oil.
 6. Containers or electrical equipment containing hazardous waste may be moved between storage areas and process areas depending upon the process needs (i.e. cutting).
 7. Hazardous waste labels shall be removed once the container has been emptied in accordance with 22 CCR 66261.7.
 8. Once empty, the electrical equipment may be dismantled in the storage bays.
- C.** The following refers to the receiving of Additional California Hazardous Waste (e.g., waste oil containing PCBs with a concentration less than 5 ppm and other non-RCRA hazardous wastes) and RCRA Hazardous Waste.

1. After an acceptability determination is complete, wastes are moved into the storage bays designated under the HWFP.
2. Containers or equipment containing Additional California Hazardous Waste or RCRA Hazardous Waste may be drained in the storage bay and the electrical equipment rendered “empty” consistent with 22 CCR 66261.7.

To achieve this, an initial pumping process is performed on the unit to remove the majority of its oil content. After the initial pumping and while the unit is still inside of the storage bay, the unit’s core will be prepared for removal (i.e. bolts removed etc.). After the core removal preparation is done, the second pumping takes place to remove the remaining liquid. After the second pumping, the letters “PP” should be written on the equipment / container to indicate that it has been pumped twice and no longer contains standing oil.
3. Additional California Hazardous Waste or RCRA Hazardous Waste may be pumped into drums or compatible, permitted tanks which are dedicated to storing such wastes.
4. Additional California Hazardous Waste or RCRA Hazardous Waste is pumped using dedicated pumps, hoses, and piping systems.
5. Hazardous waste labels shall be removed once the container or equipment has been emptied in accordance with 22 CCR 66261.7.
6. Containers or equipment containing Additional California Hazardous Waste or RCRA Hazardous Waste may be moved between storage areas and process areas depending upon the process needs (i.e. cutting).
7. Equipment that contained Additional California Hazardous Waste or RCRA Hazardous Waste may be dismantled in the storage bays once they are empty.
8. RCRA and other Additional California Hazardous wastes will be appropriately stored in storage bays as prescribed by the facility HWFP in appropriately marked containers. These wastes can be consolidated prior to the waste being transferred off site in accordance with the applicable waste profile for the proper disposal at an approved disposal site.

- D. The following refers to the receiving of TSCA-Regulated PCB Waste.
1. The facility only receives TSCA-Regulated PCB Waste in containers. The TSCA-Regulated PCB Waste is received in the facility's loading/unloading receiving area, where it is unloaded from the truck. As TSCA-Regulated PCB Waste is received, analytical is reviewed for each unit. Analytical is taken before shipment or at the time of receipt.
 2. Once the analytical review is complete, if the waste is not conforming, the facility will contact the generator in order to reconcile the discrepancy. If the generator cannot reconcile the discrepancy, the facility will return the waste to the generator or ship it to an alternate facility as directed by the generator.
 3. Containers of TSCA-Regulated PCB Waste are immediately barcoded upon off loading
 4. Containers holding TSCA-Regulated PCB Waste are moved to WMU-1 for storage in accordance with the current applicable requirements of Part **761, Title 40,** Code of Federal Regulations and the facility's EPA Region 9 TSCA Commercial Storage Permit.

All equipment used when handling PCB's shall be dedicated to the PCB storage area and not removed from this area until properly decontaminated as specified in § 761.79 in accordance with § 761.65(c)(4). All equipment shall be marked with the appropriate ML or MS label. Forklifts shall not enter the PCB storage area. A dedicated forklift or pallet jack is the only equipment used in the storage area and articles may be pallet-jacked to the edge of the area where a forklift may then lift the article to/from storage and loading/unloading.

5. All TSCA-Regulated PCB Waste that comes to WMU-1 is for storage only. TSCA-Regulated PCB Waste storage is restricted to Section 1 of WMU-1.

Note:

No draining of TSCA federally regulated PCBs will be conducted on-site unless the primary container is compromised. In that event the PCB unit will be overpacked or the PCB liquids will be repackaged using DOT approved containers to ensure environmental integrity and safe off-site transport.

- Upon discovery of a leak the subject unit will be transferred to a large metal containment tray to prevent contamination of facility.

- Small PCB transformers or equipment (i.e. pole mounts, bushings) found to be leaking will be overpacked into a drum (in accordance with the requirements set forth in 40 CFR 761.65(c)(6) and (c)7(i) large enough to contain the entire unit. The outer packaging will be relabeled, maintaining the original information.
- Units, too large to be overpacked, that do not have drain plugs (i.e. large pole mounts) will be opened at the top and the liquid contents will be poured or pumped to an approved container. The outer packaging will be relabeled, maintaining the original information.
- Large transformers (not small enough for over packing) will be drained at the bottom of the unit (utilizing existing drain plugs) until the unit ceases any flow of liquid. The drain plug will then be reinstalled and original leak point will be cleaned and sealed with silicone.
- At all times personnel will observe safe handling practices when dealing with PCBs and utilize the appropriate (PPE).
- Any equipment utilized for draining activities will be either: disposed in accordance with the applicable TSCA requirements, decontaminated in accordance with the applicable TSCA requirements, or dedicated as TSCA contaminated equipment and utilized only in conjunction with TSCA regulated activities.
- All spilled or leaked materials shall be immediately cleaned up in accordance with 40 CFR 761.125 and the materials and residues containing PCBs shall be disposed of in accordance with 40 CFR 761.61.

4. Training

Facility Operators will be trained on this procedure annually and immediately after any modifications are made to better comply with CA DTSC, EPA or the facility's permit approvals. Such training will be documented by training attendance sign in sheets.

5. Review

This procedure will be reviewed at least annually for needed modifications or otherwise, improvement based on facility practices.

ENV SOP 9.3	Title: Emerald Transformer Waste Management Training Program
Effective Year: 2024	Supersedes: ENV SOP 9.1 (10/31/2014), ENV SOP 9.2 (6/9/2015)
Department: Environmental/Safety	
APPROVALS	J. Pennington <u>Jessica Pennington</u> Date: <u>9/6/24</u> Author Director of Environmental Compliance
	M. Allred <u>Meredith Allred</u> Date: <u>09/06/2024</u> Director of Human Resources and Safety

1. Scope

The purpose of this Standard Operating Procedure is to document the training requirements set forth in 40 CFR 265.16 as pertains to Waste Management at Emerald Transformer.

For the purposes of this document, the term “waste” refers to any and all waste materials at any Emerald Transformer facility whether it meets the definition of Hazardous or not as defined by the Resource Conservation and Recovery Act. In other words, this management plan is applicable for all materials that are intended for disposal and no longer to be used in any shape, form or fashion. These wastes may or may not retain hazardous characteristics such as flammability, corrosivity, toxicity or reactivity. They may or may not be state hazardous or special waste.

2. Applicability

This applies to all associates responsible for generating, handling, preparing for shipment, inspecting, transporting or otherwise responsible in any way for waste at any Emerald Transformer facility.

Collectively, the trainings listed in this Standard Operating Procedure are applicable to ensuring facility personnel will:

- Effectively respond in the event of an emergency, which include the awareness of automatic waste feed cut off and emergency shut down systems
- Effectively utilize and maintain inspection and observation equipment in place at the facility
- Remain aware of appropriate shut down procedures/methods and those associates responsible for doing so
- Remain aware of communication and alarms methods
- Effectively respond to Material Release

Emerald Transformer facility maintenance personnel are responsible for procedures to use, inspect, repair and replace (as needed) facility emergency and monitoring equipment. Where an Emerald Transformer facility does not employ personnel specifically devoted to maintenance, the plant and/or General Manager is responsible for ensuring this task is completed.

3. Procedure

Facility personnel will participate in training provided by a hazardous waste management trained professional and/or a reputable third party source. It will include instruction specific to the functions that apply directly to each position.

4. Training

Emerald Transformer waste management Training consists of:

- DOT HazMat Training as required by 40 CFR 172 Subpart H which also includes PCB Function Specific awareness and handling training
- Facility Emergency Action Plan
- Container Labeling within Hazard Communication
- SPCC and Stormwater Best Management Practices which also includes PCB Function Specific awareness and handling training
- Fire Safety and Prevention

Occasionally, Emerald Transformer personnel participate in Occupational Safety and Health Administration (OSHA) training as it becomes available. This may take place on site or off site and may be utilized in conjunction with, but not replace, the requirements of the associate training listed in this procedure.

Training will be conducted on an annual basis or within 90 days of hire by on-the-job training. Associates may not perform tasks unsupervised until the required training has been completed.

5. Recordkeeping

As required by 40 CFR 265.16, all positions held at Emerald Transformer are accompanied by a written job description under the authority and approval of Human Resources. These include the name of each person filling the position. Job descriptions include the skill and education requisite, qualifications and duties.

Records of training and its contents are kept with Human Resources and/or Environmental Departments and/or electronically via the appropriate electronic platform.

6. Responsibility

Emerald Transformer management is responsible for ensuring the facility Hazardous Waste Management training described in this Standard Operating Procedure is provided to applicable associates in the required time frame.

NOTES

Reference: 40 CFR 265.16

APPENDIX I – EXTERNAL LABORATORY QA/QC

Quality Assurance Manual Cover Page

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1.0 Title Page

Quality Assurance Manual Approval Signatures



for
General Manager - Shea Hewage

01/27/2023

Date



Business Unit Manager / Laboratory Director - Chris
Williams

01/27/2023

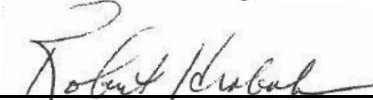
Date



Quality Assurance Manager - Lisa Stafford

01/26/2023

Date



Operations Manager / Technical Director - Robert Hrabak

01/30/2023

Date



Client Service Manager - Jill Kellmann

01/26/2023

Date

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3.0 INTRODUCTION, SCOPE AND APPLICABILITY

3.1 Introduction and Compliance References

Eurofins Sacramento's Quality Assurance (QA) Manual is a document prepared to define the overall policies, organization objectives and functional responsibilities for achieving the laboratory's QA Program. Governing SOPs are in place within the organization to ensure the proper execution of this QA Manual (refer to Appendix 1). This manual and referenced documents are required reading for all personnel.

The laboratory is a team of people who work together to serve the health and environmental needs of society through science and technology. We offer comprehensive expertise in environmental laboratory applications and client relations and maintain a national perspective in terms of quality.

As such, this QA Manual has been prepared to assure compliance with The NELAC Institute (TNI) Standard, dated 2009 and 2016; ISO/IEC Guide 17025:2005 and 2017 and the Department of Defense (DoD)/Department of Energy (DOE) Quality Systems Manual (QSM). Policies and procedures listed in Appendix 1 are compliant with the various accreditation and certification programs which are held by the laboratory to support environmental work (Appendix 2).

Refer to Appendix 3 for a list of additional references for which this QA Manual is compliant; and Appendix 4 for the compliance crosswalk of this manual to the TNI & ISO/IEC Guide 17025 requirements.

3.2 Terms and Definitions

A QA Program is a system designed to ensure that data produced by the laboratory conforms to the standards set by state and/or federal regulations. The program functions at the local management level through company goals, from guidance at the executive management level, and at the analytical level through Standard Operating Procedures (SOPs) and quality control. Our program is designed to minimize systematic error, encourage constructive, documented problem solving, and provide a framework for continuous improvement within the organization to better serve our clients.

Refer to Appendix 5 for a list of Terms and Acronyms.

3.3 Scope / Fields of Testing

The laboratory analyzes a broad range of environmental and industrial samples. Sample matrices vary among air, drinking water, effluent water, groundwater, hazardous waste, sludge, tissue and soils. The QA Program contains specific procedures and methods to test samples of differing matrices for chemical, physical and biological parameters. The Program also contains guidelines on maintaining documentation of analytical processes, reviewing results, servicing clients and tracking samples through the laboratory. The technical and service requirements of all analytical requests are thoroughly evaluated before commitments are made to accept the work. Measurements are made using published reference methods or methods developed and validated by the laboratory.

The methods covered by this manual include the most frequently requested methodologies needed to provide analytical services in the United States and its territories. The specific list of test methods used by the laboratory can be found in Appendix 7. Our areas of expertise include:

Standard Services	Specialty Services

• Volatiles • Semivolatiles • Metals • Pesticides/PCBs • Petroleum Hydrocarbons • Waste Characterization • Non-Potable Water Testing • Drinking Water Testing • Soil and Surface Water Testing • Sediment and Tissue Testing • Method Development	• Dioxins & Furans • Perchlorate • 1,4-Dioxane • PCB Congeners • PFAS • Pesticides by HRMS

NOTE: All current certificates and scopes of accreditation are available from the laboratory on request.

The approach of this manual is to define the minimum level of quality assurance and quality control necessary to meet these requirements. All methods performed by the laboratory shall meet these criteria as appropriate. In some instances, quality assurance project plans (QAPPs), project specific data quality objectives (DQOs) or local regulations may require criteria other than those contained in this manual. In these cases, the laboratory will abide by the requested criteria following review and acceptance of the requirements by the Laboratory President, General Manager, Laboratory Director and/or Business Unit Manager and the Quality Assurance (QA) Manager. In some cases, QAPPs and DQOs may specify less stringent requirements. The Laboratory President, General Manager, Laboratory Director and/or Business Unit Manager and the QA Manager must determine if it is in the lab's best interest to follow the less stringent requirements. Eurofins Sacramento shall not enter into any client agreement that conflicts with regulatory requirements in the jurisdiction in which the work is being performed.

3.4 Management of the Manual

3.4.1 Review Process

This manual is reviewed annually by senior laboratory management to assure that it reflects current practices and meets the requirements of the laboratory's clients and regulators as well as the QMP. Occasionally, the manual may need changes in order to meet new or changing regulations and operations. The QA Manager will review the changes in the normal course of business and incorporate changes into revised sections of the document. All updates will be reviewed by the senior laboratory management staff. The laboratory updates and approves such changes according to our Document Control & Updating procedures (refer to SOP/Document No. WS-QA-0021).

4.0 MANAGEMENT REQUIREMENTS

4.1 Overview

The laboratory is a local operating unit of Eurofins Environment Testing. The laboratory's operational and support staff have the day-to-day independent operational authority under the direction of the Laboratory President, General Manager, and/or Business Unit Manager/Laboratory Director and is supported by the NDSC QA team. The laboratory management staff includes directors, managers and group leaders. The organizational chart of the management staff is presented in Figure 4-1. Individual departmental staff lists are maintained in the laboratory's internal intranet.

4.2 Roles and Responsibilities

In order for the QA Program to function properly, all members of the staff must clearly understand and meet their individual responsibilities as they relate to the quality program. The responsibility for quality resides with every employee of the laboratory. All employees have access to the QA Manual, are trained to this manual, and are responsible for upholding the standards therein. Each person carries out his/her daily tasks impartially and in a manner consistent with the goals and in accordance with the procedures in this manual and the laboratory's SOPs. The following descriptions briefly define each role in its relationship to the Quality Assurance Program.

4.2.1 Vice President of Quality and Environmental Health and Safety (VP-QA/EHS)

The Vice President (VP) of QA/EHS reports directly to Eurofins Environment Testing Chief Operating Officer (COO). With the aid of the NDSC Quality Team Members, Business Unit Managers, Laboratory Directors, the VP-QA/EHS has the responsibility for the establishment, general overview and maintenance of the Quality Assurance and EH&S Programs within Eurofins Environment Testing. Additional responsibilities include:

- Review of QA/QC and EHS aspects of NDSC Official Documents, national projects and expansions or changes in services.
- Work with various organizations outside of the laboratory to further the development of quality standards and represent the laboratory at various trade meetings.
- Prepare monthly reports for quality and EH&S metrics across the environmental testing laboratories and a summary of any quality and EH&S related initiatives and issues.
- With the assistance of the Executive Management, EET Senior Management Teams, and the EHS Managers, maintenance and implementation of the Eurofins Environment Testing Environmental, Health and Safety Program.

4.2.2 Quality Directors

There are four (3) Quality Directors within NDSC that report directly to the VP-QA/EHS. These Quality Directors have oversight of the general overview and maintenance of the QA Program within the Eurofins Environment Testing laboratories. Supported tasks include:

- Monitors laboratory internal audit findings;
- Identifies common laboratory weaknesses and monitors corrective action closures.
- Develops NDSC quality guidance documents and management tools for ensuring and improving compliance;
- Monitors and communicates DoD/DoE requirements;

- Monitors and communicates regulatory and certification requirements;
- Training and On-Boarding
- Laboratory assessments, mentoring, and interventions
- Track/drive root cause investigations and corrective action plans
- Builds knowledge base for preventive actions

4.2.3 Quality Information Manager

The Quality Information works directly with the NDSC Quality Directors and EHS Managers; and reports directly to the VP-QA/EHS. The Quality Information Manager is responsible for the management of:

- NDSC Official Documents
- LIMS Certification Module Data
- Company's Intranet website
- Company's Regulatory Limits Database
- Subcontract laboratory and approved vendor information
- Internal and External client support for various company groups (e.g., Client Services, EH&S, Legal, IT, Sales) for both quality and operational functions
- Communicate regulatory information and lists

4.2.4 Environmental Health and Safety (EH&S) Managers

There are 4 EH&S Managers within NDSC that report directly to the VP-QA/EHS. These EH&S Managers have oversight of the general overview and maintenance of the EH&S Program within the Eurofins Environment Testing laboratories. Supported tasks include:

- Consolidation and tracking all safety and health-related information and reports for the company, and managing compliance activities for Eurofins Environment Testing locations.
- Coordination/preparation of the corporate Environmental, Health and Safety Manual Template that is used by each laboratory to prepare its own laboratory-specific Safety Manual/ CHP.
- Preparation of information and training materials for laboratory EHS Coordinators.
- Assistance in the coordination of employee exposure and medical monitoring programs to insure compliance with applicable safety and health regulations.
- Serving as Department of Transportation (D.O.T.) focal point and providing technical assistance to location management.
- Serving as Hazardous Waste Management main contact and providing technical assistance to location management.

4.2.5 NDSC Ethics and Compliance Officers (ECOs)

The NDSC VP-QA/EHS and Corporate Counsel are designated Ethics and Compliance Officers (ECO). Each ECO acts as a back-up to the other ECO and both are involved when data investigations occur. Each ECO has a direct line of communication to the entire executive management personnel and lab management staff.

The ECOs monitor and audit procedures to determine compliance with policies and to make recommendations for policy enhancements to the President, COO, Laboratory Director or other appropriate individuals within the laboratory. The ECO will assist the laboratory QA Manager in

the coordination of internal auditing of ethical policy related activities and processes within the laboratory, in conjunction with the laboratory's regular internal auditing function.

The ECOs will also participate in investigations of alleged violations of policies and work with the appropriate internal departments to investigate misconduct, remedy the situation, and prevent recurrence of any such activity.

4.2.6 Laboratory Director (Business Unit Manager)

The Laboratory Director is responsible for the overall quality, safety, financial, technical, human resource and service performance of the whole laboratory and reports to their business unit President. The Laboratory Director is also responsible for any service centers connected with their laboratory that perform analytical tests, such as short holding time analyses for pH. The Laboratory Director provides the resources necessary to implement and maintain an effective and comprehensive Quality Assurance and Data Integrity Program.

Specific responsibilities include, but are not limited to:

- Provides one or more technical managers for the appropriate fields of testing. If the Technical Manager is absent for a period of time exceeding 15 consecutive calendar days, the Laboratory Director must designate another full time staff member meeting the qualifications of the Technical Manager to temporarily perform this function. If the absence exceeds 35 consecutive calendar days, the primary accrediting authority must be notified in writing.
- Ensures that all analysts and supervisors have the appropriate education and training to properly carry out the duties assigned to them and ensures that this training has been documented. Works with Eurofins Environment Testing Human Resources for hiring of new personnel.
- Ensures that personnel are free from any commercial, financial and other undue pressures which might adversely affect the quality of their work.
- Ensures company human resource policies are adhered to and maintained.
- Ensures that sufficient numbers of qualified personnel are employed to supervise and perform the work of the laboratory. Assesses laboratory capacity and workload.
- Ensures that appropriate corrective actions are taken to address analyses identified as requiring such actions by internal and external performance or procedural audits. Procedures that do not meet the standards set forth in the QA Manual or laboratory SOPs may be temporarily suspended by the Laboratory Director.
- Reviews and approves all SOPs prior to their implementation and ensures all approved SOPs are implemented and adhered to.
- Pursues and maintains appropriate laboratory certification and contract approvals.
- Supports ISO 17025 requirements.
- Supporting DoD/DOE ELAP requirements
- Supporting the NELAC Institute (TNI) Standard requirements
- Ensures client specific reporting and quality control requirements are met.
- Contributes to the continuous improvement of the laboratory operations.
- Maintains an awareness of technical developments and regulatory requirements.

- Captains the management team, consisting of the QA Manager, the Technical Managers, and the EH&S Coordinator as direct reports.

4.2.7 Quality Assurance (QA) Manager or Designee

The QA Manager has responsibility and authority to ensure the continuous implementation of the quality system at the laboratory where they work. The QA Manager is also responsible for any service centers connected with their laboratory that perform analytical tests, such as short holding time analyses for pH.

The QA Manager reports directly to the Laboratory Director and their NDSC Quality Director. This position is able to evaluate data objectively and perform assessments without outside (e.g., managerial) influence. The NDSC QA Team may be used as a resource in dealing with regulatory requirements, certifications and other quality assurance related items. The QA Manager directs the activities of the QA office to accomplish specific responsibilities, which include, but are not limited to:

- Serving as the focal point for QA/QC in the laboratory.
- Serve as the Eurofins Sacramento Ethics Compliance Officer in accordance with NDSC document SOP-01-QA-QP5252.
- Having functions independent from laboratory operations for which the QA Manager has quality assurance oversight.
- Have documented training and/or experience in QA/QC procedures and the laboratory's Quality System.
- Maintaining and updating the QA Manual.
- Monitoring and evaluating laboratory certifications; scheduling proficiency testing samples.
- Monitoring and communicating regulatory changes that may affect the laboratory to management.
- Training and advising the laboratory staff on quality assurance/quality control procedures that are pertinent to their daily activities.
- Having a general knowledge of the analytical test methods for which data audit/review is performed (and/or having the means of getting this information when needed).
- Arranging for or conducting internal audits on quality systems and the technical operation.
- Performing technical data audits and method audits to ensure consistency and compliance with regulatory requirements.
- Maintaining records of all ethics-related training, including the type and proof of attendance.
- Maintaining, improving, and evaluating the corrective action database and the corrective and preventive action systems.
- Notifying laboratory management of deficiencies in the quality system and ensuring corrective action is taken. Procedures that do not meet the standards set forth in the QA Manual or laboratory SOPs shall be investigated following procedures outlined in Section 14 and if deemed necessary may be temporarily suspended during the investigation.

- Objectively monitoring standards of performance in quality control and quality assurance without outside (e.g., managerial) influence.
- Coordinating document control of SOPs, MDLs, control limits, and miscellaneous forms and information.
- Reviewing external audit reports and data validation requests.
- Following-up with audits to ensure client QAPP requirements are met.
- Establishing reporting schedule and preparation of various quality reports for the Laboratory Director, clients and/or the NDSC QA Team.
- Developing suggestions and recommendations to improve quality systems.
- Researching current state and federal requirements and guidelines.
- Directing the QA team to enable communication and to distribute duties and responsibilities.
- Ensuring communication with laboratory staff and monitoring standards of performance to ensure that systems are in place to produce the level of quality as defined in this document.
- Participate in the vendor and supplier approval process, including subcontractors.
- Communication to the relevant regulatory authorities when there are management or facility changes that impact the laboratory.
- Evaluating of the thoroughness and effectiveness of training.
- Assuring compliance with ISO 17025.
- Assuring compliance with DoD/DOE QSM.
- Assuring compliance with The NELAC Institute (TNI) Standard.

4.2.8 Technical Manager or Designee

The Technical Manager and designee(s) report directly to the Laboratory Director. The Technical Manager is accountable for all analyses and analysts under their experienced supervision and for compliance with the ISO 17025:2017 Standard. The scope of responsibility ranges from the new-hire process and existing technology through the ongoing training and development programs for existing analysts and new instrumentation. Specific responsibilities include, but are not limited to:

- Exercising day-to-day supervision of laboratory operations for the appropriate field of accreditation and reporting of results. Coordinating, writing, and reviewing preparation of all test methods, i.e., SOPs, with regard to quality, integrity, regulatory and optimum and efficient production techniques, and subsequent analyst training and interpretation of the SOPs for implementation and unusual project samples. The Technical Manager insures that the SOPs are properly managed and adhered to at the bench. The Technical Manager develops standard costing of SOPs to include supplies, labor, overhead, and capacity (design versus demonstrated versus first run yield) utilization.
- Reviewing and approving, with input from the QA Manager, proposals from marketing, in accordance with an established procedure for the review of requests and contracts. This procedure addresses the adequate definition of methods to be used for analysis and any

limitations, the laboratory's capability and resources, the client's expectations. Differences are resolved before the contract is signed and work begins. A system documenting any significant changes is maintained, as well as pertinent discussions with the client regarding their requirements or the results of the analyses during the performance of the contract. All work subcontracted by the laboratory must be approved by the client. Any deviations from the contract must be disclosed to the client. Once the work has begun, any amendments to the contract must be discussed with the client and so documented.

- Monitoring the validity of the analyses performed and data generated in the laboratory. This activity begins with reviewing and supporting all new business contracts, insuring data quality, analyzing internal and external non-conformances to identify root cause issues and implementing the resulting corrective and preventive actions, facilitating the data review process (training, development, and accountability at the bench), and providing technical and troubleshooting expertise on routine and unusual or complex problems.
- Providing training and development programs to applicable laboratory staff as new hires and, subsequently, on a scheduled basis. Training includes instruction on calculations, instrumentation management to include troubleshooting and preventive maintenance.
- Enhancing efficiency and improving quality through technical advances and improved LIMS utilization. Capital forecasting and instrument life cycle planning for second generation methods and instruments as well as asset inventory management.
- Coordinating sample management from "cradle to grave," insuring that no time is lost in locating samples.
- Scheduling all QA/QC-related requirements for compliance, e.g., MDLs, etc.
- Directing department personnel to communicate quality, technical, personnel, and instrumental issues for a consistent team approach.
- Complying with ISO 17025, The NELAC Institute (TNI) Standard, DoD/DOE QSM and the various QC programs implemented at the laboratory.

4.2.9 Client Service Manager

The Client Service Manager reports to the Laboratory Director and serves as the interface between the laboratory's technical departments and the laboratory's clients. The staff consists of the Project Management team. With the overall goal of total client satisfaction, the duties of this position are outlined below:

- Managing technical training and growth of the Project Management team
- Serving as technical liaison for the Project Management team
- Providing human resource management of the Project Management team
- Ensuring that clients receive the proper sampling supplies
- Overseeing response to client inquiries concerning sample status
- Assisting clients regarding the resolution of problems concerning COC
- Ensuring that client specifications, when known, are met by communicating project and quality assurance requirements to the laboratory

- Notifying the department managers of incoming projects and sample delivery schedules
- Being accountable to clients for communicating sample progress in daily status meeting with agreed-upon due dates
- Discussing with clients any project-related problems, resolving service issues, and coordinating technical details with the laboratory staff
- Providing information to staff with respect to specific quotes, sample log-in review, and final report completeness
- Monitoring the status of all data package projects in-house to ensure timely and accurate delivery of reports
- Informing clients of data package-related problems and resolve service issues
- Coordinating requests for sample containers and other services (data packages)

4.2.10 Project Manager (PM) & Project Manager Assistants (PMA)

Members of the laboratory Project Management Group are responsible for organizing and managing client projects. Clients are assigned a project manager who serves as their primary contact at the laboratory. It is the PM's responsibility to act as the client advocate by communicating client requirements to laboratory personnel and ensuring that clients provide complete information needed by the laboratory to meet those requirements – including all verbal communications.

The Project Manager's responsibilities include:

- Scheduling sample submissions, sample container orders and sample pick-up via the laboratory courier service.
- Confirming certification status
- Coordinating and communicating turnaround time (TAT) requirements for high priority samples/projects.
- Answering common technical questions, facilitating problem resolution and coordinating technical details with the laboratory staff.
- Ensuring client specifications, when known, are met by communicating project and quality assurance requirements to the laboratory
- Notifying laboratory personnel of incoming projects and sample delivery schedules
- Coordinating and communicating with EH&S staff regarding new/unusual sample matrices and/or analyses in advance of arrival of the work.
- Monitoring the status of all projects in-house to ensure timely delivery of reports
- Coordinating client requests for sample containers and other services
- Scheduling sample pick-ups from client offices or project sites and notifying the laboratory staff of incoming samples
- Coordinating subcontract work

- Assisting clients in procuring the proper sampling supplies
- Responding to client inquiries concerning sample status

4.2.11 Department Managers or Designees

Department Managers report directly to the Laboratory Director. They supervise the daily activities of analysis within a given laboratory area, and either oversee the review and approval, or perform the review and approval of all analytical data within that area.

Specific responsibilities include, but are not limited to:

- Ensure that analysts in their department adhere to applicable SOPs and the QA Manual. They perform frequent SOP and QA Manual review to determine if analysts are in compliance and if new, modified, and optimized measures are feasible and should be added to these documents.
- With regard to analysts, participates in the selection, training (as documented in Section 5.3), development of performance objectives and standards of performance, appraisal (measurement of objectives), scheduling, counseling, discipline, and motivation of analysts and documents these activities in accordance with systems developed by the QA and Personnel Departments. They evaluate staffing sufficiency and overtime needs. Training consists of familiarization with SOP, QC, Safety, and computer systems.
- Encourage the development of analysts to become cross-trained in various methods and/or operate multiple instruments efficiently while performing maintenance and documentation, self-supervise, and function as a department team.
- Provide guidance to analysts in resolving problems encountered daily during sample prep/analysis in conjunction with the Technical Manager, Operations Manager, and/or QA Manager. Each is responsible for 100% of the data review and documentation, non-conformance and CPAR issues, the timely and accurate completion of performance evaluation samples and MDLs, for his department.
- Ensure all logbooks are maintained, current, and properly labeled or archived.
- Report all non-conformance conditions to the QA Manager, Technical Manager, Operations Manager, and/or BU / Laboratory Director.
- Ensure that preventive maintenance is performed on instrumentation as detailed in the QA Manual or SOPs. He is responsible for developing and implementing a system for preventive maintenance, troubleshooting, and repairing or arranging for repair of instruments.
- Maintain adequate and valid inventory of reagents, standards, spare parts, and other relevant resources required to perform daily analysis.
- Achieve optimum turnaround time on analyses and compliance with holding times.
- Conduct efficiency and cost control evaluations on an ongoing basis to determine optimization of labor, supplies, overtime, first-run yield, capacity (designed vs. demonstrated), second- and third-generation production techniques/instruments, and long-term needs for budgetary planning.
- Develop, implement, and enhance calibration programs.

- Provide written responses to external and internal audit issues.
- Complying with ISO 17025:2017, The NELAC Institute (TNI) Standard, DoD/DOE QSM and the various QC programs implemented at the laboratory.

4.2.12 Laboratory Analysts

Laboratory analysts are responsible for conducting analysis and performing all tasks assigned to them by the group leader or supervisor. The responsibilities of the analysts are listed below:

- Performing analyses by adhering to analytical and quality control protocols prescribed by current SOPs, this QA Manual, and project-specific plans honestly, accurately, timely, safely, and in the most cost-effective manner.
- Document standard and sample preparation, instrument calibration and maintenance, data calculations, sample matrix effects, and any observed non-conformance on worklists, benchsheets, lab notebooks and/or the Non-Conformance Database.
- Report all non-conformance situations, sample preparation problems, instrument problems, matrix problems and QC failures, which might affect the reliability of the data, to their supervisor, the Technical Manager, and/or the QA Manager or member of QA staff.
- Perform 100% review of the data generated prior to entering and submitting for secondary level review.
- Suggest method improvements to their supervisor, the Technical Manager, and the QA Manager. These improvements, if approved, will be incorporated. Providing ideas for the optimum performance of their assigned area, for example, through the proper cleaning and maintenance of the assigned instruments and equipment, are encouraged.
- Working cohesively as a team member in their department to achieve the goals of accurate results, optimum turnaround time, cost effectiveness, cleanliness, complete documentation, and personal knowledge of environmental analysis.

4.2.13 Sample Custodians

The Sample Custodians ensure the implementation of proper sample receipt procedures, including maintaining chain-of-custody. The Sample Custodian logs samples into the LIMS and ensures that all samples are stored appropriately. Duties for the Sample Custodian include the following:

- Receiving and unloading samples or consignments in accordance with DOT regulations
- Verifying samples against the Chain of Custody (COC)
- Logging samples into the LIMS to assign a lot number for tracking purposes, and notifying Project Managers of any irregularities with the sample shipment.
- Labeling samples with lot number assigned and deliver the samples to the appropriate labs for analysis daily
- Monitoring sample receiving area freezer and cooler temperatures daily to confirm that the readings are within SOP guidelines

- Shipping all subcontracted samples to designated lab in accordance with DOT regulations as needed.

4.2.14 Quality Assurance Staff

The Quality Assurance staff members report to the QA manager. They have responsibility and authority to ensure the continuous implementation of the quality system based on ISO 17025, through involvement in the following activities:

- Assisting the QA Manager in performing the annual internal laboratory audits, compiling the evaluation, and coordinating the development of an action plan to address any deficiency identified.
- Facilitating external audits, coordinating with the QA Manager and Laboratory Staff to address any deficiencies noted at the time of the audit and subsequently presented in the final audit report.
- Assisting the QA Manager in the preparation of new SOPs and in the maintenance of existing SOPs, coordinating annual reviews and updates.
- Managing the performance testing (PT) studies, coordinating follow-up studies for failed analytes, and working with QA Manager and Laboratory Staff to complete needed corrective action reports.
- Serving as a project manager for proficiency testing samples and other QC samples.
- Reviewing and maintaining personnel training records.
- Assisting the QA Manager and Project Management Group in the review of program plans for consistency with organizational and contractual requirements. Summarize and convey to appropriate personnel anomalies or inconsistencies observed in the review process.
- Managing certifications and accreditations.
- Monitoring for compliance with the following QA Metrics: Temperature Monitoring of refrigeration units; thermometer verifications and calibrations; balance verifications and calibrations; and Eppendorf/pipette calibrations.
- Periodically checking the proper use and review of logbooks.
- Assisting in the technical review of data packages which require QA review.
- Assisting the QA Manager in maintaining the laboratory's reference data to keep it current and accurate.
- Preparing certification applications for states as directed by QA Manager.
- Performing document control maintenance.
- Assisting departments in generating MDL spreadsheets and calculations, reviewing MDL studies submitted to QA.
- Assisting in control limit generation.
- Ensuring maintenance of records archives.

- Maintaining historical indices for all technical records including SOPs, QC records, laboratory data, etc.
- Assisting the QA Manager in meeting the responsibilities of the QA Department as described in laboratory policies and SOPs.

4.3 Business Continuity and Contingency Plans

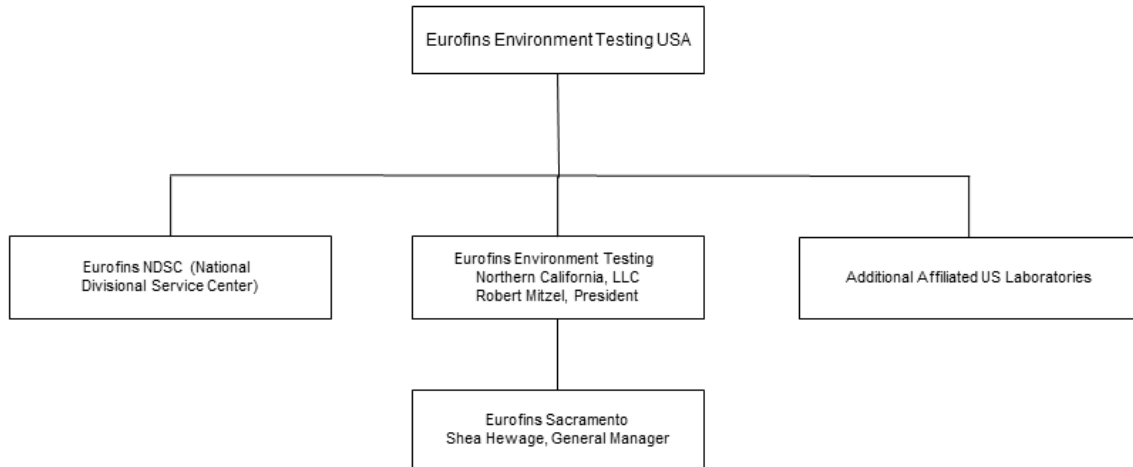
Various policies and practices are in place to address continuity of business and contingency plans to ensure continued operations or minimal disruption in operations should unplanned events (natural disasters, unexpected management changes, etc.) occur. Deputies are identified for all key management personnel. Deputies would temporarily fill a role if the primary is absent for more than 15 consecutive calendar days. The deputies must meet the same qualifications as the primary person should they be required to take on the responsibilities. The QA Manager communicates to the relevant regulatory authorities when there are management or facility changes that impact the laboratory. Changes in the technical director must be communicated within a period of time and in the manner dictated by each regulatory authority.

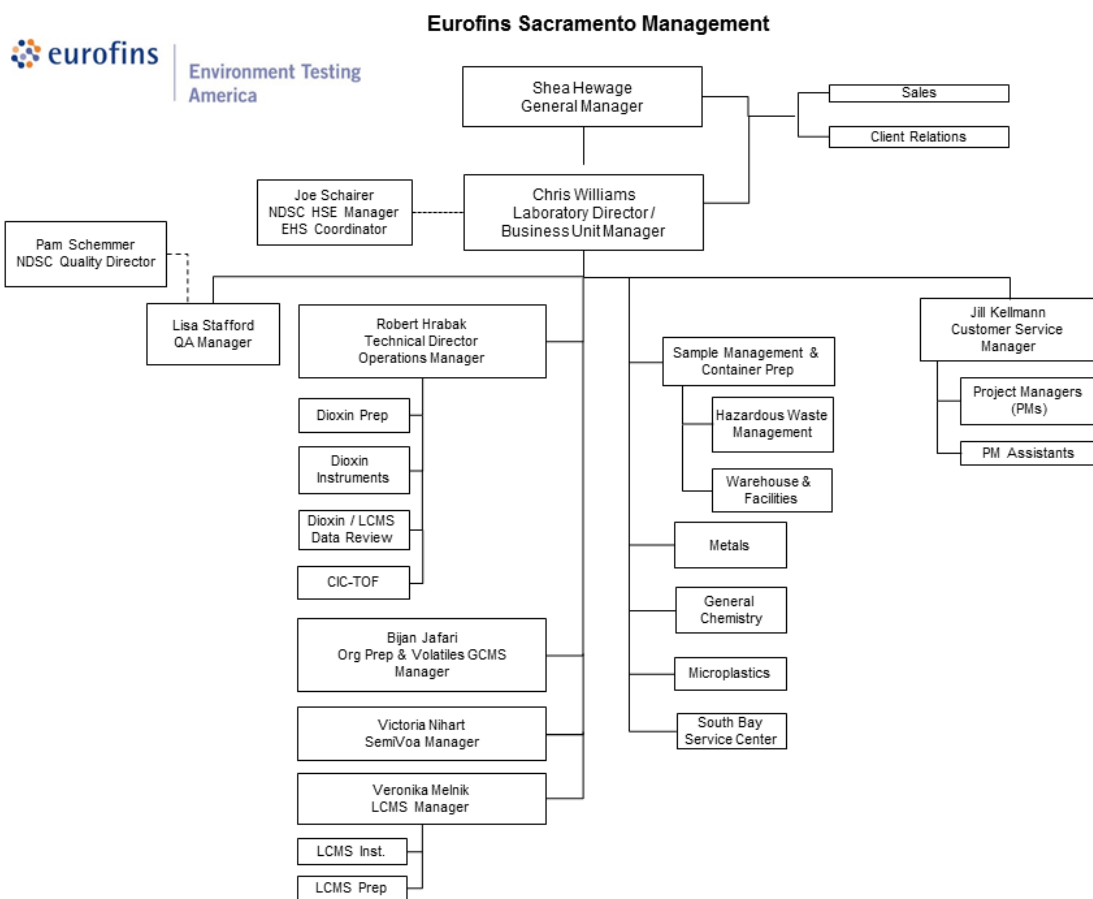
The following table defines who assumes the responsibilities of key personnel in their absence:

Key Personnel	Deputy
Chris Williams Laboratory Director/Business Unit Manager	Robert Hrabak Technical Director, Operations Manager
Lisa Stafford Quality Manager	Chris Williams Laboratory Director/Business Unit Manager
Robert Hrabak Technical Director, Operations Manager	Chris Williams Laboratory Director/Business Unit Manager
Victoria Nihart Manager of Semivolatiles	Chris Williams Laboratory Director/Business Unit Manager
Bijan Jafari Manager of Volatiles & Organic Preparation	Chris Williams Laboratory Director/Business Unit Manager
Veronika Melnik Manager of LCMS	Robert Hrabak Technical Director, Operations Manager
Joe Schairer EHS Coordinator	Chris Williams Laboratory Director/Business Unit Manager
Jill Kellmann Client Service Manager	Chris Williams Laboratory Director/Business Unit Manager

Figure 4-1. Laboratory Organization Charts

Eurofins Environment Testing





5.0 PERSONNEL

5.1 Overview

The laboratory's management believes that its highly qualified and professional staff is the single most important aspect in assuring a high level of data quality and service. The staff consists of professionals and support personnel.

All personnel must demonstrate competence in the areas where they have responsibility. Any staff that is undergoing training shall have appropriate supervision until they have demonstrated their ability to perform their job function on their own. Staff shall be qualified for their tasks based on appropriate education, training, experience and/or demonstrated skills as required.

The laboratory employs sufficient personnel with the necessary education, training, technical knowledge and experience for their assigned responsibilities.

All personnel are responsible for complying with all QA/QC requirements that pertain to the laboratory and their area of responsibility. Each staff member must have a combination of experience and education to adequately demonstrate a specific knowledge of their particular area of responsibility. Technical staff must also have a general knowledge of lab operations, test methods, QA/QC procedures and records management.

Laboratory management is responsible for formulating goals for lab staff with respect to education, training and skills and ensuring that the laboratory has a policy and procedures for identifying training needs and providing training of personnel. The training shall be relevant to the present and anticipated responsibilities of the lab staff.

The laboratory only uses personnel that are employed by or under contract to, the laboratory. Contracted personnel, when used, must meet competency standards of the laboratory and work in accordance to the laboratory's quality system.

5.2 Education and Experience Requirements for Technical Personnel

The laboratory makes every effort to hire analytical staff that possess a college degree (e.g. AA, BA, BS) in an applied science with some chemistry in the curriculum. Exceptions can be made based upon the individual's experience and ability to learn. Selection of qualified candidates for laboratory employment begins with documentation of minimum education, training, and experience prerequisites needed to perform the prescribed task. Minimum education and training requirements for laboratory employees are outlined in job descriptions maintained by Eurofins Environment Testing Human Resources and are generally summarized for analytical staff in the table below.

Experience and specialized training are occasionally accepted in lieu of a college degree (basic lab skills such as using a balance, colony counting, aseptic or quantitation techniques, etc., are also considered).

As a general rule for analytical staff:

Specialty	Education	Experience
Extractions, Digestions, some electrode methods (pH, DO, Redox, etc.), or Titrimetric and Gravimetric Analyses	H.S. Diploma	On the job training (OJT)

Specialty	Education	Experience
GFAA, CVAA, FLAA, Single component or short list Chromatography (e.g., Fuels, BTEX-GC, IC	A college degree in an applied science or 2 years of college and at least 1 year of college chemistry	Or 2 years prior analytical experience is required
ICP, ICPMS, Long List or complex chromatography (e.g., Pesticides, PCB, Herbicides, HPLC, etc.), GCMS	A college degree in an applied science or 2 years of college chemistry	or 5 years of prior analytical experience
Spectra Interpretation	A college degree in an applied science or 2 years of college chemistry	And 2 years relevant experience Or 5 years of prior analytical experience
Technical Managers	Bachelor's Degree in an applied science or engineering ¹ with 24 semester hours in chemistry An advanced (MS, PhD.) degree may substitute for one year of experience	And 3 years experience in environmental analysis of representative analytes for which they will oversee
Principal Analyst of Sophisticated Technology (e.g. GCMS, ICP, ICPMS, LCMS, GC, GCMS)	Bachelor's Degree in an applied science or engineering ¹	6 months experience instrument operation in the analysis of environmental samples.

¹ Applied science or engineering disciplines include the following: chemistry, biochemistry, biology, microbiology, natural or physical science, environmental engineering, sanitary engineering or chemical engineering.

When an analyst does not meet these requirements, they can perform a task under the direct supervision of a qualified analyst, peer reviewer or Technical Manager, and are considered an analyst in training. The person supervising an analyst in training is accountable for the quality of the analytical data and must review and approve data and associated corrective actions.

5.3 Training

The laboratory is committed to furthering the professional and technical development of employees at all levels.

Orientation to the laboratory's policies and procedures, in-house method training, and employee attendance at outside training courses and conferences all contribute toward employee proficiency. Below are examples of various areas of required employee training:

Required Training	Time Frame	Employee Type
Environmental Health & Safety	Prior to lab work	All
Ethics – New Hires	1 week of hire	All
Ethics – Comprehensive	60 days of hire	All
Data Integrity	60 days of hire	Technical and PMs
Quality Assurance	90 days of hire	All
Ethics – Comprehensive Refresher	Annually	All
Initial Demonstration of Capability (DOC)	Prior to unsupervised method performance	Technical

The laboratory maintains records of relevant authorization/competence, education, professional qualifications, training, skills and experience of technical personnel (including contracted personnel) as well as the date that approval/authorization was given. These records are kept on file at the laboratory. Also refer to “Demonstration of Capability” in Section 19.

The training of technical staff is kept up to date by:

- Each employee must have documentation in their training file that they have read, understood and agreed to follow the most recent version of the laboratory QA Manual and SOPs in their area of responsibility. This documentation is updated as SOPs are updated.
- Documentation from any training courses or workshops on specific equipment, analytical techniques or other relevant topics.
- Documentation of proficiency (refer to Section 19).
- An Ethics Agreement signed by each staff member (renewed each year) and evidence of annual ethics training.
- A Confidentiality Agreement signed by each staff member signed at the time of employment.
- Human Resources maintains documentation and attestation forms on employment status and records; confidentiality; benefit programs; timekeeping/payroll; and employee conduct (e.g., ethics violations). This information is maintained in the employee’s secured personnel file.

Evidence of successful training could include such items as:

- Adequate documentation of training within operational areas, including one-on-one technical training for individual technologies, and particularly for people cross-trained.
- Analyst’s knowledge to refer to QA Manual for quality issues.
- Analysts following SOPs, i.e., practice matches SOPs.
- Analysts regularly communicate to supervisors and QA if SOPs need revision, rather than waiting for auditors to find problems.

Further details of the laboratory’s training program are described in the Laboratory Training SOP (WS-QA-0022).

5.4 Data Integrity and Ethics Training Program

The laboratory's Ethics and Data Integrity Program is discussed in Section 6.2. Employees are trained as to the legal and environmental repercussions that result from data misrepresentation. Key topics covered in the presentation include:

- Organizational mission and its relationship to the critical need for honesty and full disclosure in all analytical reporting.
- Ethics Policy
- How and when to report ethical/data integrity issues. Confidential reporting.
- Record keeping.
- Discussion regarding data integrity procedures.
- Specific examples of breaches of ethical behavior (e.g. peak shaving, altering data or computer clocks, improper macros, etc., accepting/offering kickbacks, illegal accounting practices, unfair competition/collusion)
- Internal monitoring. Investigations and data recalls.
- Consequences for infractions including potential for immediate termination, debarment, or criminal prosecution.
- Importance of proper written narration / data qualification by the analyst and project manager with respect to those cases where the data may still be usable but are in one sense or another partially deficient.

Resources for reporting data integrity and ethics concerns are available on the EET-Net sharepoint site and posted in various locations throughout the laboratory. Additionally, a data integrity hotline (1-855-910-0005) is available.

6.0 ACCOMMODATIONS AND ENVIRONMENTAL CONDITIONS

6.1 Overview

The laboratory is a 66,000 ft² secure laboratory facility with controlled access and designed to accommodate an efficient workflow and to provide a safe and comfortable work environment for employees. All visitors sign in and are escorted by laboratory personnel. Access is controlled by various measures.

The laboratory is equipped with structural safety features. Each employee is familiar with the location, use, and capabilities of general and specialized safety features associated with their workplace. The laboratory provides and requires the use of protective equipment including safety glasses, protective clothing, gloves, etc., OSHA and other regulatory agency guidelines regarding required amounts of bench and fume hood space, lighting, ventilation (temperature and humidity controlled), access, and safety equipment are met or exceeded.

Traffic flow through sample preparation and analysis areas is minimized to reduce the likelihood of contamination. Adequate floor space and bench top area is provided to allow unencumbered sample preparation and analysis space. Sufficient space is also provided for storage of reagents and media, glassware, and portable equipment. Ample space is also provided for refrigerated sample storage before analysis and archival storage of samples after analysis. Laboratory HVAC and deionized water systems are designed to minimize potential trace contaminants.

The laboratory is separated into specific areas for sample receiving, sample preparation, volatile organic sample analysis, non-volatile organic sample analysis, inorganic sample analysis and administrative functions.

6.2 Environment

Laboratory accommodation, test areas, energy sources, and lighting are adequate to facilitate proper performance of tests. The facility is equipped with heating, ventilation, and air conditioning (HVAC) systems appropriate to the needs of environmental testing performed at this laboratory.

The environment in which these activities are undertaken does not invalidate the results or adversely affect the required accuracy of any measurements.

The laboratory provides for the effective monitoring, control and recording of environmental conditions that may affect the results of environmental tests as required by the relevant specifications, methods, and procedures. Such environmental conditions include humidity, voltage, temperature, and vibration levels in the laboratory. In the event of a power outage, the laboratory can be equipped with a backup power supply for sample storage, as detailed in SOP No. WS-QA-0005, Temperature Monitoring and Corrective Action for Refrigerators and Freezers and WS-WI-0880, Emergency Power Outage Procedure.

When any of the method or regulatory required environmental conditions changes to a point where they may adversely affect test results, analytical testing will be discontinued until the environmental conditions are returned to the required levels.

Environmental conditions of the facility housing the computer network and LIMS are regulated to protect against raw data loss.

When the laboratory performs laboratory activities at sites or facilities outside its permanent control, it shall ensure that the requirements related to facilities and environmental conditions of this document are met.

Specific requirements for facility and environmental conditions, as well as periodic monitoring of conditions, are given in the Environmental Health & Safety Manual (NDSC-US EHS-QP46060) plus the laboratory's Facility Addendum (WS-PEHS-002)

6.3 Work Areas

There is effective separation between neighboring areas when the activities therein are incompatible with each other. Examples include:

- Volatile organic chemical handling areas, including sample preparation and waste disposal, and volatile organic chemical analysis areas.

Access to and use of all areas affecting the quality of analytical testing is defined and controlled by secure access to the laboratory building as described below in the Building Security section.

Adequate measures are taken to ensure good housekeeping in the laboratory and to ensure that any contamination does not adversely affect data quality. These measures include regular cleaning to control dirt and dust within the laboratory. Work areas are available to ensure an unencumbered work area. Work areas include:

- Access and entryways to the laboratory.
- Sample receipt areas.
- Sample storage areas.
- Chemical and waste storage areas.
- Data handling and storage areas.
- Sample processing areas.
- Sample analysis areas.

6.4 Responding to Emergencies

Employees must be aware of procedures to respond to all emergencies that might occur in the workplace. Employees must be familiar with the location and proper operation of all emergency equipment, evacuation routes and designated assembly areas for all areas where they work. Refer to the HSE Manual Document No. NDSC-US EHS-QP46060 Sec. 7 and the laboratory's local EH&S addendum (WS-PEHS-002) for complete details. These documents provide direction for situations where normal operations of the laboratory are not possible (e.g., electrical failures, heating/air conditioning failures, fire/building evacuation, computer failures, hazardous material spills, injury to employees, pandemic flu, disruption of phone service, etc.)

In the event that the building or information technology (IT) systems would be severely challenged, a designated disaster recovery team, which includes Facility Management, Maintenance, Safety, Laboratory/Executive Management, Public Relations, IT, QA and other applicable personnel depending on the scope of the disaster, would assemble at a designated area to assess the situation and formulate a plan.

6.5 Building Security

The laboratory is considered a secure facility. All outside doors (except the main lobby entrance) are locked during normal business hours to prevent unauthorized entry. Access to the laboratory from the lobby is controlled by key card access. Building keys, key cards, and alarm codes are distributed to employees as necessary.

Employees wear photographic identification badges or temporary badges without a photo while on the premises.

Visitors to the laboratory sign in and out in a visitor's logbook. A visitor is defined as any person who visits the laboratory who is not an employee of the laboratory. Both visitors and vendors must review and sign the EH&S specific forms. Visitors (with the exception of company employees) are escorted by laboratory personnel at all times, or the location of the visitor is noted in the visitor's logbook.

7.0 QUALITY SYSTEM

7.1 Quality Policy Statement

It is Eurofins Sacramento's Policy to:

- ❖ Provide data of known and documented quality to its client by adhering to approved methodologies, regulatory requirements and the QA/QC protocols.
- ❖ Effectively manage all aspects of the laboratory and business operations by the highest ethical standards
- ❖ Continually improve systems and provide support to quality improvement efforts in the laboratory, administrative, and managerial activities. Eurofins Sacramento recognizes that the implementation of a quality assurance program requires management's commitment and support as well as the involvement of the entire staff.
- ❖ Provide clients with the highest level of professionalism and the best service practices in the industry
- ❖ To comply with the ISO/IEC 17025:2017(E) / 17025:2005 (E) International Standards and the 2009/2016 TNI Standard, and to continually improve the effectiveness of the management system.

As an organization, all personnel are committed to high quality professional practice, testing and data, and service to our clients. We strive to provide the highest quality data achievable by:

- ❖ Reading and understanding all of the quality documents applicable to each position and implementing the process in our work.
- ❖ Following all recordkeeping requirements; describing clearly and accurately all activities performed; recording "real time" as the task is carried out; understanding that it is never acceptable to "back date" entries and should additional information be required at a later date, the actual date and by whom the notation is made must be documented.
- ❖ Ensuring data integrity through the completeness, consistency, impartiality and accuracy of the data generated. Data is attributable, legible, contemporaneously recorded, original or a true copy, and accurate (ALCOA). This applies to manual paper documentation and electronic records.
- ❖ Providing accountability and traceability for each sample analyzed through proper sample handling, labeling, preparation, instrument calibration/qualification/validation, analysis, and reporting; establishing an audit trail (the who, what, when, and why) that identifies date, time, analyst, instrument used, instrument conditions, quality control samples (where appropriate and/or required by the method), and associated standard material.
- ❖ Emphasizing a total quality management process which provides impartiality, accuracy, and strict compliance with agency regulations and client requirements, giving the highest degree of confidence; understanding that meeting the requirements of the next employee in the work flow process is just as important as meeting the needs of the external client.
- ❖ Providing thorough documentation and explanation to qualify reported data that may not meet all requirements and specifications, but is still of use to the client; understanding this occurs only after discussion with the client on the data limitations and acceptability of this approach.
- ❖ Responding immediately to indications of questionable data, out-of-specification occurrences, equipment malfunctions, and other types of laboratory problems, with investigation and

applicable corrective action; documenting these activities completely, including the reasons for the decisions made.

- ❖ Providing a work environment that ensures accessibility to all levels of management and encourages questions and expression of concerns on quality issues to management. Eurofins recognizes that the implementation of a quality assurance program requires management's commitment and support as well as the involvement of the entire staff
- ❖ Continually improve systems and manage risk to support quality improvement efforts in laboratory, administrative and managerial activities.

7.2 Ethics and Data Integrity

Eurofins Environment Testing is committed to ensuring the integrity of its data and meeting the quality needs of its clients. The laboratory operates its Ethics and Data Integrity program under the guidance of Eurofins' Key Guidance Document (KGD). The elements of the program include:

- An Ethics Policy (NDSC Document No. SOP01-QA-QP5252) and Employee Ethics Statements.
- Ethics and Compliance Officer/s (ECOs).
- A Training Program.
- Self-governance through disciplinary action for violations.
- A confidential mechanism for anonymously reporting alleged misconduct and a means for conducting internal investigations of all alleged misconduct. (NDSC Document No. QA-QP38228).
- Procedures and guidance for recalling data if necessary (NDSC Document No. QA-QP38229).
- Effective external and internal monitoring system that includes procedures for internal audits (laboratory SOP No. WS-QA-0036, Internal Auditing).
- Produce results, which are accurate and include QA/QC information that meets client pre-defined Data Quality Objectives (DQOs).
- Present services in a confidential, honest and forthright manner.
- Provide employees with guidelines and an understanding of the Ethical and Quality Standards of our Industry.
- Provide procedures and guidance to ensure the impartiality and confidentiality of all data and customer information.
- Operate our facilities in a manner that protects the environment and the health and safety of employees and the public.
- Obey all pertinent federal, state and local laws and regulations and encourage other members of our industry to do the same.
- Educate clients as to the extent and kinds of services available.
- Assert competency only for work for which adequate personnel and equipment are available and for which adequate preparation has been made.
- Promote the status of environmental laboratories, their employees, and the value of services rendered by them.

7.3 Quality System Documentation

The laboratory's Quality System is communicated through a variety of documents.

- Quality Assurance (QA) Manual – Each laboratory has a lab-specific QA manual.
- NDSC Official Documents – Each laboratory may use the Guidance (instructional use) documents at their discretion. Template documents are process documents that the laboratory's need to implement locally by using the document as is or as an outline to define their internal practices that meet the minimum requirements of the template. Required documents need to be implemented as is and listed in the laboratory's document control list.
- Key Guidance Documents (KGDs) - Documents compiled at the Group Service Centre (GSC) level by Functional Leaders (document owners) aimed at providing specific Eurofins groups of employees with guidelines necessary for the good conduct of their respective work.
- Laboratory SOPs and Policies – General and Technical
- Work Instructions – A subset of procedural steps, tasks or forms associated with an operation of a management system (e.g., checklists, preformatted bench sheets, forms).

7.3.1 Order of Precedence

In the event of a conflict or discrepancy between policies, the order of precedence is as follows:

- NDSC Guidance Documents
- KGDs
- Laboratory Quality Assurance Manual (QA Manual)
- Laboratory SOPs and Policies
- Other (Work Instructions (WI), memos, flow charts, etc.)

NOTE: The laboratory has the responsibility and authority to operate in compliance with regulatory requirements of the jurisdiction in which the work is performed.

7.4 QA/QC Objectives for the Measurement of Data

Quality Assurance (QA) is responsible for developing planned activities whose purpose is to provide assurance to all levels of management that a quality program is in place within the laboratory, and that it is functioning in an effective manner that is consistent with the requirements of NELAP, ISO 17025, DoD, PALA¹, and any other regulatory agencies (i.e., states) in which the laboratory maintains accreditation.

Quality Control (QC) is generally understood to be limited to the analyses of samples and to be synonymous with the term "*analytical quality control*". QC refers to the routine application of statistically based procedures to evaluate and control the accuracy of results from analytical measurements. The QC program includes procedures for estimating and controlling precision and bias and for determining reporting limits.

Request for Proposals (RFPs) and Quality Assurance Project Plans (QAPP) provide a mechanism for the client and the laboratory to discuss the data quality objectives in order to ensure that analytical services closely correspond to client needs. In order to ensure the ability of the laboratory to meet the Data Quality Objectives (DQOs) specified in the QAPP, clients are advised to allow time for the laboratory to review the QAPP before being finalized. The client is

responsible for developing the QAPP; however, the laboratory will provide support to the client for developing the sections of the QAPP that concern laboratory activities.

Historically, laboratories have described their QC objectives in terms of precision, accuracy, representativeness, comparability, completeness, selectivity and sensitivity (PARCCSS). Each laboratory SOP defines the required QC indicators.

7.4.1 Precision

The objective is to meet the performance for precision demonstrated for the methods on similar samples and to meet DQOs of the EPA and/or other regulatory programs. Precision is defined as the degree of reproducibility of measurements under a given set of analytical conditions (exclusive of field sampling variability). In laboratory reports, batch precision is commonly expressed in terms of relative percent difference (RPD) for replicate pairs of measurements (e.g., matrix spike/matrix spike duplicates) or relative standard deviation (RSD) for more than two replicates.

7.4.2 Accuracy

The objective is to meet the performance for accuracy demonstrated for the methods on similar samples and to meet DQOs of the EPA and/or other regulatory programs. Accuracy is defined as the degree of bias in a measurement system. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations. Accuracy is commonly expressed by the laboratory as a percent recovery of analytical spikes (fortified samples) and may be documented through the use of laboratory control samples (LCS) and/or MS. A statement of accuracy is expressed as an interval of acceptance recovery about the mean recovery.

7.4.3 Representativeness

The objective is to provide data which is representative of the sampled medium. Representativeness is defined as the degree to which data represent a characteristic of a population or set of samples and is a measurement of both analytical and field sampling precision. The representativeness of the analytical data is a function of the procedures used in procuring and processing the samples. The representativeness can be documented by the relative percent difference between separately procured, but otherwise identical samples or sample aliquots.

The representativeness of the data from the sampling sites depends on both the sampling procedures and the analytical procedures. Refer to laboratory SOPs for subsampling and homogenization techniques appropriate to the analytical method.

7.4.4 Comparability

The objective is to provide analytical data for which the accuracy, precision, representativeness, and reporting limit statistics are similar to these quality indicators generated by other laboratories for similar samples, and data generated by the laboratory over time. To ensure comparability, project plans typically require the use of methods approved by EPA or other standards setting bodies. Within the laboratory, analysts are required to use uniform procedures (e.g., SOPs) and a uniform set of units and calculations for analyzing and reporting environmental data.

Comparability is documented by inter-laboratory studies carried out by regulatory agencies or carried out for specific projects or contracts, by comparison of periodically generated statements of accuracy, precision, and reporting limits with those of other laboratories.

7.4.5 Completeness

The completeness objective for data is 90% (or as specified by a particular project), expressed as the ratio of the valid (or useable) data to the total data over the course of the project. Data will be considered valid if they are adequate for their intended use. Data usability will be defined in a QAPP, project scope, or regulatory requirement. Examples of factors negatively affecting completeness include the following: sample leakage or breakage in transit or during handling, loss of sample during laboratory analysis, improper documentation such that traceability is compromised, or the sample result is rejected due to failure to conform to QC specifications. Data validation is the process for reviewing data to determine its usability and completeness. If the completeness objective is not met, actions will be taken internally and with the data user to improve performance. This may take the form of an audit to evaluate the methodology and procedures as possible sources for the difficulty or may result in a recommendation to use a different method.

7.4.6 Selectivity

Selectivity is defined as the capability of a test method or instrument to respond to a target substance or constituent in the presence of non-target substances. Target analytes are separated from non-target constituents and subsequently identified/detected through one or more of the following, depending on the analytical method: extractions (separation), digestions (separation), interelement corrections (separation), use of matrix modifiers (separation), specific retention times (separation and identification), confirmations with different columns or detectors (separation and identification), specific wavelengths (identification), specific mass spectra (identification), and specific electrodes (separation and identification).

7.4.7 Sensitivity

Sensitivity refers to the amount of analyte necessary to produce a detector response that can be reliably detected (above the Method Detection Limit) or quantified (above the Reporting Limit).

7.5 Criteria for Quality Indicators

The laboratory maintains tables, housed in LIMS that summarize the precision and accuracy acceptability limits for performed analyses. This summary includes an effective date, is updated each time new limits are generated, and are managed by the laboratory's QA department. Unless otherwise noted, limits within these tables are laboratory generated. Some acceptability limits are derived from US EPA methods when they are required. Where US EPA method limits are not required, the laboratory has developed limits from evaluation of data from similar matrices. Criteria for development of control limits are contained in SOP WS-QA-0035, Statistical Process Control/Control Chart and Section 26.

7.6 Statistical Quality Control

Statistically-derived precision and accuracy limits are required by selected methods (such as SW-846) and programs. The laboratory routinely utilizes statistically-derived limits to evaluate method performance and determine when corrective action is appropriate. The analysts use the current limits entered into LIMS. The QA department maintains an archive of all limits used within the laboratory. If a method defines the QC limits, the method limits are used.

If a method requires the generation of historical limits, the lab develops such limits from recent data in the QC database of LIMS following the guidelines described in WS-QA-0035, Statistical Process Control/Control Chart and Section 26. All calculations and limits are documented and

dated when approved and effective. On occasion, a client requests contract-specified limits for a specific project.

Current QC limits are entered and maintained in the LIMS analyte database. As sample results and the related QC are entered into LIMS, the sample QC values are compared with the limits in LIMS to determine if they are within the acceptable range. The analyst then evaluates if the sample needs to be rerun or re-extracted/rerun or if a comment should be added to the report explaining the reason for the QC outlier.

7.6.1 QC Charts

As the QC limits are calculated, QC charts are generated showing warning and control limits for the purpose of evaluating trends. The QA Manager evaluates these to determine if adjustments need to be made or for corrective actions to methods. All findings are documented and kept on file. Control charts are generated according to laboratory SOP No. SOP WS-QA-0035, Statistical Process Control/Control Chart.

7.7 Quality System Metrics

In addition to the QC parameters discussed above, the entire Quality System is evaluated on a monthly basis through the use of specific metrics (refer to Section 18). These metrics are used to drive continuous improvement in the laboratory's Quality System.

8.0 DOCUMENT CONTROL

8.1 Overview

The QA Department is responsible for the control of documents used in the laboratory to ensure that approved, up-to-date documents are in circulation and out-of-date (obsolete) documents are archived or destroyed. The following documents, at a minimum, must be controlled:

- Laboratory Quality Assurance (QA) Manual
- Laboratory Standard Operating Procedures (SOP)
- Laboratory Policies
- Work Instructions and Forms
- NDSC Documents¹

¹Includes locally implemented documents that are document controlled within the laboratory's document control system.

The security and control of documents is essential to ensure that confidential information is not distributed and that all current copies of a given document are from the latest approved revision. Unambiguous identification of a controlled document is maintained by identification of the following items in the document header: Document Number, Revision Number, Effective Date, and Number of Pages. Controlled documents are authorized by Management and/or the QA Department. Controlled documents are marked as such, and records of their distribution are maintained by the QA Department. Document control may be achieved by either electronic or hardcopy distribution.

The NDSC documents are only considered controlled when they are read on the intranet site. Printed copies are considered uncontrolled unless the laboratory physically distributes them as controlled documents. The laboratory's internal document control procedure is defined in SOP No. WS-QA-0021, Preparation and Management of Standard Operating Procedures.

The laboratory QA Department also maintains access to various references and document sources integral to the operation of the laboratory. This includes reference methods and regulations. Instrument manuals (hard or electronic copies) are also maintained by the laboratory.

The laboratory maintains control of records for raw analytical data and supporting records such as audit reports and responses, logbooks, standard logs, training files, MDL studies, Proficiency Testing (PT) studies, certifications and related correspondence, and corrective action reports. Raw analytical data consists of bound logbooks, instrument printouts, any other notes, magnetic media, electronic data, and final reports.

8.2 Document Approval and Issue

The pertinent elements of the document control system includes a unique document title and number, pagination, the total number of pages of the item or an 'end of document' page, the effective date, revision number, and the laboratory's name. The QA personnel are responsible for the maintenance of this system.

Controlled documents are authorized by the QA Department. In order to develop a new document, a responsible manager submits an electronic draft to the QA Department for suggestions and approval before use. Upon approval, QA personnel add the identifying version information to the

document and retain that document as the official document on file. That document is then provided to all applicable operational units. Controlled documents are identified as such and records of their distribution are kept by the QA Department. Document control may be achieved by either electronic or hardcopy distribution.

The QA Department maintains a list of the official versions of controlled documents.

Quality System Policies and Procedures will be reviewed at a minimum of every two years (annually for documents applicable to drinking water and DoD/DOE programs) and revised as appropriate. Changes to documents occur when a procedural change warrants.

8.3 Procedures for Document Control Policy

For changes to the QA Manual, refer to SOP No. WS-QA-0021, Preparation and Management of Standard Operation Procedures. Uncontrolled copies must not be used within the laboratory. Previous revisions and back-up data are stored by the QA department. Electronic copies are stored on the QA share on the local server for the applicable revision, and are accessible using the laboratory's Intranet

For changes to SOPs, refer to SOP No. WS-QA-0021, Preparation and Management of Standard Operating Procedures. The SOP identified above also defines the process of changes to SOPs.

Forms, worksheets, work instructions and information are organized by department in the QA office. There is a table of contents. Electronic versions are kept on the networked QA fileshare; hard copies are kept in QA files. The procedure for the care of these documents is in SOP WS-QA-0037, Document Control.

8.4 Obsolete Documents

All invalid or obsolete documents are removed, or otherwise prevented from unintended use. The laboratory has specific procedures as described above to accomplish this. In general, obsolete documents are collected from employees according to distribution lists and are marked obsolete on the cover or destroyed. At least one copy of the obsolete document is archived according to SOP No. WS-QA-0021, Preparation and Management of Standard Operating Procedures.

9.0 SERVICE TO THE CLIENT

9.1 Overview

The laboratory has established procedures for the review of work requests and contracts, oral or written. The procedures include evaluation of the laboratory's capability and resources to meet the contract's requirements within the requested time period. All requirements, including the methods to be used, must be adequately defined, documented and understood. For many environmental sampling and analysis programs, testing design is site or program specific and does not necessarily fit into a standard laboratory service or product. It is the laboratory's intent to provide both standard and customized environmental laboratory services to our clients.

A thorough review of technical and QC requirements contained in contracts is performed to ensure project success. The appropriateness of requested methods, and the lab's capability to perform them must be established. Projects, proposals, and contracts are reviewed for adequately defined requirements and the laboratory's capability to meet those requirements. Alternate test methods that are capable of meeting the clients' requirements may be proposed by the lab. A review of the lab's capability to analyze non-routine analytes is also part of this review process.

All projects, proposals and contracts are reviewed for the client's requirements in terms of compound lists, test methodology requested, sensitivity (detection and reporting levels), accuracy, and precision requirements (% Recovery and RPD). The reviewer ensures that the laboratory's test methods are suitable to achieve these requirements and that the laboratory holds the appropriate certifications and approvals to perform the work. The laboratory and any potential subcontract laboratories must be certified, as required, for all proposed tests.

Electronic or hard copy deliverable requirements are evaluated against the laboratory's capacity for production of the documentation.

If the laboratory cannot provide all services but intends to subcontract such services, whether to another Eurofins facility on the same LIMS or to an outside firm, this will be documented and discussed with the client prior to contract approval. (Refer to Section 10 for Subcontracting Procedures.)

The laboratory informs the client of the results of the review if it indicates any potential conflict, deficiency, lack of accreditation, or inability of the lab to complete the work satisfactorily. Any discrepancy between the client's requirements and the laboratory's capability to meet those requirements is resolved in writing before acceptance of the contract. It is necessary that the contract be acceptable to both the laboratory and the client. Amendments initiated by the client and/or Eurofins Sacramento are documented in writing.

All contracts, QAPPs, Sampling and Analysis Plans (SAPs), contract amendments, and documented communications become part of the project record.

The same contract review process used for the initial review is repeated when there are amendments to the original contract by the client, and the participating personnel are informed of the changes.

9.2 Review Sequence and Key Personnel

Appropriate personnel will review the work request at each stage of evaluation.

For routine projects and other simple tasks, a review by the Project Manager (PM) is considered adequate. The PM confirms that the laboratory has any required certifications, that it can meet the clients' data quality and reporting requirements and that the lab has the capacity to meet the

clients turn around needs. The PM will also get approval by the Laboratory Director to commit to delivery schedules that are shorter than the published standard turnaround times (TATs). The Laboratory Director updates these TATs on a routine basis, and it is the responsibility of CSMs and PMs to review them prior to making commitments for the laboratory.

It is recommended that, where there is a sales person assigned to the account, an attempt should be made to contact that sales person to inform them of the incoming samples.

For new, complex or large projects, the proposed contract is given to the Client Relationship Manager or Proposal Team, who will decide which lab will receive the work based on the scope of work and other requirements, including certification, testing methodology, and available capacity to perform the work. .

This review encompasses all facets of the operation. The scope of work is distributed to the appropriate personnel, as needed based on scope of contract, to evaluate all of the requirements shown above (not necessarily in the order below):

- Contract Administrator
- Client Relations Manager
- Laboratory Project Manager
- Laboratory Directors and/or NDSC Technical Directors
- Account Executives
- Quality Managers
- Laboratory Environmental Health and Safety Managers/Coordinators

New contracts and purchase orders are forwarded to the "Legal-Contract Review" email group for formal review and comments. Changes are negotiated by Project Managers or the Client Relations Manager. When all negotiations are concluded, The Laboratory Director reviews the formal laboratory quote and makes final acceptance for the facility. The Sales Director, Contract Administrator, Account Executive or Proposal Coordinator then submits the final proposal to the client. Once signed by the client, local contracts are stored on the laboratory fileshare, and national contracts are stored on EETA Net.

In the event that one of the above personnel is not available to review the contract, his or her back-up will fulfill the review requirements.

9.3 Balancing Laboratory Capacity and Workload

Evaluating laboratory capacity to perform specific projects is the responsibility of the Laboratory Directors and Managers, and the Client Services director and manager. Many analysts are cross-trained to perform a variety of tests, and there is redundant equipment available in case of malfunctions. This minimizes the need to evaluate small and medium size projects against capacity available to complete them. Large and complex projects are reviewed against capacity estimates before bids are submitted to ensure that the client's analysis schedule is met. Regularly scheduled meetings are held between laboratory management, PMs, Client Services and QA personnel to review progress with current projects, as well as special requirements of new work scheduled for the laboratory. Laboratory capacity and backlog is tracked on a continuous basis using information from the Laboratory Sample Information System (LIMS) including turnaround time, and work in-house.

9.4 Documentation

The Contracts Department maintains copies of all signed contracts. The Sacramento laboratory's Customer Service Organization maintains copies of all signed contracts on the computer network for reference locally.

Appropriate records are maintained for every contract or work request. All stages of the contract review process are documented and include records of any significant changes. These records are archived by client and project in a restricted network folder accessible to laboratory department managers, project managers, and senior managers.

Records are maintained of pertinent discussions with a client relating to the client's requirements or the results of the work during the period of execution of the contract. Each Laboratory Project Manager keeps a phone log of conversations with the client. In addition, all conversations involving notification of important information, or actions directed by the client are documented with a follow up e-mail and archived in the contracts folder or the SDG documentation and case narrative. Instances include change in scope, alterations to the requests listed on a chain of custody, directions to proceed in the event of a non-conformance, and any other conversation that changes the direction of a COC or contract.

9.4.1 Project-Specific Quality Planning

Communication of contract specific technical and QC criteria is an essential activity in ensuring the success of site specific testing programs. To achieve this goal, a PM is assigned to each client. It is the PM's responsibility to ensure that project-specific technical and QC requirements are effectively evaluated and communicated to the laboratory personnel before and during the project. QA department involvement may be needed to assist in the evaluation of custom QC requirements.

PM's are the primary client contact and they ensure resources are available to meet project requirements, they coordinate opportunities and work with laboratory management and supervisory staff to ensure available resources are sufficient to perform work for the client's project.

Prior to work on a new project, the dissemination of project information and/or project opening meetings may occur to discuss schedules and unique aspects of the project. Items to be discussed may include the project technical profile, turnaround times, holding times, methods, analyte lists, reporting limits, deliverables, sample hazards, or other special requirements. The PM introduces new project information to maximize production and client satisfaction, while maintaining quality. Project notes may be associated with each sample batch as a reminder upon sample receipt and analytical processing.

Any change that may occur within an active project is agreed upon between the client/regulatory agency and the PM/laboratory. These changes (e.g., use of a non-standard method or modification of a method) and approvals must be documented prior to implementation. Documentation pertains to any document (e.g., letter, e-mail, variance, contract addendum), which has been signed by both parties.

Such changes are also communicated to the laboratory via project notes and method comments in LIMS as well as during production meetings. Such changes are updated to the project notes and are introduced to the managers at these meetings. The laboratory staff is then introduced to the modified requirements via the PM or the individual laboratory Department Manager, supervisor, or lead analyst. After the modification is implemented into the laboratory process, documentation of the modification is made in the case narrative of the data report(s).

The laboratory strongly encourages client visits to the laboratory and for formal/informal information sharing session with employees in order to effectively communicate ongoing client needs as well as project specific details for customized testing programs.

9.5 Special Services

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. It is the laboratory's goal to meet all client requirements in addition to statutory and regulatory requirements. The laboratory has procedures to ensure confidentiality to clients (Section 17 and 25).

The laboratory's standard procedures for reporting data are described in Section 25. Special services are also available and provided upon request. These services include:

- Reasonable access for our clients or their representatives to the relevant areas of the laboratory for the witnessing of tests performed for the client.
- Assisting client-specified third party data validators as specified in the client's contract.
- Supplemental information pertaining to the analysis of their samples. Note: An additional charge may apply for additional data/information that was not requested prior to the time of sample analysis or previously agreed upon.

When the client requests a statement of conformity to a specification or standard based on the analysis performed by the laboratory (e.g., pass/fail, in-tolerance/out-of-tolerance), the decision rule shall be clearly defined. Unless inherent in the requested specification or standard, the decision rule selected shall be communicated to the client. Associated reporting requirements are addressed in Section 25.2.18.

9.6 Client Communication

PMs are the primary communication link to the clients. They shall inform their clients of any delays in project completion as well as any non-conformances in either sample receipt or sample analysis. Project management will maintain ongoing client communication throughout the entire client project.

Technical Managers are available to discuss any technical questions or concerns that the client may have.

9.7 Client Confidentiality

Data and sample materials provided by the client or at the client's request, and the results obtained by Eurofins Sacramento, shall be held in confidence (unless such information is generally available to the public or is in the public domain) subject to any disclosure required by law or legal process. Eurofins Sacramento will not intentionally divulge to any person (other than the Client or any other person designated by the Client in writing) any information regarding the services provided by Eurofins Sacramento or any information disclosed to Eurofins Sacramento by the Client. Furthermore, information known to be potentially endangering to national security or an entity's proprietary rights will not be released.

Note: This shall not apply to the extent that the information is required to be disclosed by Eurofins Sacramento under the compulsion of legal process. Eurofins Sacramento will, to the extent feasible, provide reasonable notice to the client before disclosing the information.

9.8 Reporting

The laboratory works with our clients to produce any special communication reports required by the contract.

9.9 Client Feedback and Surveys

The laboratory assesses both positive and negative client feedback. The results are used to improve overall laboratory quality and client service. Eurofins Sales and Marketing teams periodically develop lab and client specific surveys to assess client satisfaction. Client satisfaction surveys are sent with every report.

When a complaint is received, we determine, to the best of our ability, the extent of the issue and what data is in question. The person receiving the complaint documents this information and promptly forwards it to the appropriate management personnel where the work in question was performed. If a data reporting error is discovered, the final report and/or data must be regenerated with the correct value(s).

The project manager or QA is responsible for entering client concerns into ICAT. In some cases, an ICAT / ICAR (Investigation and Corrective Action Report) is initiated to address and document the situation. While an individual issue may not warrant a formal investigation, QA monitors these issues for potential trends and will issue an ICAR/ICAT if a trend is evident.

10.0 SUBCONTRACTING OF TESTS

10.1 Overview

For the purpose of this quality manual, the phrase subcontract laboratory refers to a laboratory external to the Eurofins Environment Testing (EET) laboratories. The phrase “work sharing” refers to internal transfers of samples between the EET laboratories. The term outsourcing refers to the act of subcontracting tests.

When contracting with our clients, the laboratory makes commitments regarding the services to be performed and the data quality for the results to be generated. When the need arises to outsource testing for our clients because project scope, changes in laboratory capabilities, capacity, or unforeseen circumstances, we must be assured that the subcontractors or work sharing laboratories understand the requirements and will meet the same commitments we have made to the client. Refer to the NDSC Document on Subcontracting Procedures (NDSC-US-SUB-SOP44936).

When outsourcing analytical services, the laboratory will assure, to the extent necessary, that the subcontract or work sharing laboratory maintains a program consistent with the requirements of this document, the requirements specified in TNI/ISO 17025 and/or the client’s Quality Assurance Project Plan (QAPP). All QC guidelines specific to the client’s analytical program are transmitted to the subcontractor and agreed upon before sending the samples to the subcontract facility. Additionally, work requiring accreditation will be placed with an appropriately accredited laboratory. The laboratory performing the subcontracted work will be identified in the final report, as will non-TNI accredited work where required.

PMs or other responsible Client Service members, for the Export Lab (i.e., the Eurofins laboratory that transfers samples to another laboratory) are responsible for obtaining client approval prior to subcontracting any samples. The laboratory will advise the client of a subcontract arrangement in writing and when possible approval from the client shall be obtained and retained in the project folder. Standard Eurofins Sacramento Terms & Conditions include the flexibility to subcontract samples within the EET laboratories. Therefore, additional advance notification to clients for intra-laboratory subcontracting is not necessary unless specifically required by a client contract.

Note: In addition to the client, some regulating agencies (e.g., USDA) or contracts (e.g., DoD and DOE projects) require notification prior to placing such work. Documentation of approval is stored electronically in the quote folder within SACSALLES share on a local laboratory server. If the approval is specific to a single laboratory login or job, the approval is stored in the LIMS with the login information.

10.2 Qualifying and Monitoring Subcontractors

Whenever a PM or Client Relationship Manager becomes aware of a client requirement or laboratory need where samples must be outsourced to another laboratory, the other laboratory(s) shall be selected based on the following:

- Subcontractors specified by the client - In these circumstances, the client assumes responsibility for the quality of the data generated from the use of a subcontractor.
- Subcontractors reviewed by EET-NDSC – Firms which have been reviewed by the company and are known to meet standards for accreditations (e.g., State, TNI and DoD/DOE); technical specifications; legal and financial information.

A listing of vendors is available on the EET sharepoint site.

All EET laboratories are pre-qualified for work sharing provided they hold the appropriate accreditations and can adhere to the project/program requirements. In these cases, the client must provide acknowledgement that the samples can be sent to that facility (an e-mail is sufficient documentation or if acknowledgement is verbal, the date, time, and name of person providing acknowledgement must be documented). The originating laboratory is responsible for communicating all technical, quality, and deliverable requirements as well as other contract needs.

10.2.1 When the potential subcontract laboratory has not been previously approved, Account Executives or PMs may nominate a laboratory as a subcontractor based on need. The decision to nominate a laboratory must be approved by the Client Relations Manager (CRM) or Laboratory Director. The CRM or Laboratory Director requests that the PM begin the process of approving the subcontract laboratory. Refer to the NDSC Document No. NDSC-US-SUB-SOP44936, Subcontracting Procedures.

Once the appropriate accreditation and legal information is received by the laboratory, it is evaluated for acceptability and forwarded to the NDSC Quality Information Manager (QIM) for review. After the NDSC QIM reviews the documents for completeness, the information is forwarded to the Finance Department for formal signature and contracting with the laboratory. The approved vendor will be added to the approved subcontractor list on the intranet site, and the finance group is concurrently notified.

The client will assume responsibility for the quality of the data generated from the use of a subcontractor they have requested the lab to use. The qualified subcontractors on the intranet site are known to meet minimal standards. EET does not certify laboratories. The subcontractors on our approved list can only be recommended to the extent that we would use them.

10.3 Oversight and Reporting

The status and performance of qualified subcontractors will be monitored by NDSC, and includes an annual review process (ref.: NDSC Document No. SOP NDSC-US-SUB-SOP44936. Any problems identified will be brought to the attention of NDSC:

- Complaints shall be investigated. Documentation of the complaint, investigation, and corrective action will be maintained in the subcontractor's file on the intranet site. Complaints are posted using the Vendor Performance Report.
- Information shall be updated on the intranet when new information is received from the subcontracted laboratories.
- Subcontractors in good standing will be retained on the intranet listing. Client Service personnel will notify all EET laboratories, NDSC, and Corporate Contracts if any laboratory requires removal from the intranet site. This notification will be posted on the intranet site and e-mailed to all Client Service/CSO Personnel, Laboratory Directors, QA Managers, and Sales Personnel.

Prior to initially sending samples to the subcontracted laboratory, the PM confirms their certification status to determine if it is current and scope-inclusive. The information is documented within the project records.

The laboratory's certifications are available on request. They are stored on the QA fileshare and in the LIMS.

10.3.1 All subcontracted samples must be accompanied by a Eurofins Sacramento Chain of Custody (COC). A copy of the original COC sent by the client must be available in LIMS for all

samples workshared within EET. Client COCs are only forwarded to external subcontractors when samples are shipped directly from the project site to the subcontractor lab. Under routine circumstances, client COCs are not provided to external subcontractors.

Through communication with the subcontracted laboratory, the PM monitors the status of the subcontracted analyses, facilitates successful execution of the work, and ensures the timeliness and completeness of the analytical report.

Non-TNI accredited work must be identified in the subcontractor's report as appropriate. If TNI accreditation is not required, the report does not need to include this information.

Reports submitted from subcontractor laboratories are not altered and are included in their original form in the final project report. This clearly identifies the data as being produced by a subcontractor facility. If subcontract laboratory data is incorporated into the laboratory's EDD (i.e., imported), the report must explicitly indicate which lab produced the data for which methods and samples.

Note: The results submitted by an EET work sharing laboratory may be transferred electronically and the results reported by the EET work sharing lab are identified on the final report. The report must explicitly indicate which lab produced the data for which methods and samples. The final report must include a copy of the completed COC for all work sharing reports.

10.4 Contingency Planning

The full qualification of a subcontractor may be waived to meet emergency needs. This decision and justification must be documented in the project files, and the 'Purchase Order Terms and Conditions for Subcontracted Laboratory Services' must be sent with the samples and COC. In the event this provision is utilized, the laboratory (e.g., PM) will be required to verify and document the applicable accreditations of the subcontractor. All other quality and accreditation requirements will still be applicable, but the subcontractor need not have signed a subcontract agreement with EET at this time.

The use of any emergency subcontractor will require the PM to complete a New Vendor Add Form in order to process payment to the vendor and add them to LIMS. This form requires the user to define the subcontractor's category/s of testing and the reason for testing.

10.5 Use of NELAP and Accrediting Body Logo

It is not laboratory policy to use these logos on any company letterhead, including analytical reports.

11.0 PURCHASING SERVICES AND SUPPLIES

11.1 Overview

Evaluation and selection of suppliers and vendors is performed, in part, on the basis of the quality of their products, their ability to meet the demand for their products on a continuous and short term basis, the overall quality of their services, their past history, and competitive pricing. This is achieved through evaluation of objective evidence of quality furnished by the supplier, which can include certificates of analysis, recommendations, and proof of historical compliance with similar programs for other clients. To ensure that quality critical consumables and equipment conform to specified requirements, which may affect quality, all purchases from specific vendors are approved by a member of the supervisory or management staff. Capital expenditures are approved by Eurofins Environment Testing, and are made in accordance with the guidelines presented on the EET-NET/Finance sharepoint.

Contracts will be signed in accordance with Eurofins Environment Testing's Spending & Contract Authority Policies as maintained on the EET-NET/Finance sharepoint. Request for Proposals (RFP's) will be issued where more information is required from the potential vendors than just price. Process details are available on the EET-NET/Finance sharepoint. RFP's allow the laboratory to determine if a vendor is capable of meeting requirements such as supplying all of the laboratory facilities, meeting required quality standards and adhering to necessary ethical and environmental standards. The RFP process also allows potential vendors to outline any additional capabilities they may offer.

11.2 Glassware

Glassware used for volumetric measurements must be Class A or verified for accuracy according to laboratory procedure. Pyrex (or equivalent) glass should be used where possible. For safety purposes, thick-wall glassware should be used where available.

11.3 Reagents, Standards & Supplies

Purchasing guidelines for equipment, consumables, and reagents must meet the requirements of the specific method and testing procedures for which they are being purchased. Solvents and acids are pre-tested in accordance with NDSC Document No. NDSC-QA-SOP46704, Acid and Solvent Testing and Approval Program. Approval information for the solvents and acids tested under Document No. NDSC-QA-SOP46704 is stored on the laboratory's SharePoint site, under Solvent Approvals. A master list of all tested materials, as well as the certificates of analysis for the materials, is stored in the same location.

11.3.1 Purchasing

Chemical reagents, solvents, glassware, and general supplies are ordered as needed to maintain sufficient quantities on hand. Materials used in the analytical process must be of a known quality. The wide variety of materials and reagents available makes it advisable to specify recommendations for the name, brand, and grade of materials to be used in any determination. This information is contained in the method SOP. Many items used routinely are pre-qualified and placed into the on-site consignment system. The analyst may check the item out of the on-site consignment system that contains items approved for laboratory use.

For items not available from the consignment system or items that are not used routinely, an order is placed in the ordering system. Only personnel trained in the ordering program may place orders using the program. The analyst must provide the item description, package size, and quantity

needed to the ordering person. All relevant information, including quantity, must be entered into the ordering program. Only approved vendors may be used. The Laboratory Director or designee approves all orders placed in the ordering program.

11.3.2 Receiving

It is the responsibility of the analyst or department manager who placed the order to receive the shipment. For items received for an on-site consignment system, the purchasing manager verifies that the material received meets the quality level specified. This is documented by stamping the packing slip with "Received" and the date. For materials that are outside of the on-site consignment systems, it is the responsibility of the analyst who ordered the materials to document the date materials were received. Once the ordered reagents or materials are received, the analyst compares the information on the label or packaging to the original order to ensure that the purchase meets the quality level specified. This is documented through the addition of the received date and initials to the information present in the ordering system.

The purchasing manager verifies the lot numbers of received solvents and acids against the pre-approval lists. If a received material is listed as unapproved, or is not listed, it is sequestered and returned to the vendor. Alternatively, the laboratory may test the material for the intended use, and if it is acceptable, document the approval on the approval list. Records of any testing performed locally are maintained on the shared "public" folder on the computer network.

Materials may not be released for use in the laboratory until they have been inspected, verified as suitable for use, and the inspection/verification has been documented.

Safety Data Sheets (SDSs) are available online through the Company's intranet website. Anyone may review these for relevant information on the safe handling and emergency precautions of on-site chemicals.

11.3.3 Specifications

Methods used in the laboratory specify the grade of reagent that must be used in the procedure. If the quality of the reagent is not specified, analytical reagent grade will be used. It is the responsibility of the analyst to check the procedure carefully for the suitability of grade of reagent.

Chemicals must not be used past the manufacturer's expiration date and must not be used past the expiration time noted in a method SOP. If expiration dates are not provided, the laboratory may contact the manufacturer to determine an expiration date.

The laboratory assumes a five year expiration date on inorganic dry chemicals and solvents unless noted otherwise by the manufacturer or by the reference source method. Chemicals/solvents should not be used past the manufacturer's or SOP expiration date unless verified as outlined below. See laboratory SOP No. WS-QA-0017, Standards and Reagent Preparation and Quality Control Check Procedures, for standard verification procedures.

- An expiration date **cannot** be extended if the dry chemical/solvent is discolored or appears otherwise physically degraded. In this case, the dry chemical/solvent must be discarded.
- Expiration dates can be extended if the dry chemical/solvent is found to be satisfactory based on acceptable performance of quality control samples (Continuing Calibration Verification (CCV), Blanks, Laboratory Control Sample (LCS), etc.).
- If the dry chemical/solvent is used for the preparation of standards, the expiration dates can be extended 6 months if the dry chemical/solvent is compared to an unexpired independent source in performing the method and the performance of the dry chemical/solvent is found to be satisfactory. The comparison must show that the dry chemical/solvent meets CCV limits.

The comparison studies are maintained on-file and available for review on the shared public folder on the computer network.

Wherever possible, standards must be traceable to national or international standards of measurement or to national or international reference materials. Records to that effect are available to the user.

Compressed gases in use are checked for pressure and secure positioning daily. To prevent a tank from going to dryness, or introducing potential impurities, the pressure should be closely watched as it decreases to approximately 15% of the original reading, at which point it should be replaced. For example, a standard sized laboratory gas cylinder containing 3,000 psig of gas should be replaced when it drops to approximately 500 psig. The quality of the gases must meet method or manufacturer specification or be of a grade that does not cause any analytical interference.

Water used in the preparation of samples, standards or reagents must have a specific conductivity of less than 1- μ mho/cm (or specific resistivity of greater than 1.0 megohm-cm) at 25°C. The specific conductivity is checked and recorded daily. If the water's specific conductivity is greater than the specified limit, the Facility Manager and appropriate Technical Managers must be notified immediately in order to notify all departments, decide on cessation (based on intended use) of activities, and make arrangements for correction.

The laboratory may purchase reagent grade (or other similar quality) water for use in the laboratory. This water must be certified clean by the supplier for all target analytes or otherwise verified by the laboratory prior to use. This verification is documented.

Standard lots are verified before first time use if the laboratory switches manufacturers or has historically had a problem with the type of standard. See laboratory SOP No. WS-QA-0017, Standards and Reagent Preparation and Quality Control Check Procedures, for standard QC procedures.

Purchased bottlere used for sampling must be certified clean and the certificates must be maintained. If uncertified sampling bottlere is purchased, all lots must be verified clean prior to use. This verification must be maintained.

Each laboratory section maintains records of manufacturer's certification and traceability statements on the network. These records include date of receipt, lot number (when applicable), and expiration date (when applicable). Incorporation of the item into the record indicates that the analyst has compared the new certificate with the previous one for the same purpose and that no difference is noted, unless approved and so documented by the Technical Manager or QA Manager.

11.3.4 Storage

Reagent and chemical storage is important from the aspects of both integrity and safety. Light-sensitive reagents may be stored in brown-glass containers. Storage conditions are per the NDSC HSE Manual, Document No. NDSC-US EHS-QP46060, the local laboratory EH&S manual addendum and method SOPs or manufacturer instructions.

11.4 Purchase of Equipment / Instruments / Software

When a new piece of equipment is needed, either for additional capacity or for replacing inoperable equipment, the analyst or supervisor makes a supply request to the Technical Manager and/or the Laboratory Director. If they agree with the request, a decision is made as to which piece of equipment can best satisfy the requirements. The appropriate written requests

are completed and purchasing places the order.

Upon receipt of a new or used piece of equipment, an identification name is assigned and added to the equipment list. IT must also be notified so that they can synchronize the instrument for back-ups. Its capability is assessed to determine if it is adequate or not for the specific application. For instruments, a calibration curve is generated, followed by MDLs, Demonstration of Capabilities (DOCs), and other relevant criteria (refer to Section 20). For software, its operation must be deemed reliable and evidence of instrument verification must be retained by the QA Department. Software certificates supplied by the vendors are filed with the LIMS Administrator. The manufacturer's operation manual is retained at the bench and inventoried in the master document list.

New support equipment such as weight sets, autopipettors, etc. must be accompanied by a calibration certificate from a vendor with current and valid ISO 17025 accreditation for calibration of the specific piece of equipment. If the equipment is not accompanied by such a certificate, it must be withheld from service until it has been calibrated by an approved vendor with the appropriate accreditation.

11.5 Services

Service to analytical instruments (except analytical balances) is performed on an as needed basis. Routine preventative maintenance is discussed in Section 22. The need for service is determined by analysts and/or Technical Managers. The service providers that perform the services are approved by the Technical Manager.

Analytical balances are serviced and calibrated annually in accordance with SOP No. WS-QA-0041, Calibration and Calibration Check of Balances. The calibration and maintenance services are performed on-site, and the balances are returned to use immediately following successful calibration. Calibration certificates are filed for reference. If the calibration was unsuccessful, the balance is immediately removed from service and segregated pending either further maintenance or disposal.

Calibration services for support equipment such as thermometers, weight sets, autopipettors, etc., are obtained from vendors with current and valid ISO 17025 accreditation for calibration of the specific piece of equipment. Prior to utilizing the vendor's services, the vendor's accreditation status is verified. Once the equipment has been calibrated, the calibration certificates are reviewed by the QA department, and documentation of the review is filed with the calibration certificates. The equipment is then returned to service within the laboratory

11.6 Suppliers

The laboratory selects vendors through a competitive proposal / bid process, strategic business alliances or negotiated vendor partnerships (contracts).

The level of control used in the selection process is dependent on the anticipated spending amount and the potential impact on the laboratory's business. Vendors that provide test and measuring equipment, solvents, standards, certified containers, instrument related service contracts or subcontract laboratory services shall be subject to more rigorous controls than vendors that provide off-the-shelf items of defined quality that meet the end use requirements. The purchasing system includes all suppliers/vendors that have been approved for use.

Evaluation of suppliers is accomplished by ensuring the supplier ships the product or material ordered and that the material is of the appropriate quality. This is documented by signing off on

packing slips or other supply receipt documents. The purchasing documents contain the data that adequately describe the services and supplies ordered.

Any issues of vendor performance are to be reported immediately by the laboratory staff to the Purchasing Group by completing a Vendor Performance Report.

The Purchasing Group will work through the appropriate channels to gather the information required to clearly identify the problem and will contact the vendor to report the problem and to make any necessary arrangements for exchange, return authorization, credit, etc.

Suppliers are subject to re-evaluation, as deemed appropriate, through the use of Vendor Performance Reports used to summarize and review to determine corrective action necessary, or service improvements required by vendors

The laboratory has access to a listing of all approved suppliers of critical consumables, supplies and services. This information is provided through the purchasing system.

11.6.1 New Vendor Procedure

Laboratory employees who wish to request the addition of a new vendor must complete a Vendor Add Request Form.

New vendors are evaluated based upon criteria appropriate to the products or services provided as well as their ability to provide those products and services at a competitive cost. Vendors are also evaluated to determine if there are ethical reasons or potential conflicts of interest with laboratory employees that would make it prohibitive to do business with them as well as their financial stability. The QA Department and/or the Technical Services Director are consulted with vendor and product selection that have an impact on quality.

12.0 COMPLAINTS

12.1 Overview

The laboratory considers an effective client complaint handling processes to be of significant business and strategic value. Listening to and documenting client concerns captures client knowledge that enables our operations to continually improve processes and client satisfaction. An effective client complaint handling process also provides assurance to the data user that the laboratory will stand behind its data, service obligations and products.

A client complaint is any expression of dissatisfaction with any aspect of our business services (e.g., communications, responsiveness, data, reports, invoicing and other functions) expressed by any party, whether received verbally or in written form. Client inquiries, complaints or noted discrepancies are documented, communicated to management, and addressed promptly and thoroughly.

The laboratory has procedures for addressing both external and internal complaints with the goal of providing satisfactory resolution to complaints in a timely and professional manner.

The nature of the complaint is identified, documented and investigated, and an appropriate action is determined and taken. In cases where a client complaint indicates that an established policy or procedure was not followed, the QA Department must evaluate whether a special audit must be conducted to assist in resolving the issue. A written confirmation or letter to the client, outlining the issue and response taken is recommended as part of the overall action taken.

The process of complaint resolution and documentation utilizes the procedures outlined in Section 14 (Corrective Actions) and is documented following laboratory policy WS-PQA-013, Procedure to Address Customer Complaints. A copy of this procedure will be made available to any interested party on request.

12.2 External Complaints

An employee that receives a complaint initiates the complaint resolution process by first documenting the complaint according to laboratory policy WS-PQA-013, Procedure to Address Customer Complaints.

Complaints fall into two categories: correctable and non-correctable. An example of a correctable complaint would be one where a report re-issue would resolve the complaint. An example of a non-correctable complaint would be one where a client complains that their data was repeatedly late. Non-correctable complaints should be reviewed for preventive action measures to reduce the likelihood of future occurrence and mitigation of client impact.

The general steps in the complaint handling process are:

- Receiving and documenting complaints
- Acknowledging receipt of complaint, whenever possible
- Complaint investigation and service recovery
- Process improvement

The laboratory shall inform the initiator of the complaint of the results of the investigation and the corrective action taken, if any.

12.3 Internal Complaints

Internal complaints include, but are not limited to: errors and non-conformances, training issues, internal audit findings, and deviations from methods. Corrective actions may be initiated by any staff member who observes a nonconformance and shall follow the procedures outlined in Section 14. In addition, Executive Management, Sales and Marketing and IT may initiate a complaint by contacting the laboratory or through the corrective action system described in Section 14.

12.4 Management Review

The number and nature of client complaints is reported by the QA Manager to the Laboratory Director and Quality Director in the QA Monthly report. Monitoring and addressing the overall level and nature of client complaints and the effectiveness of the solutions is part of the Annual Management Systems Review (Section 18).

13.0 CONTROL OF NON-CONFORMING WORK

13.1 Overview

When data discrepancies are discovered or deviations and departures from laboratory SOPs, policies and/or client requests have occurred, corrective action is taken immediately. First, the laboratory evaluates the significance of the nonconforming work. Then, a corrective action plan is initiated based on the outcome of the evaluation. If it is determined that the nonconforming work is an isolated incident, the plan could be as simple as adding a qualifier to the final results and/or making a notation in the case narrative. If it is determined that the nonconforming work is a systematic or improper practices issue, the corrective action plan could include a more in depth investigation and a possible suspension of an analytical method. In all cases, the actions taken are documented using the laboratory's corrective action system (refer to Section 14).

Due to the frequently unique nature of environmental samples, sometimes departures from documented policies and procedures are needed. When an analyst encounters such a situation, the problem is presented to the supervisor for resolution. The supervisor may elect to discuss it with the Technical Manager or have a representative contact the client to decide on a logical course of action. Once an approach is agreed upon, the analyst documents it using the laboratory's corrective action system described in Section 14. This information can then be supplied to the client in the form of a footnote or a case narrative with the report.

Project Management may encounter situations where a client may request that a special procedure be applied to a sample that is not standard lab practice. Based on a technical evaluation, the lab may accept or opt to reject the request based on technical or ethical merit. An example might be the need to report a compound that the lab does not normally report. The lab would not have validated the method for this compound following the procedures in Section 21. The client may request that the compound be reported based only on the calibration. Such a request would need to be approved by the Technical Manager and QA Manager, documented and included in the project folder. Deviations **must** also be noted on the final report with a statement that the compound is not reported in compliance with TNI (or the analytical method) requirements and the reason. Data being reported to a non-TNI state would need to note the change made to how the method is normally run.

13.2 Responsibilities and Authorities

Under certain circumstances, the Laboratory Director, a Technical Manager, or a member of the QA team may authorize departures from documented procedures or policies. The departures may be a result of procedural changes due to the nature of the sample; a one-time procedure for a client; QC failures with insufficient sample to reanalyze, etc. In most cases, the client will be informed of the departure prior to the reporting of the data. Any departures must be well documented using the laboratory's corrective action procedures. This information may also be documented in logbooks and/or data review checklists as appropriate. Any impacted data must be referenced in a case narrative and/or flagged with an appropriate data qualifier.

Any misrepresentation or possible misrepresentation of analytical data discovered by any laboratory staff member must be reported to facility Senior Management within 24-hours. The Senior Management staff is comprised of the Laboratory Director, the QA Manager, and the Technical Managers. The reporting of issues involving alleged violations of the company's Data Integrity or Manual Integration procedures must be conveyed to an NDSC ECO (e.g., the VP-QA/EHS) and the laboratory's Quality Director within 24 hours of discovery.

Whether an inaccurate result was reported due to calculation or quantitation errors, data entry errors, improper practices, or failure to follow SOPs, the data must be evaluated to determine the possible effect.

The Laboratory Director, QA Manager, ECOs, VP of Operations and the Quality Directors have the authority and responsibility to halt work, withhold final reports, or suspend an analysis for due cause as well as authorize the resumption of work.

13.3 Evaluation of Significance and Actions Taken

For each nonconforming issue reported, an evaluation of its significance and the level of management involvement needed is made. This includes reviewing its impact on the final data, whether or not it is an isolated or systematic issue, and how it relates to any special client requirements.

The NDSC Document entitled Nonconforming Work (QA-QP38229) is the procedure to be followed when it is discovered that erroneous or biased data may have been reported to clients or regulatory agencies.

The NDSC Document entitled Internal Investigations (QA-QP38228) is the procedure to be followed for investigation and correction of situations involved alleged incidents of misconduct or violation of the company's ethics policy.

Laboratory level decisions are documented and approved using the laboratory's standard nonconformance/corrective action reporting in lieu of the data recall determination form contained in NDSC Document No. QA-QP38229.

13.4 Prevention of Nonconforming Work

If it is determined that the nonconforming work could recur, further corrective actions must be made following the laboratory's corrective action system. Periodically, as defined by the laboratory's preventive action schedule, the QA Department evaluates non-conformances to determine if any nonconforming work has been repeated multiple times. If so, the laboratory's corrective action process may be followed.

13.5 Method Suspension / Restriction (Stop Work Procedures)

In some cases, it may be necessary to suspend/restrict the use of a method or target analyte which constitutes significant risk and/or liability to the laboratory. Suspension/restriction procedures can be initiated by any of the persons noted in Section 13.2, Paragraph 4.

Prior to suspension/restriction, confidentiality will be respected, and the problem with the required corrective and preventive action will be stated in writing and presented to the Laboratory Director.

The Laboratory Director shall arrange for the appropriate personnel to meet with the QA Manager as needed. This meeting shall be held to confirm that there is a problem, that suspension/restriction of the method is required and will be concluded with a discussion of the steps necessary to bring the method/target or test fully back on line. In some cases, that may not be necessary if all appropriate personnel have already agreed there is a problem and there is agreement on the steps needed to bring the method, target or test fully back on line. The QA Manager will also initiate a corrective action report as described in Section 14 if one has not already been started. A copy of any meeting notes and agreed upon steps should be e-mailed by the laboratory to their Business Unit President; and the VP-QA & EHS. This e-mail acts as notification of the incident.

After suspension/restriction, the lab will hold all reports to clients pending review. No faxing, mailing or distributing through electronic means may occur. The report must not be posted for viewing on the internet. It is the responsibility of the Laboratory Director to hold all reporting and to notify all relevant laboratory personnel regarding the suspension/restriction (e.g., Project Management, Log-in, etc.). Clients will NOT generally be notified at this time. Analysis may proceed in some instances depending on the non-conformance issue.

Within 72 hours, the QA Manager will determine if compliance is now met and reports can be released, OR determine the plan of action to bring work into compliance, and release work. A team, with all principals involved (e.g., Laboratory Director, Technical Manager, QA Manager) can devise a start-up plan to cover all steps from client notification through compliance and release of reports. Project Management and the Directors of Client Services and Sales and Marketing must be notified if clients must be notified or if the suspension/restriction affects the laboratory's ability to accept work. The QA Manager must approve start-up or elimination of any restrictions after all corrective action is complete.

14.0 CORRECTIVE ACTION

14.1 Overview

A major component of the laboratory's (QA) Program is the problem investigation and feedback mechanism designed to keep the laboratory staff informed on quality related issues and to provide insight to problem resolution. When nonconforming work or departures from policies and procedures in the quality system or technical operations are identified, the corrective action procedure provides a systematic approach to assess the issues, restore the laboratory's system integrity, and prevent reoccurrence. The laboratory employs two systems to manage non-conformances. Issues suspected of being systematic in nature and for which root cause analysis and a formal Corrective Action Report (CAR) are documented in the Incident Corrective Action Tracking (ICAT) database. Routine batch non-conformances, events that are understood to be isolated in nature, are documented in the LIMS non-conformance memo (NCM) system.

14.2 General

Problems within the quality system or within analytical operations may be discovered in a variety of ways, such as QC sample failures, internal or external audits, proficiency testing (PT) performance, client complaints, staff observation, etc.

The purpose of a corrective action system is to:

- Identify non-conformance events and assign responsibility for investigating.
- Resolve non-conformance events and assign responsibility for any required corrective action.
- Identify systematic problems before they become serious.
- Identify and track client complaints and provide resolution.

14.2.1 Non-Conformance Memo (NCM)

NCMs are used to document the following types of corrective actions:

- Deviations from an established procedure or SOP
- QC outside of limits
- Isolated reporting / calculation errors
- Client complaints
- Discrepancies in materials / goods received vs. manufacturer packing slips (Forms of documentation other than NCMs in LIMS are also acceptable)

14.2.2 Corrective Actions Documented In the ICAT Database

- Internal and external audit findings
- Failed or unacceptable PT results
- Identified poor process or method performance trends
- Systematic reporting / calculation errors

- Data recall investigations
- Questionable trends that are found in the review of NCMs.
- Client complaints
- Excessive revised reports

The ICAT database is used to document background information, track the results of corrective action investigations and root cause analysis, and to provide reports of corrective action plans.

14.3 Closed Loop Corrective Action Process

Any employee in the company can initiate a corrective action. There are four main components to a closed-loop corrective action process once an issue has been identified: Cause Analysis, Selection and Implementation of Corrective Actions (both short and long term), Monitoring of the Corrective Actions, and Follow-up.

14.3.1 Cause Analysis

- Upon discovery of a non-conformance event, the event must be defined and documented. An entry into the ICAT system must be initiated, someone is assigned to investigate the issue and the event is investigated for cause. Table 14-1 provides some general guidelines on determining responsibility for assessment.
- The cause analysis step is the key to the process as a long term corrective action cannot be determined until the cause is determined.
- If the cause is not readily obvious, the Technical Manager, Laboratory Director, or QA Manager (or QA designee) is consulted.

14.3.2 Selection and Implementation of Corrective Actions

- Where corrective action is needed, the laboratory shall identify potential corrective actions. The action(s) most likely to eliminate the problem and prevent recurrence are selected and implemented. Responsibility for implementation is assigned.
- Corrective actions shall be to a degree appropriate to the magnitude of the problem identified through the cause analysis.
- Whatever corrective action is determined to be appropriate, the laboratory shall document and implement the changes. The ICAT record is used for this documentation.

14.3.3 Root Cause Analysis

Root Cause Analysis is a class of problem solving (investigative) methods aimed at identifying the basic or causal factor(s) that underlie variation in performance or the occurrence of a significant failure. The root cause may be buried under seemingly innocuous events, many steps preceding the perceived failure. At first glance, the immediate response is typically directed at a symptom and not the cause. Typically, root cause analysis would be best with three or more incidents to triangulate a weakness. NDSC Document No. NDSC-QA-SOP43847, Root Cause Analysis, provides guidance on this procedure.

Systematically analyze and document the root causes of the more significant problems that are reported. Identify, track, and implement the corrective actions required to reduce the likelihood of recurrence of significant incidents. Trend the root cause data from these incidents to identify root

causes that, when corrected, can lead to dramatic improvements in performance by eliminating entire classes of problems.

Identify the one event associated with problem and ask why this event occurred. Brainstorm the root causes of failures; for example, by asking why events occurred or conditions existed; and then why the cause occurred consecutive times until you get to the root cause. For each of these sub events or causes, ask why it occurred. Repeat the process for the other events associated with the incident.

Root cause analysis does not mean the investigation is over. Look at technique or other systems outside the normal indicators. Often creative thinking will find root causes that ordinarily would be missed and continue to plague the laboratory or operation.

14.3.4 Monitoring of the Corrective Actions

- The Technical Manager and QA Manager are responsible to ensure that the corrective action taken was effective.
- Ineffective actions are documented and re-evaluated until acceptable resolution is achieved. Technical Managers are accountable to the Laboratory Director to ensure final acceptable resolution is achieved and documented appropriately.
- The QA Manager reviews monthly NCM and ICAT records for trends. Highlights are included in the QA monthly report (refer to Section 18). If a significant trend develops that adversely affects quality, an audit of the area is performed and corrective action implemented.
- Any out-of-control situations that are not addressed acceptably at the laboratory level may be reported to the NDSC Quality Director by the QA Manager, indicating the nature of the out-of-control situation and problems encountered in solving the situation.

14.3.5 Follow-up Audits

- Follow-up audits may be initiated by the QA Manager and shall be performed as soon as possible when the identification of a nonconformance casts doubt on the laboratory's compliance with its own policies and procedures, or on its compliance with state or federal requirements.
- These audits often follow the implementation of the corrective actions to verify effectiveness. An additional audit would only be necessary when a critical issue or risk to business is discovered.

(Also refer to Section 17.1.4, Special Audits.)

14.4 Technical Corrective Actions

In addition to providing acceptance criteria and specific protocols for technical corrective actions in the method SOPs, the laboratory has general procedures to be followed to determine when departures from the documented policies and procedures and quality control have occurred (refer to Section 13). The documentation of these procedures is through the use of an NCM or record in the ICAT system.

Table 14-1 includes examples of general technical corrective actions. For specific criteria and corrective actions, refer to the analytical methods or specific method SOPs. The laboratory may also maintain Work Instructions on these items that are available upon request.

Table 14-1 provides some general guidelines for identifying the individual(s) responsible for assessing each QC type and initiating corrective action. The table also provides general guidance on how a data set should be treated if associated QC measurements are unacceptable. Specific procedures are included in Method SOPs, Work Instructions, QA Manual Sections 19 and 20. All corrective actions are reviewed monthly, at a minimum, by the QA Manager and highlights are included in the QA monthly report.

To the extent possible, samples shall be reported only if all quality control measures are acceptable. If the deficiency does not impair the usability of the results, data will be reported with an appropriate data qualifier and/or the deficiency will be noted in the case narrative. Where sample results may be impaired, the PM is notified by an NCM and appropriate corrective action (e.g., reanalysis) is taken and documented.

14.5 Basic Corrections

When mistakes occur in records, each mistake shall be crossed-out, [not obliterated (e.g. no white-out)], and the correct value entered alongside. All such corrections shall be initialed (or signed) and dated by the person making the correction. In the case of records stored electronically, the original uncorrected file must be maintained intact and a second corrected-file is created. This same process applies to adding additional information to a record. All additions made later than the initial must also be initialed (or signed) and dated. When corrections are due to reasons other than obvious transcription errors, the reason for the corrections (or additions) shall also be documented.

Table 14-1. Example – General Corrective Action Procedures

QC Activity (Individual Responsible for Initiation/Assessment)	Acceptance Criteria	Recommended Corrective Action
Initial Instrument Blank (Analyst)	- Instrument response < MDL.	- Prepare another blank. - If same response, determine cause of contamination: reagents, environment, instrument equipment failure, etc.
Initial Calibration Standards (Analyst, Technical Manager(s))	- Correlation coefficient > 0.99 or standard concentration value. - % Recovery within acceptance range. - See details in Method SOP.	- Reanalyze standards. - If still unacceptable, remake standards and recalibrate instrument.
Independent Calibration Verification (Second Source) (Analyst, Technical Manager(s))	- % Recovery within control limits.	- Remake and reanalyze standard. - If still unacceptable, then remake calibration standards or use new primary standards and recalibrate instrument.

QC Activity (Individual Responsible for Initiation/Assessment)	Acceptance Criteria	Recommended Corrective Action
Continuing Calibration Standards (Analyst, Data Reviewer)	% Recovery within control limits.	- Reanalyze standard. - If still unacceptable, then recalibrate and rerun affected samples.
Matrix Spike / Matrix Spike Duplicate (MS/MSD) (Analyst, Data Reviewer)	- % Recovery within limits documented in the LIMS or Project QAPP.	- If the acceptance criteria for duplicates or matrix spikes are not met because of matrix interferences, the acceptance of the analytical batch is determined by the validity of the LCS. - If the LCS is within acceptable limits the batch is acceptable. - The results of the duplicates, matrix spikes and the LCS are reported with the data set. - For matrix spike or duplicate results outside criteria the data for that sample shall be reported with qualifiers.
Laboratory Control Sample (LCS) (Analyst, Data Reviewer)	- % Recovery within limits specified in the LIMS or Project QAPP.	- Batch must be re-prepared and re-analyzed. This includes any allowable marginal exceedance. - When not using marginal exceedances, the following exceptions apply: 1) when the acceptance criteria for the positive control are exceeded high (i.e., high bias) and there are associated samples that are non-detects, then those non-detects may be reported with data qualifying codes; 2) when the acceptance criteria for the positive control are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level with data qualifying codes. Note: If there is insufficient sample or the holding time cannot be met, contact client and report with flags.
Surrogates (Analyst, Data Reviewer)	- % Recovery within limits of method or within three standard deviations of the historical mean.	- Individual sample must be repeated. Place comment in LIMS. - Surrogate results outside criteria shall be reported with qualifiers.

QC Activity (Individual Responsible for Initiation/Assessment)	Acceptance Criteria	Recommended Corrective Action
Method Blank (MB) (Analyst, Data Reviewer)	< Reporting Limit ¹	- Reanalyze blank. - If still positive, determine source of contamination. If necessary, reprocess (i.e. digest or extract) entire sample batch. Report blank results. - Qualify the result(s) if the concentration of a targeted analyte in the MB is at or above the reporting limit AND is > 1/10 of the amount measured in the sample.
Proficiency Testing (PT) Samples (QA Manager, Technical Manager(s))	- Criteria supplied by PT Supplier.	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat a PT sample to show the problem is corrected.
Internal / External Audits (QA Manager, Technical Manager(s), Laboratory Director)	- Defined in Quality System documentation such as SOPs, QAM, etc.	- Non-conformances must be investigated through CAR system and necessary corrections must be made.
Reporting / Calculation Errors (Depends on issue – possible individuals include: Analysts, Data Reviewers, Project Managers, Technical Managers, QA Manager, NDSC QA, Executive Management)	- NDSC Document No. QA-QP38229, Nonconforming Work.	- Corrective action is determined by type of error. Follow the procedures in NDSC Document No. QA-QP38228.
Client Complaints (Project Managers, Lab Director/Manager, Sales and Marketing)	-	- Corrective action is determined by the type of complaint. For example, a complaint regarding an incorrect address on a report will result in the report being corrected and then follow-up must be performed on the reasons the address was incorrect (e.g., database needs to be updated).

QC Activity (Individual Responsible for Initiation/Assessment)	Acceptance Criteria	Recommended Corrective Action
QA Monthly Report (Refer to Section 16 for an example) (QA Manager, Lab Director/Manager, Technical Manager(s))	- QAM, SOPs.	- Corrective action is determined by the type of issue. For example, CARs for the month are reviewed and possible trends are investigated.
Health and Safety Violation (Safety Officer, Lab Director/Manager, Technical Manager(s))	- Environmental Health and Safety (EHS) Manual.	- Non-conformance is investigated and corrected through CAR system.

Note:

1. Except as noted below for certain compounds, the method blank should be below the detection (reporting) limit. Concentrations up to five times the reporting limit will be allowed for the ubiquitous laboratory and reagent contaminants as defined in policy WS-PQA-003 provided they appear at similar levels in the reagent blank and samples. The ubiquitous contaminants include: methylene chloride, toluene, acetone, 2-butanone, phthalates and octachlorodibenzodioxin. This allowance presumes that the detection limit is significantly below any regulatory limit to which the data are to be compared and that blank subtraction will not occur. For benzene and ethylene dibromide (EDB) and other analytes for which regulatory limits are extremely close to the detection limit, the method blank must be below the method detection limit.

15.0 PREVENTIVE ACTION / IMPROVEMENT

15.1 Overview

The laboratory's preventive action programs improve or eliminate potential causes of nonconforming product and/or nonconformance to the quality system. This preventive action process is a proactive and continuous process of improvement activities that can be initiated through feedback from clients, employees, business providers, and affiliates. The QA Department has the overall responsibility to ensure that the preventive action process is in place, and that relevant information on actions is submitted for management review.

Dedicating resources to an effective preventive action system emphasizes the laboratory's commitment to its QA Program. It is beneficial to identify and address negative trends before they develop into complaints, problems and corrective actions. Additionally, the laboratory continually strives to improve customer service and client satisfaction through continuous improvements to laboratory systems.

Opportunities for improvement may be discovered through any of the following:

- review of the monthly QA Metrics Report,
- trending NCMs,
- review of control charts and QC results,
- trending proficiency testing (PT) results,
- performance of management system reviews,
- trending client complaints,
- review of processing operations, or
- staff observations.

The monthly Management Systems Metrics Report shows performance indicators in all areas of the laboratory and quality system. These areas include revised reports, corrective actions, audit findings, internal auditing and data authenticity audits, client complaints, PT samples, holding time violations, SOPs, ethics training, etc. The metrics report is reviewed monthly by the laboratory management, NDSC QA Team, Local and Executive Management. These metrics are used in evaluating the management and quality system performance on an ongoing basis and provide a tool for identifying areas for improvement.

Items identified as continuous improvement opportunities to the management system may be issued as goals from the annual management systems review, recommendations from internal audits, white papers, Lessons Learned, Technical Services audit report, Technical Best Practices, or as Executive or management initiatives.

The laboratory's corrective action process is integral to implementation of preventive actions. A critical piece of the corrective action process is the implementation of actions to prevent further occurrence of a non-compliance event. Historical review of corrective action and non-conformances provides a valuable mechanism for identifying preventive action opportunities.

15.1.1 The following elements are part of a preventive action/process improvement system:

- Identification of an opportunity for preventive action or process improvement.
- Process for the preventive action or improvement.

- Define the measurements of the effectiveness of the process once undertaken.
- Execution of the preventive action or improvement.
- Evaluation of the plan using the defined measurements.
- Verification of the effectiveness of the preventive action or improvement.
- Close-Out by documenting any permanent changes to the Quality System as a result of the Preventive Action or Process Improvement. Documentation of Preventive Action/process Improvement is incorporated into the monthly QA reports, corrective action process and management review.

15.1.2 Any preventive actions/process improvement undertaken or attempted shall be taken into account during the annual Management Systems Review (Section 16). A highly detailed report is not required; however, a summary of successes and failures within the preventive action program is sufficient to provide management with a measurement for evaluation.

15.2 Management of Change

The Management of Change process is designed to manage significant events and changes that occur within the laboratory. Through these procedures, the potential risks inherent with a new event or change are identified and evaluated. The risks are minimized or eliminated through pre-planning and the development of preventive measures. The types of changes covered under this system include: Facility Changes, Major Accreditation Changes, Addition or Deletion to Division's Capabilities or Instrumentation, Key Personnel Changes, Laboratory Information Management System (LIMS) changes. This process is discussed in further detail in WS-QA-0050, Management of Change Procedures.

16.0 CONTROL OF RECORDS

The laboratory maintains a records management system appropriate to its needs and that complies with applicable standards or regulations as required. The system produces unequivocal, accurate records that document all laboratory activities. The laboratory retains all original observations, calculations and derived data, calibration records and a copy of the analytical report for a minimum of five years after it has been issued. Exceptions for programs with longer retention requirements are discussed in Section 16.1.2.

16.1 Overview

The laboratory has established procedures for identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records. A record index is listed in Table 16-1. More detailed information on retention of specific records is provided in NDSC Document Nos. CW-L-P-001, Records Retention Policy and CW-L-WI-001, Records Retention/Storage Schedule. Quality records are maintained by the QA department in a database or in specific folders on the local QA share on a corporate server, which is backed up as part of the regular laboratory backup. Records are of two types; either electronic or hard copy paper formats depending on whether the record is computer or hand generated (some records may be in both formats). Technical records are maintained by Department Managers.

Table 16-1. Record Index

	<u>Record Types</u> ¹ :	<u>Retention Time</u> :
Technical Records	- Raw Data - Logbooks² - Standards - Certificates - Analytical Records - MDLs/IDLs/DOCs - Lab Reports	5 Years from analytical report issue*
Official Documents	- Quality Assurance Manual (QAM) - Work Instructions - Policies - SOPs - Policy Memorandums - Manuals - Published Methods	Indefinitely
QA Records	- Certifications - Method and Software Validation / Verification Data	Indefinitely

	<u>Record Types</u> ¹ :	<u>Retention Time</u> :
QA Records	- Internal & External Audits/Responses - Corrective/Preventive Actions - Management Reviews - Data Investigation	5 Years from archival* <u>Data Investigation</u> : 5 years or the life of the affected raw data storage whichever is greater (beyond 5 years if ongoing project or pending investigation)
Project Records	- Sample Receipt & COC Documents - Contracts and Amendments - Correspondence - QAPP - SAP - Telephone Logbooks - Lab Reports	5 Years from analytical report issue*
Administrative Records	Financial and Business Operations	Refer to NDSC Doc. No. CW-L-WI-001
	EH&S Manual, Permits	Indefinitely
	Disposal Records	Indefinitely
	Employee Handbook	Indefinitely
	Personnel files, Employee Signature & Initials, Administrative Training Records (e.g., Ethics)	Refer to HR Manual
	Administrative Policies	Indefinitely
	Technical Training Records	7 years
	Legal Records	Indefinitely
	HR Records	Refer to NDSC Doc. No. CW-L-WI-001
	IT Records	Refer to NDSC Doc. No. CW-L-WI-001
	NDSC Governance Records	Refer to NDSC Doc. No. CW-L-WI-001
	Sales & Marketing	5 years
	Real Estate	Indefinitely

¹ Record Types encompass hardcopy and electronic records.

² Examples of Logbook types: Maintenance, Instrument Run, Preparation (standard and samples), Standard and Reagent Receipt, Archiving, Balance Calibration, Temperature (hardcopy or electronic records).

* Exceptions listed in Table 16-2.

16.1.1 All records are stored and retained in such a way that they are secure and readily retrievable at the laboratory facility that provides a suitable environment to prevent damage or deterioration and to prevent loss. All records shall be protected against fire, theft, loss, environmental deterioration, and vermin. In the case of electronic records, electronic or magnetic sources, storage media are protected from deterioration caused by magnetic fields and/or electronic deterioration. Access to the data is limited to laboratory and company employees and shall be documented with an access log. Logs are maintained in each storage area to note removal and return of records. Records are maintained for a minimum of five years unless otherwise specified by a client or regulatory requirement.

For raw data and project records, record retention shall be calculated from the date the project report is issued. For other records, such as NDSC Documents, QA, or Administrative Records, the retention time is calculated from the date the record is formally retired. Records related to the programs listed in Table 16-2 have lengthier retention requirements and are subject to the requirements in Section 16.1.3.

16.2 Programs with Longer Retention Requirements

Some regulatory programs have longer record retention requirements than the standard record retention time. These are detailed in Table 16-2 with their retention requirements. In these cases, the longer retention requirement is enacted. If special instructions exist such that client data cannot be destroyed prior to notification of the client, the container or box containing that data is marked as to who to contact for authorization prior to destroying the data.

Table 16-2. Example: Special Record Retention Requirements

Program	¹ Retention Requirement
Drinking Water – All States	10 years (lab reports and raw data) 10 years - Radiochemistry (project records)
Drinking Water Lead and Copper Rule	12 years (project records)
Commonwealth of MA – All environmental data 310 CMR 42.14	10 years
FIFRA – 40 CFR Part 160	Retain for life of research or marketing permit for pesticides regulated by EPA
Housing and Urban Development (HUD) Environmental Lead Testing	10 years
Alaska	10 years
Louisiana – All	10 years
Michigan Department of Environmental Quality – all environmental data	10 years
Navy Facilities Engineering Service Center (NFESC)	10 years
Ohio VAP	10 years and State contacted prior to disposal
OSHA	30 years

¹Note: Extended retention requirements must be noted with the archive documents or addressed in facility-specific records retention procedures.

16.2.1 The laboratory has procedures to protect and back-up records stored electronically and to prevent unauthorized access to or amendment of these records. All analytical data is maintained

as hard copy or in a secure readable electronic format. For analytical reports that are maintained as copies in PDF format, refer to Section 19.15.1 and WS-PQA-017 for more information.

16.2.2 The record keeping system allows for historical reconstruction of all laboratory activities that produced the analytical data, as well as rapid recovery of historical data. The history of the sample from when the laboratory took possession of the samples must be readily understood through the documentation. This shall include inter-laboratory transfers of samples and/or extracts.

- The records include the identity of personnel involved in sampling, sample receipt, preparation, or testing. All analytical work contains the initials (at least) of the personnel involved. The laboratory's copy of the COC is stored with the invoice and the work order sheet generated by the LIMS as scanned documents within the LIMS. The chain of custody would indicate the name of the sampler. If any sampling notes are provided with a work order, they are kept with this package.
- All information relating to the laboratory facilities equipment, analytical test methods, and related laboratory activities, such as sample receipt, sample preparation, or data verification are documented.
- The record keeping system facilitates the retrieval of all working files and archived records for inspection and verification purposes (e.g., set format for naming electronic files, set format for what is included with a given analytical data set.) Refer to SOP WS-QA-0009, Document Archiving. Instrument data is stored sequentially by instrument. A given day's analyses are maintained in the order of the analysis. Run logs are maintained for each instrument or method; a copy of each day's run log or instrument sequence is stored with the data to aid in re-constructing an analytical sequence. Where an analysis is performed without an instrument, bound logbooks or bench sheets are used to record and file data. Standard and reagent information is recorded in logbooks or entered into LIMS for each method as required.
- Changes to hardcopy records shall follow the procedures outlined in Section 12 and 19. Changes to electronic records in LIMS or instrument data are recorded in audit trails.
- The reason for a signature or initials on a document is clearly indicated in the records such as "sampled by," "prepared by," "reviewed by", or "analyzed by".
- All generated data except those that are generated by automated data collection systems, are recorded directly, promptly and legibly in permanent dark ink.
- Hard copy data may be scanned into PDF format for record storage as long as the scanning process can be verified in order to ensure that no data is lost and the data files and storage media must be tested to verify the laboratory's ability to retrieve the information prior to the destruction of the hard copy that was scanned. The procedure for this verification can be found in SOP WS-QA-0009.
- Also refer to Section 19.15.1 'Computer and Electronic Data Related Requirements'.

16.3 Technical and Analytical Records

16.3.1 The laboratory retains records of original observations, derived data and sufficient information to establish an audit trail, calibration records, staff records and a copy of each analytical report issued, for a minimum of five years unless otherwise specified by a client or

regulatory requirement. The records for each analysis shall contain sufficient information to enable the analysis to be repeated under conditions as close as possible to the original. The records shall include the identity of laboratory personnel responsible for the sampling, performance of each analysis and reviewing results.

16.3.2 Observations, data and calculations are recorded real-time and are identifiable to the specific task.

16.3.3 Changes to hardcopy records shall follow the procedures outlined in Section 12 and 19. Changes to electronic records in LIMS or instrument data are recorded in audit trails.

The essential information to be associated with analysis, such as strip charts, tabular printouts, computer data files, analytical notebooks, and run logs, include:

- Laboratory sample ID code;
- Date of analysis; time of analysis is also required if the holding time is seventy-two (72) hours or less, or when time critical steps are included in the analysis (e.g., drying times, incubations, etc.); instrumental analyses have the date and time of analysis recorded as part of their general operations. Where a time critical step exists in an analysis, location for such a time is included as part of the documentation in a specific logbook or on a benchsheet.
- Instrumentation identification and instrument operating conditions/parameters. Operating conditions/parameters are typically recorded in instrument maintenance logs where available.
- analysis type;
- all manual calculations and manual integrations;
- analyst's or operator's initials/signature;
- sample preparation including cleanup, separation protocols, ID codes, volumes, weights, instrument printouts, meter readings, calculations, reagents;
- test results;
- standard and reagent origin, receipt, preparation, and use;
- calibration criteria, frequency and acceptance criteria;
- data and statistical calculations, review, confirmation, interpretation, assessment and reporting conventions;
- quality control protocols and assessment;
- electronic data security, software documentation and verification, software and hardware audits, backups, and records of any changes to automated data entries; and
- Method performance criteria including expected quality control requirements. These are indicated both in LIMS and on specific analytical report formats.

16.3.4 All logbooks used during receipt, preparation, storage, analysis, and reporting of samples or monitoring of support equipment shall undergo a periodic, documented supervisory or peer review.

16.4 Laboratory Support Activities

In addition to documenting all the above-mentioned activities, the following are retained QA records and project records (previous discussions in this section relate where and how these data are stored):

- all original raw data, whether hard copy or electronic, for calibrations, samples and quality control measures, including analysts' work sheets and data output records (chromatograms, strip charts, and other instrument response readout records);
- a written description or reference to the specific test method used which includes a description of the specific computational steps used to translate parametric observations into a reportable analytical value;
- copies of final reports;
- archived SOPs;
- correspondence relating to laboratory activities for a specific project;
- all corrective action reports, audits and audit responses;
- proficiency test results and raw data; and
- results of data review, verification, and crosschecking procedures

16.4.1 Sample Handling Records

Records of all procedures to which a sample is subjected while in the possession of the laboratory are maintained. These include but are not limited to records pertaining to:

- sample preservation including appropriateness of sample container and compliance with holding time requirement;
- sample identification, receipt, acceptance or rejection and login;
- sample storage and tracking including shipping receipts, sample transmittal / COC forms; and
- procedures for the receipt and retention of samples, including all provisions necessary to protect the integrity of samples.

16.5 Administrative Records

The laboratory also maintains the administrative records in either electronic or hard copy form. Refer to Table 16-1.

16.6 Records Management, Storage and Disposal

All records (including those pertaining to test equipment), certificates and reports are safely stored, held secure and in confidence to the client. Certification related records are available upon request.

All information necessary for the historical reconstruction of data is maintained by the laboratory. Records that are stored only on electronic media must be supported by the hardware and software necessary for their retrieval.

Records that are stored or generated by computers or personal computers have hard copy, write-protected backup copies, or an electronic audit trail controlling access.

The laboratory has a record management system (a.k.a., document control) for control of laboratory notebooks, instrument logbooks, standards logbooks, and records for data reduction, validation, storage and reporting. Laboratory notebooks are issued on a per analysis basis, and are numbered sequentially. All data are recorded sequentially within a series of sequential notebooks. Bench sheets are filed sequentially. Standards are maintained in LIMS. Records are considered archived when noted as such in the records management system (a.k.a., document control.)

16.6.1 Transfer of Ownership

In the event that the laboratory transfers ownership or goes out of business, the laboratory shall ensure that the records are maintained or transferred according to client's instructions. Upon ownership transfer, record retention requirements shall be addressed in the ownership transfer agreement and the responsibility for maintaining archives is clearly established. In addition, in cases of bankruptcy, appropriate regulatory and state legal requirements concerning laboratory records must be followed. In the event of the closure of the laboratory, all records will revert to the control of the NDSC. Should the entire company cease to exist, as much notice as possible will be given to clients and the accrediting bodies who have worked with the laboratory during the previous 5 years of such action.

16.6.2 Records Disposal

Records are removed from the archive and destroyed after 5 years unless otherwise specified by a client or regulatory requirement. On a project specific or program basis, clients may need to be notified prior to record destruction. Records are destroyed in a manner that ensures their confidentiality such as shredding, mutilation or incineration. (Refer to Tables 16-1 and 16-2).

Electronic copies of records must be destroyed by erasure or physically damaging off-line storage media so no records can be read.

If a third party records management company is hired to dispose of records, a "Certificate of Destruction" is required.

Records maintained within LIMS are purged from the system based on the retention period/type associated to the project. The LIMS administrator queries the database on a quarterly basis and provides a listing of the records to be purged to the client services organization (CSO). The CSO reviews the list and adjusts any incorrect retention settings. Then the LIMS Administrator starts an automated process that removes the data identified as ready for purging.

17.0 AUDITS

17.1 Internal Audits

Internal audits are performed to verify that laboratory operations comply with the requirements of the lab's quality system and with the external quality programs under which the laboratory operates. Audits are planned and organized by the QA staff. Personnel conducting the audits should be independent of the area being evaluated. Auditors will have sufficient authority, access to work areas, and organizational freedom necessary to observe all activities affecting quality and to report the assessments to laboratory management and, when requested, to Executive management.

Audits are conducted and documented as described in the NDSC Document on performing Internal Auditing, SOP No. SOP02-QA-QP5260. The types and frequency of routine internal audits are described in Table 17-1. Special or ad hoc assessments may be conducted as needed under the direction of the QA staff.

Table 17-1. Types of Internal Audits and Frequency

Description	Performed by	Frequency
Quality Systems Audits	QA Department, QA approved designee, or NDSC QA	All areas of the laboratory annually
QA Technical Audits	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to NDSC SOP02-QA-QP5260)	Technical Audits Frequency: 50% of methods annually
SOP Method Compliance	Joint responsibility: a) QA Manager or designee c) Technical Manager or Designee (Refer to NDSC SOP02-QA-QP5260)	SOP Compliance Review Frequency - Minimum of every two years. - Annually for all methods and administrative SOPs relating to DoD/DOE programs. - Annually for drinking water methods.
Special	QA Department or Designee	Surveillance or spot checks performed as needed, e.g., to confirm corrective actions from other audits.
Performance Testing	Analysts with QA oversight	Two successful per year for each TNI field of testing or as dictated by regulatory requirements

17.1.1 Annual Quality Systems Audit

An annual quality systems audit is required to ensure compliance to analytical methods and SOPs, Eurofins Data Integrity and Ethics Policies (see Section 7.2), TNI quality systems, client and state requirements, and the effectiveness of the internal controls of the analytical process, including but not limited to data review, quality controls, preventive action and corrective action.

The completeness of earlier corrective actions is assessed for effectiveness & sustainability. The audit is divided into sections for each operating or support area of the lab, and each section is comprehensive for a given area. The area audits may be performed on a rotating schedule throughout the year to ensure adequate coverage of all areas. This schedule may change as situations in the laboratory warrant.

17.1.2 QA Technical Audits

QA technical audits assess data authenticity and analyst integrity. These audits are based on client projects, associated sample delivery groups, and the methods performed. Reported results are compared to raw data to verify the authenticity of results. The validity of calibrations and QC results are compared to data qualifiers, footnotes, and case narratives. Documentation is assessed by examining run logs and records of manual integrations. Manual calculations are checked. Where possible, electronic audit miner programs (e.g., Chrom AuditMiner) are used to identify unusual manipulations of the data deserving closer scrutiny. QA technical audits will include all methods within a two-year period.

17.1.3 SOP Method Compliance

Compliance of all SOPs with the source methods and compliance of the operational groups with the SOPs will be assessed by the Technical Manager or qualified designee at least every two years. This is performed annually for methods and administrative SOPs related to drinking water and DoD/DOE programs. It is also recommended that the work of each newly hired analyst is assessed within 3 months of working independently, (e.g., completion of method IDOC). In addition, as analysts add methods to their capabilities, (new IDOC) reviews of the analyst work products will be performed within 3 months of completing the documented training.

17.1.4 Special Audits

Special audits are conducted on an as needed basis, generally as a follow up to specific issues such as client complaints, corrective actions, PT results, data audits, system audits, validation comments, regulatory audits or suspected ethical improprieties. Special audits are focused on a specific issue, and report format, distribution, and timeframes are designed to address the nature of the issue.

17.1.5 Performance Testing

The laboratory participates semi-annually in performance audits conducted through the analysis of PT samples provided by a third party. The laboratory generally participates in the following types of PT studies: Soil, Water Supply, Water Pollution, and round-robin studies for sediments and biological materials. When available for parameters tested by the laboratory, the laboratory will also participate in the DOE administered MAPEP program.

It is Eurofins policy that PT samples be treated as typical samples in the production process. Furthermore, where PT samples present special or unique problems, in the regular production process they may need to be treated differently, as would any special or unique request submitted by any client. The QA Manager must be consulted and in agreement with any decisions made to treat a PT sample differently due to some special circumstance.

Written investigations for unacceptable PT results are required. In some cases it may be necessary for blind QC samples to be submitted to the laboratory to show a return to control.

17.2 External Audits

External audits are performed when certifying agencies or clients conduct on-site inspections or submit performance testing samples for analysis. It is Eurofins policy to cooperate fully with regulatory authorities and clients. The laboratory makes every effort to provide the auditors with access to personnel, documentation, and assistance. Laboratory supervisors are responsible for providing corrective actions to the QA Manager who coordinates the response. Audit responses are due in the time allotted by the client or agency performing the audit.

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. The client may only view data and systems related directly to the client's work. All efforts are made to keep other client information confidential.

17.2.1 Confidential Business Information (CBI) Considerations

During on-site audits, auditors may come into possession of information claimed as business confidential. A business confidentiality claim is defined as "a claim or allegation that business information is entitled to confidential treatment for reasons of business confidentiality or a request for a determination that such information is entitled to such treatment." When information is claimed as business confidential, the laboratory must place on (or attach to) the information at the time it is submitted to the auditor, a cover sheet, stamped or typed legend or other suitable form of notice, employing language such as "trade secret", "proprietary" or "company confidential". Confidential portions of documents otherwise non-confidential must be clearly identified. CBI may be purged of references to client identity by the responsible laboratory official at the time of removal from the laboratory. However, sample identifiers may not be obscured from the information. Additional information regarding CBI can be found within the 2009 and 2016 TNI standards

17.3 Audit Findings

Audit findings are documented using the corrective action process and database (see Section 14). The laboratory's corrective action responses may include action plans that could not be completed within a predefined timeframe. In these instances, a completion date must be set and agreed to by operations management and the QA Manager.

Developing and implementing corrective actions to findings is the responsibility of the Technical Manager where the finding originated. Findings that are not corrected by specified due dates are reported monthly to management in the QA monthly report.

If any audit finding casts doubt on the effectiveness of the operations or on the correctness or validity of the laboratory's test results, the laboratory shall take timely corrective action, and shall notify clients in writing if the investigations show that the laboratory results have been affected. Once corrective action is implemented, a follow-up audit is scheduled to ensure that the problem has been corrected.

Clients must be notified promptly in writing, of any event such as the identification of defective measuring or test equipment that casts doubt on the validity of results given in any test report or amendment to a test report. The investigation must begin within 24-hours of discovery of the problem and all efforts are made to notify the client within two weeks after the completion of the investigation.

18.0 MANAGEMENT REVIEWS

18.1 Quality Assurance Report

The QA Department is responsible for preparing a comprehensive monthly metrics report to Management to keep them apprised of current quality issues. This report fosters communication, review, and refinement of the QA system to evaluate the suitability of policies and procedures to meet both regulatory and laboratory quality objectives.

The NDSC QA team compiles information from all of the Environment Testing laboratories monthly metrics reports for the Executive Management team. This report includes notable information and concerns regarding the laboratories QA program and a listing of new regulations that may potentially impact the laboratories.

18.2 Annual Management Review

The Laboratory Management team (Laboratory Director, Technical Managers, and QA Manager) conducts a review annually of its quality systems to ensure its continuing suitability and effectiveness in meeting client and regulatory requirements and to introduce any necessary changes or improvements. It will also provide a platform for defining goals, objectives and action items that feed into the laboratory planning system. NDSC personnel can be included in this meeting at the discretion of the Laboratory Director. The LIMS review consists of examining any audits, complaints or concerns that have been raised through the year that are related to LIMS. The laboratory will summarize any critical findings that cannot be solved by the lab and report them to Corporate IT.

This management systems review (NDSC Document No. QA-QP38702 & Form No. NDSC-QA-FRM43453) uses information generated during the preceding year to assess the “big picture” by ensuring that routine actions taken and reviewed on a monthly basis are not components of larger systematic concerns. The monthly review should keep the quality systems current and effective; therefore, the annual review is a formal senior management process to review specific existing documentation. Significant issues from the following documentation are compiled or summarized by the QA Manager prior to the review meeting:

- Matters arising from the previous annual review.
- Prior Monthly QA Reports issues.
- Laboratory QA Metrics.
- Review of report reissue requests.
- Review of client feedback and complaints.
- Issues arising from any prior management or staff meetings.
- Minutes from prior senior lab management meetings. Issues that may be raised from these meetings include:
 - o Adequacy of staff, equipment and facility resources.
 - o Adequacy of policies and procedures.
 - o Future plans for resources and testing capability and capacity.
- The annual internal double blind PT program sample performance (if performed),

- Compliance to the Ethics Policy and Data Integrity Plan. Including any evidence/incidents of inappropriate actions or vulnerabilities related to data Integrity.
- Evaluation of overall risk, including risks to impartiality, confidentiality, reporting statements of conformity, and nonconforming work.

A report is generated by the QA Manager and management. The report is distributed to the Laboratory Manager, President of the Business Unit, and the Business Unit Manager. The report includes, but is not limited to:

- The date of the review and the names and titles of participants.
- A reference to the existing data quality related documents and topics that were reviewed.
- Quality system or operational changes or improvements that will be made as a result of the review [e.g., an implementation schedule including assigned responsibilities for the changes (Action Table)].

Changes to the quality systems requiring update to the laboratory QA Manual shall be included in the next revision of the QA Manual.

18.3 Potential Integrity Related Managerial Reviews

Potential integrity issues (data or business related) must be handled and reviewed in a confidential manner until such time as a follow-up evaluation, full investigation, or other appropriate actions have been completed and issues clarified. The NDSC Document No. QA-QP38228, Internal Investigations, shall be followed. All investigations that result in finding of inappropriate activity are documented and include any disciplinary actions involved, corrective actions taken, and all appropriate notifications of clients.

The Eurofins Environment Testing Presidents, Business Unit Managers, Laboratory Directors and NDSC Team are informed of any current data integrity or data recall investigations via the monthly metrics report.

19.0 TEST METHODS AND METHOD VALIDATION

19.1 Overview

The laboratory uses methods that are appropriate to meet our clients' requirements and that are within the scope of the laboratory's capabilities. These include sampling, handling, transport, storage and preparation of samples, and, where appropriate, an estimation of the measurement of uncertainty as well as statistical techniques for analysis of environmental data.

Instructions are available in the laboratory for the operation of equipment as well as for the handling and preparation of samples. All instructions, Standard Operating Procedures (SOPs), reference methods and manuals relevant to the working of the laboratory are readily available to all staff. Deviations from published methods are documented (with justification) in the laboratory's approved SOPs. SOPs are submitted to clients for review at their request. Significant deviations from published methods require client approval and regulatory approval where applicable.

19.2 Standard Operating Procedures (SOPs)

The laboratory maintains SOPs that accurately reflect all phases of the laboratory such as assessing data integrity, corrective actions, handling customer complaints as well as all analytical methods and sampling procedures. The method SOPs are derived from the most recently promulgated/approved, published methods and are specifically adapted to the laboratory facility. Modifications or clarifications to published methods are clearly noted in the SOPs. All SOPs are controlled in the laboratory.

- All SOPs contain a revision number, effective date, and appropriate approval signatures. Controlled copies are available to all staff.
- Procedures for writing an SOP are incorporated by reference to the laboratory's SOP WS-QA-0021 (Preparation and Management of Standard Operating Procedures).
- SOPs are reviewed at a minimum of every 2 years (annually for Drinking Water and DoD/DOE SOPs), and where necessary, revised to ensure continuing suitability and compliance with applicable requirements.

19.3 Laboratory Methods Manual

For each test method, the laboratory shall have available the published referenced method as well as the laboratory developed SOP.

Note: If more stringent standards or requirements are included in a mandated test method or regulation than those specified in this manual, the laboratory shall demonstrate that such requirements are met. If it is not clear which requirements are more stringent, the standard from the method or regulation is to be followed. Any exceptions or deviations from the referenced methods or regulations are noted in the specific analytical SOP.

The laboratory maintains an SOP Index for both technical and non-technical SOPs. Technical SOPs are maintained to describe a specific test method. Non-technical SOPs are maintained to describe functions and processes not related to a specific test method.

19.4 Selection of Methods

Since numerous methods and analytical techniques are available, continued communication between the client and laboratory is imperative to assure the correct methods are utilized. Once

client methodology requirements are established, this and other pertinent information is summarized by the PM. These mechanisms ensure that the proper analytical methods are applied when the samples arrive for log-in. For non-routine analytical services (e.g., special matrices, non-routine compound lists), the method of choice is selected based on client needs and available technology. The methods selected should be capable of measuring the specific parameter of interest, in the concentration range of interest, and with the required precision and accuracy.

19.4.1 Sources of Methods

Routine analytical services are performed using standard EPA-approved methodology. In some cases, modification of standard approved methods may be necessary to provide accurate analyses of particularly complex matrices. When the use of specific methods for sample analysis is mandated through project or regulatory requirements, only those methods shall be used.

When clients do not specify the method to be used or methods are not required, the methods used will be clearly validated and documented in an SOP and available to clients and/or the end user of the data. Refer to Appendix 6 for a list of the currently accepted U.S. EPA Analytical method references used by the laboratory.

The laboratory reviews updated versions to all the aforementioned references for adaptation based upon capabilities, instrumentation, etc., and implements them as appropriate. As such, the laboratory strives to perform only the latest versions of each approved method as regulations allow or require.

Other reference procedures for non-routine analyses may include methods established by specific states (e.g., Underground Storage Tank methods), ASTM or equipment manufacturers. Sample type, source, and the governing regulatory agency requiring the analysis will determine the method utilized.

The laboratory shall inform the client when a method proposed by the client may be inappropriate or out of date. After the client has been informed, and they wish to proceed contrary to the laboratory's recommendation, it will be documented.

19.4.1.1 Client Supplied Methods

Most of the client-supplied method requirements presented to the laboratory involve achieving specific quality control criteria, limits of quantitation (LOQ), and/or method detection limits (MDL) using standard EPA methods. These requirements are communicated to the appropriate technical groups prior to the project start up. Each technical group evaluates the scope of work and the requirements to ensure the criteria can be met using the standard EPA method. The data is monitored to ensure the criteria are met throughout the project. The PM notifies the client if there is a more appropriate method available or if the client's criteria cannot be achieved on a certain sample matrix (i.e., due to matrix or dilutions).

Occasionally, the laboratory is asked to transfer a non-standardized method from a client into the lab or to develop a new method, when one is not available. In the case of a method transfer, the laboratory will set up the client's method and perform some initial evaluation. Following the initial evaluation, the laboratory may make recommendations regarding method performance improvements. If the method appears to be adequate, we determine linearity, specificity, precision, accuracy, MDL, and LOQ by performing calibrations, analyzing method blanks, and carrying out method detection limit and IDOC studies.

In the case of method development, the laboratory works with the client and/or data user to determine the level of validation required ensuring that the method meets its intended purpose. In addition to the elements above, the laboratory may also determine standard and sample stability and robustness depending on the scope of the project. A standard operating procedure is written and submitted to the client with the results of the validation. These steps are completed prior to analysis of field samples. Data related to the setup of the method are archived.

19.4.2 Demonstration of Capability

Before the laboratory may institute a new method and begin reporting results, the laboratory shall confirm that it can properly operate the method. In general, this demonstration does not test the performance of the method in real world samples, but in an applicable and available clean matrix sample. If the method is for the testing of analytes that are not conducive to spiking, demonstration of capability may be performed on quality control samples.

A demonstration of capability (DOC, Lab SOP # WS-QA-0022) is performed whenever there is a change in instrument type (e.g., new instrumentation), matrix, method or personnel (e.g., analyst has not performed the test within the last 12 months).

Note: The laboratory shall have a DOC for all analytes included in the methods that the laboratory performs, and proficiency DOCs for each analyst shall include all analytes that the laboratory routinely performs. Addition of non-routine analytes does not require new DOCs for all analysts if those analysts are already qualified for routine analytes tested using identical chemistry and instrument conditions.

The initial demonstration of capability must be thoroughly documented and approved by the Technical Manager and QA Manager prior to independently analyzing client samples. All associated documentation must be retained in accordance with the laboratory's archiving procedures.

The laboratory must have an approved SOP, demonstrate satisfactory performance, and conduct an MDL study (when applicable). There may be other requirements as stated within the published method or regulations (e.g., retention time window study).

Note: In some instances, a situation may arise where a client requests that an unusual analyte be reported using a method where this analyte is not normally reported. If the analyte is being reported for regulatory purposes, the method must meet all procedures outlined within this QA Manual (SOP, MDL, and Demonstration of Capability). If the client states that the information is not for regulatory purposes, the result may be reported as long as the following criteria are met:

- The instrument is calibrated for the analyte to be reported using the criteria for the method and ICV/CCV criteria are met (unless an ICV/CCV is not required by the method or criteria are per project DQOs).
- The laboratory's nominal or default reporting limit (RL) is equal to the quantitation limit (QL), must be at or above the lowest non-zero standard in the calibration curve and must be reliably determined. Project RLs are client specified reporting levels which may be higher than the QL. Results reported below the QL must be qualified as estimated values. Also see Section 19.6.1.3, Relationship of Limit of Detection (LOD) to Quantitation Limit (QL).
- The client request is documented and the lab informs the client of its procedure for working with unusual compounds. The final report must be footnoted: *Reporting Limit based on the low standard of the calibration curve.*

19.4.3 Initial Demonstration of Capability (IDOC) Procedures

19.4.3.1 The spiking standard used must be prepared independently from those used in instrument calibration.

19.4.3.2 The analyte(s) shall be diluted in a volume of clean matrix sufficient to prepare four aliquots at the concentration specified by a method or the laboratory SOP. If the concentration is unspecified, the routine LCS spike level may be used.

19.4.3.3 At least four aliquots shall be prepared (including any applicable clean-up procedures) and analyzed according to the test method (either concurrently or over a period of days).

19.4.3.4 Using all of the results, calculate the mean recovery in the appropriate reporting units and the standard deviations for each parameter of interest.

19.4.3.5 When it is not possible to determine the mean and standard deviations, such as for presence, absence and logarithmic values, the laboratory will assess performance against criteria described in the Method SOP.

19.4.3.6 Compare the information obtained above to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory generated acceptance criteria (LCS or interim criteria) if there is no mandatory criteria established. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter.

19.4.3.7 When one or more of the tested parameters fail at least one of the acceptance criteria, the analyst must proceed according to either option listed below:

- Locate and correct the source of the problem and repeat the test for all parameters of interest beginning with 19.4.3.3 above.
- Beginning with 19.4.3.3 above, repeat the test for all parameters that failed to meet criteria. Repeated failure, however, will confirm a general problem with the measurement system. If this occurs, locate and correct the source of the problem and repeat the test for all compounds of interest beginning with 19.4.3.1 above.

Note: Results of successive LCS analyses can be used to fulfill the DOC requirement.

Methods on line prior to the effective date of this Section shall be updated to the procedures outlined above as new analysts perform their demonstration of capability. A copy of the new record will replace that which was used for documentation in the past. At a minimum, the precision and accuracy of four mid-level laboratory control samples must have been compared to the laboratory's quality control acceptance limits.

In accordance with Arizona Administrative Code R9-14-616.5f, documentation of each analyst's performance of proficiency testing, as applicable, will be maintained in the training record.

19.5 Laboratory Developed Methods and Non-Standard Methods

Any new method developed by the laboratory must be fully defined in an SOP and validated by qualified personnel with adequate resources to perform the method. Method specifications and the relation to client requirements must be clearly conveyed to the client if the method is a non-standard method (not a published or routinely accepted method). The client must also be in agreement to the use of the non-standard method.

19.6 Validation of Methods

Validation is the confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

All non-standard methods, laboratory designed/developed methods, standard methods used outside of their scope, and major modifications to published methods must be validated to confirm they are fit for their intended use. The validation will be as extensive as necessary to meet the needs of the given application. The results are documented with the validation procedure used and contain a statement as to the fitness for use.

19.6.1 Method Validation and Verification Activities for All New Methods

While method validation can take various courses, the following activities can be required as part of method validation. Method validation records are designated QC records and are archived accordingly.

When changes are made to any validated methods, the influence of such changes shall be documented and, if appropriate, a new validation shall be performed.

19.6.1.1 **Determination of Method Selectivity** – Method selectivity is the demonstrated ability to discriminate the analyte(s) of interest from other compounds in the specific matrix or matrices from other analytes or interference. In some cases to achieve the required selectivity for an analyte, a confirmation analysis is required as part of the method.

19.6.1.2 **Determination of Method Sensitivity** – Sensitivity can be both estimated and demonstrated. Whether a study is required to estimate sensitivity depends on the level of method development required when applying a particular measurement system to a specific set of samples. Detection limit studies are conducted as described in Section 19.7. Where other protocols for estimations and/or demonstrations of sensitivity are required by regulation or client agreement, these shall be followed.

19.6.1.3 **Relationship of Limit of Detection (LOD) to the Limit of Quantitation (LOQ)** – An important characteristic of expression of sensitivity is the distinction between the LOD and the LOQ. The LOD is the minimum level at which the presence of an analyte can be reliably concluded. The LOQ is the minimum concentration of analyte that can be quantitatively determined with acceptable precision and bias, equivalent to the laboratory's routine reporting limit (RL). For most instrumental measurement systems, there is a region where semi-quantitative data is generated around the LOD (both above and below the estimated MDL or LOD) and below the LOQ. In this region, detection of an analyte may be confirmed but quantification of the analyte is unreliable within the accuracy and precision guidelines of the measurement system. When an analyte is detected below the LOQ, and the presence of the analyte is confirmed by meeting the qualitative identification criteria for the analyte, the analyte can be reliably reported, but the amount of the analyte can only be estimated. If data is to be reported in this region, it must be done so with a qualification that denotes the semi-quantitative nature of the result.

19.6.1.4 **Determination of Interferences** – A determination that the method is free from interferences in a blank matrix is performed.

19.6.1.5 **Determination of Range** – Where appropriate to the method, the quantitation range is determined by comparison of the response of an analyte in a curve to established or targeted criteria. Generally the upper quantitation limit is defined by highest acceptable calibration concentration. The lower quantitation limit or QL cannot be lower than the lowest non-zero calibration level, and can be constrained by required levels of bias and precision.

19.6.1.6 **Determination of Accuracy and Precision** – Accuracy and precision studies are generally performed using replicate analyses, with a resulting percent recovery and measure of reproducibility (standard deviation, relative standard deviation) calculated and measured against a set of target criteria.

19.6.1.7 **Documentation of Method** – The method is formally documented in an SOP. If the method is a minor modification of a standard laboratory method that is already documented in an SOP, an SOP Attachment describing the specific differences in the new method is acceptable in place of a separate SOP.

19.6.1.8 **Continued Demonstration of Method Performance** – Continued demonstration of method performance is addressed in the SOP. Continued demonstration of method performance is generally accomplished by batch specific QC samples such as LCS, method blanks or PT samples.

19.7 Method Detection Limit (MDL) / Limits of Detection (LOD)

The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017. The MDL is equivalent to the TNI LOD or DL, and is also equivalent to the DoD/DOE Quality Systems Manual (QSM) DL. The working or final MDL is the higher of the MDL value determined from spikes (MDLs) and the MDL value determined from blanks (MDLb). An initial MDL study shall be performed during the method validation process and when the method is altered in a way that can reasonably be expected to change its sensitivity. On-going data are collected during each quarter in which samples are being analyzed. At least once every 13 months the MDLs and MDLb are re-calculated and re-evaluated using data collected during the preceding period. Details of the procedure for conducting MDL studies are given in NDSC Document No. NDSC-QA-SOP42091 and laboratory SOP WS-QA-0006.

19.8 Verification of Detection Limits

If it is found during the re-evaluation of detection limit results that more than 5% of the spiked samples do not return positive numeric results that meet all method qualitative identification criteria, then the spiking level shall be increased and the initial MDL study re-performed at the new spiking concentration. Additional requirements for DOD/DOE accredited parameters are given NDSC Document No. NDSC-QA-SOP42091 - Attachment 2.

19.9 Instrument Detection Limits (IDL)

The IDL is sometimes used to assess the reasonableness of the MDL or in some cases required by the analytical method or program requirements. IDLs are most commonly used in metals analyses but may be useful in demonstration of instrument performance in other areas.

IDLs are calculated to determine an instrument's sensitivity independent of any preparation method. IDLs are calculated either using 7 replicate spike analyses, like MDL but without sample preparation, or by the analysis of 10 instrument blanks and calculating 3 x the absolute value of the standard deviation.

19.10 Limit of Quantitation

The LOQ shall be at a concentration equivalent to the lowest calibration standard concentration, with the exception of methods using a single-point calibration, and shall be greater than the MDL. The LOQ is verified by preparing and analyzing spikes at concentrations 1-2X the selected LOQ,

employing the complete analytical process. Additional requirements for DOD/DOE accredited parameters are given in NDSC Document No. NDSC-QA-SOP42091.

When the laboratory establishes a quantitation limit, it must be initially verified by the analysis of a low level standard or QC sample at 1-2 times the reporting limit or by a DL check sample at or below the LOQ. The LOQ is verified annually thereafter. The annual requirement is waived for methods that have an annually verified MDL. The laboratory will comply with any regulatory requirements.

19.11 Retention Time Windows

Most organic analyses and some inorganic analyses use chromatography techniques for qualitative and quantitative determinations. For every chromatography analysis or as specified in the reference method, each analyte will have a specific time of elution from the column to the detector. This is known as the analyte's retention time. The variance in the expected time of elution is defined as the retention time window. As the key to analyte identification in chromatography, retention time windows must be established on every column for every analyte used for that method. These records are kept on-file and available for review. Complete details are available in the laboratory SOPs.

19.12 Evaluation of Selectivity

The laboratory evaluates selectivity by following the checks within the applicable analytical methods, which include mass spectral tuning, second column confirmation, ICP interelement interference checks, chromatography retention time windows, sample blanks, spectrochemical, atomic absorption or fluorescence profiles, co-precipitation evaluations and specific electrode response factors.

19.13 Estimation of Uncertainty of Measurement

19.13.1 Uncertainty is "a parameter associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand" (as defined by the International Vocabulary of Basic and General Terms in Metrology, ISO Geneva, 1993, ISBN 92-67-10175-1). Knowledge of the uncertainty of a measurement provides additional confidence in a result's validity. Its value accounts for all the factors which could possibly affect the result, such as adequacy of analyte definition, sampling, matrix effects and interferences, climatic conditions, variances in weights, volumes, and standards, analytical procedure, and random variation. Some national accreditation organizations require the use of an "expanded uncertainty" defined as the range within which the value of the measurand is believed to lie within at least a 95% confidence level with the coverage factor $k=2$.

19.13.2 Uncertainty is not error. Error is a single value (i.e., the difference between the true result and the measured result). On environmental samples, the true result is never known. The measurement is the sum of the unknown true value and the unknown error. Unknown error is a combination of systematic error, or bias, and random error. Bias varies predictably, constantly, and independently from the number of measurements. Random error is unpredictable, assumed to be Gaussian in distribution, and reducible by increasing the number of measurements.

19.13.3 The minimum uncertainty associated with results generated by the laboratory can be determined by using the Laboratory Control Sample (LCS) accuracy range for a given analyte. The LCS limits are used to assess the performance of the measurement system since they take into consideration all of the laboratory variables associated with a given test over time (except for variability associated with the sampling and the variability due to matrix effects). The percent

recovery of the LCS is compared either to the method-required LCS accuracy limits or to the statistical, historical, in-house LCS accuracy limits.

19.13.4 To calculate the uncertainty for the specific result reported, multiply the result by the decimal of the lower end of the LCS range percent value for the lower end of the uncertainty range, and multiply the result by the decimal of the upper end of the LCS range percent value for the upper end of the uncertainty range. These calculated values represent uncertainties at approximately the 99% confidence level with a coverage factor of $k = 3$. To include the bias when the median/mean of the recovery range is not 100%, divide the range percent values by the median/mean of the recovery range (in % as well). As an example, for a reported result of 1.0 mg/L with an LCS recovery range of 70 to 110%, the estimated uncertainty in the result would be calculated as follows:

$$\text{Lower Uncertainty} = C \times \left(\frac{\text{Lower Limit (\%)}}{\text{Mean (\%)}} \right) = 1 \times \left(\frac{70}{90} \right) = 0.78 \text{ mg/L}$$

$$\text{Upper Uncertainty} = C \times \left(\frac{\text{Upper Limit (\%)}}{\text{Mean (\%)}} \right) = 1 \times \left(\frac{110}{90} \right) = 1.22 \text{ mg/L}$$

Where C = the reported result, and the mean is the mean of the recovery range.

Thus, the uncertainty for this example after bias correction is 0.78 – 1.22 mg/L.

19.13.5 In the case where a well-recognized test method specifies limits to the values of major sources of uncertainty of measurement (e.g., 524.2, 525, etc.) and specifies the form of presentation of calculated results, no further discussion of uncertainty is required.

19.14 Sample Reanalysis Guidelines

Because there is a certain level of uncertainty with any analytical measurement, a sample re-preparation (where appropriate) and subsequent analysis (hereafter referred to as 'reanalysis') may result in either a higher or lower value from an initial sample analysis. There are also variables that may be present (e.g., sample homogeneity, analyte precipitation over time, etc.) that may affect the results of a reanalysis. Based on the above comments, the laboratory will reanalyze samples at a client's request with the following caveats. **Client specific Contractual Terms & Conditions for reanalysis protocols may supersede the following items.**

Homogenous samples: If a reanalysis agrees with the original result to within the RPD limits for MS/MSD or Duplicate analyses, or within ± 1 reporting limit for samples $\leq 5x$ the reporting limit, the original analysis will be reported. At the client's request, both results may be reported on the same report but not on two separate reports.

- If the reanalysis does not agree (as defined above) with the original result, then the laboratory will investigate the discrepancy and reanalyze the sample a third time for confirmation if sufficient sample is available.
- Any potential charges related to reanalysis are discussed in the contract terms and conditions or discussed at the time of the request. The client will typically be charged for reanalysis unless it is determined that the lab was in error.
- Due to the potential for increased variability, reanalysis may not be applicable to Non-homogenous, Encore, and Sodium Bisulfate preserved samples. See the Area Supervisor or Laboratory Director if unsure.

19.15 Control of Data

The laboratory has policies and procedures in place to ensure the authenticity, integrity, and accuracy of the analytical data generated by the laboratory.

19.15.1 Computer and Electronic Data Related Requirements

The three basic objectives of our computer security procedures and policies are shown below.

The laboratory is currently using the Eurofins LIMS system, which has been highly customized to meet the needs of the laboratory.

19.15.1.1 Maintain the Database Integrity – Assurance that data is reliable and accurate through data verification (review) procedures, password-protecting access, anti-virus protection, data change requirements, as well as an internal LIMS permissions procedure.

- LIMS Database Integrity is achieved through data input validation, internal user controls, documentation of system failures and corrective actions taken, and data change requirements.
- Spreadsheets and other software developed in-house must be verified with documentation through hand calculations prior to use. Cells containing calculations must be lock-protected and controlled.
- Instrument hardware and software adjustments are safeguarded through maintenance logs, audit trails and controlled access.

19.15.1.2 Ensure Information Availability – Protection against loss of information or service is ensured through scheduled back-ups, stable file server network architecture, secure storage of media, line filter, Uninterruptible Power Supply (UPS), and maintaining older versions of software as revisions are implemented.

19.15.1.3 Maintain Confidentiality – Ensure data confidentiality through physical access controls such as password protection or website access approval when electronically transmitting data.

19.15.2 Data Reduction

The complexity of the data reduction depends on the analytical method and the number of discrete operations involved (e.g., extractions, dilutions, instrument readings and concentrations). The analyst calculates the final results from the raw data or uses appropriate computer programs to assist in the calculation of final reportable values.

For manual data entry, e.g., Wet Chemistry, the data is reduced by the analyst and then verified by the Department Manager or alternate analyst prior to updating the data in LIMS. The spreadsheets, or any other type of applicable documents, are signed by both the analyst and alternate reviewer to confirm the accuracy of the manual entry(s).

Manual integration of peaks will be documented and reviewed and the raw data will be flagged using laboratory SOP No. WS-PQA-011, Manual Integration Documentation and Practices. Analytical results are reduced to appropriate concentration units specified by the analytical method, taking into account factors such as dilution, sample weight or volume, etc. Blank correction will be applied only when required by the method or per manufacturer's indication; otherwise, it should not be performed. Calculations are independently verified by appropriate laboratory staff. Calculations and data reduction steps for various methods are summarized in the respective analytical SOPs or program requirements.

19.15.2.1 All raw data must be retained in the worklist folder, computer file (if appropriate), and/or runlog. All criteria pertinent to the method must be recorded. The documentation is recorded at the time observations or calculations are made and must be signed or initialed/dated (month/day/year). It must be easily identifiable who performed which tasks if multiple people were involved.

19.15.2.2 In general, concentration results are reported in milligrams per liter (mg/l) or micrograms per liter ($\mu\text{g/l}$) for liquids and milligrams per kilogram (mg/kg) or micrograms per kilogram ($\mu\text{g/kg}$) for solids. For values greater than 10,000 mg/l, results can be reported in percent, i.e., 10,000 mg/l = 1%. Units are defined in each lab SOP.

19.15.2.3 In reporting, the analyst or the instrument output records the raw data result using values of known certainty plus one uncertain digit. If final calculations are performed external to LIMS, the results should be entered in LIMS with at least three significant figures. In general, results are reported to 2 significant figures on the final report.

19.15.2.4 For those methods that do not have an instrument printout or an instrumental output compatible with the LIMS, the raw results and dilution factors are entered directly into LIMS by the analyst, and the software calculates the final result for the analytical report. LIMS has a formatter for significant figure criteria for each analyte.

19.15.2.5 The laboratory strives to import data directly from instruments or calculation spreadsheets to ensure that the reported data are free from transcription and calculation errors. For those analyses with an instrumental output compatible with LIMS, the raw results and dilution factors are transferred into LIMS electronically after reviewing the quantitation report, and removing unrequested or poor spectrally-matched compounds. The analyst may print a copy of what has been entered to check for errors. This printout and the instrument's data file of calibrations, concentrations, retention times, chromatograms, and mass spectra, if applicable, are retained within Chrom or LIMS, based on the type of data.

19.15.3 Logbook / Worksheet Use Guidelines

Logbooks and worksheets are filled out 'real time' and have enough information on them to trace the events of the applicable analysis/task. (e.g. calibrations, standards, analyst, sample ID, date, time on short holding time tests, temperatures when applicable, calculations are traceable, etc.)

- Corrections are made following the procedures outlined in Section 14.
- Logbooks are controlled by the QA department. A record is maintained of all logbooks in the lab.
- Unused portions of pages must be "Z'd" out, signed and dated.
- Worksheets are created with the approval of the Technical Manager/QA Manager at the facility. The QA Department controls all worksheets following the procedures in Section 6.

19.15.4 Review / Verification Procedures

Review procedures are outlined in several laboratory SOPs (WS-PQA-003, "Quality Control Program", WS-PQA-012, "Technical Data Review Requirements", WS-PM-0001, "Final Report Assembly and Third Level Data Review") to ensure that reported data are free from calculation and transcription errors, that QC parameters have been reviewed and evaluated before data is reported. The laboratory also has an SOP discussing Manual Integrations to ensure the authenticity of the data (WS-PQA-011, "Manual Integration Documentation and Practices"). The

general review concepts are discussed below, more specific information can be found in the SOPs.

19.15.4.1 Log-In Review - The data review process starts at the sample receipt stage. Sample control personnel review chain-of-custody forms and project instructions from the project management group. This is the basis of the sample information and analytical instructions entered into the LIMS. The log-in instructions are reviewed by the personnel entering the information, and a second level review is conducted by the project management staff.

19.15.4.2 First Level Data Review - The next level of data review occurs with the analysts. As data are generated, analysts review their work to ensure that the results meet project and SOP requirements. First level reviews include inspection of all raw data (e.g., instrument output for continuous analyzers, chromatograms, spectra, and manual integrations), evaluation of calibration/calibration verification data in the day's analytical run, evaluation of QC data, and reliability of sample results. The analyst transfers data into LIMS, data qualifiers are added as needed. All first level reviews are documented.

19.15.4.3 Second Level Data Review – All analytical data are subject to review by a second qualified analyst or supervisor. Second level reviews include inspection of all raw data (e.g., instrument output, chromatograms, and spectra) including 100% of data associated with any changes made by the primary analyst, such as manual integrations or reassignment of peaks to different analytes, or elimination of false negative analytes. The second review also includes evaluation of initial calibration/calibration verification data in the day's analytical run, evaluation of QC data, reliability of sample results, qualifiers and NCM narratives. Manual calculations are checked in second level review. All second level reviews are documented.

Issues that deem further review include the following:

- QC data are outside the specified control limits for accuracy and precision
- Reviewed sample data does not match with reported results
- Unusual detection limit changes are observed
- Samples having unusually high results
- Samples exceeding a known regulatory limit
- Raw data indicating some type of contamination or poor technique
- Inconsistent peak integration
- Transcription errors
- Results outside of calibration range

19.15.4.4 Unacceptable analytical results may require reanalysis of the samples. Any problems are brought to the attention of the Laboratory Director, Project Manager, Quality Director/Manager, Technical Manager, or Supervisor for further investigation. Corrective action is initiated whenever necessary.

19.15.4.5 The results are then entered or directly transferred into the computer database and a .pdf is printed for the client.

19.15.4.6 As a final review prior to the release of the report, the Project Manager reviews the results for appropriateness and completeness. This review and approval ensures that client

requirements have been met and that the final report has been properly completed. The process includes, but is not limited to, verifying that the COC is followed, cover letters / narratives are present, flags are appropriate, and project specific requirements are met. The Project Manager may also evaluate the validity of results for different test methods given expected chemical relationships.

19.15.4.7 Any project that requires a data package is subject to a tertiary data review for transcription errors and acceptable quality control requirements. The Project Manager then signs the final report. The accounting personnel also check the report for any clerical or invoicing errors. When complete, the report is sent out to the client.

19.15.4.8 A brief overview of sample flow and information through the laboratory, as well as data review and validation, is presented in Figure 19-1.

19.15.5 Manual Integrations

Computerized data systems provide the analyst with the ability to re-integrate raw instrument data in order to optimize the interpretation of the data. Though manual integration of data is an invaluable tool for resolving variations in instrument performance and some sample matrix problems, when used improperly, this technique would make unacceptable data appear to meet quality control acceptance limits. Improper re-integrations lead to legally indefensible data, a poor reputation, or possible laboratory decertification. Because guidelines for re-integration of data are not provided in the methods and most methods were written prior to widespread implementation of computerized data systems, the laboratory trains all analytical staff on proper manual integration techniques using SOP WS-PQA-011, "Manual Integration Documentation and Practices" which is based on NDSC Document No. NDSC-QA-SOP43862, Acceptable Manual Integration Practices.

19.15.5.1 The analyst must adjust baseline or the area of a peak in some situations, for example when two compounds are not adequately resolved or when a peak shoulder needs to be separated from the peak of interest. The analyst must use professional judgment to determine when manual integrating is required. Analysts are encouraged to ask for assistance from a senior analyst or manager when in doubt.

19.15.5.2 Analysts shall not increase or decrease peak areas for the sole purpose of achieving acceptable QC recoveries that would have otherwise been unacceptable. The intentional recording or reporting of incorrect information (or the intentional omission of correct information) is against company principles and policy and is grounds for immediate termination.

19.15.5.3 Client samples, performance evaluation samples, and quality control samples are all treated equally when determining whether or not a peak area or baseline should be manually adjusted.

19.15.5.4 All manual integrations receive a second level review. Manual integrations must be indicated on an expanded scale "before" and "after" chromatograms such that the integration performed can be easily evaluated during data review. Expanded scale "before" chromatograms are also required for all manual integrations on QC parameters (calibrations, calibration verifications, laboratory control samples, internal standards, surrogates, etc.).

Figure 19-1. Example – Work Flow

Action	Personnel Involved
Bottle orders generated upon request - Bottles packed and shipped to the client under CoC	- Client Service Personnel / PM - Bottle Preparation Personnel
Samples received at laboratory - Unpacked and reconciled against client paperwork or CoC - Samples acceptance documented against completed (CoC) ¹	Sample Login Personnel
Samples are entered into LIMS - Job # assigned - Methods/Analytes linked from project - Sample labels generated - LIMS backlogs updated immediately	Sample Login Personnel
Sample Storage - Short TATs and hold-time samples are delivered directly to the laboratory for analysis - Samples stored in assigned locations (refrigerated walk-in coolers, freezers, VOA refrigerators; etc.)	Sample Login Personnel
Sample Receipt Acknowledgement sent to client (when requested)	Sample Login Personnel
Sample Acquisition/Testing - Analysts collect samples from assigned storage. - Legal CoC samples are signed in-and-out of storage - Remaining sample returned to storage.	Analysts / Login Personnel
Preparation and analysis is performed according to selected analytical method and applicable Project notes - Raw data recorded/reviewed ² - Data imported to LIMS	Analysts
LIMS performs calculations: - Data reviewed by primary/secondary analyst - Data approved as final	Data Process (LIMS / Analyst)
Generation/review/release of reports (automated through LIMS) - Electronic copy saved in LIMS	Project Management Assistants / Reporting Group
Electronic Data Deliverables (EDDs) generated (as applicable)	EDD Group
Hard copy and electronic batch raw data is archived according to data archiving procedures.	Analysts / IT

¹Refer to Sec. 23.3.

²Analyses requiring the analyst's interpretation may involve manual data reduction before entry into LIMS.

20.0 EQUIPMENT and CALIBRATIONS

20.1 Overview

The laboratory purchases the most technically advanced analytical instrumentation for sample analyses. Instrumentation is purchased on the basis of accuracy, dependability, efficiency and sensitivity. Each laboratory is furnished with all items of sampling, preparation, analytical testing and measurement equipment necessary to correctly perform the tests for which the laboratory has capabilities. Each piece of equipment is capable of achieving the required accuracy and complies with specifications relevant to the method being performed. Before being placed into use, the equipment (including sampling equipment) is calibrated and checked to establish that it meets its intended specification. The calibration routines for analytical instruments establish the range of quantitation. Calibration procedures are specified in laboratory SOPs. A list of available laboratory instrumentation is presented in Table 20-1.

Equipment is only operated by authorized and trained personnel. Manufacturer's instructions for equipment use are readily accessible to all appropriate laboratory personnel.

20.2 Preventive Maintenance

The laboratory follows a well-defined maintenance program to ensure proper equipment operation and to prevent the failure of laboratory equipment or instrumentation during use. This program of preventive maintenance helps to avoid delays due to instrument failure.

Routine preventive maintenance procedures and frequency, such as cleaning and replacements, should be performed according to the procedures outlined in the manufacturer's manual. Qualified personnel must also perform maintenance when there is evidence of degradation of peak resolution, a shift in the calibration curve, loss of sensitivity, or failure to continually meet one of the quality control criteria.

Scheduled routine maintenance is defined in each method SOP. It is the responsibility of each Technical Manager to ensure that instrument maintenance logs are kept for all equipment in his/her department. Preventative maintenance procedures are also outlined in analytical SOPs or instrument manuals. (Note: for some equipment, the log used to monitor performance is also the maintenance log. Multiple pieces of equipment may share the same log as long as it is clear as to which instrument is associated with an entry.)

Instrument maintenance logs are controlled and are used to document instrument problems, instrument repair and maintenance activities. Maintenance logs shall be kept for all major pieces of equipment. Instrument maintenance logs may also be used to specify instrument parameters.

- Documentation must include all major maintenance activities such as contracted preventive maintenance and service and in-house activities such as the replacement of electrical components, lamps, tubing, valves, columns, detectors, cleaning and adjustments.
- Each entry in the instrument log includes the analyst's initials, the date, a detailed description of the problem (or maintenance needed/scheduled), a detailed explanation of the solution or maintenance performed, and a verification that the equipment is functioning properly (state what was used to determine a return to control. e.g. CCV run on 'date' was acceptable, or instrument recalibrated on 'date' with acceptable verification, etc.) must also be documented in the instrument records.
- When maintenance or repair is performed by an outside agency, service receipts detailing the service performed can be affixed into the logbooks adjacent to pages describing the

maintenance performed. This stapled in page must be signed across the page entered and the logbook so that it is clear that a page is missing if only half a signature is found in the logbook.

If an instrument requires repair (subjected to overloading or mishandling), gives suspect results, or otherwise has shown to be defective or outside of specified limits it shall be taken out of operation and tagged as out-of-service or otherwise isolated until such a time as the repairs have been made and the instrument can be demonstrated as operational by calibration and/or verification or other test to demonstrate acceptable performance. The laboratory shall examine the effect of this defect on previous analyses.

In the event of equipment malfunction that cannot be resolved, service shall be obtained from the instrument vendor manufacturer, or qualified service technician, if such a service can be tendered. If on-site service is unavailable, arrangements shall be made to have the instrument shipped back to the manufacturer for repair. Back up instruments, which have been approved, for the analysis shall perform the analysis normally carried out by the malfunctioning instrument. If the back-up is not available and the analysis cannot be carried out within the needed timeframe, the samples shall be subcontracted.

At a minimum, if an instrument is sent out for service or transferred to another facility, it must be recalibrated and the laboratory MDL verified (using an MDLV) prior to return to lab operations.

20.3 Support Equipment

This section applies to all devices that may not be the actual test instrument, but are necessary to support laboratory operations. These include but are not limited to: balances, ovens, refrigerators, freezers, incubators, water baths, temperature measuring devices, thermal/pressure sample preparation devices and volumetric dispensing devices if quantitative results are dependent on their accuracy, as in standard preparation and dispensing or dilution into a specified volume. All raw data records associated with the support equipment are retained to document instrument performance.

20.3.1 Weights and Balances

The accuracy of the balances used in the laboratory is checked every working day, before use. All balances are placed on stable counter tops.

Each balance is checked prior to initial serviceable use with at least two certified ASTM type 1 weights spanning its range of use (weights that have been calibrated to ASTM type 1 weights may also be used for daily verification). ASTM type 1 weights used only for calibration of other weights (and no other purpose) are inspected for corrosion, damage or nicks at least annually and if no damage is observed, they are calibrated at least every 5 years by an outside calibration laboratory. Any weights (including ASTM Type 1) used for daily balance checks or other purposes are recalibrated/recertified annually to NIST standards (this may be done internally if laboratory maintains "calibration only" ASTM type 1 weights).

All balances are serviced annually by a qualified service representative, who supplies the laboratory with a certificate that identifies traceability of the calibration to the NIST standards.

All of this information is recorded in logs, and the recalibration/recertification certificates are kept on file. See SOP No. WS-QA-0041, Calibration and Calibration Check of Balances for more details.

20.3.2 pH, Conductivity, and Turbidity Meters

The pH meters used in the laboratory are accurate to ± 0.1 pH units, and have a scale readability of at least 0.05 pH units. The meters automatically compensate for the temperature, and are calibrated with at least two working range buffer solutions before each use.

Conductivity meters used in the laboratory are capable of measuring conductivity with an error not exceeding 1% or one $\mu\text{mhos/cm}$, whichever is greater. The meters are also calibrated before each use with a known standard.

Turbidity meters are also calibrated before each use. All of this information is documented in logs.

Consult pH, Conductivity, and Turbidity SOPs for further information.

20.3.3 Thermometers

All thermometers are calibrated on an annual basis with a NIST-traceable thermometer at temperatures bracketing the range of use.

- If the temperature measuring device is used over a range of 10°C or less, then a single point verification within the range of use is acceptable;
- If the temperature measuring device is used over a range of greater than 10°C , then the verification must bracket the range of use.

IR thermometers, digital probes and thermocouples are calibrated quarterly. IR Thermometers should be calibrated over the full range of use, including ambient, iced (4°C) and frozen (0 to -5°C), per the Drinking Water Manual.

The digital NIST thermometer is recalibrated every five years (unless the thermometer has been exposed to extreme temperatures) by an approved outside service and the provided certificate of traceability is kept on file. Alternately a new NIST thermometer with certificate of traceability from the manufacturer may be purchased. The NIST thermometer(s) have increments of 1 degree or smaller (0.5 degree or less increments are required for drinking water microbiological laboratories), and have ranges applicable to method and certification requirements. The NIST traceable thermometer is used for no other purpose than to calibrate other thermometers.

All of this information is documented in logbooks. Monitoring method-specific temperatures, including heating blocks, water baths, and ovens, is documented in method-specific logbooks. More information on this subject can be found in the SOP No. WS-QA-0016, "Thermometer Calibration."

20.3.4 Refrigerators/Freezer Units, Water baths, Ovens and Incubators

The temperatures of all refrigerator units and freezers used for sample storage are monitored 7 days a week; and each working day for units used for standard storage.

Ovens and water baths are monitored on days of use. Drying oven temperature must be recorded before and at the end of use. For example, an oven used for moisture determination must have its temperature recorded at the start and end of the drying process. Temperature must be $\pm 5\%$ of set temperature for DoD/DOE work.

All of this equipment has a unique identification number, and is assigned a thermometer for monitoring.

Sample storage refrigerator temperatures are kept at $> 0^{\circ}\text{C}$ and $\leq 6^{\circ}\text{C}$.

Specific temperature settings/ranges for other refrigerators, ovens, and water baths can be found in method specific SOPs.

All of this information is documented in Daily Temperature Logbooks and method-specific logbooks, and discussed in SOP No. WS-QA-0005, Refrigerator and Freezer Monitoring.

20.3.5 Autopipettors, Dilutors, and Syringes

Mechanical volumetric dispensing devices including burettes (except Class A Glassware and Glass microliter syringes) are given unique identification numbers and the delivery volumes are verified gravimetrically, at a minimum on a quarterly basis.

For those dispensers that are not used for analytical measurements, a label shall be applied to the device stating that it is not calibrated. Any device not regularly verified cannot be used for any quantitative measurements. See SOP WS-QA-0004, "Maintenance and Calibration Check of Fixed and Adjustable Volume Autopipettors, Autodispensers and Volumetric Containers".

Micro-syringes are purchased from Hamilton Company. Each syringe is traceable to NIST. The laboratory keeps on file an "Accuracy and Precision Statement of Conformance" from Hamilton attesting established accuracy.

20.4 Instrument Calibrations

Calibration of analytical instrumentation is essential to the production of quality data. Strict calibration procedures are followed for each method. These procedures are designed to determine and document the method detection limits, the working range of the analytical instrumentation and any fluctuations that may occur from day to day.

Sufficient raw data records are retained to allow an outside party to reconstruct all facets of the initial calibration. Records contain, but are not limited to, the following: calibration date, method, instrument, analyst(s) initials or signatures, analysis date, analytes, concentration, response, and type of calibration (Average RF, curve, or other calculations that may be used to reduce instrument responses to concentration.)

Sample results must be quantitated from the initial calibration and may not be quantitated from any continuing instrument calibration verification unless otherwise required by regulation, method or program.

If the initial calibration results are outside of the acceptance criteria, corrective action is performed and any affected samples are reanalyzed if possible. If the reanalysis is not possible, any data associated with an unacceptable initial calibration will be reported with appropriate data qualifiers (refer to Section 14).

Note: Instruments are calibrated initially and as needed after that and at least annually (the annual requirement does not apply to Isotope Dilution Methods).

20.4.1 Calibration Standards

Calibration standards are prepared using the procedures indicated in the Reagents and Standards section of the determinative method SOP. If a reference method does not specify the number of calibration standards, a minimum of 3 calibration points will be used.

Standards for instrument calibration are obtained from a variety of sources. All standards are traceable to national or international standards of measurement, or to national or international standard reference materials.

The lowest concentration calibration standard that is analyzed during an initial calibration must be at or below the stated reporting limit for the method based on the final volume of extract (or sample).

The other concentrations define the working range of the instrument/method or correspond to the expected range of concentrations found in actual samples that are also within the working range of the instrument/method. Results of samples not bracketed by initial instrument calibration standards (within calibration range to at least the same number of significant figures used to report the data) must be reported as having less certainty, e.g., defined qualifiers or flags (additional information may be included in the case narrative). The exceptions to these rules are the ICP and ICPMS methods which define the working range with periodic linear dynamic range studies, rather than through the range of concentrations of daily calibration standards.

All initial calibrations are verified with a standard obtained from a second source and traceable to a national standard, when available (or vendor certified different lot if a second source is not available). For unique situations, such as PFAS analysis where no other source or lot is available, a standard made by a different analyst at a different time or a different preparation would be considered a second source. This verification occurs immediately after the calibration curve has been analyzed, and before the analysis of any samples.

20.4.1.1 Calibration Verification

The calibration relationship established during the initial calibration must be verified initially and at least daily as specified in the laboratory method SOPs in accordance with the referenced analytical methods and in the 2009 and 2016 TNI Standard. The process of calibration verification applies to both external standard and internal standard calibration techniques, as well as to linear and non-linear calibration models. Initial calibration verification (ICV) is with a standard source secondary (second source standard) to the calibration standards, but continuing calibration verifications (CCV) may use the same source standards as the calibration curve.

Note: The process of calibration verification referred to here is fundamentally different from the approach called "calibration" in some methods. As described in those methods, the calibration factors or response factors calculated during calibration are used to update the calibration factors or response factors used for sample quantitation. This approach, while employed in other EPA programs, amounts to a daily single-point calibration.

All target analytes and surrogates, including those reported as non-detects, must be included in periodic calibration verifications for purposes of retention time confirmation and to demonstrate that calibration verification criteria are being met, i.e., RPD, per 2009 and 2016 TNI Std. EL-V1M4 Sec. 1.7.2.

All samples must be bracketed by periodic analyses of standards that meet the QC acceptance criteria (e.g., calibration and retention time). The frequency is found in the determinative methods or SOPs.

Note: If an internal standard calibration is being used then bracketing standards may not be required, only daily verifications are needed. (Exception: Some QC programs, such as the DoD/DOE QSM Version 5.4, require bracketing standards with internal standard calibration). The results from these verification standards must meet the calibration verification criteria and the retention time criteria (if applicable).

Generally, the calibrations must be verified by an ICV analyzed immediately following initial calibration and before sample analysis. The ICV may be used as the first bracketing CCV, if criteria for both are met.

A continuing instrument calibration verification (CCV) is generally analyzed at the beginning of each 12-hour analytical shift during which samples are analyzed. The 12-hour analytical shift begins with the injection of the calibration verification standard (or the MS tuning standard in MS methods). The shift ends after the completion of the analysis of the last sample, QC, or standard that can be injected within 12-hours of the beginning of the shift. For methods that have quantitation by external calibration models, a CCV is analyzed at the end of each analytical sequence. Some methods have more frequent CCV requirements. See specific SOPs. Most inorganic methods require the CCV to be analyzed after every 10 samples or injections, including matrix or batch QC samples.

Note: If an internal standard calibration is being used (e.g., GCMS) then bracketing standards are not required, only daily verifications are needed, except as specified by program or method requirements.

If the results of a CCV are outside the established acceptance criteria and analysis of a second consecutive (and immediate) CCV fails to produce results within acceptance criteria, corrective action shall be performed. Once corrective actions have been completed and documented, the laboratory shall demonstrate acceptable instrument / method performance by analyzing two consecutive CCVs, or a new initial instrument calibration shall be performed.

Sample analyses and reporting of data may not occur or continue until the analytical system is calibrated or calibration verified. However, data associated with an unacceptable calibration verification may be fully useable reported based upon discussion and approval of the client under the following special conditions:

a) when the acceptance criteria for the CCV are exceeded high (i.e., high bias) and the associated samples within the batch are non-detects, then those non-detects may be reported case narrative comment explaining the high bias. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted; or

b) when the acceptance criteria for the CCV are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted.

Samples reported by the 2 conditions identified above will be appropriately flagged.

20.4.1.2 Verification of Linear and Non-Linear Calibrations

Calibration verification for calibrations involves the calculation of the percent drift or the percent difference of the instrument response between the initial calibration and each subsequent analysis of the verification standard. (These calculations are available in the laboratory method SOPs.) Verification standards are evaluated based on the % Difference from the average CF or RF of the initial calibration or based on % Drift or % Recovery if a linear or quadratic curve is used.

Regardless of whether a linear or non-linear calibration model is used, if initial verification criterion is not met, then no sample analyses may take place until the calibration has been verified or a new initial calibration is performed that meets the specifications listed in the method SOPs. If the calibration cannot be verified after the analysis of a single verification standard, then adjust the instrument operating conditions and/or perform instrument maintenance, and analyze another aliquot of the verification standard. If the calibration cannot be verified with the second standard, then a new initial calibration is performed.

- When the acceptance criteria for the calibration verification are exceeded high, i.e., high bias, and there are associated samples that are non-detects, then those non-detects may be reported. Otherwise, the samples affected by the unacceptable calibration verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted.
- When the acceptance criteria for the calibration verification are exceeded low, i.e., low bias, those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise, the samples affected by the unacceptable verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted. Alternatively, a reporting limit standard may be analyzed to demonstrate that the laboratory can still support non-detects at their reporting limit.

20.5 Tentatively Identified Compounds (TICs) – GC/MS Analysis

For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. The necessity to perform this type of identification will be determined by the purpose of the analyses being conducted. Data system library search routines should not use normalization routines that would misrepresent the library or unknown spectra when compared to each other.

Note: If the TIC compound is not part of the client target analyte list but is calibrated by the laboratory and is both qualitatively and/or quantitatively identifiable, it should not be reported as a TIC. If the compound is reported on the same form as true TICs, it should be qualified and/or narrated that the reported compound is qualitatively and quantitatively (if verification in control) reported compared to a known standard that is in control (where applicable).

20.6 GC/MS Tuning

Prior to any GC/MS analytical sequence, including calibration, the instrument parameters for the tune and subsequent sample analyses within that sequence must be set.

Prior to tuning/auto-tuning the mass spectrometer, the parameters may be adjusted within the specifications set by the manufacturer or the analytical method. These generally do not need any adjustment but it may be required based on the current instrument performance. If the tune verification does not pass it may be necessary to clean the source or perform additional maintenance. Any maintenance is documented in the maintenance log.

Table 20-1. Instrumentation List

Instrument Type	Number in Use
Autoanalyzer	1
Autotitrator	1
Conductivity Meter	1
Cold-Vapor Analyzers	2
Combustion Ion Chromatograph	1
Dissolved Oxygen Meter	1
GC/HRMS	6
GC/MS - Semivolatiles	7
GC/MS - Volatiles	8
GC/MS/MS	1
GC-ECD/ECD	6
GC-FID/FID	3
HPLC/MS/MS	16
ICP	2
ICP/MS	1
Ion Chromatograph	5
Raman Spectrometer	1
UV/Vis Spectrometer	1
Turbidimeter	1
ddPCR	2

21.0 MEASUREMENT TRACEABILITY

21.1 Overview

Traceability of measurements shall be assured using a system of documentation, calibration, and analysis of reference standards. Laboratory equipment that are peripheral to analysis and whose calibration is not necessarily documented in a test method analysis or by analysis of a reference standard shall be subject to ongoing certifications of accuracy. At a minimum, these must include procedures for checking specifications of ancillary equipment: balances, thermometers, temperature, Deionized (DI) and Reverse Osmosis (RO) water systems, automatic pipettes and other volumetric measuring devices. (Refer to Section 20.3). With the exception of Class A Glassware and glass microliter syringes, quarterly accuracy checks are performed for all mechanical volumetric devices. Wherever possible, subsidiary or peripheral equipment is checked against standard equipment or standards that are traceable to national or international standards. Class A Glassware and glass microliter syringes should be routinely inspected for chips, acid etching or deformity (e.g., bent needle). If the Class A glassware or syringe is suspect, the accuracy of the glassware will be assessed prior to use.

21.2 NIST-Traceable Weights and Thermometers

Reference standards of measurement shall be used for calibration only and for no other purpose, unless it can be shown that their performance as reference standards would not be invalidated.

For NIST-traceable weights and thermometers, the laboratory requires that all calibrations be conducted by a calibration laboratory accredited by A2LA, ANAB, NVLAP (National Voluntary Laboratory Accreditation Program) or another accreditation organization that is a signatory to a MRA (Mutual Recognition Arrangement) of one or more of the following cooperations – ILAC (International Laboratory Accreditation Cooperation) or APLC (Asia-Pacific Laboratory Accreditation Cooperation). A calibration certificate and scope of accreditation is kept on file at the laboratory.

21.3 Reference Standards / Materials

Reference standards/materials, where commercially available, are traceable to certified reference materials. Commercially prepared reference standards are purchased from vendors that are accredited to ISO/IEC Standard 17034 and ISO/IEC Guide 17025. All reference standards from commercial vendors shall be accompanied with a certificate that includes at least the following information:

- Manufacturer
- Analytes or parameters calibrated
- Identification or lot number
- Calibration method
- Concentration with associated uncertainties
- Purity

If a standard cannot be purchased from a vendor that supplies a Certificate of Analysis, the purity of the standard is documented by analysis. The receipt of all reference standards must be documented. Reference standards are labeled with a unique Standard Identification Number and expiration date. All documentation received with the reference standard is retained as a QC record and references the Standard Identification Number.

All reference, primary and working standards/materials, whether commercially purchased or laboratory prepared, must be checked regularly to ensure that the variability of the standard or

material from the true value does not exceed method requirements. The accuracy of calibration standards is checked by comparison with a standard from a second source. In cases where a second standard manufacturer is not available, a vendor certified different lot is acceptable for use as a second source. For unique situations, such as PFAS analysis where no other source or lot is available, a standard made by a different analyst would be considered a second source. The appropriate Quality Control (QC) criteria for specific standards are defined in laboratory SOPs. In most cases, the analysis of an Initial Calibration Verification (ICV) or LCS (where there is no sample preparation) is used as the second source confirmation. These checks are generally performed as an integral part of the analysis method (e.g. calibration checks, laboratory control samples).

All standards and materials must be stored and handled according to method or manufacturer's requirements in order to prevent contamination or deterioration. Refer to the Environmental Health & Safety Manual or laboratory SOPs. For safety requirements, please refer to method SOPs and the laboratory's Environmental Health and Safety Manual.

Standards and reference materials shall not be used after their expiration dates unless their reliability is verified by the laboratory and their use is approved by the Quality Assurance Manager. The laboratory must have documented contingency procedures for re-verifying expired standards.

21.4 Documentation and Labeling of Standards, Reagents, and Reference Materials

Reagents must be at a minimum the purity required in the test method. The date of reagent receipt and the expiration date are documented. The lots for most of the common solvents and acids are tested for acceptability prior to company-wide purchase. Refer to NDSC Document No. NDSC-QA-SOP46704, Acid and Solvent Testing and Approval Program.

All manufacturer or vendor supplied Certificate of Analysis or Purity must be retained, stored appropriately, and readily available for use and inspection. These records are scanned and maintained on the local server, and attached to the reagent preparation record in the LIMS. Records must be kept of the date of receipt and date of expiration of standards, reagents and reference materials. In addition, records of preparation of laboratory standards, reagents, and reference materials must be retained, stored appropriately, and be readily available for use and inspection. For detailed information on documentation and labeling, please refer to method specific SOPs and SOP No. WS-QA-0017, Standards and Reagents and Quality Control Check Procedures.

Commercial materials purchased for preparation of calibration solutions, spike solutions, etc., are usually accompanied with an assay certificate or the purity is noted on the label. If the assay purity is 96% or better, the weight provided by the vendor may be used without correction. If the assay purity is less than 96% a correction will be made to concentrations applied to solutions prepared from the stock commercial material (for 1613B dioxin/furan analyses the purity must be 98% or corrections must be made).

21.4.1 All standards, reagents, and reference materials must be labeled in an unambiguous manner. Standards are logged into the laboratory's LIMS, and are assigned a unique identification number. The following information is typically recorded in the electronic database within the LIMS.

- Standard ID
- Description of Standard
- Department

- Preparer's name
- Final volume and number of vials prepared
- Solvent type and lot number
- Preparation Date
- Expiration Date
- Standard source type (stock or daughter)
- Standard type (spike, surrogate, other)
- Parent standard ID (if applicable)
- Parent Standard Analyte Concentration (if applicable)
- Parent Standard Amount used (if applicable)
- Component Analytes
- Final concentration of each analyte
- Comment box (text field)

Records are maintained electronically for standard and reference material preparation. These records show the traceability to purchased stocks or neat compounds. These records also include method of preparation, date of preparation, expiration date and preparer's name or initials. Preparation procedures are provided in the Method SOPs.

21.4.2 All standards, reagents, and reference materials must be clearly labeled with a minimum of the following information:

- Expiration Date (include prep date for reagents)
- Standard ID (from LIMS or the preparation logbook)
- Special Health/Safety warnings if applicable

Records must also be maintained of the date of receipt for commercially purchased items or date of preparation for laboratory prepared items. Special Health/Safety warnings must also be available to the analyst. This information is maintained in the SDS section of EET-Net.

21.4.3 In addition, the following information may be helpful:

- Date opened (for multi-use containers, if applicable)
- Description of standard (if different from manufacturer's label or if standard was prepared in the laboratory)
- Recommended Storage Conditions
- Concentration (if applicable)
- Initials of analyst preparing standard or opening container

All containers of prepared reagents must include an expiration date and an ID number to trace back to preparation.

Procedures for preparation of reagents can be found in the Method SOPs.

Standard ID numbers must be traceable through associated logbooks, worksheets and preparation/analytical batch records.

All reagents and standards must be stored in accordance to the following priority: 1) with the manufacturer's recommendations; 2) with requirements in the specific analytical methods as specified in the laboratory SOP.

22.0 SAMPLING

22.1 Overview

The laboratory does not provide sampling services. The laboratory's responsibility in the sample collection process lies in supplying the sampler with the necessary coolers, reagent water, sample containers, preservatives, sample labels, custody seals, COC forms, ice, and packing materials required to properly preserve, pack, and ship samples to the laboratory.

22.2 Sampling Containers

The laboratory offers clean sampling containers for use by clients. These containers are obtained from reputable container manufacturers and meet EPA specifications as required. Certificates of cleanliness for bottles and preservatives are provided by the supplier and are maintained at the laboratory. Alternatively, the certificates may be maintained by the supplier and available to the laboratory on-line.

22.2.1 Preservatives

Upon request, preservatives are provided to the client in pre-cleaned sampling containers. In some cases containers may be purchased pre-preserved from the container supplier. Whether prepared by the laboratory or bought pre-preserved, the grades of the preservatives are at a minimum:

- Hydrochloric Acid – Reagent ACS (Certified VOA Free) or equivalent
- Methanol – Purge and Trap grade
- Nitric Acid – Instra-Analyzed or equivalent
- Sodium Bisulfate – ACS Grade or equivalent
- Sodium Hydroxide – Instra-Analyzed or equivalent
- Sulfuric Acid – Instra-Analyzed or equivalent
- Sodium Thiosulfate – ACS Grade or equivalent
- Ammonium Acetate – Fisher Optima LCMS grade or equivalent
- Trizma – Biotechnology performance certified or equivalent

22.3 Definition of Holding Time

The date and time of sampling documented on the COC form establishes the day and time zero. As a general rule, when the maximum allowable holding time is expressed in days (e.g., 14 days, 28 days), the holding time is based on calendar day measured. Holding times expressed in hours (e.g., 6 hours, 24 hours, etc.) are measured from date and time zero. Holding times for analysis include any necessary reanalysis. However, there are some programs that determine holding time compliance based on the date and specific time of analysis compared to the time of sampling regardless of how long the holding time is.

22.4 Sampling Containers, Preservation Requirements, Holding Times

The preservation and holding time criteria specified in the laboratory SOPs are derived from the source documents for the methods. If method required holding times or preservation requirements are not met, the reports will be qualified using a flag, footnote or case narrative. As soon as

possible or “ASAP” is an EPA designation for tests for which rapid analysis is advised, but for which neither EPA nor the laboratory have a basis for a holding time.

22.5 Sample Aliquots / Subsampling

Taking a representative sub-sample from a container is necessary to ensure that the analytical results are representative of the sample collected in the field. The size of the sample container, the quantity of sample fitted within the container, and the homogeneity of the sample need consideration when sub-sampling for sample preparation. It is the laboratory's responsibility to take a representative subsample or aliquot of the sample provided for analysis.

Analysts should handle each sample as if it is potentially dangerous. At a minimum, safety glasses, gloves, and lab coats must be worn when preparing aliquots for analysis.

Guidelines on taking sample aliquots & subsampling are located SOP Nos. WS-QA-0018, Subsampling and Compositing of Samples (Method ASTM D 6323-98) and WS-QA-0028, Incremental Sampling Methodology of Soils and Sediments.

23.0 HANDLING OF SAMPLES

It is the responsibility of the client to send us representative and/or homogeneous and properly preserved samples of the system from which they are drawn. The laboratory assumes that all multiple sample containers with the same designator/description and bottle type contain a homogeneous, representative sample.

The laboratory provides the appropriate sample containers, required preservative, chain-of-custody (COC) forms, shipping containers, labels, and custody seals. The laboratory also provides trip blanks and analyte-free water for field blanks. Preparation of methanol containers for field preservation of volatile soil samples is available.

Sample management procedures at the laboratory ensure that sample integrity and custody are maintained and documented from sampling/receipt through disposal.

23.1 Chain of Custody (COC)

The COC form is the written documented history of any sample and is initiated when bottles are sent to the field, or at the time of sampling. This form is completed by the sampling personnel and accompanies the samples to the laboratory where it is received and stored under the laboratory's custody. The purpose of the COC form is to provide a legal written record of the handling of samples from the time of collection until they are received at the laboratory. It also serves as the primary written request for analyses from the client to the laboratory. The COC form acts as a purchase order for analytical services when no other contractual agreement is in effect.

23.1.1 Field Documentation

The information the sampler needs to provide at the time of sampling on the container label is:

- Sample identification
- Date and time
- Preservative

During the sampling process, the COC form is completed and must be legible. This form includes information such as:

- Client name, address, phone number and fax number (if available)
- Project name and/or number
- The sample identification
- Date, time and location of sampling
- Sample collectors name
- The matrix description
- The container description
- The total number of each type of container
- Preservatives used
- Analysis requested
- Requested turnaround time (TAT)

- Any special instructions
- Purchase Order number or billing information (e.g. quote number) if available
- The date and time that each person received or relinquished the sample(s), including their signed name.

When the sampling personnel deliver the samples directly to the laboratory personnel, the samples are stored in a cooler with ice, as applicable, and remain solely in the possession of the client's field technician until the samples are delivered to the laboratory personnel. The sample collector must assure that each container is in his/her physical possession or in his/her view at all times, or stored in such a place and manner to preclude tampering. The field technician relinquishes the samples in writing on the COC form to the sample control personnel at the laboratory or to a laboratory courier. When sampling personnel deliver the samples through a common carrier (Fed-Ex, UPS), the CoC relinquished date/time is completed by the field personnel and samples are released to the carrier. Samples are only considered to be received by the laboratory when personnel at the fixed laboratory facility have physical contact with the samples.

Note: Independent couriers are not required to sign the COC form. The COC is usually kept in the sealed sample cooler. The receipt from the courier is stored in log-in by date; it lists all receipts each date.

23.1.2 Legal / Evidentiary Chain-of-Custody

If samples are identified for legal/evidentiary purposes on the COC, login will retain the custody seal and shipping record with the COC, and initiate an internal COC for use by analysts and a sample disposal record.

23.2 Sample Receipt

Samples are received at the laboratory by designated sample receiving personnel and a unique laboratory project identification number is assigned. Each sample container shall be assigned a unique sample identification number that is cross-referenced to the client identification number such that traceability of test samples is unambiguous and documented. Each sample container is affixed with a durable sample identification label. Sample acceptance, receipt, tracking and storage procedures are detailed in the laboratory's SOP No. WS-QA-0003, "Sample Receipt and Procedures" summarized in the following sections.

23.2.1 Laboratory Receipt

When samples arrive at the laboratory, sample receiving personnel inspect the coolers and samples. The integrity of each sample must be determined by comparing sample labels or tags with the COC and by visual checks of the container for possible damage. Any non-conformance, irregularity, or compromised sample receipt must be documented on the lot receipt checklist and within the non-conformance program and brought to the immediate attention of the client. The COC, shipping documents, documentation of any non-conformance, irregularity, or compromised sample receipt, record of client contact, and resulting instructions become part of the project record. Laboratory receipt procedures are described in more detail in SOP No. WS-QA-0003.

Unique Sample Identification -

All samples that are processed through the laboratory receive a unique sample identification to ensure that there can be no confusion regarding the identity of such samples at any time. This system includes identification for all samples, subsamples and subsequent extracts and/or digestates.

The laboratory assigns a unique identification (e.g., Sample ID) code to each sample container received at the laboratory. This Primary ID is made up of the following information (consisting of 4 components):



The above example states the Eurofins Sacramento Location ID (Location 320), the Login ID (9608) which is unique to a particular client/job occurrence, the container code (A) indicating the first container and Sample Number (1).

If the primary container goes through a prep step that creates a “new” container, then the new container is considered secondary and gets another ID. An example of this being a client sample in a 1-Liter amber bottle is sent through a Liquid/Liquid Extraction and an extraction vial is created from this step. The vial would be a SECONDARY container. The secondary ID has 5 components.

Example: 320 - 9608 - A - 1 - **A** **Secondary Container Occurrence**

Example: 320-9608-A-1-A, would indicate the PRIMARY container listed above that went through a step that created the 1st occurrence of a Secondary container.

With this system, a client sample can literally be tracked throughout the laboratory in every step from receipt to disposal.

23.3 Sample Acceptance Policy

The laboratory has a written sample acceptance policy (Figure 23-1) that clearly outlines the circumstances under which samples shall be accepted or rejected. These include:

- a COC filled out completely;
- samples must be properly labeled;
- proper sample containers with adequate volume for the analysis (Sampling Guide) and necessary QC;
- samples must be preserved according to the requirements of the requested analytical method (Sampling Guide);
- sample holding times must be adhered to (Sampling Guide);
- the project manager will be notified if any sample is received in damaged condition.

Data from samples which do not meet these criteria are flagged and the nature of the variation from policy is defined.

23.1.1 After inspecting the samples, the sample receiving personnel sign and date the COC form, make any necessary notes of the samples' conditions and store them in appropriate refrigerators or storage locations.

23.1.2 Any deviations from these checks that question the suitability of the sample for analysis, or incomplete documentation as to the tests required will be resolved by consultation with the client. If the sample acceptance policy criteria are not met, the laboratory shall either:

- Retain all correspondence and/or records of communications with the client regarding the disposition of rejected samples, or
- Fully document any decision to proceed with sample analysis that does not meet sample acceptance criteria.

Note: North Carolina requires that they be notified when samples are processed that do not meet sample acceptance criteria.

Once sample acceptance is verified, the samples are logged into the LIMS according SOP No. WS-QA-0003.

23.4 Sample Storage

In order to avoid deterioration, contamination or damage to a sample during storage and handling, from the time of receipt until all analyses are complete, samples are stored in refrigerators, freezers or protected locations suitable for the sample matrix. In addition, samples to be analyzed for volatile organic parameters are stored in separate refrigerators designated for volatile organic parameters only. Samples are never to be stored with reagents, standards or materials that may create contamination.

To ensure the integrity of the samples during storage, refrigerator blanks are maintained in the volatile sample refrigerators and analyzed every two weeks.

Analysts and technicians retrieve the sample container allocated to their analysis from the designated refrigerator and place them on carts, analyze the sample, and return the remaining sample to the refrigerator from which it originally came. All unused portions of samples are returned to the secure sample control area. Empty sample containers are marked as Destroyed in the TALS sample check-in/check-out module and are disposed by the analytical staff. All samples are kept in the refrigerators for 30 days past invoicing, unless other arrangements have been made with the client.

Access to the laboratory is controlled such that sample storage need not be locked at all times unless a project specifically demands it. Samples are accessible to laboratory personnel only. Visitors to the laboratory are prohibited from entering the refrigerator and laboratory areas unless accompanied by an employee of Eurofins Sacramento.

23.5 Hazardous Samples and Foreign Soils

To minimize risk, all soil samples are considered to be from USDA quarantine areas, and materials used to process them are therefore treated in accordance with the laboratory's USDA Soil Permit Compliance agreement. This includes disposing of soil samples by sending them for incineration by a USDA-approved waste disposal facility.

23.6 Sample Shipping

In the event that the laboratory needs to ship samples, the samples are placed in a cooler with enough ice to ensure the samples remain just above freezing and at or below 6.0°C during transit. The samples are carefully surrounded by packing material to avoid breakage (yet maintain appropriate temperature). A trip blank is enclosed for those samples requiring water/solid volatile organic analyses (see Note). The chain-of-custody form is signed by the sample control technician and attached to the shipping paperwork. Samples are generally shipped overnight express or hand-delivered by a Eurofins courier to maintain sample integrity. All personnel

involved with shipping and receiving samples must be trained to maintain the proper chain-of-custody documentation and to keep the samples intact and on ice. The Environmental, Health and Safety Manual contains additional shipping requirements.

Note: If a client does not request trip blank analysis on the COC or other paperwork, the laboratory will not analyze the trip blanks that were supplied. However, in the interest of good client service, the laboratory will advise the client at the time of sample receipt that it was noted that they did not request analysis of the trip blank; and that the laboratory is providing the notification to verify that they are not inadvertently omitting a key part of regulatory compliance testing.

23.7 Sample Disposal

Samples should be retained for a minimum of 30 days after the project report is sent, however, provisions may be made for earlier disposal of samples once the holding time is exceeded. An exception is samples contained in laboratory-owned air sample canisters. These are held for a minimum of 24 hours after the project report is sent, prior to evacuating the canister and returning it to the equipment pool. Some samples are required to be held for longer periods based on regulatory or client requirements (e.g., 60 days after project report is sent). The laboratory must follow the longer sample retention requirements where required by regulation or client agreement. Several possibilities for sample disposal exist: the sample may be consumed completely during analysis, the sample may be returned to the customer or location of sampling for disposal, or the sample may be disposed of in accordance with the laboratory's waste disposal procedures (SOP: WS-EHS-001, "Waste Disposal"). All procedures in the laboratory's Environmental, Health and Safety Manual are followed during disposal. Samples are normally maintained in the laboratory no longer than two months from receipt unless otherwise requested. Unused portions of samples found or suspected to be hazardous according to state or federal guidelines may be returned to the client upon completion of the analytical work.

If a sample is part of a known litigation, the affected legal authority, sample data user, and/or submitter of the sample must participate in the decision about the sample's disposal. All documentation and correspondence concerning the disposal decision process must be kept on file. Pertinent information includes the date of disposal, nature of disposal (such as sample depletion, hazardous waste facility disposal, and return to client), names of individuals who conducted the arrangements and physically completed the task. The laboratory will remove or deface sample labels prior to disposal unless this is accomplished through the disposal method (e.g., samples are incinerated). A Waste Disposal Record should be completed.

Figure 23-1.Example: Sample Acceptance Policy



Environment Testing
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SACRAMENTO
LABORATORY
SAMPLE ACCEPTANCE
POLICY
(Effective 02/01/2022)

The TNI Standard and Eurofins Sacramento have specific requirements under which all samples will be received by the laboratory for analysis. Eurofins Sacramento will review your sample shipment against those requirements as listed below, and will communicate any discrepancies to you. Your project manager will assist you in the appropriate resolution of any issues related to sample receipt. Please contact your project manager with any questions.

VOA vials should be stored in controlled conditions. Exposure of trip blanks to temperature fluctuations is likely to cause development of bubbles in the trip blanks.

When completing the chain of custody form, please note that you must sign your name in the "relinquished by" box.

Requirements are as follows:

- Proper, full and complete documentation, which includes sample identification, the location, date and time of collection, the collector's name, the preservation type, the sample matrix type, the requested testing method, and any special remarks concerning the samples, shall be provided.
- Samples must be accompanied by written disclosure of the known or suspected presence of any hazardous substances, as defined by applicable federal or state law.
- Per State and/or Federal Regulation, the client is responsible to ensure that samples are shipped in accordance with DOT/IATA requirements, and that radioactive materials may only be delivered to licensed facilities. Any samples containing (or suspected to contain) Source, Byproduct, or Special Nuclear Material as defined by 10 CFR should be delivered directly to facilities licensed to handle such radioactive material. Natural material or ores containing naturally occurring radionuclides may be delivered to any Eurofins facility or courier as long as the activity concentration of the material does not exceed 270 pCi/g alpha or 2700 pCi/g beta (49 CFR Part 173).
- Each sample shall be collected in the appropriate sample container and labeled with unique, durable and indelible identification.
- Drinking water samples for Method 1813B that may have residual chlorine must be checked and treated in the field, or collected in sodium thiosulfate preserved containers.
- Containers of water meant for perchlorate analysis should have adequate headspace to prevent anaerobic microbial degradation. A void approximately 1/3 of the container volume is sufficient.
- The samples shall arrive at the laboratory with adequate remaining holding time for the analyses requested.
- Sufficient sample volume must be available to perform the requested analyses.
- Received samples must not exhibit obvious signs of damage, contamination or inadequate preservation.
- Most analytical methods require chilling samples to 4° C (other than water samples for metals analysis). For these methods, the criteria are met if the samples are chilled to below 6° C and above freezing (0°C). For methods with other temperature criteria (e.g. some bacteriological methods require ≤ 10°C), the samples must arrive within ± 2°C of the required temperature or within the method specified range.
 1. Samples that are delivered to the laboratory on the same day they are collected may not meet the requirements above. In these cases, the samples shall be considered acceptable if the samples were received on ice.
 2. If sample analysis is begun within fifteen (15) minutes of collection, thermal preservation is not required.
 3. Thermal preservation is not required in the field if the laboratory receives and refrigerates the sample within fifteen (15) minutes of collection.

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Environment Testing
America

SACRAMENTO
LABORATORY
SAMPLE ACCEPTANCE
POLICY
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CONTINUED

- Chemical preservation (pH) will be verified prior to analysis and documented, either in sample control or at the analyst level. The project manager will be notified immediately if there is a discrepancy. If analysis will still be performed, all affected results will be flagged to indicate improper preservation.
- For samples undergoing chemical warfare degradate analysis, the sample must be screened for agent prior to shipment in accordance with Appendix 6 of our Sample Receipt Procedure (WS-QA-0003).
- Samples containing mammalian tissue will not be accepted without prior coordination with a project manager. Additional conditions for receipt and handling of tissue are outlined in Appendix 7 of our Sample Receipt Procedure (WS-QA-0003).
- The client must inform the laboratory if the samples are suspected to contain high levels of target analytes (>1 ppm levels for organics; >1ppb levels for dioxins, PCB congeners and PFAS). Unannounced samples grossly contaminated with dioxins, PCB congeners or PFAS (>1ppb) can have a severe impact on the laboratory's glassware and instrumentation. It is important our clients share in this risk and be held financially accountable for destroyed glassware that cannot be cleaned to trace level requirements.
- For AFFF samples, due to the potential for high concentrations of PFASs, it is critical that the associated chain of custody and sample containers clearly state that they are AFFF related samples.

The laboratory will notify the client/Project Manager upon sample receipt if the samples fail to meet any of the above requirements.

24.0 ASSURING THE QUALITY OF TEST RESULTS

24.1 Overview

In order to assure our clients of the validity of their data, the laboratory continuously evaluates the quality of the analytical process. The analytical process is controlled not only by instrument calibration as discussed in Section 20, but also by routine process quality control measurements (e.g. Blanks, Laboratory Control Samples (LCS), Matrix Spikes (MS), duplicates (DUP), surrogates, Internal Standards (IS)). These quality control checks are performed as required by the method or regulations to assess precision and accuracy. Quality control samples are to be treated in the exact same manner as the associated field samples being tested. In addition to the routine process quality control samples, Proficiency Testing (PT) Samples (concentrations unknown to laboratory) are analyzed to help ensure laboratory performance.

24.2 Controls

Sample preparation or pre-treatment is commonly required before analysis. Typical preparation steps include homogenization, grinding, solvent extraction, sonication, acid digestion, reflux, evaporation, and drying. During these pre-treatment steps, samples are arranged into discrete manageable groups referred to as preparation (prep) batches. Prep batches provide a means to control variability in sample treatment. Control samples are added to each prep batch to monitor method performance and are processed through the entire analytical procedure with investigative/field samples.

24.3 Negative Controls

Table 24-1. Example – Negative Controls

Control Type	Details
Method Blanks (MB)	are used to assess preparation and analysis for possible contamination during the preparation and processing steps. The specific frequency of use for method blanks during the analytical sequence is defined in the specific standard operating procedure for each analysis. Generally it is 1 for each batch of samples; not to exceed 20 environmental samples. The method blank is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (e.g., Reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The method blank goes through all of the steps of the process (including as necessary: filtration, clean-ups, etc.). Reanalyze or qualify associated sample results when the concentration of a targeted analyte in the blank is at or above the reporting limit as established by the method or by regulation, AND is greater than 1/10 of the amount measured in the sample.
Calibration Blanks	are prepared and analyzed along with calibration standards where applicable. They are prepared using the same reagents that are used to prepare the standards. In some analyses the calibration blank may be included in the calibration curve.
Instrument Blanks	are blank reagents or reagent water that may be processed during an analytical sequence in order to assess contamination in the analytical system. In general, instrument blanks are used to differentiate between contamination caused by the analytical system and that caused by the sample handling or sample prep process. Instrument blanks may also be inserted throughout the analytical sequence to minimize the effect of carryover from samples with high analyte content.

Table 24-1. Example – Negative Controls

Control Type	Details
Trip Blank ¹	are required to be submitted by the client with each shipment of samples requiring aqueous and solid volatiles analyses (or as specified in the client's project plan). A trip blank may be purchased (certified clean) or is prepared by the laboratory by filling a clean container with pure deionized water that has been purged to remove any volatile compounds. Appropriate preservatives are also added to the container. The trip blank is sent with the bottle order and is intended to reflect the environment that the containers are subjected to throughout shipping and handling and help identify possible sources if contamination is found. The field sampler returns the trip blank in the cooler with the field samples.
Field Blanks ¹	are sometimes used for specific projects by the field samplers. A field blank prepared in the field by filling a clean container with pure reagent water and appropriate preservative, if any, for the specific sampling activity being undertaken. (EPA OSWER)
Equipment Blanks ¹	are also sometimes created in the field for specific projects. An equipment blank is a sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures. (TNI)
Holding Blanks	also referred to as refrigerator or freezer blanks, are used to monitor the sample storage units for volatile organic compounds during the storage of VOA samples in the laboratory

¹ When known, these field QC samples should not be selected for matrix QC as it does not provide information on the behavior of the target compounds in the field samples. Usually, the client sample ID will provide information to identify the field blanks with labels such as "FB", "EB", or "TB."

Evaluation criteria and corrective action for these controls are defined in the specific standard operating procedure for each analysis.

24.4 Positive Controls

Control samples (e.g., QC indicators) are analyzed with each batch of samples to evaluate data based upon (1) Method Performance (Laboratory Control Sample (LCS) or Blank Spike (BS)), which entails both the preparation and measurement steps; and (2) Matrix Effects (Matrix Spike (MS) (Matrix spikes are not applicable to air) or Sample Duplicate (MD, DUP), which evaluates field sampling accuracy, precision, representativeness, interferences, and the effect of the matrix on the method performed. Each regulatory program and each method within those programs specify the control samples that are prepared and/or analyzed with a specific batch

Note that frequency of control samples vary with specific regulatory, methodology and project specific criteria. Complete details on method control samples are as listed in each analytical SOP.

24.4.1 Method Performance Control - Laboratory Control Sample (LCS)

The LCS measures the accuracy of the method in a blank matrix and assesses method performance independent of potential field sample matrix affects in a laboratory batch.

The LCS is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (for example: Reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The LCS is spiked with verified known amounts of analytes or is made of a material containing known and verified amounts of analytes, taken through all preparation and analysis steps along with the field samples. Where there is no preparation taken for an analysis (such as in aqueous volatiles), or when all samples and standards undergo the same preparation and analysis process, a calibration verification standard is reported as the LCS. In some instances where there is no practical clean solid matrix available, aqueous LCS's may be processed for solid matrices; final

results may be calculated as mg/kg or ug/kg, assuming 100% solids and a weight equivalent to the aliquot used for the corresponding field samples, to facilitate comparison with the field samples.

Certified pre-made reference material purchased from a NIST/ISO 17025 accredited vendor may also be used for the LCS when the material represents the sample matrix or the analyte is not easily spiked (e.g. solid matrix LCS for metals, TDS, etc.).

The specific frequency of use for LCS during the analytical sequence is defined in the specific standard operating procedure for each analysis. It is generally 1 for each batch of samples; not to exceed 20 environmental samples.

If the mandated or requested test method, or project requirements, do not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample (and Matrix Spike) where applicable (e.g. no spike of pH). However, in cases where the components interfere with accurate assessment (such as simultaneously spiking chlordane, toxaphene and Pesticides in Method 8081B), the test method has an extremely long list of components or components are incompatible, at a minimum, a representative number of the listed components (see below) shall be used to control the test method. The selected components of each spiking mix shall represent all chemistries, elution patterns and masses, permit specified analytes and other client requested components. However, the laboratory shall ensure that all reported components are used in the spike mixture within a two-year time period.

- For methods that have 1-10 target analytes, spike all components.
- For methods that include 11-20 target analytes, spike at least 10 or 80%, whichever is greater.
- For methods with more than 20 target analytes, spike at least 16 components.
- Exception: Due to analyte incompatibility in pesticides, Toxaphene and Chlordane are only spiked at client request based on specific project needs.
- Exception: Due to analyte incompatibility between the various PCB Aroclors, Aroclors 1016 and 1260 are used for spiking as they cover the range of all of the Aroclors. Specific Aroclors may be used by request on a project specific basis.

24.5 Sample Matrix Controls

Table 24-5. Sample Matrix Control

Control Type	Details	
Matrix Spikes (MS)	Use	used to assess the effect sample matrix of the spiked sample has on the precision and accuracy of the results generated by the method used;
	Typical Frequency ¹	At a minimum, with each matrix-specific batch of samples processed, an MS is carried through the complete analytical procedure. Unless specified by the client, samples used for spiking are randomly selected and rotated between different client projects. If the mandated or requested test method does not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample and Matrix Spike. Refer to the method SOP for complete details
	Description	Essentially a sample fortified with a known amount of the test analyte(s).
Surrogate	Use	Measures method performance to sample matrix (organics only).

Table 24-5. Sample Matrix Control

Control Type	Details	
	Typical Frequency ¹	Are added to all samples, standards, and blanks, for all organic chromatography methods except when the matrix precludes its use or when a surrogate is not available. The recovery of the surrogates is compared to the acceptance limits for the specific method. Poor surrogate recovery may indicate a problem with sample composition and shall be reported, with data qualifiers, to the client whose sample produced poor recovery.
	Description	Are similar to matrix spikes except the analytes are compounds with properties that mimic the analyte of interest and are unlikely to be found in environment samples.
Duplicates ²	Use	For a measure of analytical precision, with each matrix-specific batch of samples processed, a matrix duplicate (MD or DUP) sample, matrix spike duplicate (MSD), or LCS duplicate (LCSD) is carried through the complete analytical procedure.
	Typical Frequency ¹	Duplicate samples are usually analyzed with methods that do not require matrix spike analysis.
	Description	Performed by analyzing two aliquots of the same field sample independently or an additional LCS.
Internal Standards	Use	Are spiked into all environmental and quality control samples (including the initial calibration standards) to monitor the qualitative aspect of organic and some inorganic analytical measurements.
	Typical Frequency ¹	All organic and ICP methods as required by the analytical method.
	Description	Used to correct for matrix effects and to help troubleshoot variability in analytical response and are assessed after data acquisition. Possible sources of poor internal standard response are sample matrix, poor analytical technique or instrument performance.

¹ See the specific analytical SOP for type and frequency of sample matrix control samples.

² LCSD's are normally not performed except when regulatory agencies or client specifications require them. The recoveries for the spiked duplicate samples must meet the same laboratory established recovery limits as the accuracy QC samples. If an LCSD is analyzed both the LCS and LCSD must meet the same recovery criteria and be included in the final report. The precision measurement is reported as "Relative Percent Difference" (RPD). Poor precision between duplicates (except LCS/LCSD) may indicate non-homogeneous matrix or sampling.

24.6 Acceptance Criteria (Control Limits)

As mandated by the test method and regulation, each individual analyte in the LCS, MS, or Surrogate Spike is evaluated against the control limits published in the test method. Where there are no established acceptance criteria, the laboratory calculates in-house control limits with the use of control charts or, in some cases, utilizes client project specific control limits. When this occurs, the regulatory or project limits will supersede the laboratory's in-house limits.

Note: For methods, analytes and matrices with very limited data (e.g., unusual matrices not analyzed often), interim limits are established using available data or by analogy to similar methods or matrices.

Once control limits have been established, they are verified, reviewed, and updated if necessary on an annual basis unless the method requires more frequent updating. Control limits are

established per method (as opposed to per instrument) regardless of the number of instruments utilized.

Laboratory generated % Recovery acceptance (control) limits are generally established by taking ± 3 Standard Deviations (99% confidence level) from the average recovery of a minimum of 30 data points (more points are preferred).

- Regardless of the calculated limit, the limit should be no tighter than the Calibration Verification (ICV/CCV). (Unless the analytical method specifies a tighter limit).
- In-house limits cannot be any wider than those mandated in a regulated analytical method. Client or contract required control limits are evaluated against the laboratory's statistically derived control limits to determine if the data quality objectives (DQOs) can be achieved. If laboratory control limits are not consistent with DQOs, then alternatives must be considered, such as method improvements or use of an alternate analytical method.
- The lowest acceptable recovery limit will be 10% (the analyte must be detectable and identifiable). Exception: The lowest acceptable recovery limit for Benzidine will be 5% and the analyte must be detectable and identifiable.
- The maximum acceptable recovery limit will be 150%. Some specific methods or SOPs may allow for higher recoveries.
- The maximum acceptable RPD limit will be 35% for waters and 40% for soils. The minimum RPD limit is 10%.
- If either the high or low end of the control limit changes by $\leq 5\%$ from previous, the control chart is visually inspected and, using professional judgment, they may be left unchanged if there is no affect on laboratory ability to meet the existing limits.

24.6.1 The lab must be able to generate a current listing of their control limits and track when the updates are performed. In addition, the laboratory must be able to recreate historical control limits. See SOP WS-QA-0035 for further details.

24.6.2 A LCS that is within the acceptance criteria establishes that the analytical system is in control and is used to validate the process. Samples that are analyzed with an LCS with recoveries outside of the acceptance limits may be determined as out of control and should be reanalyzed if possible. If reanalysis is not possible, then the results for all affected analytes for samples within the same batch must be qualified when reported. The internal corrective action process (see Section 12) is also initiated if an LCS exceeds the acceptance limits. Sample results may be qualified and reported without reanalysis if:

- The analyte results are below the reporting limit and the LCS is above the upper control limit.
- If the analytical results are above the relevant regulatory limit and the LCS is below the lower control limit.

Or, for TNI and DoD/DOE work, there are an allowable number of Marginal Exceedances (ME):

<11 analytes	0 marginal exceedances are allowed.
11 – 30 Analytes	1 marginal exceedance is allowed
31-50 Analytes	2 marginal exceedances are allowed
51-70 Analytes	3 marginal exceedances are allowed
71-90 Analytes	4 marginal exceedances are allowed

> 90 Analytes	5 marginal exceedances are allowed

- Marginal exceedances are recovery exceedances between 3 SD and 4 SD from the mean recovery limit (TNI).
- Marginal exceedances must be random. If the same analyte exceeds the LCS control limit repeatedly, it is an indication of a systematic problem. The source of the error must be located and corrective action taken. The laboratory has a system to monitor marginal exceedances to ensure that they are random.

Though marginal exceedances may be allowed, the data must still be qualified to indicate it is outside of the normal limits.

24.6.3 If the MS/MSDs do not meet acceptance limits, the MS/MSD and the associated spiked sample is reported with a qualifier for those analytes that do not meet limits. If obvious preparation errors are suspected, or if requested by the client, unacceptable MS/MSDs are reprocessed and reanalyzed to prove matrix interference. A more detailed discussion of acceptance criteria and corrective action can be found in the lab's method SOPs and in Section 12.

24.6.4 If a surrogate standard falls outside the acceptance limits, if there is not obvious chromatographic matrix interference, reanalyze the sample to confirm a possible matrix effect. If the recoveries confirm or there was obvious chromatographic interference, results are reported from the original analysis and a qualifier is added. If the reanalysis meets surrogate recovery criteria, the second run is reported (or both are reported if requested by the client). Under certain circumstances, where all of the samples are from the same location and share similar chromatography, the reanalysis may be performed on a single sample rather than all of the samples and if the surrogate meets the recovery criteria in the reanalysis, all of the affected samples would require reanalysis.

24.7 Additional Procedures to Assure Quality Control

The laboratory has written and approved method SOPs to assure the accuracy of the test method including calibration (see Section 20), use of certified reference materials (see Section 21) and use of PT samples (see Section 17).

A discussion regarding MDLs, Limit of Detection (LOD) and Limit of Quantitation (LOQ) can be found in Section 19.

- Use of formulae to reduce data is discussed in the method SOPs and in Section 20.
- Selection of appropriate reagents and standards is included in Section 11 and 21.
- A discussion on selectivity of the test is included in Section 7.
- Constant and consistent test conditions are discussed in Section 6.
- The laboratories sample acceptance policy is included in Section 23.

25.0 REPORTING RESULTS

25.1 Overview

The results of each test are reported accurately, clearly, unambiguously, and objectively in accordance with State and Federal regulations as well as client requirements. Analytical results are issued in a format that is intended to satisfy customer and laboratory accreditation requirements as well as provide the end user with the information needed to properly evaluate the results. Where there is conflict between client requests and laboratory ethics or regulatory requirements, the laboratory's ethical and legal requirements are paramount, and the laboratory will work with the client during project set up to develop an acceptable solution. Refer to Section 9.

A variety of report formats are available to meet specific needs.

In cases where a client asks for simplified reports, there must be a written request from the client. There still must be enough information that would show any analyses that were out of conformance (QC out of limits) and there should be a reference to a full report that is made available to the client. Review of reported data is included in Section 19.

25.2 Test Reports

Analytical results are reported in a format that is satisfactory to the client and meets all requirements of applicable accrediting authorities and agencies. A variety of report formats are available to meet specific needs. The report is printed on laboratory letterhead, reviewed, and signed by the appropriate project manager. At a minimum, the standard laboratory report shall contain the following information:

25.2.1 A report title (e.g., Analytical Report)

25.2.2 The cover page shall include the laboratory name, address and telephone number.

25.2.3 A unique identification of the report (e.g., Eurofins Sacramento Job ID #) and on each page an identification in order to ensure the page is recognized as part of the report and a clear identification of the end.

Note: Page numbers of report are represented as page # of ##. Where the first number is the page number and the second is the total number of pages.

25.2.4 A copy of the chain of custody (COC).

- Any COCs involved with Subcontracting are included.

25.2.5 The name and address of client and a project name/number, if applicable.

25.2.6 Client project manager or other contact

25.2.7 Description and unambiguous identification of the tested sample(s) including the client identification code.

25.2.8 Date of receipt of sample, date and time of collection, and date(s) of test preparation and performance, and time of preparation or analysis if the required holding time for either activity is less than or equal to 72 hours.

25.2.9 Date reported or date of revision, if applicable.

25.2.10 Method of analysis including method code (EPA, Standard Methods, etc.).

- 25.2.11 Reporting limit.
- 25.2.12 Method detection limits (if requested)
- 25.2.13 Definition of Data qualifiers and reporting acronyms (e.g. ND).
- 25.2.14 Sample results.
- 25.2.15 QC data consisting of method blank, surrogate, LCS, and MS/MSD recoveries and control limits.
- 25.2.16 Condition of samples at receipt including temperature. This may be accomplished in a narrative or by attaching sample login sheets (Refer to Sec. 25.2.4 – Item 3 regarding additional addenda).
- 25.2.17 A statement expressing the validity of the results, that the source methodology was followed and all results were reviewed for error.
- 25.2.18 A statement to the effect that the results relate only to the items tested and the sample as received by the laboratory, except when information is provided by the client. When data is provided by the client there shall be a clear identification of it, and a disclaimer shall be put in the report when the client supplied data can affect the validity of the test.
- 25.2.19 A statement that the report shall not be reproduced except in full, without prior express written approval by the laboratory.
- 25.2.20 A signature and title of the person(s) accepting responsibility for the content of the report and date of issue. Authorized signatories are qualified Project Managers appointed by the Customer Service Manager.
- 25.2.21 When TNI accreditation is required, the lab shall certify that the test results meet all requirements of TNI or provide reasons and/or justification if they do not.
- 25.2.22 The laboratory includes a cover letter.
- 25.2.23 Where applicable, a narrative to the report that explains the issue(s) and corrective action(s) taken in the event that a specific accreditation or certification requirement was not met.
- 25.2.24 When soil samples are analyzed, a specific identification as to whether soils are reported on a “wet weight” or “dry weight” basis.
- 25.2.25 Appropriate laboratory certification number for the state of origin of the sample, if applicable.
- 25.2.26 If only part of the report is provided to the client (client requests some results before all of it is complete), it must be clearly indicated on the report (e.g., partial report, or how your lab identifies it). A complete report must be sent once all of the work has been completed.
- 25.2.27 Any analytical results generated by an external laboratory are clearly identified in the final report. Analytical results generated by a laboratory using the EET LIMS are provided in a single report in which the laboratory associated with each specific test is clearly identified. Reports from external laboratories not on the EET LIMS system are provided in their entirety as an attachment to the EET final report.
- 25.2.28 A Certification Summary Report, where required, will document that, unless otherwise noted, all analytes tested and reported by the laboratory were covered by the noted certifications.
- Note:** Refer to the NDSC Document No. NDSC-US-IT-QP46227, Electronic Reporting and Signature Policy, for details on internally applying electronic signatures of approval.

25.2.29 Reports for Ohio VAP work require a VAP affidavit be completed and included with the report.

25.2.30 Where the laboratory is responsible for the sampling stage, in addition to the requirements listed above, reports containing the results of sampling shall include the following, where necessary for the interpretation of test results:

- the date of sampling;
- unambiguous identification of the material sampled;
- the location of sampling plan and procedures, and deviations, addition to or exclusions from the sample procedures;
- a reference to the sampling plan and procedure, and deviations, additions to or exclusions from the sample procedures;
- details of any environmental conditions during sampling that affect the interpretation of test results;
- information required to evaluate measurement uncertainty for subsequent testing

25.3 Reporting Level or Report Type

The laboratory offers four levels of quality control reporting. Each level, in addition to its own specific requirements, contains all the information provided in the preceding level. The packages provide the following information in addition to the information described above:

- Level 1 is a report with all of the elements outlined in Section 25.2 above, excluding 25.2.15 (QC data).
- Level II is a Level I report plus summary information, including results for the method blank reported to the laboratory MDL, percent recovery for laboratory control samples and matrix spike samples, and the RPD values for all MSD and sample duplicate analyses.
- Level III contains all the information supplied in Level II, but presented on the CLP-like summary forms, and relevant calibration information. A Level II report is not included, unless specifically requested. No raw data is provided.
- Level IV is the same as Level III with the addition of all raw supporting data.

In addition to the various levels of QC packaging, the laboratory also provides reports in EDD (see below). Initial reports may be provided to clients by facsimile. Procedures used to ensure client confidentiality are outlined in Section 25.6.

25.4 Electronic Data Deliverables (EDDs)

EDDs are routinely offered as part of Eurofins Sacramento's services in addition to the test report as described in Section 25.2. When NELAP accreditation is required and both a test report and EDD are provided to the client, the official version of the test report will be the combined information of the report and the EDD. The Sacramento laboratory offers a variety of EDD formats including Environmental Restoration Information Management System (ERPIMS), New Agency Standard (NAS), Format A, Excel, Dbase, GISKEY, Text Files, Staged Electronic Data Deliverable (SEDD) Environmental Quality Information System (EQulS), Electronic Deliverable Format (EDF), Excel and custom files.

EDD specifications are submitted to the IT department by the PM for review and undergo the contract review process. Once the facility has committed to providing data in a specific electronic format, the coding of the format may need to be performed. This coding is documented and validated. The validation of the code is retained by the IT staff coding the EDD, and a copy filed on the QA share of the local server.

EDDs shall be subject to a review to ensure their accuracy and completeness. If EDD generation is automated, review may be reduced to periodic screening if the laboratory can demonstrate that it can routinely generate that EDD without errors. Any revisions to the EDD format must be reviewed until it is demonstrated that it can routinely be generated without errors. If the EDD can be reproduced accurately and if all subsequent EDDs can be produced error-free, each EDD does not necessarily require a review.

25.5 Supplemental Information for Test

The lab identifies any unacceptable QC analyses or any other unusual circumstances or observations such as environmental conditions and any non-standard conditions that may have affected the quality of a result. This is typically in the form of a footnote or a qualifier and/or a narrative explaining the discrepancy in the front of the report.

Numeric results with values outside of the calibration range, either high or low are qualified as estimated.

Where quality system requirements are not met, a statement of compliance/non-compliance with requirements and/or specifications is required, including identification of test results derived from any sample that did not meet TNI sample acceptance requirements such as improper container, holding time, or temperature.

Where applicable, a statement on the estimated uncertainty of measurements; information on uncertainty is needed when a client's instructions so require.

When, as requested by the client and agreed to by Eurofins Sacramento, the report includes a statement of conformity to specification or standard (see Special Services, Section 7.4), the report shall clearly identify:

- to which results the statement applies,
- which specifications, standard or parts thereof are met or not, and
- the decision rule that was applied (unless the decision rule is inherent in the requested specification or standard, taking into account the level of risk (such as false accept and false reject and statistical assumptions) associated with the decision rule.

Opinions and Interpretations - The test report contains objective information, and generally does not contain subjective information such as opinions and interpretations. If such information is required by the client, the Laboratory Director will determine if a response can be prepared. If so, the Laboratory Director will designate the appropriate member of the management team to prepare a response. The response will be fully documented, and reviewed by the Laboratory Director, before release to the client. There may be additional fees charged to the client at this time, as this is a non-routine function of the laboratory.

Note: Review of data deliverable packages for submittal to regulatory authorities requires responses to non-conforming data concerning potential impact on data quality. This necessitates a limited scope of interpretation, and this work is performed by the QA Department. This is the only form of "interpretation" of data that is routinely performed by the laboratory.

When opinions or interpretations are included in the report, the laboratory provides an explanation as to the basis upon which the opinions and interpretations have been made. Opinions and interpretations are clearly noted as such and where applicable, a comment should be added suggesting that the client verify the opinion or interpretation with their regulator.

25.6 Environmental Testing Obtained From Subcontractors

If the laboratory is not able to provide the client the requested analysis, the samples would be subcontracted following the procedures outlined in the [NDSC Document No. NDSC-US-SUB-SOP44936, Subcontracting](#).

Data reported from analyses performed by a subcontractor laboratory are clearly identified as such on the analytical report provided to the client. Results from a subcontract laboratory outside of the EET network, or laboratories within the EET network that do not share the Eurofins LIMS are reported to the client on the subcontract laboratory's original report stationary and the report includes any accompanying documentation. Test results from a laboratory within the EET network sharing the Eurofins LIMS are noted within the Eurofins LIMS-generated report.

25.7 Client Confidentiality

The laboratory will ensure the highest standards of quality and integrity of the data and services provided to our clients.

The laboratory is responsible for maintaining in confidence all client information obtained or created. In situations involving the transmission of environmental test results by telephone, facsimile or other electronic means, client confidentiality must be maintained.

The laboratory will not intentionally divulge to any person (other than the client or any other person designated by the client in writing) any information regarding the services provided by the laboratory or any information disclosed to the laboratory by the client. Furthermore, information known to be potentially endangering to national security or an entity's proprietary rights will not be released.

Information about the client obtained from sources other than the client (e.g., complainant, regulators) shall be confidential between client and the laboratory. The source of this information shall be confidential to the laboratory and shall not be shared with the client, unless agreed by the source.

Note: This shall not apply to the extent that the information is required to be disclosed by the laboratory under the compulsion of legal process. The laboratory will, to the extent feasible, provide reasonable notice to the client before disclosing the information.

Note: Authorized representatives of an accrediting authority are permitted to make copies of any analyses or records relevant to the accreditation process, and copies may be removed from the laboratory for purposes of assessment.

25.7.1 Report deliverable formats are discussed with each new client. If a client requests that reports be e-mailed, the reports are to meet all requirements of this document.

25.8 Format of Reports

The format of reports is designed to accommodate each type of environmental test carried out and to minimize the possibility of misunderstanding or misuse.

25.9 Amendments to Test Reports

Corrections, additions, or deletions to reports are only made when justification arises through supplemental documentation. Justification is documented using the laboratory's corrective action system (refer to Section 12).

The revised report is retained on in the LIMS, as is the original report. The revised report is stored in the Archive data server under the report number followed by Rev (x) where the x represents the revision number. The original version does not have a revision number. The revised report will have the notation "Revision X" under the client project description on the cover page, and "Rev. x" next to the date in the footer of subsequent pages.

When the report is re-issued, a notation of "report re-issue" is placed on the cover/signature page of the report *or at the top of the narrative page* with a brief explanation of reason for the re-issue and a reference back to the last final report generated. *For Example: Report was revised on 3/8/20 to include toluene in sample NQA1504 per client's request. This final report replaces the final report generated on 1/27/20 at 10:47am.*

25.10 Policies on Client Requests for Amendments

25.10.1 Policy on Data Omissions or Reporting Limit Increases

Fundamentally, our policy is simply to not omit previously reported results (including data qualifiers) or to not raise reporting limits and report sample results as ND. This policy has few exceptions. Exceptions are:

- Laboratory error.
- Sample identification is indeterminate (confusion between COC and sample labels).
- An incorrect analysis (not analyte) was requested (e.g., COC lists 8315 but client wanted 8310). A written request for the change is required.
- Incorrect limits reported based on regulatory requirements.
- The requested change has absolutely no possible impact on the interpretation of the analytical results and there is no possibility of the change being interpreted as misrepresentation by anyone inside or outside of our company.

25.10.2 Multiple Reports

The laboratory does not issue multiple reports for the same work order where there is different information on each report (this does not refer to copies of the same report) unless required to meet regulatory needs and approved by QA.

Appendix 1. List of Governing Documents applicable to the QA Manual

NDSC Doc. No.	Title
NDSC-US-IT-QP46227	Electronic Reporting and Signature Policy
NDSC-QA-SOP46704	Acid and Solvent Testing and Approval Program
NDSC-QA-SOP43862	Manual Integrations
NDSC-QA-SOP42091	Detection and Quantitation Limits
NDSC-QA-SOP43847	Root Cause Analysis
NDSC-US EHS-46060	Environmental Health & Safety Manual
NDSC-US-IT-QP46202	IT Change Control Procedure Manual
CW-L-P-001	Records Retention Policy
SOP01-QA-QP5252	Ethics and Data Integrity Policy
QA-SOP38228	Internal Investigation
NDSC-US-SUB-SOP44936	Subcontracting
NDSC-QA-SOP5260	Internal Auditing
QA-QP38702	Management Systems Review
QA-SOP38229	Nonconforming Work
Local Laboratory Document No.	Title
WS-EHS-0001	Waste Disposal
WS-PEHS-002	Sacramento Addendum to Environmental Health and Safety Manual
WS-PM-0001	Final Report Assembly and Third Level Data Review
WS-PM-0003	Program Setup and Distillation
WS-PQA-003	Quality Control Program
WS-PQA-012	Technical Data Review Requirements
WS-PQA-013	Procedures to Address Customer Complaints
WS-PQA-017	Electronic Reporting and Client Deliverables
WS-PQA-018	Quality Assurance Project Plan (QAPP) Review
WS-PQA-021	Federal Program Requirements
WS-QA-0003	Sample Receipt and Procedures
WS-QA-0004	Maintenance and Calibration Check of Fixed and Adjustable Volume Autopipettors, Autodispensers and Volumetric Containers
WS-QA-0005	Temperature Monitoring and Corrective Action for Freezers
WS-QA-0006	Method Detection Limits (MDL) and Instrument Detection Limits (IDL)
WS-QA-0009	Document Archiving
WS-QA-0016	Thermometer Calibration
WS-QA-0017	Standards and Reagents and Quality Control Check Procedures
WS-QA-0018	Subsampling and Compositing of Samples
WS-QA-0021	Preparation and Management of Standard Operating Procedures
WS-QA-0022	Employee Orientation and Training
WS-QA-0023	Non-Conformance and Corrective Action System
WS-QA-0024	QA Data Review
WS-QA-0028	Incremental Sampling Methodology of Soils and Sediments

WS-QA_0031	Verification and Security of Spreadsheet Applications
WS-QA-0035	Statistical Process Control / Control Chart
WS-QA-0041	Calibration and Calibration Check of Balances

Appendix 2. List of Laboratory Certifications, Accreditations, Validations

The laboratory maintains accreditations, certifications, and approvals with numerous state and national entities. Programs vary but may include on-site audits, reciprocal agreements with another entity, performance testing evaluations, review of the QA Manual, Standard Operating Procedures, Method Detection Limits, training records, etc. At the time of this QA Manual revision, the laboratory has accreditation/ certification/licensing with the following organizations:

Program	Authority	Identification	Expiration Date
Dept. of Defense ELAP	ANAB	L2468	01/20/2024
Dept. of Energy	ANAB	L2468.01	01/20/2024
ISO/IEC 17025	ANAB	L2468	01/20/2024
NELAP	Florida	E87570	06/30/2023
NELAP	Illinois	200060	03/17/2024
NELAP	Kansas	E-10375	10/31/2022
NELAP	Louisiana	01944	06/30/2023
NELAP	Louisiana (All)	01944	06/30/2023
NELAP	New Hampshire	2997	04/18/2023
NELAP	New Jersey	CA005	06/30/2023
NELAP	New York	11666	04/01/2023
NELAP	Oregon	4040	01/29/2023
NELAP	Texas	T104704399-19-13	05/31/2023
NELAP	Utah	CA000442021-12	02/28/2023
NELAP	Virginia	460278	03/14/2023
State	Alaska (UST)	17-020	02/20/2024
State	Arizona	AZ0708	08/11/2023
State	Arkansas DEQ	88-0691	06/17/2022 *
State	California	2897	01/31/2023
State	Colorado	CA0004	08/31/2023
State	Georgia	4040	01/30/2023
State	Hawaii	NA	01/29/2023
State	Maine	CA00004	04/14/2024
State	Michigan	9947	01/31/2023
State	Nevada	CA00044	07/31/2023
State	Ohio	41252	01/29/2023
State	Washington	C581	05/05/2023
State	West Virginia (DW)	9930C	12/31/2022
State	Wisconsin	998204680	08/31/2023

* Certification Valid - Laboratory is Pending Renewal with the Program Authority. Current certificates and accredited parameter lists are available for each State/Program organization from the laboratory on request.

Appendix 3. References used to prepare the QA Manual

The QAM has been prepared to be consistent with the requirements of the following documents:

- ANSI/ASQC, E4-1994, "Specifications and Guidelines for Quality Management Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995, or most recent version)
- "EPA Requirements for Quality Management Programs" (QA/R-2) (EPA/240/B-01/002, May 31, 2006).
- EPA 600/4-88/039, *Methods for the Determination of Organic Compounds in Drinking Water*, EPA, Revised July 1991.
- EPA 600/R-95/131, *Methods for the Determination of Organic Compounds in Drinking Water*, Supplement III, EPA, August 1995.
- EPA 600/4-79-019, *Handbook for Analytical Quality Control in Water and Wastewater Laboratories*, EPA, March 1979.
- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846)*, Third Edition, September 1986, Final Update I, July 1992, Final Update IIA, August 1993, Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996; Final Update IV, January 2008; Final Update V, August 2015; Final Update VI, June 2018; Final Update VII, July 2021
- U.S. Department of Defense (DoD)/Department of Energy (DOE) *Consolidated Quality Systems Manual (QSM) for Environmental Laboratories*, Version 5.4, dated 2021
- Federal Register, 40 CFR Parts 136, 141, 172, 173, 178, 179 and 261.
- *Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005) (DW labs only)*
- *Statement of Work for Inorganics & Organics Analysis, SOM and ISM*, current versions, USEPA Contract Laboratory Program Multi-media, Multi-concentration.
- APHA, *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 19th, 20th, 21st, 22nd and on-line Editions.
- U.S. Department of Energy Order 414.1B, *Quality Assurance*, Approved April 29, 2004.
- U.S. Department of Energy Order 414.1C, *Quality Assurance*, June 17, 2005.
- U.S. Department of Energy Order 414.1D, *Quality Assurance*, April, 25, 2011.
- Nuclear Regulatory Commission (NRC) Quality Assurance Requirements.
- Marine Protection, Research, and Sanctuaries Act (MPRSA).
- Toxic Substances Control Act (TSCA).

Appendix 4. QA Manual Crosswalk with TNI and ISO/IEC 17025 Standards

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
-	Quality Assurance Manual Cover Page	V1M2 Sec. 4.2.8.3		
1.0	Title Page			
2.0	Table of Contents	V1M2 Secs. 4.2.8.3- 4.2.8.4		8.1.2, 8.2.1
3.0	Introduction, Scope and Applicability	V1M2 Sec. 4.2.8.4		
3.1	Introduction and Compliance References	V1M2 Secs. 1.1; 1.2; 2.0; 3.2; 4.1.2; 4.2.4	4.1.2; 4.2.4	5.3; 5.4; 8.2.4; 8.3.1
3.2	Terms and Definitions	V1M2 Secs. 3.0; 4.2.4	4.2.4	
3.3	Scope /Field of Testing	V1M2 Secs. 1.2; 4.2.4	4.1.2; 4.2.4	5.3; 5.4; 8.2.1; 8.2.4
3.4	Management of The Manual	V1M2 Secs. 4.2.1; 4.2.7; 4.3.3.2; 4.3.3.3	4.2.1; 4.2.7; 4.3.3.2; 4.3.3.3	5.3
4.0	Management and Responsibilities	V1M2 Sec. 4		8.2.4; 8.2.5
4.1	Overview	V1M2 Secs. 4.1.1, 4.1.3; 4.1.5	4.1.1; 4.1.3; 4.1.5; 4.2.6	5.1; 5.2; 5.5; 5.6 ; 6.2.1; 6.2.4
4.2	Roles and Responsibilities	V1M2 Secs. 4.1.4; 4.1.5; 4.1.6; 4.2.1; 4.2.6; 5.2.4	4.1.3; 4.1.5; 4.1.6; 4.2.1; 4.2.6; 5.2.4	4.1.1 to 4.1.3; 4.1.5; 5.5; 5.6; 6.2.1; 6.2.4; 6.2.6 8.2.2;
4.3	Business Continuity and Contingency Plan (<i>Prev. Deputies</i>)	V1M2 Secs. 4.1.5; 4.1.7.2; 4.2.7	4.1.5; 4.2.7	
5.0	PERSONNEL	V1M2 Secs. 5.2; 5.2.1	5.2.1	6.1; 6.2.3
5.1	Overview	V1M2 Secs. 5.2.2; 5.2.3; 5.2.5	5.2.2; 5.2.3; 5.2.5	6.2.2
5.2	Education and Experience Requirements for Technical Staff	V1M2 Secs. 5.2.1; 5.2.3; 5.2.4	5.2.1; 5.2.3; 5.2.4	6.2.2 to 6.2.4
5.3	Training	V1M2 Sec. 5.2.5	5.2.5	4.2.1; 6.2.2; 6.2.4; 6.2.5
5.4	Data Integrity and Ethics Training Program	V1M2 Sec. 4.2.8.1; 5.2.7		4.1.1
6.0	ACCOMMODATIONS AND ENVIRONMENTAL CONDITIONS	V1M2 Sec. 5.3		6.1; 6.3.1
6.1	Overview	V1M2 Secs. 5.3.1; 5.3.3; 5.3.4; 5.3.5	5.3.1; 5.3.3; 5.3.4; 5.3.5	6.3.1

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
6.2	Environment	V1M2 Secs. 5.3.1; 5.3.2; 5.3.3; 5.3.4; 5.3.5	5.3.1; 5.3.2; 5.3.3; 5.3.4; 5.3.5	6.3.1 to 6.3.5
6.3	Work Area	V1M2 Secs. 5.3.3; 5.3.4; 5.3.5	5.3.3; 5.3.4; 5.3.5	6.3.1
6.4	Responding to Emergencies			
6.5	Building Security	V1M2 Sec. 5.3.4	5.3.4	6.3.4
7.0	QUALITY SYSTEM			6.1; 8.2.4
7.1	Quality Policy	V1M2 Secs. 4.1.5; 4.2.2; 4.2.3; 4.2.8.3	4.1.5; 4.2.2; 4.2.3	8.2.3; 8.6.1
7.2	Ethics and Data Integrity	V1M2 Secs. 4.1.5; 4.1.6; 4.2.2; 4.2.8.1; 5.2.7	4.1.5; 4.2.2	4.1.1 to 4.1.3; 4.2.1; 6.2.1; 8.2.2; 8.2.3
7.3	Quality System Documentation	V1M2 Secs. 4.1.5; 4.2.2; 4.2.5	4.2.2; 4.2.5	8.2.4
7.4	QA/QC Objectives for the Measurement of Data	V1M2 Sec. 4.2.2	4.1.5; 4.2.2	6.2.4
7.5	Criteria for Quality Indicators			
7.6	Statistical Quality Control			
7.7	Quality System Metrics			
8.0	Document Control	V1M2 Secs. 4.2.7; 4.3.1; 4.3.2.2 ; 4.3.3.3; 4.3.3.4	4.2.7; 4.3.1; 4.3.2.2; 4.3.3.3; 4.3.3.4	8.2.4; 8.3.1
8.1	Overview			8.2.5; 8.3.1; 8.3.2
8.2	Document Approval and Issue	V1M2 Secs. 4.3.2; 4.3.2.1-4.3.2.3; 4.3.3.1	4.3.2.1; 4.3.2.2; 4.3.2.3; 4.3.3.1	8.2.5; 8.3.2
8.3	Procedures for Document Control Policy	V1M2 Secs. 4.3.2.1- 4.3.2.2; 4.3.3.1	4.3.2.1; 4.3.2.2; 4.3.3.1	8.2.5; 8.3.2
8.4	Obsolete Documents	V1M2 Secs. 4.3.2.1- 4.3.2.2	4.3.2.1; 4.3.2.2	8.2.5; 8.3.2
9.0	SERVICE TO THE CLIENT	V1M2 Secs. 4.4.1 - 4.4.4	4.4.1; 4.4.2; 4.4.3; 4.4.4	7.1.1; 7.1.1.4; 7.1.1.5; 7.1.1.8; 7.1.2.1
9.1	Overview	V1M2 Secs. 4.4.5; 4.5.5; 5.7.1	4.4.5; 5.7.1	
9.2	Review Sequence and Key Personnel	V1M2 Sec. 4.4.5	4.4.5	7.1.1.6
9.3	Balancing Laboratory Work Load and Capacity			
9.4	Documentation	V1M2 Sec. 5.7.1	5.7.1	
9.5	Special Services	V1M2 Secs. 4.7.1- 4.7.2	4.7.1; 4.7.2	7.1.1.3; 7.1.1.7
9.6	Client Communication	V1M2 Secs. 4.7.1- 4.7.2	4.7.1; 4.7.2	7.1.1.7

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
9.7	Reporting	V1M2 Secs. 4.7.1- 4.7.2	4.7.1; 4.7.2	7.1.1.7
9.8	Client Feedback and Surveys	V1M2 Secs. 4.7.1- 4.7.2	4.7.1; 4.7.2	7.1.1.7; 8.6.2
10.0	SUBCONTRACTING OF TESTS	V1M2 Secs. 4.4.3; 4.5.4	4.4.3; 4.5.4	
10.1	Overview	V1M2 Secs. 4.5.1 - 4.5.3; 4.5.5; 5.3.1	4.5.1; 4.5.2; 4.5.3; 5.3.1	6.6.1; 7.1.2.1; 7.1.2.2
10.2	Qualifying and Monitoring Subcontractors	V1M2 Secs. 4.5.1; 4.5.2; 4.5.3; 4.5.5	4.5.1; 4.5.2; 4.5.3	6.6.1; 7.1.2.1; 7.1.2.2
10.3	Oversight and Reporting	V1M2 Sec. 4.5.5		
10.4	Contingency Planning			
10.5	Use of NELAP and A2LA Logo			
11.0	PURCHASING SERVICES AND SUPPLIES	V1M2 Sec. 4.6.1	4.6.1	
11.1	Overview	V1M2 Secs. 4.6.2; 4.6.3; 4.6.4	4.6.2; 4.6.3; 4.6.4	6.6.1; 6.6.2
11.2	Glassware	V1M2 Sec. 5.5.13.1		
11.3	Reagents, Standards & Supplies	V1M2 Secs. 4.6.2; 4.6.3; 4.6.4 2016 V1M4 1.7.2.5	4.6.2; 4.6.3; 4.6.4	6.6.1 to 6.6.3
11.4	Purchase of Equipment / Instruments / Software			
11.5	Services			
11.6	Suppliers			
12.0	COMPLAINTS	V1M2 Sec. 4.8	4.8	8.6.1; 8.6.2
12.1	Overview			7.9.1 to 7.9.3 8.6.1; 8.6.2;
12.2	External Complaints			7.9.2 to 7.9.7 8.6.1; 8.6.2;
12.3	Internal Complaints			8.6.1; 8.6.2
12.4	Management Review			8.6.1; 8.6.2
13.0	CONTROL OF NON-CONFORMING WORK	V1M2 Secs. 4.9.1; 5.10.5	4.9.1; 5.10.5	7.10.1
13.1	Overview	V1M2 Secs. 4.9.1; 4.11.3; 4.11.5	4.9.1; 4.11.3; 4.11.5	7.10.1
13.2	Responsibilities and Authorities	V1M2 Secs. 4.9.1; 4.11.3; 4.11.5; 5.2.7	4.9.1; 4.11.3; 4.11.5	7.10.1
13.3	Evaluation of Significance and Action Taken	V1M2 Secs. 4.9.1; 4.11.3; 4.11.5	4.9.1; 4.11.3; 4.11.5	4.1.5; 7.10.1; 7.10.2; 8.5.3
13.4	Prevention of Non-Conforming Work	V1M2 Secs. 4.9.4; 4.11.2	4.9.2; 4.11.2	7.10.2; 7.10.3; 8.5.3

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
13.5	Method Suspension / Restriction (Stop Work Procedures)	V1M2 Secs. 4.9.1; 4.9.2; 4.11.5	4.9.1; 4.9.2; 4.11.5	7.10.1; 7.10.2
14.0	CORRECTIVE ACTION	V1M2 Sec. 4.11		4.1.4; 4.1.5
14.1	Overview	V1M2 Secs. 4.9.2; 4.11.1; 4.11.2	4.9.2; 4.11.1; 4.11.2; 8.7.1; 8.7.3	7.10.2 8.7.1; 8.7.3;
14.2	General	V1M2 Sec. 4.11.2; 4.11.3	4.11.2; 4.11.3	7.7.2; 8.5.3; 8.7.1;
14.3	Closed Loop Correction Action Process	V1M2 Sec. 4.11.2; 4.11.3; 4.11.4; 4.11.6; 4.11.7; 4.12.2	4.11.2; 4.11.3; 4.11.4; 4.12.2	8.5.3; 8.6.1; 8.7.2
14.4	Technical Corrective Actions	V1M2 Sec. 4.11.6		8.7.1
14.5	Basic Corrections	V1M2 Secs. 4.11.1; 4.13.2.3	4.11.1; 4.13.2.3	7.5.2; 8.7.1
15.0	PREVENTIVE ACTION / IMPROVEMENT	V1M2 Secs. 4.10; 4.12.1; 4.12.2	4.10; 4.12.1; 4.12.2	4.1.4
15.1	Overview	V1M2 Secs. 4.15.1; 4.15.2	4.15.1; 4.15.2	8.6.2
15.2	Management of Change			
16.0	CONTROL OF RECORDS	V1M2 Secs. 4.2.7; 4.13.1.1; 4.13.3	4.2.7; 4.13.1.1	8.4.2
16.1	Overview	V1M2 Secs. 4.13.1.1 - 4.13.1.4; 4.13.2.1-4.13.2.3; 4.13.3	4.13.1.1 - 4.13.1.4; 4.13.2.1- 4.13.2.3	8.4.1; 8.4.2
16.2	Programs with Longer Retention Requirements			
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19.4	Selection of Methods	V1M2 Secs. 4.13.3; 5.4.1; 5.4.2; 5.4.3. (2019 5.4.4) V1M4 Secs. 1.4; 1.5.1; 1.6.1; 1.6.2; 1.6.2.1; 1.6.2.2	5.4.1; 5.4.2; 5.4.3; 5.4.4; 5.4.5.1; 5.4.5.2; 5.4.5.3	7.1.1.2; 7.2; 7.2.1.2; 7.2.1.3; 7.1.2.4 to 7.2.1.7; 7.2.2.1 to 7.2.1.7; 7.2.2.1
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19.6	Validation of Methods	V1M2 Sec. 5.4.2. (2019 5.4.5.4) V1M4 Secs. 1.5.1; 1.5.2; 1.5.2.1; 1.5.2.2; 1.5.3	5.4.2; 5.4.4; 5.4.5.2; 5.4.5.3	7.1.1.2; 7.1.2.4; 7.2.1.6; 7.2.2.1 to 7.2.2.4
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Appendix 5. Terms/Glossary and Acronyms (EL-V1M2 Sec. 3.1)

Terms/Glossary:

Acceptance Criteria: Specified limits placed on characteristics of an item, process, or service defined in requirement documents. (ASQC)

Accreditation: The process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory.

Accuracy: The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator. (QAMS)

Analyst: The designated individual who performs the “hands-on” analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

Analytical Uncertainty: A subset of Measurement Uncertainty that includes all laboratory activities performed as part of the analysis. (TNI)

Anomaly: A condition or event, other than a deficiency, that may affect the quality of the data, whether in the laboratory’s control or not.

Assessment: The evaluation process used to measure or establish the performance, effectiveness, and conformance of an organization and/or its systems to defined criteria (to the standards and requirements of laboratory accreditation). (TNI)

Audit: A systematic and independent examination of facilities, equipment, personnel, training, procedures, record-keeping, data validation, data management, and reporting aspects of a system to determine whether QA/QC and technical activities are being conducted as planned and whether these activities will effectively achieve quality objectives. (TNI)

Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A **preparation batch** is composed of one (1) to twenty (20) environmental samples of the same quality systems matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be twenty-four (24) hours. An **analytical batch** is composed of prepared environmental samples (extracts, digestates or concentrates) which are analyzed together as a group. An analytical batch can include prepared samples originating from various quality system matrices and can exceed twenty (20) samples. (TNI)

Bias: The systematic or persistent distortion of a measurement process, which causes errors in one direction (i.e., the expected sample measurement is different from the sample’s true value). (TNI)

Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results. (ASQC)

Calibration: A set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards. (TNI)

1) In calibration of support equipment the values realized by standards are established through the use of reference standards that are traceable to the International System of Units (SI).

2) In calibration according to methods, the values realized by standards are typically established through the use of Reference Materials that are either purchased by the laboratory with a certificate of analysis or purity, or prepared by the laboratory using support equipment that has been calibrated or verified to meet specifications.

Calibration Curve: The mathematical relationship between the known values, such as concentrations, of a series of calibration standards and their instrument response. (TNI)

Calibration Standard: A substance or reference material used to calibrate an instrument (QAMS)

Certified Reference Material (CRM): A reference material accompanied by a certificate, having a value, measurement uncertainty, and stated metrological traceability chain to a national metrology institute. (TNI)

Chain of Custody (COC) Form: Record that documents the possession of the samples from the time of collection to receipt in the laboratory. This record generally includes: the number and types of containers; the mode of collection; the collector; time of collection; preservation; and requested analyses. (TNI)

Compromised Samples: Those samples which are improperly sampled, insufficiently documented (chain of custody and other sample records and/or labels), improperly preserved, collected in improper containers, or exceeding holding times when delivered to a laboratory. Under normal conditions, compromised samples are not analyzed. If emergency situation require analysis, the results must be appropriately qualified.

Confidential Business Information (CBI): Information that an organization designates as having the potential of providing a competitor with inappropriate insight into its management, operation or products. TNI and its representatives agree to safeguard identified CBI and to maintain all information identified as such in full confidentiality.

Confirmation: Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to Second Column Confirmation; Alternate wavelength; Derivatization; Mass spectral interpretation; Alternative detectors or Additional Cleanup procedures. (TNI)

Conformance: An affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements. (ANSI/ASQC E4-1994)

Correction: Actions necessary to correct or repair analysis specific non-conformances. The acceptance criteria for method specific QC and protocols as well as the associated corrective actions. The analyst will most frequently be the one to identify the need for this action as a result of calibration checks and QC sample analysis. No significant action is taken to change behavior, process or procedure.

Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence. (ISO 8402)

Data Integrity: The condition that exists when data are sound, correct, and complete, and accurately reflect activities and requirements. (TNI)

Data Audit: A qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data are of acceptable quality (i.e., that they meet specified acceptance criteria).

Data Reduction: The process of transforming the number of data items by arithmetic or statistical calculations, standard curves, and concentration factors, and collation into a more useable form. (TNI)

Deficiency: An unauthorized deviation from acceptable procedures or practices, or a defect in an item (ASQC), whether in the laboratory's control or not.

Demonstration of Capability: A procedure to establish the ability of the analyst to generate analytical results of acceptable accuracy and precision. (TNI)

Document Control: The act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly, and controlled to ensure use of the correct version at the location where the prescribed activity is performed. (ASQC)

Duplicate Analyses: The analyses or measurements of the variable of interest performed identically on two subsamples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory. (EPA-QAD)

Equipment Blank: Sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures.

External Standard Calibration: Calibrations for methods that do not utilize internal standards to compensate for changes in instrument conditions.

Field Blank: Blank prepared in the field by filling a clean container with pure de-ionized water and appropriate preservative, if any, for the specific sampling activity being undertaken (EPA OSWER)

Field of Accreditation: Those matrix, technology/method, and analyte combinations for which the accreditation body offers accreditation.

Holding Times: The maximum time that samples may be held prior to analyses and still be considered valid or not compromised. (40 CFR Part 136)

Internal Standard: A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical test method. (TNI)

Internal Standard Calibration: Calibrations for methods that utilize internal standards to compensate for changes in instrument conditions.

Instrument Blank: A clean sample (e.g., distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination. (EPA-QAD)

Instrument Detection Limit (IDL): The minimum amount of a substance that can be measured with a specified degree of confidence that the amount is greater than zero using a specific instrument. The IDL is associated with the instrumental portion of a specific method only, and sample preparation steps are not considered in its derivation. The IDL is a statistical estimation at a specified confidence interval of the concentration at which the relative uncertainty is $\pm 100\%$. The IDL represents a range where qualitative detection occurs on a specific instrument. Quantitative results are not produced in this range.

Laboratory Control Sample (however named, such as laboratory fortified blank, spiked blank, or QC check sample): A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes, taken through all preparation and analysis steps of the procedure unless otherwise noted in a reference method. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

An LCS shall be prepared at a minimum of 1 per batch of 20 or less samples per matrix type per sample extraction or preparation method except for analytes for which spiking solutions are not available such as total suspended solids, total dissolved solids, total volatile solids, total solids, pH, color, odor, temperature, dissolved oxygen or turbidity. The results of these samples shall be used to determine batch acceptance.

Least Squares Regression (1st Order Curve): The least squares regression is a mathematical calculation of a straight line over two axes. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The regression calculation will generate a correlation coefficient (r) that is a measure of the "goodness of fit" of the regression line to the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r must be greater than or equal to 0.99 for organics and 0.995 for inorganics.

Limit(s) of Detection (LOD) [a.k.a., Method Detection Limit (MDL)]: The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017.

Limit(s) of Quantitation (LOQ) [a.k.a., Reporting Limit]: The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence.

(QS) Matrix: The component or substrate that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following matrix distinctions shall be used:

Aqueous: Any aqueous sample excluded from the definition of Drinking Water or Saline/Estuarine. Includes surface water, groundwater effluents, and TCLP or other extracts.

Drinking Water: Any aqueous sample that has been designated as a potable or potential potable water source.

Saline/Estuarine: Any aqueous sample from an ocean or estuary, or other salt water source such as the Great Salt Lake.

Non-Aqueous Liquid: Any organic liquid with <15% settleable solids.

Biological Tissue: Any sample of a biological origin such as fish tissue, shellfish, or plant material. Such samples shall be grouped according to origin.

Solids: Includes soils, sediments, sludges, and other matrices with >15% settleable solids.

Chemical Waste: A product or by-product of an industrial process that results in a matrix not previously defined.

Air & Emissions: Whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbent tube, impinger solution, filter, or other device. (TNI)

Matrix Spike (spiked sample or fortified sample): A sample prepared, taken through all sample preparation and analytical steps of the procedure unless otherwise noted in a referenced method, by adding a known amount of target analyte to a specified amount of sample for which an independent test result of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

Matrix Spike Duplicate (spiked sample or fortified sample duplicate): A replicate matrix spike prepared and analyzed to obtain a measure of the precision of the recovery for each analyte.

Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

Method Detection Limit: See Limit of Detection (LOD)

Negative Control: Measures taken to ensure that a test, its components, or the environment do not cause undesired effects, or produce incorrect test results.

Non-conformance: An indication, judgment, or state of not having met the requirements of the relevant specifications, contract, or regulation.

Observation: A record of phenomena that (1) may assist in evaluation of the sample data; (2) may be of importance to the project manager and/or the client, and yet not at the time of the observation have any known effect on quality.

Performance Audit: The routine comparison of independently obtained qualitative and quantitative measurement system data with routinely obtained data in order to evaluate the proficiency of an analyst or laboratory.

Positive Control: Measures taken to ensure that a test and/or its components are working properly and producing correct or expected results from positive test subjects.

Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms. (TNI)

Preservation: Any conditions under which a sample must be kept in order to maintain chemical and/or biological integrity prior to analysis. (TNI)

Proficiency Testing: A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source. (TNI)

Proficiency Testing Program: The aggregate of providing rigorously controlled and standardized environmental samples to a laboratory for analysis, reporting of results, statistical evaluation of the results and the collective demographics and results summary of all participating laboratories. (TNI)

Proficiency Test Sample (PT): A sample, the composition of which is unknown to the laboratory and is provided to test whether the laboratory can produce analytical results within specified acceptance criteria. (TNI)

Quality Assurance: An integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process, item or service is of the type of quality needed and expected by the client. (TNI)

Quality Assurance [Project] Plan (QAPP): A formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved. (EAP-QAD)

Quality Control: The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality; also the system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against "out of control" conditions and ensuring that the results are of acceptable quality. (TNI)

Quality Control Sample: A sample used to assess the performance of all or a portion of the measurement system. One of any number of samples, such as Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking, intended to demonstrate that a measurement system or activity is in control. (TNI)

Quality Manual: A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users. (TNI)

Quality System: A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC activities. (TNI)

Raw Data: The documentation generated during sampling and analysis. This documentation includes, but is not limited to, field notes, electronic data, magnetic tapes, untabulated sample results, QC sample results, print outs of chromatograms, instrument outputs, and handwritten records. (TNI)

Record Retention: The systematic collection, indexing and storing of documented information under secure conditions.

Reference Material: Material or substance one or more properties of which are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. (TNI)

Reference Standard: Standard used for the calibration of working measurement standards in a given organization or a given location. (TNI)

Sampling: Activity related to obtaining a representative sample of the object of conformity assessment, according to a procedure.

Second Order Polynomial Curve (Quadratic): The 2nd order curves are a mathematical calculation of a slightly curved line over two axes. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The 2nd order regression will generate a coefficient of determination (COD or r^2) that is a measure of the "goodness of fit" of the quadratic curvature the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r^2 must be greater than or equal to 0.99.

Selectivity: The ability to analyze, distinguish, and determine a specific analyte or parameter from another component that may be a potential interferent or that may behave similarly to the target analyte or parameter within the measurement system. (TNI)

Sensitivity: The capability of a method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. (TNI)

Spike: A known mass of target analyte added to a blank, sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.

Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of standard setting and meets the approval requirements of standard adoption organizations procedures and policies. (TNI)

Standard Operating Procedures (SOPs): A written document which details the method for an operation, analysis, or action, with thoroughly prescribed techniques and steps. SOPs are officially approved as the methods for performing certain routine or repetitive tasks. (TNI)

Storage Blank: A blank matrix stored with field samples of a similar matrix (volatiles only) that measures storage contribution to any source of contamination.

Surrogate: A substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.

Surrogate compounds must be added to all samples, standards, and blanks, for all organic chromatography methods except when the matrix precludes its use or when a surrogate is not available. Poor surrogate recovery may indicate a problem with sample composition and shall be reported to the client whose sample produced poor recovery. (QAMS)

Systems Audit (also Technical Systems Audit): A thorough, systematic, qualitative on-site assessment of the facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and reporting aspects of a total measurement system. (EPA-QAD)

Technical Manager: A member of the staff of an environmental laboratory who exercises actual day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results

Technology: A specific arrangement of analytical instruments, detection systems, and/or preparation techniques.

Traceability: The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standards, primary standards, basic physical constants or properties, or reference materials. In a data collection sense, it relates calculations and data generated throughout the project back to the requirements for the quality of the project. (TNI)

Trip Blank: A blank matrix placed in a sealed container at the laboratory that is shipped, held unopened in the field, and returned to the laboratory in the shipping container with the field samples.

Uncertainty: A parameter associated with the result of a measurement that characterizes the dispersion of the value that could reasonably be attributed to the measured value.

Acronyms:

A2LA – American Association for Laboratory Accreditation
ANSI – American National Standards Institute
ASQ – American Society of Quality
CAR – Corrective Action Report
CCB – Continuing Calibration Blank
CCV – Continuing Calibration Verification
CF – Calibration Factor
CFR – Code of Federal Regulations
COC – Chain of Custody
DOC – Demonstration of Capability
DQO – Data Quality Objectives
DUP - Duplicate
EHS – Environment, Health and Safety
EPA – Environmental Protection Agency
GC - Gas Chromatography
GC/MS - Gas Chromatography/Mass Spectrometry
HPLC - High Performance Liquid Chromatography
ICB – Initial Calibration Blank
ICP - Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP/MS – ICP/Mass Spectrometry
ICV – Initial Calibration Verification
IDL – Instrument Detection Limit
IH – Industrial Hygiene
IS – Internal Standard
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
LIMS – Laboratory Information Management System
LOD – Limit of Detection
LOQ – Limit of Quantitation
MDL – Method Detection Limit
MDLCK – MDL Check Standard
MDLV – MDL Verification Check Standard
MRL – Method Reporting Limit Check Standard
MS – Matrix Spike
MSD – Matrix Spike Duplicate
NELAP - National Environmental Laboratory Accreditation Program
PT – Performance Testing
TNI – The NELAC Institute
QAM – Quality Assurance Manual
QA/QC – Quality Assurance / Quality Control
QAPP – Quality Assurance Project Plan
RF – Response Factor
RPD – Relative Percent Difference

RSD – Relative Standard Deviation
SD – Standard Deviation
SDS - Safety Data Sheet
SOP – Standard Operating Procedure
TAT – Turn-Around-Time
VOA – Volatiles
VOC – Volatile Organic Compound

Appendix 6. Analytical Method References

Reference methods include:

- HASL-300 28th Edition, Environmental Measurements Laboratory (EML), 1997.
- Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, US EPA, January 1996.
- Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; Analysis and Sampling Procedures; 40CFR Part 136 as amended by Method Update Rule; August 28, 2017.
- Methods for Chemical Analysis of Water and Wastes, EPA 600 (4-79-020), 1983.
- Methods for the Determination of Inorganic Substances in Environmental Samples, EPA-600/R-93/100, August 1993.
- Methods for the Determination of Metals in Environmental Samples, EPA/600/4-91/010, June 1991. Supplement I: EPA-600/R-94/111, May 1994.
- Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991, Supplement I, EPA-600-4-90-020, July 1990, Supplement II, EPA-600/R-92-129, August 1992. Supplement III EPA/600/R-95/131 - August 1995 (EPA 500 Series) (EPA 500 Series methods)
- Technical Notes on Drinking Water Methods, EPA-600/R94-173, October 1994
- Statement of Work for Inorganics & Organics Analysis, SOM and ISM, current versions, USEPA Contract Laboratory Program Multi-media, Multi-concentration.
- Standard Methods for the Examination of Water and Wastewater, 18th/19th/20th/ on-line edition; Eaton, A.D. Clesceri, L.S. Greenberg, A.E. Eds; American Water Works Association, Water Pollution Control Federation, American Public Health Association: Washington, D.C.
- Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846), Third Edition, September 1986, Final Update I, July 1992, Final Update IIA, August 1993, Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996; Final Update IV, January 2008; Final Update V, August 2015; Final Update VI, May 2019; Final Update VII, July 2021.
- Annual Book of ASTM Standards, American Society for Testing & Materials (ASTM), Philadelphia, PA.
- National Status and Trends Program, National Oceanographic and Atmospheric Administration, Volume I-IV, 1985-1994.
- Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005)
- Code of Federal Regulations (CFR) 40, Parts 136, 141, 172, 173, 178, 179 and 261

Appendix 7. Listing of Methods Performed

Preparation Only Methods

Method	Aqueous	Solid	Waste	Biological
Organics				
Calif. CAM-WET	X	X	X	
EPA 1311	X	X	X	
EPA 1312 (E/W)	X	X	X	
EPA 3510C	X			
EPA 3535	X			
EPA 3540B		X		
EPA 3546		X		
EPA 3550B/C		X		X
EPA 3580A			X	
EPA 3600C	X	X	X	
EPA 3620B	X	X	X	
EPA 3630C	X	X	X	
EPA 3640A	X	X		X
EPA 5030B/C	X	X	X	
EPA 5035, 5035A	X	X	X	
Inorganics				
Calif. CAM WET	X	X	X	
EPA 1311	X	X	X	
EPA 1312 (E/W)	X	X	X	
EPA 3005A	X			
EPA 3010A	X			
EPA 3050B		X	X	X

Organics Methods Performed

Parameter	Method	Aqueous	Solid	Waste	Biological	Air
Volatile Organics	EPA 8260B/C	X	X	X		
Base Neutrals and Acids (BNAs)	EPA 8270C/D	X	X	X	X	
Organochlorine Pesticides	EPA 8081B	X	X	X	X	
	EPA 1699					
PCBs (Aroclors)	EPA 8082A	X	X	X	X	
PCB Congeners	EPA 1668A/C	X	X	X	X	
Petroleum Hydrocarbons	EPA 8015C/D (DRO/ORO)	X	X	X		
	EPA 8260B/C (GRO)	X	X	X		
Nitrosamines	WS-MS-0012	X	X			
PAHs	EPA 8270C/D (SIM)	X	X	X		
1,4-Dioxane	8270 C SIM	X				
Perfluorinated Alkyl Substances (PFAS), including PFOA/PFOS	EPA 537 (Modified)	X	X	X	X	X
	EPA 537 (Modified) in accordance with QSM 5.4 Table B-15 or higher	X	X		X	
	EPA 1633	X	X		X	
	EPA 533	X				
	EPA 537	X				
	EPA 537.1	X				
Dioxins & Furans	EPA 1613B	X	X	X	X	
	EPA 8290/8290A	X	X	X	X	
	EPA 8280A/B	X	X	X	X	

Inorganics Methods Performed

Parameter	Method	Aqueous	Solid	Waste	Biological	Air
Alkalinity (Carbonate, Bicarbonate, Total)	SM 2320B	X				
Bromide, Chloride, and Fluoride	EPA 300.0	X				
	EPA 9056 / 9056A	X	X			
Chromium, Hexavalent	EPA 7196A	X				
	EPA 7199	X				
Conductivity	EPA 9050A	X				
	EPA 120.1	X				
	SM 2510 B	X				
Demand, Chemical Oxygen	EPA 410.4	X				
	SM 5520D	X				
Moisture	ASTM 2216		X			
Microplastics	CA SWB-MP-1	X				
	CA SWB-MP-2	X				
Nitrate	EPA 353.2	X				
	EPA 300.0	X				
	EPA 9056	X	X			
Nitrate-Nitrite	EPA 353.2	X				
	EPA 300.0	X				
Nitrite	EPA 353.2	X				
	EPA 300.0	X				
	EPA 9056 / 9056A	X	X			
Orthophosphate	EPA 300.0	X				
	EPA 9056 / 9056A	X				
Particulates in Air	EPA 5					X
	40 CFR Part 50					X
Perchlorate	EPA 314.0	X				
	EPA 331.0	X				
	EPA 6850	X	X			
pH	SM 4500 H+ B	X				
	EPA 9040A	X				
	EPA 9045C/D		X	X		
Solids, Total	SM 2540 B	X				
Solids, Total Dissolved	SM 2540 C	X				
Solids, Total Suspended	SM 2540 D	X				
Sulfate	EPA 300.0	X				
	EPA 9056	X	X			
Turbidity	EPA 180.1	X				

Metals Methods Performed

Parameter	Methods	Aqueous	Solid	Waste	Biological	Air
Trace Metals	EPA 6010B/C/D	X	X	X	X	
	EPA 6020 / 6020A/B	X	X	X	X	X
	EPA 200.8	X				
Hardness	SM 2340B	X				
Mercury	EPA 7470A	X				
	EPA 7471A/B		X	X	X	

Appendix 8. Listing of Common Data Qualifiers

Data Qualifiers below are examples of the qualifiers available. Qualifiers are defined in each data package reported, based on the qualifier used and the analysis group for which it is applied. In specific instances (for instance, programs under the DOD/DOE QSM), the qualifiers below may not have the same definitions as in the data package used, or different qualifiers may be used.

Qualifier	Qualifier Definition
*	LCS or LCSD is outside acceptance limits.
*1	LCS/LCSD RPD exceeds control limits.
*3	ISTD response or retention time outside acceptable limits.
*4	ICPMS relative intensity is outside the method limits.
*5	Isotope dilution analyte is outside acceptance limits.
^	Instrument related QC is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
B	Compound was found in the blank and sample.
CI	The peak identified by the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be a high bias.
cn	Refer to Case Narrative for further detail
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
E	Result exceeded calibration range.
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
F3	Duplicate RPD exceeds the control limit
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
ND	Compound not detected.
P, p1	The %RPD between the primary and confirmation column/detector is >40%. The lower/higher value has been reported. (Wording updated based on report context).
Q	The reported result is the estimated maximum possible concentration of this analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference.
U	Indicates the analyte was analyzed for but not detected.
X	Surrogate recovery exceeds control limits

APPENDIX J – FINACIAL ASSURANCE

APPENDIX K - EPA GUIDANCE DOCUMENT ON SAMPLING

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 1

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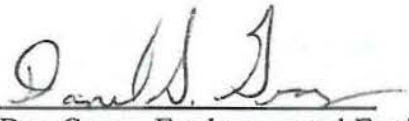


STANDARD OPERATING PROCEDURE FOR SAMPLING POROUS SURFACES FOR POLYCHLORINATED BIPHENYLS (PCBs)

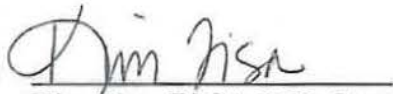
May 2011

**STANDARD OPERATING PROCEDURE
FOR SAMPLING POROUS SURFACES
FOR POLYCHLORINATED BIPHENYLS (PCBs)**

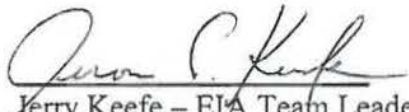
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Attachments:

Example of Custody Seal and Sample Label

Example of Chain of Custody Form

1.0 Scope and Application

- 1.1 This Standard Operating Procedure (SOP) is suitable for collection of a porous matrix sample for analysis of Polychlorinated Biphenyls (PCBs).
- 1.2 This SOP describes sampling techniques for both hard and soft porous surfaces.
 - 1.2.1 Hard surfaces, and most soft surfaces, can be sampled using an impact hammer drill to generate a uniform, finely ground, powder to be extracted and analyzed for PCBs. This procedure is primarily geared at providing enough sample quantity for two analyses. Hard porous surfaces include concrete, brick, asphalt, cement, sandstone, limestone, unglazed ceramics, and other possible PCB suspected material. This procedure may also be used on other softer porous surfaces, such as wood.
 - 1.2.2 Soft surfaces can be sampled using a chisel or sharp knife to generate a representative sample to be extracted and analyzed for PCBs. Soft porous surfaces include wood, wall plasterboard, low density plastics, rubber, caulking, and other PCB suspected material.
- 1.3 This SOP provides for collection of surface samples (0 – 0.5 inches) and delineation of PCB contamination throughout the core of the porous surface. The procedure can be used to sample the porous surface at distinctly different depth zones.

2.0 Method Summary

A one-inch or other sized diameter carbide drill bit is used in a rotary impact hammer drill to generate a fine powder, or other representative sample, suitable for extraction and analysis of PCBs from porous surfaces. This method also allows the use of chisels or knives for the collection of samples from soft porous surfaces for PCB analysis.

3.0 Definitions

- 3.1 Field/Bottle Blank: A sample container of the same lot as the containers used for the environmental samples. This evaluates PCB contamination introduced from the sample container(s) from a common lot.
- 3.2 Equipment/Rinse/Rinsate Blanks: A sample that is collected by pouring hexane over the sample collection equipment after decontamination and before sample collection. The sample is collected in the appropriate sample container identical to the sample containers. This represents background contamination resulting from the field equipment, sampling procedure, sample container, and shipment.

- 3.3 Field Replicates/Duplicates: Two or more samples collected at the same sampling location. Field replicates should be samples collected side by side. Field replicates represent the precision of the whole method, site heterogeneity, field sampling, and the laboratory analysis.
- 3.4 Field Split Samples: Two or more representative subsamples taken from one environmental sample in the field. Prior to splitting, the environmental sample is homogenized to correct for sample heterogeneity that would adversely impact data comparability. Field split samples are usually analyzed by different laboratories (interlaboratory comparison) or by the same laboratory (intralaboratory comparison). Field splits are used to assess sample handling procedures from field to laboratory and laboratory comparability.
- 3.5 Laboratory Quality Samples: Additional samples that will be collected for the laboratory's quality control program: matrix spike, matrix spike duplicate, laboratory duplicates, etc.
- 3.6 Proficiency Testing (PT)/Performance Evaluation (PE) Sample: A sample, the composition of which is unknown to the laboratory or analyst, provided to the analyst or laboratory to assess the capability to produce results within acceptable criteria. This is optional depending on the data quality objectives. If possible, it is recommended that the PE sample be of similar matrix as the porous surface(s) being sampled.
- 3.7 Porous Surface: Any surface that allows PCBs to penetrate or pass into itself including, but not limited to, paint or coating on metal; corroded metal; fibrous glass or glass wool; unglazed ceramics; ceramics with porous glaze; porous building stone such as sandstone, travertine, limestone, or coral rock; low density plastics such as Styrofoam and low density polyethylene; coated (varnished or painted) or uncoated wood; painted or unpainted concrete or cement; plaster; plasterboard; wallboard; rubber; caulking; fiberboard; chipboard; asphalt; or tar paper.
- 3.8 Shipping Container Temperature Blank: A water sample that is transported to the laboratory to measure the temperature of the samples in the cooler.
- 4.0 Health and Safety**
- 4.1 Eye, respiratory, and hearing protection are required at all times during sample drilling. A properly fitted respirator is required for hard porous surface sampling. A respirator is recommended whenever there is a risk of inhalation of either particulate or volatilized PCBs during sampling.
- 4.2 All proper personal protection clothing and equipment must be worn.

4.3 When working with potentially hazardous materials or situations, follow EPA, OSHA, and specific health or safety procedures.

4.4 Care must be exercised when using an electrical drill and sharp cutting objects.

5.0 Interferences and Potential Problems

5.1 This sampling technique produces a finely ground uniform powder, which minimizes the physical matrix effects from variations in the sample consistency (i.e., particle size, uniformity, homogeneity, and surface condition). Matrix spike analysis of a sample is highly recommended to monitor for any matrix related interferences.

5.2 Nitrile gloves are recommended. Latex gloves must not be used due to possible phthalate contamination.

5.3 Interferences may result from using contaminated equipment, solvents, reagents, sample containers, or sampling in a disturbed area. The drill bit must be decontaminated between samples. (see Section 11.0.)

5.4 Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment.

6.0 Personnel Qualifications

6.1 All field samplers working at hazardous materials/waste sites are required to take a 40 hour health and safety training course prior to engaging in any field activities. Subsequently, an 8 hour refresher health and safety course is required annually.

6.2 The field sampler should be trained by an experienced sampler before initiating this procedure.

6.3 All personnel shall be responsible for complying with all quality assurance/quality control requirements that pertain to their organizational/technical function.

7.0 Equipment and Supplies

7.1 This list varies with the matrix and if depth profiling is required

- Rotary impact hammer variable speed drill
- 1-inch or other suitable (1/2, 3/4, etc.) diameter carbide tip drill bits
- Steel chisel or sharp cutting knife, and hammer
- Brush and cloths to clean area
- Stainless steel scoopulas

Aluminum foil to collect the powder sample
1 quart Cubitainer with the top cut out to collect the powder sample
Aluminum weighing pans to collect the powder sample
Cleaned glass container (2 oz or 40 mL) with Teflon lined cap
Decontamination supplies: hexane, two small buckets, a scrub brush, detergent, deionized water, hexane squirt bottle, and paper towels
Dedicated vacuum cleaner with a disposable filter or a vacuum pump with a dust filter
Polyethylene tubing and Pasteur pipettes
Sample tags/labels, custody seals, and Chain-of-Custody form

8.0 Sampling Design

8.1 A sufficient number of samples must be collected to meet the data quality objectives of the project. If the source of the PCB contamination is regulated under the federal TSCA PCB Regulations at 40 CFR Part 761, the sampler should insure that the sampling design is sufficient to meet any investigation or verification sampling requirements. At a minimum, the following is recommended:

8.1.1 Suspected stained area (s) should be sampled.

8.1.2 At each separate location, collect at least 3 samples of each type of porous surface, regardless of the amount of each type of porous surface present.

8.1.3 In areas where PCB equipment was used or where PCBs were stored, samples should be collected at a frequency of 1 sample/100 square feet (ft²).

9.0 Sample Collection

9.1 Hard Porous Surfaces

9.1.1 Lock a 1-inch or another size diameter carbide drill bit into the impact hammer drill and plug the drill into an appropriate power source. For easy identification, sample locations may be pre-marked using a marker or paint. (Note: the actual drilling point must not be marked.) Remove any debris with a clean brush or cloth prior to drilling. All sampling decisions of this nature should be noted in the sampling logbook.

9.1.2 Use a Cubitainer with the top cut off or aluminum foil to contain the powdered sample. Begin drilling in the designated location. Apply steady even pressure and let the drill do the work. Applying too much pressure will generate excessive heat and dull the drill bit prematurely. The drill will provide a finely ground powder that can be easily collected.

- 9.1.3 Samples should be collected at ½-inch depth intervals. Thus, the initial surface sample should be collected from 0 – 0.5 inches. A ½-inch deep hole generates about 10 grams (20 mL) of powder. Multiple holes located closely adjacent to each other, may be needed to generate sufficient sample volumes for a PCB determination. It is strongly recommended that the analytical laboratory be consulted on the minimum sample size needed for PCB extraction and analysis.
- 9.1.4 Wall and Ceiling Sampling: A team of two samplers will be required for wall and ceiling sampling. The second person will hold a clean catch surface (e.g. an aluminum pan) below the drill to collect the falling powder. Alternatively, use the chuck-end of the drill bit and punch a hole through the center of the collection pan. The drill bit is then mounted through the pan and into the drill. For ceilings, the drill may be held at an angle to collect the powder. Thus the driller can be drilling at an angle while the assistant steadies the pan to catch the falling powder. As a precaution, it may be advantageous to tape a piece of plastic around the drill, just below the chuck, to avoid dust contaminating the body of the drill and entering the drill's cooling vents. Caution must be taken to prevent obstruction of the drill's cooling vents.

9.2 Soft Porous Surfaces

- 9.2.1 The procedure for the hard porous surface may be used for certain soft porous surfaces, such as wood.
- 9.2.2 Samples should be collected at no more than ½-inch depth intervals using a metal chisel or sharp cutting knife. Thus, the initial surface sample should be collected from 0 – 0.5 inches. It is important to collect at least 10 grams for analysis.
- 9.2.3 For soft porous surfaces, such as caulking and rubber, a representative sample can be collected using a metal chisel or sharp cutting knife.

9.3 Multiple Depth Sampling

- 9.3.1 Multiple Depth Sampling may not be applicable to certain porous surfaces, such as caulking.
- 9.3.2 Collect the surface sample as outlined in Section 9.1 or 9.2.
- 9.3.3 Use the vacuum pump or cleaner to clean out the hole.
- 9.3.4 To collect multiple depths there are two options.

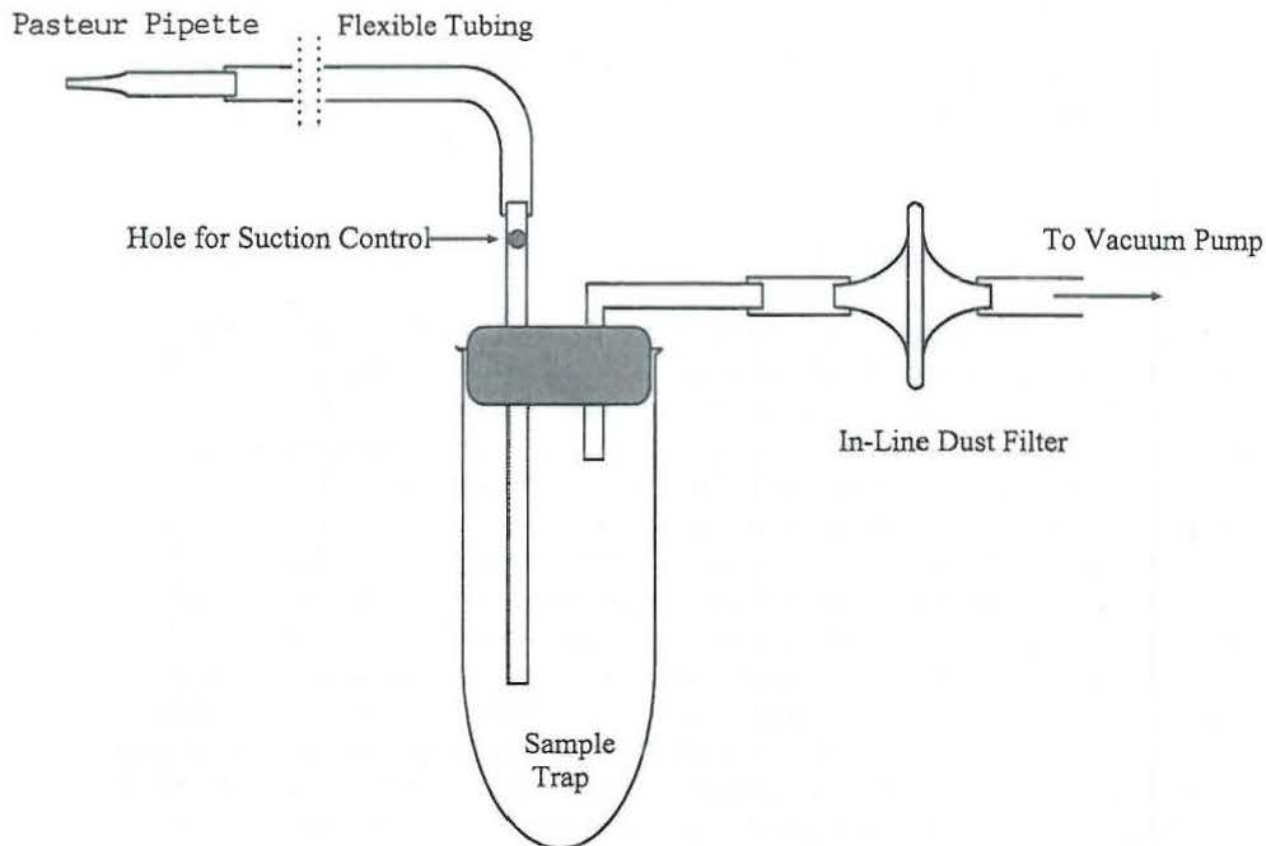
9.3.4.1 Option one: drill sequentially ½-inch increments with the 1 inch drill.

9.3.4.2 Option two: drill with the 1 inch bit and either make the hole larger or use a smaller bit to take the next ½- inch sample.

9.3.5 A stainless steel scoopula will make it easier to collect the sample from the bottom of the hole.

9.4 Vacuum Trap Design and Clean-out

The trap presented in Figure 1 is a convenient and thorough way for collecting and removing concrete powder from drilled holes. The trap system is designed to allow for control of the suction from the vacuum pump and easy trap clean-out between samples. Note, by placing a hole in the inlet tube (see Figure 1), a finger on the hand holding the trap can be used to control the suction at the sampling tip. Thus, when this hole is left completely open, there will be no suction, and the sampler can have complete control over where and what to sample. To change-out between samples the following steps should be taken: 1) the Pasteur pipette and piece of polyethylene tubing at the sample inlet should be replaced with new materials, 2) the portion of the rubber stopper and glass tubing that was in the trap should be wiped down with a clean damp paper towel (wetted with deionized water) and then dried with a fresh paper towel, 3) a clean pipe cleaner should be drawn through the glass inlet tube to remove any concrete dust present, and 4) the glass tube or flask used to collect the sample should be swapped out with a clean decontaminated sample trap. Having several clean tubes or flasks on hand will facilitate change-out between samples.

Figure 1

Note: the holes should be vacuumed thoroughly to minimize any cross-contamination between sample depths and the bits should be decontaminated between samples. (See Section 11.0)

10.0 Sample Handling, Preservation, and Storage

- 10.1 Samples must be collected in glass containers for PCB analyses. In general, a 2-ounce sample container with a Teflon-lined cap (wide-mouth jars are preferred) will hold sufficient mass for most analyses. A 2-ounce jar can hold roughly 90 grams of sample.
- 10.2 Samples are to be shipped refrigerated and maintained at $\leq 6^{\circ}\text{C}$ until the time of extraction and analysis.
- 10.3 The suggested holding time for PCB samples is 14 days to extraction.

11.0 Decontamination

- 11.1 Assemble two decontamination buckets. The first bucket contains a detergent and potable water solution, and the second bucket is for rinsate. Place all used drill bits, hose for the vacuum cleaner, and utensils in the detergent and water bucket. Scrub each piece thoroughly using the scrub brush. Note, the powder does cling to the metal surfaces, so care should be taken during this step, especially with the twists and curves of the drill bits. Next, rinse each piece with water and hexane. Place the rinsed pieces on clean paper towels and individually dry and inspect each piece. Note: all pieces should be dry prior to reuse.
- 11.2 Lightly contaminated drill bits and utensils may be wiped with a hexane soaked cloth and hexane rinsed for decontamination.

12.0 Data and Record Management

- 12.1 All data and information collection should follow a Field Data Management SOP or Quality Assurance Project Plan (QAPP).
- 12.2 Follow the chain of custody procedures to release the samples to the laboratory. A copy is kept with the sampling records.
- 12.3 The field data is stored for at least 3 years.

13.0 Quality Control and Quality Assurance

- 13.1 Representative samples are required. The sampler will evaluate the site specific conditions to assure the sample will be representative.
- 13.2 All sampling equipment must be decontaminated prior to use and between each discrete sample.
- 13.3 All field Quality Control (QC) sample requirements in a Sample and Analysis Plan (SAP) or QAPP must be followed. The SAP or QAPP may involve field blanks, equipment blanks, field duplicates and/or the collection of extra samples for the laboratory's quality control program.
- 13.4 Field duplicates should be collected at a minimum frequency of 1 per 20 samples or 1 per non-related porous matrix, whichever is greater.

14.0 Waste Management and Pollution Prevention

- 14.1 During field sampling events there may be PCB and/or hazardous waste produced from the sample collection. The waste must be handled and disposed of in accordance with federal, state, and local regulations. The dust filter, and tubing if a vacuum pump is used, is disposed after each site investigation. This waste will be treated as PCB waste if the samples are positive for PCBs. It may be possible to manage or dispose of the waste produced at the site where the work was performed. If the site does not meet regulatory requirements for these types of activities, the waste must be transported to a facility permitted to manage and/or dispose of the waste.

15.0 References

1. Guidance for the Preparation of Standard Operating Procedures for Quality-Related Operations, QA/G-6, EPA/600/R-96/027, November 1995.
2. 40 CFR Part 761 – Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, and Use Prohibitions
3. Sample Container and Holding Time: RCRA SW 846, Chapter 4, Table 4.1, Revision 4, February, 2007.

Example of Sample Label and Custody Seal

U.S. ENVIRONMENTAL PROTECTION AGENCY – REGION I BOSTON, MASS.	
LABEL	NAME OF UNIT AND ADDRESS ENVIRONMENTAL SERVICES DIVISION 60 WESTVIEW STREET LEXINGTON, MASSACHUSETTS 02173
	DATE: YR/MO/DAY
SAMPLE	TIME
	STATION NO.
	SAMPLE NO.
	SUB NO.
	PRESERVATIVE
	AMOUNT
SOURCE OF SAMPLE	
SAMPLING CREW (FIRST, INITIAL, LAST NAME)	
ANALYST	

 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY OFFICIAL SAMPLE SEAL	SAMPLE NO.	DATE
	SIGNATURE	
	PRINT NAME AND TITLE (Inspector, Analyst or Technician)	
SEAL BROKEN BY		DATE

EPA FORM 7500-2 (R7-75)



REGION 1

CHAIN OF CUSTODY RECORD

[illegible]

APPENDIX L – FACILITY SOP ON WIPE SAMPLING

I. PURPOSE

This procedure is implemented for the permitted TSCA storage area to ensure that there are no contaminants above the regulatory threshold of $10\mu\text{g}/100\text{cm}^2$ which can be transferred outside the confines of the permitted unit.

II. RESPONSIBILITIES**A. Facility Manager**

The Facility Manager will ensure the requirements of this procedure are met continually. The Facility Manager shall be responsible for ensuring that all required training, inspections, and operational procedures are performed as required, and in accordance with this procedure. The Facility Manager is also responsible for monitoring compliance.

B. Manager and Supervisor

The Manager and Supervisor are responsible for training employees on this procedure to ensure good operating practices in compliance with all appropriate regulations. Managers and supervisors are responsible for documenting such training and providing appropriate competency testing and updates as necessary.

C. Lab Manager/Technician

The lab manager/ technician shall be responsible for selection sample locations, marking sample location on grid map, collecting samples and analyzing (or sending them out for analysis) samples in accordance with the requirements of this SOP.

D. Health and Safety Manager

The Health and Safety Manager is responsible for assisting the determination of the proper Personal Protective Equipment that must be employed when handling PCB materials. The Health and Safety Manager is also responsible for assisting in the development of procedures necessary to safely handle materials listed by this procedure by identifying Workplace Hazard, Personal Protective equipment and developing and implementing training.

E. Environmental Manager

Then Environmental Manager is responsible for assisting development of good operating procedures that comply with all relevant permits and regulatory citations.

F. Employee

The employee is responsible for promptly reporting any deviation from this procedure or non-compliance situation which may develop. The employee is responsible for following all facility policies and procedures and using good judgment during implementation of this and other procedures.

III. PROCEDURES

The Emerald Transformer wipe sampling program is in place to ensure on-going compliance with regulatory cleanup levels. The following information details the requirements of this program:

A. Collection Times

Wipe samples will be collected four (4) times per year. These quarterly samples will be collected, in the first month of the quarter (e.g. for the first quarter, January – March, the sample will be collected in January).

B. Number of Samples

Based on the size of TSCA storage location, a minimum of two (2) samples will be taken quarterly. The two areas of attention are the floor of the PCB containment bay and the ramp to that bay.

C. Collection Locations

Random samples will be taken from both the PCB containment bay and the ramp located at the entrance of the bay. To that end, each location has a designated grid pattern that can be selected as the quarterly sampling location:

- PCB Containment Bay (locations A-1 through E-3)
- Ramp (locations 1 through 8)

A diagram will be maintained showing the location of each sample taken for that quarter. Once a location has been selected it will not be sampled again until a sample has been taken from each location (see Figure 1).

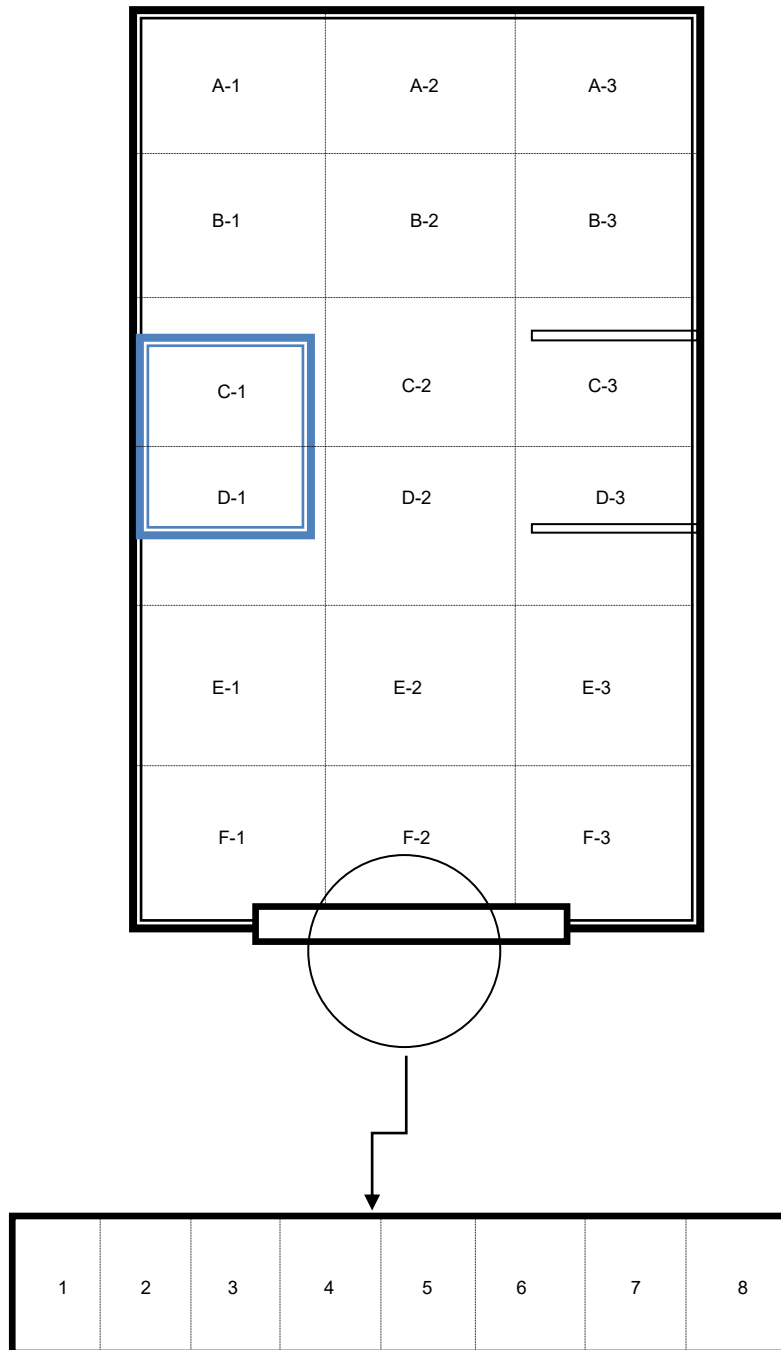


Figure 1

D. Sampling Procedure Used

The standard wipe test protocol will be followed for collecting samples.

E. Threshold to Define PCB Contamination

For the purpose of this sampling, concentrations of less than $10\mu\text{g}/100\text{cm}^2$ will be considered not contaminated and require no further action. Concentrations above $10\mu\text{g}/100\text{cm}^2$ will be considered contaminated and the protocol described in Section H of this SOP will be followed.

F. Sample Analysis

Samples will be analyzed at the Facility on-site laboratory. All samples collected will be analyzed using EPA SW-846 Method 8082

At least one time per year samples will be sent to an off-site laboratory for analysis.

G. Reporting

The results of the quarterly wipe sampling results will be submitted to the EPA on an annual basis. The annual analysis report will contain a compilation of the data for all four quarters of wipe sampling for that calendar year. Annual analysis reports will be submitted at the end of the fourth quarter of the calendar year, within 30 days following fourth quarter sampling activities. Additionally, records of the laboratory results for each quarter will be maintained at the Emerald Transformer facility, and will be readily available for EPA inspection.

a. The report will be sent to the USEPA as indicated below:

- Submittal must be electronic to R9LandSubmit@epa.gov and include Emerald Transformer Los Angeles, LLC and Site ID CAD050806850 in the subject line.
- U.S. Environmental Protection Agency Region 9
75 Hawthorne St
San Francisco, CA 94105
Attention:PCB Coordinator
USEPA ID# CAD050806850

Information included to the report to EPA will include:

- Location of sampling
- Dates Samples were collected
- Name of person collecting samples
- Analytical results of the sampling event

H. Remedial Requirements

If wipe samples show PCB concentrations greater than $10\mu\text{g}/100\text{ cm}^2$, the area of contamination will be fully delineated to determine the extent of PCB contamination.

This will be accomplished by first marking the location where the elevated levels were found and then sampling in a step out fashion, utilizing a 1.5 meter spacing grid, reorienting it, and collecting a sample at each point where the grid falls in the cleanup area. The contaminated area will then be cleaned in accordance with 40 CFR § 761.61 or 40 CFR § 761 Subpart G (PCB Spill Cleanup Policy) and follow-up sampling will be conducted to verify the contamination has been removed (see Figure 2).

If, in any given quarter, the PCB concentration in any of the wipe samples exceeds the threshold concentration of $10\mu\text{g}/100\text{cm}^2$, EPA will be promptly notified. A report providing the following information will be sent to EPA:

- Location of sampling
- Dates Samples were collected
- Name of person collecting samples
- Analytical results of the sampling event
- A description of the extent of contamination
- Process used to and clean-up the contaminants

The report will be sent to EPA within 30 days of the sampling event detecting the contamination.

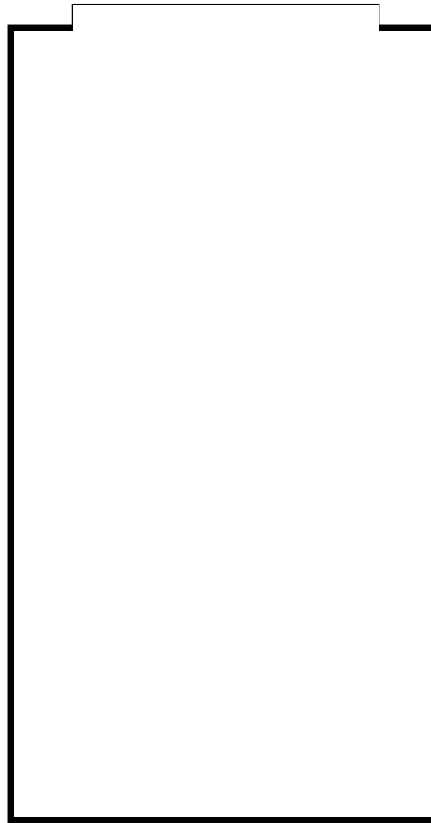


Figure 2

I. Record-Keeping

In addition to the reports sent to EPA, records of all sampling and clean-up activities required by this SOP will be maintained on-site and made available for inspection.

APPENDIX M – CLOSURE REPORT FOR CONTAINMENT BAY E

Hazardous Waste Treatment, Storage, and Recycling Facility

Closure Certification Report

TSCA Containment Bay E

Date: May 13, 2014

Prepared For: Clean Harbors, Los Angeles LLC
5756 Alba Street
Los Angeles, CA 90058

Prepared By: Omega Technical Services, Inc.
2736 Via Sinaloa
Claremont, CA 91711

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EXECUTIVE SUMMARY

Closure of the TSCA storage area designated as Containment Bay E at the Clean Harbors, Los Angeles, LLC facility was completed in accordance with Appendix M of the TSCA Commercial Storage Permit, Revision 1, June 2013 that was previously submitted to and approved by the United States Environmental Protection Agency (USEPA).

Omega Technical Services, Inc. is the independent registered professional engineer contracted to certify the containment bay at the Clean Harbors, Los Angeles, LLC Facility. This report is the documentation of closure activities at the site. With the exception of items specifically noted within this report, the Closure Plan was followed in its entirety.

The unit documented in this report was closed in accordance with the Closure Plan. All TSCA wastes were removed from the TSCA regulated units and disposed of at a permitted disposal facility.

1.0 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Closure Report documents the procedures that Clean Harbors, Los Angeles, LLC followed to close a specific TSCA unit at its facility in Los Angeles, California.

The closure project was completed in accordance with Appendix M - Closure of Containment Bay E of the TSCA Commercial Storage Permit Revision 1 dated June, 2013. This document is included as Appendix I of this report. The goal of the Closure Plan was to achieve clean closure. This means that all TSCA wastes were removed from the TSCA regulated units, and that any releases at or from the units were remediated so that further regulatory control is not necessary to protect human health and the environment.

The Closure Report includes background information on the facility, information concerning the closure team and schedule, a discussion of any modifications to the Closure Plan, a description of closure activities, certification of closure, and a conclusion. Documentation of closure activities is included in the appendices to this report.

1.2 BACKGROUND

Facility Identification

The subject of this report is the Clean Harbors, Los Angeles, LLC facility, located at 5756 Alba Street in Los Angeles, California. The facility EPA Identification Number is CAD 050806850.

General Facility Description

The facility receives, stores, and processes wastes in either bulk loads (e.g. tank trucks, roll off bins, etc.), containers (e.g. transformers, pole mounts, bushings, ballasts, and other oil filled or contaminated electrical PCB and non-PCB equipment and articles. Waste is manifested and transported to the facility by licensed hazardous waste transporters. All containers manifested to the facility are inspected and assigned tracking numbers. The containers are then stored in designated storage areas or assigned processing areas. Storage and processing areas are equipped with concrete secondary containment and a roof, and are operated such that incompatible wastes are kept segregated.

The facility reclaims, recycles, treats and stores hazardous waste using the following management options:

- Electrical transformer draining, flushing, disposal and salvage.

No onsite disposal takes place at the facility. All wastes are transferred off site for ultimate disposal or reuse.

The facility once received EPA characteristic industrial wastewater for phase separation, solidification, neutralization, and precipitation. The systems associated with this past activity are no longer in use and are subject to closure under this plan and the facility RCRA Closure Plan. The facility retains an active permit for wastewater processing.

The facility is permitted under the federal National Pollutant Discharge Elimination System (NPDES) Storm Water Multi-Sector General Permit for storm water discharges under the terms and conditions imposed by this general permit.

The facility does not accept the following types of hazardous wastes for treatment or processing:

- Radioactive waste
- Explosives
- Etiological waste
- Pathogenic waste

Facility Location

The facility is located in the city of Los Angeles in a heavy industrial area. The facility is surrounded by manufacturing and distribution plants to the north, south, east and west.

Prior Site Activities

The facility formerly accepted a wide range of RCRA and non-RCRA waste materials. Primary activities were wastewater treatment and organic waste processing (reliquification, fuel blending, etc.). The current owner of the facility is Clean Harbors Los Angeles LLC (CHLA). Previous owners were Safety-Kleen, Inc.; Laidlaw Environmental Services; Rollins OPC, Inc.; and Oil Process Company.

Facility Design

The hazardous waste management units at the facility consist of a container storage and processing building on the southeast portion, tank storage units in the center portion, and a container storage and processing area in the east-center portion. Facility administrative, supervisory, and management personnel, as well as the facility laboratory, are located in a building at the southwest portion of the facility. This building also includes the plant lunchroom and locker/shower facilities. The entire site is paved.

1.3

CLOSURE PLAN IMPLEMENTATION

Closure Team

A closure team consisting of experienced firms was assembled by Clean Harbors to perform the closure of this containment bay. Clean Harbors retained responsibility for the overall management of the closure project. Primary members of the closure team were as follows:

Closure Contractor: Metro Environmental Services, Inc.

Independent Registered Professional Engineer Certifying Closure: Omega Technical Services, Inc.

Closure Schedule

Closure activities commenced on November 22, 2013 and were completed on March 25, 2014.

2.0 CLOSURE ACTIVITIES

Closure activities in the Containment Bay E area began on 11/22/2013 and were completed on 3/25/2014. Closure activities followed the original closure plan and amendments to the closure plan.

On 11/22/2013, Clean Harbors Environmental Services personnel collected wipe samples from the side walls of the metal intermodal container located in Containment Bay E that was utilized for the storage of closed TSCA containers. These samples were analyzed for the presence of polychlorinated biphenyls (PCB's) by the onsite laboratory at the Clean Harbors facility.

After review of the results of this analysis, wipe samples were collected by Clean Harbors personnel on 11/25/2013 in the same locations and delivered to DeMenno-Kerdoon for third party laboratory analysis. Removal of the wooden floor of the intermodal container, in accordance with the Closure Plan, was started on 11/26/2013 by Clean Harbors personnel. On 12/1/2013, work was halted with approximately 25% of the wooden floor having been removed. A chronological list of tasks completed through this date is included as Appendix II of this document.

On 3/17/2013, Metro Environmental Services, Inc. ("Metro") was contracted to complete the closure. Omega Technical Services Inc. ("Omega") was contracted to act as the Closure Engineer on this project. The Closure Engineer's daily observations are included in Appendix III. Photographs documenting the closure process are included in Appendix IV.

On 3/20/2014, Metro Environmental Services, Inc. mobilized to the site and collected five concrete samples from the containment bay between the walls of the intermodal container and the dike wall, in accordance with the Closure Plan. These samples were transported under chain of custody to the DeMenno-Kerdoon laboratory for analysis.

Metro returned to the site on 3/21/2014 to continue the removal of the wooden floor. The floor removal was completed on 3/24/2014. Following removal of the wooden floor, Metro Environmental Services, Inc. cut the floor into pieces not exceeding three feet in length and two feet in width and loaded the pieces into cubic yard boxes for disposal.

Table 1 lists the Hazardous Waste Manifests associated with disposal of hazardous waste material from closure activities. Copies of the manifests are included in Appendix V.

On 3/25/2014, wipe samples were collected from four locations on the containment bay floor after removal of the intermodal wooden floor, and from two locations outside of the permitted PCB storage area, in accordance with the Closure Plan. These samples were also transported under chain of custody to the DeMenno-Kerdoon laboratory for analysis.

Table 2 summarizes the results of laboratory analysis conducted in order to verify decontamination. Copies of the complete laboratory analysis are included in Appendix

VI. All field and laboratory data Quality Assurance and Quality Control (“QA/QC”) requirements as specified in the Closure Plan were met.

Omega Technical Services, Inc. observed field activities during the closure and examined the containment bay and surrounding area following the floor removal in accordance with the procedures in the Closure Plan.

3.0

CONCLUSIONS

In conclusion, it is my opinion that the closure of Containment Bay E at the Clean Harbors facility was performed in accordance with the Closure Plan approved by USEPA. All PCB wastes were removed from the TSCA regulated units and disposed of at authorized treatment/disposal facilities. No evidence of any release was noted.

4.0 CLOSURE CERTIFICATION

4.1 Certification of Independent Registered Professional Engineer

I, George Oney, a Professional Engineer registered pursuant to the Professional Engineers Registration Law, the California Professional Engineers Act, hereby certify that I have reviewed the Closure Plan for Containment Bay "E" at the hazardous waste treatment, storage, and recycling facility at Clean Harbors, Los Angeles, LLC ("Facility"), located at 5756 Alba Street, in the City of Los Angeles, State of California, that I am familiar with the rules and regulations of 40 CFR Part 761.65 pertaining to partial closure of such facility, and that I personally have made visual inspections of the aforementioned facility, and that the partial closure of the aforementioned facility has been performed in full and complete accordance with the facility's closure plan and the rules and regulations of 40 CFR Part 761.65.



(Signature)

CH004494

(Professional Engineering License Number)

April 25, 2014
(Date)

Omega Technical Services, Inc.
2736 Via Sinaloa
Claremont, California 91711

(Business Address)

909-223-5888
(Telephone Number)



4.2 Certification of Owner/Operator

I hereby state, to the best of my knowledge and belief, that the Containment Bay "E" has been closed in accordance with the previously approved Closure Plan and in full compliance with the rules and regulations of 40 CFR Part 761.65.

(Signature)

(Name)

April 25, 2014
(Date)

(Title)

LIST OF TABLES

Table 1	Hazardous Waste Manifests
Table 2	Laboratory Analytical Summary

TABLES

Table 1 Hazardous Waste Manifests

Manifest Number	Date Shipped	Waste Description	Quantity	Comments
006955554 FLE	03/31/14	Waste chlorinated biphenyls, solid	2 CF boxes	Wood floor

TABLE 2 – LABORATORY ANALYTICAL SUMMARY

Analysis Number	Date Collected	Description	Results
112613-01	11/25/13	Inside left wall	ND
112603-02	11/25/13	Inside left rear wall	ND
112603-03	11/25/13	Outside middle column	ND
112603-04	11/25/13	Inside rear right wall	ND
112603-05	11/25/13	Inside right wall	ND
032114-01	03/20/14	East containment area – south side	ND
032114-02	03/20/14	East containment area – north side	ND
032114-03	03/20/14	South containment area	ND
032114-04	03/20/14	North containment area	ND except for Aroclor-1260 = 0.2 mg/kg
032114-05	03/20/14	West containment area	ND
032114-06	03/20/14	East containment area – south side duplicate	ND
032514-09	03/25/14	Container floor #1	ND
032514-10	03/25/14	Container floor #2	ND
032514-11	03/25/14	Container floor #3	ND
032514-12	03/25/14	Container floor #4	ND
032514-13	03/25/14	Non-PCB storage area – north	ND
032514-14	03/25/14	Non-PCB storage area – south	ND

APPENDIX I
TSCA COMMERCIAL STORAGE
PERMIT APPENDIX M

APPENDIX M – CLOSURE OF CONTAINMENT BAY E

As part of the permit renewal process Clean Harbor will not seek renewal of TSCA storage authorization for an area known as Containment Bay E. As such, upon approval from EPA, the area will be closed in accordance with the information detailed in this section and with applicable TSCA standards.

Unit Description

Containment Bay E consist of a 9.5 Feet X 20 Feet sealed concrete area with a containment berm height of 6 inches. Inside this area, a metal intermodal container (approximately 8 Feet X 18 Feet) was utilized for the storage of closed TSCA containers. It should be noted that; although the container is metal it contains a raised wooden floor. Since this floor is a porous surface and decontamination would be impossible (if any exist); therefore it will be removed prior to closure sampling and disposed as TSCA contaminated debris.

Note: although the unit is permitted for TSCA storage, it has not been utilized for that purpose for many years.

Characterization Sampling

- Disposal of the current wood floor - For this purpose of this closure Clean Harbors will assume a worst case scenario and assume that the wood floor contains PCBs at levels equal to or greater 50 ppm. It will therefore be disposed as TSCA contaminated debris.
- Core sampling (porous areas) – Clean Harbors will collect five (5) core samples around the perimeter of the intermodal container to determine the presence of PCBs within the containment system (see Figure 1). To collect these samples the existing epoxy coating will be removed and core samples will be collected at depth of up to 1.25cm and a diameter of 2 to 3 cm. in accordance with the following guidance document for collecting core samples:
<http://www.epa.gov/region1/cleanup/pcbs/pdfs/484692.pdf>.
- Wipe sampling (non-porous areas) – in accordance with the requirements outlined in 40 CFR 761, subpart P; nine (9) wipe samples will be taken from locations of the involving the intermodal container (see Figure 1) as follows:
 - 4– evenly spaced for floor of container (after wooden floor has been removed);
 - 1 - Inside left wall;
 - 1 - Inside left rear wall;
 - 1 - Outside middle column;
 - 1 - Inside right rear wall;
 - 1 - Inside right wall
- Samples outside the permitted unit:

- In addition to the samples described above, two (2) randomly placed wipe samples will be collected towards the entrance of the unit to verify that PCBs are not present at surface concentrations greater than $2 \mu\text{g} / 100 \text{ cm}^2$.

All samples collected will be analyzed using EPA SW-846 Method 8082 or the current equivalent method. Samples will be analyzed upon receipt so the proper decision can be made regarding any additional decontamination activities. In that regard, holding times for the samples will not be an issue since PCBs very stable and holding times are up to one year.

All samples will be sent to a third party lab for analysis.

Note: See section 4.3 of the permit application for further discussion on safety plan, sampling, sampling equipment, decontamination, and sample management.

Cleanup levels

The facility will pursue cleanup standards designated for High Occupancy Areas for the closure of this unit. A High occupancy area means any area where PCB remediation waste has been disposed of on-site and where occupancy for any individual not wearing dermal and respiratory protection for a calendar year is: 840 hours or more (an average of 16.8 hours or more per week) for non-porous surfaces and 335 hours or more (an average of 6.7 hours or more per week) for bulk PCB remediation waste. Examples could include a residence, school, day care center, sleeping quarters, a single or multiple occupancy 40 hours per week work station, a school class room, a cafeteria in an industrial facility, a control room, and a work station at an assembly line.

As such, the cleanup level for closure of Containment Bay E for PCB Aroclors, will be less than or equal to 1 mg/kg for porous surfaces or $10\mu\text{g}/100\text{cm}^2$ for non-porous surfaces.

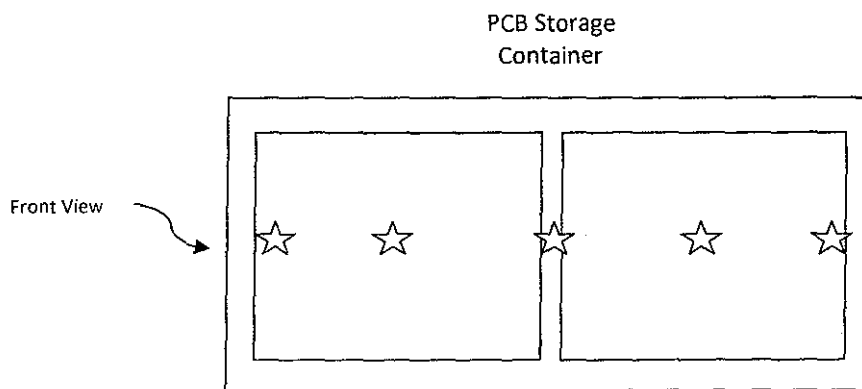
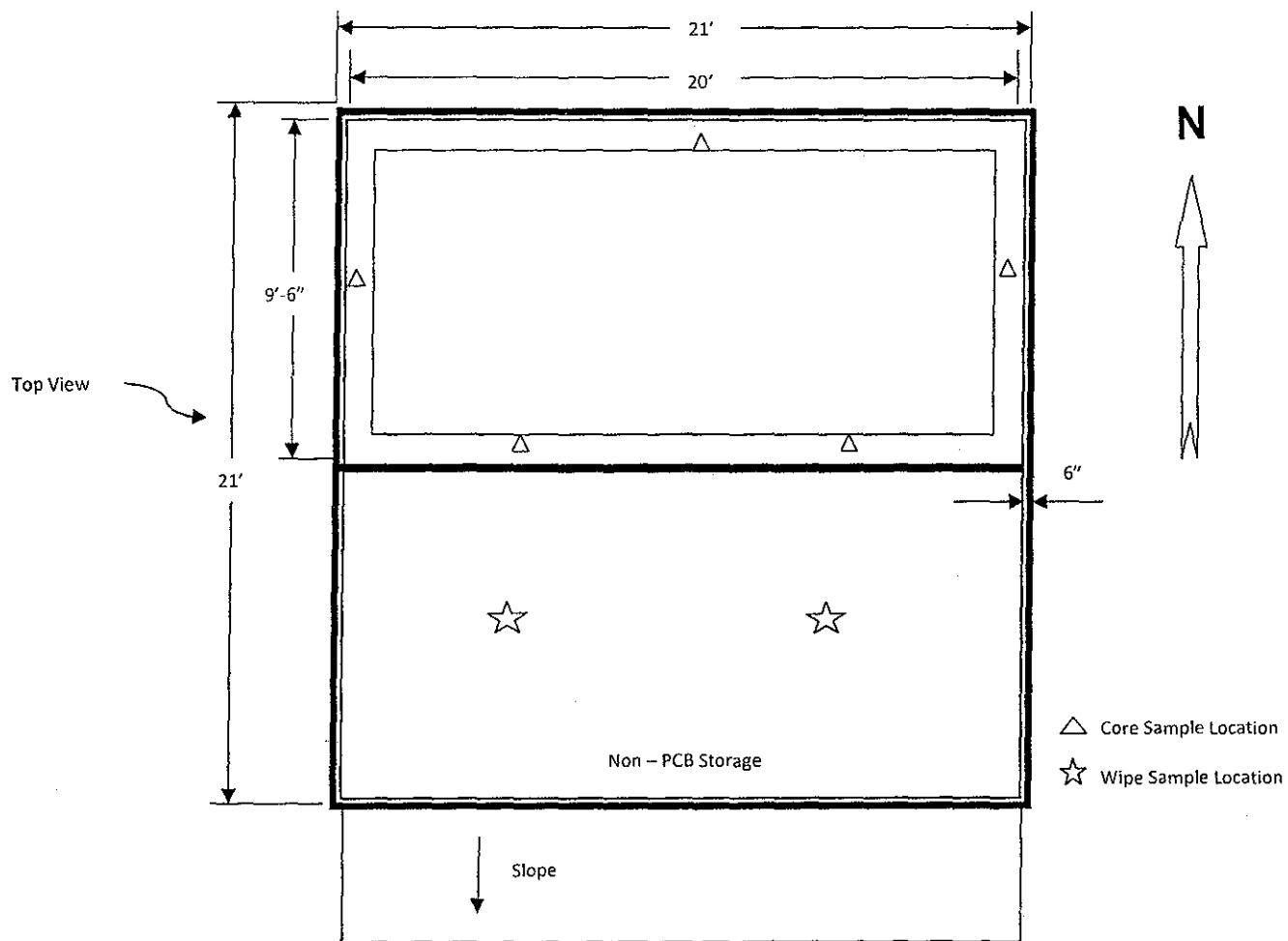
QA/QC Procedures

Certified data received from the laboratory will be evaluated and validated by the Project Manager with regard to sample integrity and concentrations. Samples that are at or above the clean-up levels ($> 1 \text{ mg/kg}$ for porous surfaces or $10\mu\text{g}/100\text{cm}^2$ or non-porous surfaces), described in Table 4-4 of the permit application, will be noted and the corresponding areas, where the samples were taken, will be identified and designated for further decontamination and sampling in accordance with section 4.3.4. of the permit application

It is anticipated that data from certain samples may not be usable (e.g. lost samples, broken bottles, instrument failure, lab mistakes, etc.). In that event the data set will be evaluated to ensure that a minimum of 90% of the data is complete so that determinations of contaminants can be evaluated. Based on this criterion, the Project Manager will then decide if additional samples are warranted.

Additionally, the lab utilized will meet the following requirements:

- Surrogate recoveries must be between 50% and 150%
- Must use two surrogates – DCB and TCMX
- Laboratory control sample analyte recovery must be between 50% and 150%
- Reporting limit must be below 0.25 mg/kg for core samples, and below 1 $\mu\text{g}/100\text{ cm}^2$ for wipe samples
- All solid sample results must be reported by Dry weight
- Use TSCA-specified extraction methods 3550C or 3540C (Soxhlet is preferred)



Wipe samples (left to right):

- Inside left wall;
- Inside left rear wall;
- Outside middle column;
- Inside right rear wall;
- Inside right wall

Figure 1

Decontamination

After all the data has been validated, and the areas of PCB contamination above cleanup levels have been identified, cleanup of this area can be initiated. Cleanup methods listed below will be selected for the various items to be decontaminated. Areas that will potentially need to be decontaminated may include intermodal container and containment system.

For the containment area, a grid system for determining initial sampling points will be utilized in the event that the containment system is contaminated; a one grid square (half-way between the contaminated sample location, and the next 'clean' sampling point'), as specified in 40 CFR 761, Subpart O (40 CFR 761.283(d)) will be utilized, for the purpose of decontamination, if contaminants are found above the action level (see Figure 2).

Note: in the event of contamination in the containment system it will be necessary to remove the intermodal container prior to re-sampling.

Items to be discussed in this section include:

- Evaluation of Cleanup Methods.
- Description of Selected Cleanup Methods
- Decontamination of Cleanup Equipment
- Health and Safety Considerations
- Disposal of Cleanup Derived Waste

Evaluation of Cleanup Methods

Currently, there are several methods in use for cleanup of PCBs. For porous surfaces, such as concrete, contamination will be removed by scarification (if the contaminate is localized to the surface area or by cutting and removal of the concrete if contamination has shown penetration. For non-porous surfaces (e.g. the intermodal container), the solvent clean method and various proprietary aqueous solvent or foam methods.

- **Scarification/Cutting and Removal**

For porous surfaces the facility will concentrate on removal of contaminants. Since these areas have been coated (and maintained) with epoxy it is anticipated that there is a low likelihood of contamination. However, if contamination is discovered the entire area will be decontaminated via scarification. If gaps or cracks are discovered the cleanup coordinator may alternately select cutting and removal of the affected concrete followed by verification sampling of the underlying material.

Equipment and support facilities needed for the Scarification/Cutting process are a Scarifier and Concrete saw. Additionally, rags, solvents, wire brushes, buckets, pumps,

and other small items will be used to decontaminate scarification unit using the solvent clean method described below.

- **Solvent Clean Method**

If any wipe sample within the metal container is found to be above the action level, the entire surface (i.e. the entire floor or sidewall) will be decontaminated using the Solvent Clean method.

This method can be used to decontaminate both exposed surfaces and PCB containers as specified in 40 CFR 761.79. Acceptable solvents include, but are not limited to, isopropyl alcohol, kerosene, hexane and #2 diesel fuel. For exposed surfaces, sufficient volume of solvent is applied to cover the entire contaminated surface, the excess solvent is absorbed with rags, and the contaminated area is wiped with a clean rag. If the surface is porous, scrubbing may be required using a wire brush. The process is then repeated and all solvent is absorbed with rags and granular absorbent.

The Solvent Clean Method is the most common cleanup method for PCBs. This method has been proven to be effective on most types of materials. It does not work as well on porous surfaces because the solvent tends to increase the mobility of the PCBs and allow them to penetrate further into the porous surface.

Equipment and support facilities needed for the solvent clean method are minimal. The only equipment needed is: rags, solvents, wire brushes, buckets, pumps, and other small items.

The solvent clean method is a simple procedure to implement and should not require any special time requirements. Since this method involves the use of flammable solvents, special precautions would need to be taken to prevent ignition of the solvents.

The relative cost of the Solvent Clean Method is expected to be low. As mentioned previously, this method does not involve any sophisticated equipment, so the main costs will be for labor, solvent, rags, and other miscellaneous equipment.

- **Health and Safety Considerations**

Persons performing closure operations will be trained in proper chemical handling and safety procedures. They will be under the direct supervision of persons who are familiar with the process and understand the hazard potential of the stored material. Management will oversee closure, will be familiar with this closure plan, and will ensure that all closure personnel are properly trained to safely perform the cleaning operation. The supervisor will have health and safety training provided through Clean Harbors' corporate health and safety program.

During the cleaning process, personnel will be equipped with the appropriate protective equipment. They will also utilize head protection and chemical resistant gloves and boots. The clothing will be designed so that both sleeves and pant legs can be taped at

the wrists and ankles respectively, to protect against upward or inward splash of water during cleaning.

Additionally, when utilizing scarification or cutting equipment of concrete, personnel will wear respirators and the area will be wetted with water to minimize dust generation.

Additional health and safety considerations during the cleanup of the facility are further addressed in Appendix H of the permit application.

- **Disposal of Cleanup Derived Waste**

Waste material generated during the PCB closure activities will fall into the two categories of contaminated and non-contaminated. Contaminated material will include liquid waste from the solvent clean process, miscellaneous sampling equipment, personnel protective equipment, and other items. These items will be segregated into liquids and solids and stored in 55-gallon drums. Both liquids and solids will be transported, in accordance with applicable regulatory requirements, to an approved disposal facility.

Non-contaminated material generated during closure activities will be disposed of at the local sanitary landfill.

Post Cleanup Verification Procedures

In order to verify that cleanup has been effective in reducing PCB contamination below acceptable levels and to satisfy the requirements of 40 CFR 761.125 (c)(5)(viii), post cleanup sampling will be performed as described below. Sample collection, analytical, and management will be in accordance with the standards previously outlined.

- **Sampling Methods, Locations, and Rationale**

The methods used for post cleanup sampling will be the same as those used for the pre-cleanup sampling. This will consist of chip, core, and wipe samples

Before any post cleanup sampling begins, the records from the previous sampling will be reviewed to identify areas where elevated levels of PCBs were found. Samples will be taken, based on this review in accordance in a step out fashion, utilizing a 1.5 meter spacing grid, reorienting it, and collecting a sample at each point where the grid falls in the cleanup area (see Figure 2).

- **Analytical Procedures**

Samples collected during post cleanup sampling will be analyzed using the same analytical methods described in the pre-cleanup analytical procedures. After the results are returned and validated as described previously, any sampling locations with PCB concentrations above the established cleanup levels will be decontaminated again using the same procedures as previously specified.

- **Waste Collection**

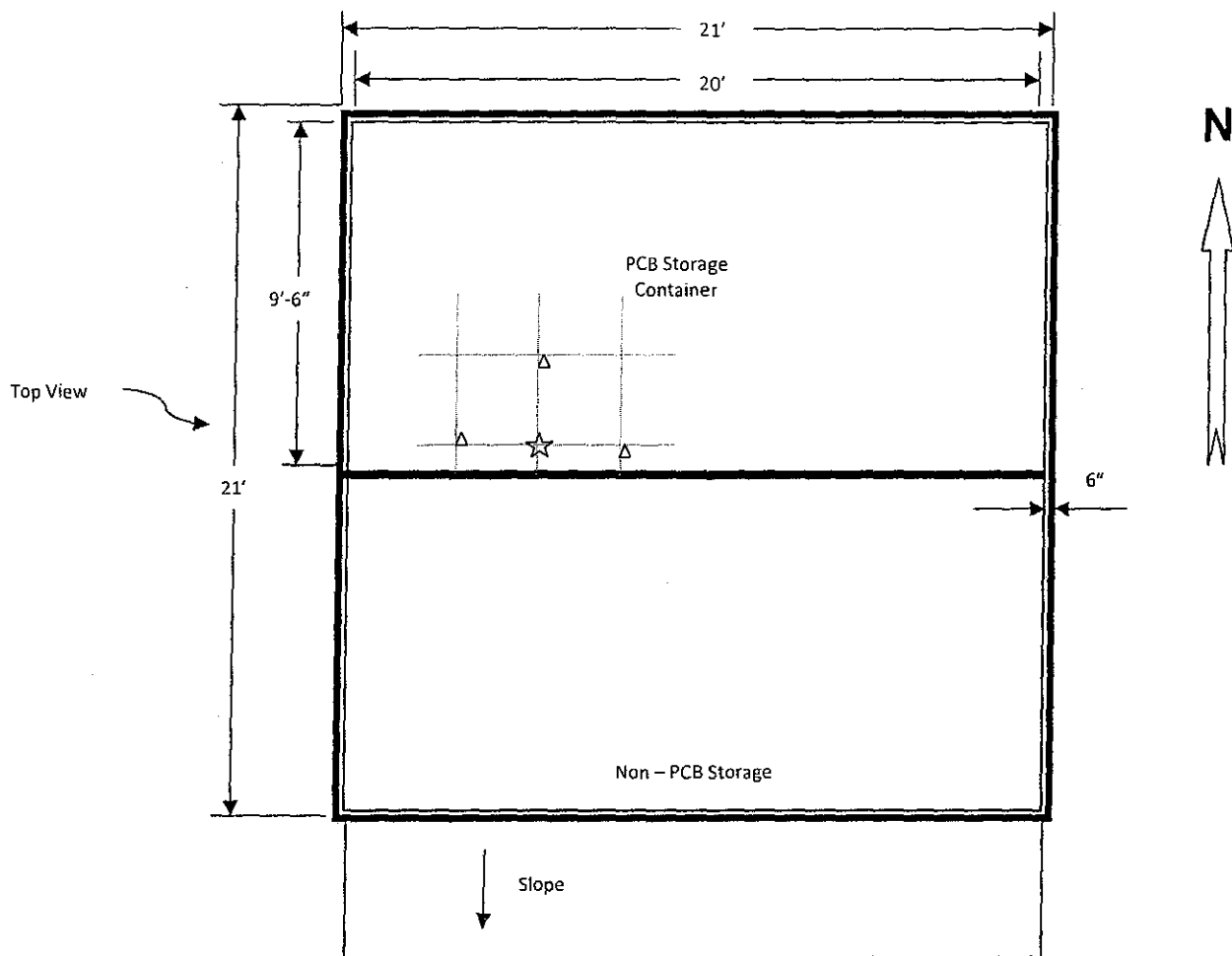
All waste generated during the post cleanup sampling will be collected, containerized, and disposed in accordance with all Federal (e.g. 40 CFR 761.65(e)(7)), State, and Local regulations.

After all sampling and cleanup conditions have been satisfied; a final closure report will be submitted to EPA detailing the above activities. The report will include the following information:

- Full analytical laboratory reports
- Copies of documents (e.g., manifests) indicating total amount of waste disposed
- List of approved facilities where cleanup waste was transported for disposal
- List of any contractors used during the closure process
- Inventory or equipment that will be brought back into reuse
- The nature of the contamination, including types of materials contaminated.
- A summary of the procedures used to sample contaminated and adjacent areas and a table or cleanup site map showing PCB concentrations measured in all pre-cleanup characterization samples. The summary must include sample collection and analysis dates.
- The location and extent of the identified contaminated area, including maps with sample collection sites cross referenced to the sample identification numbers in the data summary.
- A description of any deviation from the closure plan and/or any supplemental activities that may have been conducted based on verification sampling
- A written certification, signed by the owner of the property that the PCB storage facility has been closed in accordance with the approved closure plan. This should incorporate the language for a Certification defined in 761.3

Closure report shall be sent by registered mail to:

Manager
U.S. EPA Region 9
RCRA Facilities Management (WST-4)
75 Hawthorne Street
San Francisco, CA 94105



☆ - Hypothetical contamination location

Δ - Clean-up verification sample location

Figure 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 1

5 Post Office Square, Suite 100

Boston, MA 02109-3912



**STANDARD OPERATING PROCEDURE FOR SAMPLING POROUS
SURFACES FOR POLYCHLORINATED BIPHENYLS (PCBs)**

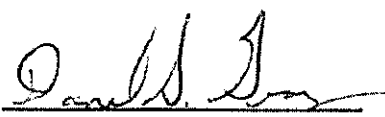
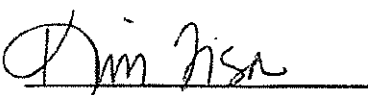
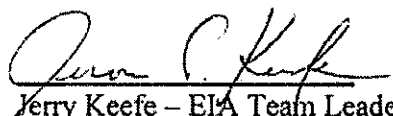
May 2011



SDMS DocID 484692

**STANDARD OPERATING PROCEDURE
FOR SAMPLING POROUS SURFACES
FOR POLYCHLORINATED BIPHENYLS (PCBs)**

**The Office of Environmental Measurement and Evaluation
EPA New England – Region 1
11 Technology Dr.
North Chelmsford, MA 01863**

Prepared by:	 Dan Granz, Environmental Engineer	<u>5/5/11</u> Date
Reviewed by:	 Kim Tisa, TSCA PCB Coordinator	<u>5/5/11</u> Date
Reviewed by:	 Jerry Keefe – EIA Team Leader	<u>05/23/11</u> Date
Approved by:	 Dan Boudreau, EIA Chemistry Team Leader	<u>5/23/11</u> Date

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This document contains direction developed solely to provide internal guidance to U.S. Environmental Protection Agency (EPA) personnel. EPA retains the discretion to adopt approaches that differ from these procedures on a case by case basis. The procedures set forth do not create any rights, substantive or procedural, enforceable at law by a party to litigation with EPA or the United States.

[illegible]

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Attachments:

Example of Custody Seal and Sample Label
Example of Chain of Custody Form

1.0 Scope and Application

- 1.1 This Standard Operating Procedure (SOP) is suitable for collection of a porous matrix sample for analysis of Polychlorinated Biphenyls (PCBs).
- 1.2 This SOP describes sampling techniques for both hard and soft porous surfaces.
 - 1.2.1 Hard surfaces, and most soft surfaces, can be sampled using an impact hammer drill to generate a uniform, finely ground, powder to be extracted and analyzed for PCBs. This procedure is primarily geared at providing enough sample quantity for two analyses. Hard porous surfaces include concrete, brick, asphalt, cement, sandstone, limestone, unglazed ceramics, and other possible PCB suspected material. This procedure may also be used on other softer porous surfaces, such as wood.
 - 1.2.2 Soft surfaces can be sampled using a chisel or sharp knife to generate a representative sample to be extracted and analyzed for PCBs. Soft porous surfaces include wood, wall plasterboard, low density plastics, rubber, caulking, and other PCB suspected material.
- 1.3 This SOP provides for collection of surface samples (0 – 0.5 inches) and delineation of PCB contamination throughout the core of the porous surface. The procedure can be used to sample the porous surface at distinctly different depth zones.

2.0 Method Summary

A one-inch or other sized diameter carbide drill bit is used in a rotary impact hammer drill to generate a fine powder, or other representative sample, suitable for extraction and analysis of PCBs from porous surfaces. This method also allows the use of chisels or knives for the collection of samples from soft porous surfaces for PCB analysis.

3.0 Definitions

- 3.1 Field/Bottle Blank: A sample container of the same lot as the containers used for the environmental samples. This evaluates PCB contamination introduced from the sample container(s) from a common lot.
- 3.2 Equipment/Rinse/Rinsate Blanks: A sample that is collected by pouring hexane over the sample collection equipment after decontamination and before sample collection. The sample is collected in the appropriate sample container identical to the sample containers. This represents background contamination resulting from the field equipment, sampling procedure, sample container, and shipment.

- 3.3 Field Replicates/Duplicates: Two or more samples collected at the same sampling location. Field replicates should be samples collected side by side. Field replicates represent the precision of the whole method, site heterogeneity, field sampling, and the laboratory analysis.
- 3.4 Field Split Samples: Two or more representative subsamples taken from one environmental sample in the field. Prior to splitting, the environmental sample is homogenized to correct for sample heterogeneity that would adversely impact data comparability. Field split samples are usually analyzed by different laboratories (interlaboratory comparison) or by the same laboratory (intralaboratory comparison). Field splits are used to assess sample handling procedures from field to laboratory and laboratory comparability.
- 3.5 Laboratory Quality Samples: Additional samples that will be collected for the laboratory's quality control program: matrix spike, matrix spike duplicate, laboratory duplicates, etc.
- 3.6 Proficiency Testing (PT)/Performance Evaluation (PE) Sample: A sample, the composition of which is unknown to the laboratory or analyst, provided to the analyst or laboratory to assess the capability to produce results within acceptable criteria. This is optional depending on the data quality objectives. If possible, it is recommended that the PE sample be of similar matrix as the porous surface(s) being sampled.
- 3.7 Porous Surface: Any surface that allows PCBs to penetrate or pass into itself including, but not limited to, paint or coating on metal; corroded metal; fibrous glass or glass wool; unglazed ceramics; ceramics with porous glaze; porous building stone such as sandstone, travertine, limestone, or coral rock; low density plastics such as Styrofoam and low density polyethylene; coated (varnished or painted) or uncoated wood; painted or unpainted concrete or cement; plaster; plasterboard; wallboard; rubber; caulking; fiberboard; chipboard; asphalt; or tar paper.
- 3.8 Shipping Container Temperature Blank: A water sample that is transported to the laboratory to measure the temperature of the samples in the cooler.
- 4.0 Health and Safety**
- 4.1 Eye, respiratory, and hearing protection are required at all times during sample drilling. A properly fitted respirator is required for hard porous surface sampling. A respirator is recommended whenever there is a risk of inhalation of either particulate or volatilized PCBs during sampling.
- 4.2 All proper personal protection clothing and equipment must be worn.

4.3 When working with potentially hazardous materials or situations, follow EPA, OSHA, and specific health or safety procedures.

4.4 Care must be exercised when using an electrical drill and sharp cutting objects.

5.0 Interferences and Potential Problems

5.1 This sampling technique produces a finely ground uniform powder, which minimizes the physical matrix effects from variations in the sample consistency (i.e., particle size, uniformity, homogeneity, and surface condition). Matrix spike analysis of a sample is highly recommended to monitor for any matrix related interferences.

5.2 Nitrile gloves are recommended. Latex gloves must not be used due to possible phthalate contamination.

5.3 Interferences may result from using contaminated equipment, solvents, reagents, sample containers, or sampling in a disturbed area. The drill bit must be decontaminated between samples. (see Section 11.0.)

5.4 Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment.

6.0 Personnel Qualifications

6.1 All field samplers working at hazardous materials/waste sites are required to take a 40 hour health and safety training course prior to engaging in any field activities. Subsequently, an 8 hour refresher health and safety course is required annually.

6.2 The field sampler should be trained by an experienced sampler before initiating this procedure.

6.3 All personnel shall be responsible for complying with all quality assurance/quality control requirements that pertain to their organizational/technical function.

7.0 Equipment and Supplies

7.1 This list varies with the matrix and if depth profiling is required

- Rotary impact hammer variable speed drill
- 1-inch or other suitable (1/2, 3/4, etc.) diameter carbide tip drill bits
- Steel chisel or sharp cutting knife, and hammer
- Brush and cloths to clean area
- Stainless steel scoopulas

Aluminum foil to collect the powder sample
1 quart Cubitainer with the top cut out to collect the powder sample
Aluminum weighing pans to collect the powder sample
Cleaned glass container (2 oz or 40 mL) with Teflon lined cap
Decontamination supplies: hexane, two small buckets, a scrub brush, detergent, deionized water, hexane squirt bottle, and paper towels
Dedicated vacuum cleaner with a disposable filter or a vacuum pump with a dust filter
Polyethylene tubing and Pasteur pipettes
Sample tags/labels, custody seals, and Chain-of-Custody form

8.0 Sampling Design

- 8.1 A sufficient number of samples must be collected to meet the data quality objectives of the project. If the source of the PCB contamination is regulated under the federal TSCA PCB Regulations at 40 CFR Part 761, the sampler should insure that the sampling design is sufficient to meet any investigation or verification sampling requirements. At a minimum, the following is recommended:

- 8.1.1 Suspected stained area (s) should be sampled.
- 8.1.2 At each separate location, collect at least 3 samples of each type of porous surface, regardless of the amount of each type of porous surface present.
- 8.1.3 In areas where PCB equipment was used or where PCBs were stored, samples should be collected at a frequency of 1 sample/100 square feet (ft²).

9.0 Sample Collection

9.1 Hard Porous Surfaces

- 9.1.1 Lock a 1-inch or another size diameter carbide drill bit into the impact hammer drill and plug the drill into an appropriate power source. For easy identification, sample locations may be pre-marked using a marker or paint. (Note: the actual drilling point must not be marked.) Remove any debris with a clean brush or cloth prior to drilling. All sampling decisions of this nature should be noted in the sampling logbook.
- 9.1.2 Use a Cubitainer with the top cut off or aluminum foil to contain the powdered sample. Begin drilling in the designated location. Apply steady even pressure and let the drill do the work. Applying too much pressure will generate excessive heat and dull the drill bit prematurely. The drill will provide a finely ground powder that can be easily collected.

- 9.1.3 Samples should be collected at ½-inch depth intervals. Thus, the initial surface sample should be collected from 0 – 0.5 inches. A ½-inch deep hole generates about 10 grams (20 mL) of powder. Multiple holes located closely adjacent to each other, may be needed to generate sufficient sample volumes for a PCB determination. It is strongly recommended that the analytical laboratory be consulted on the minimum sample size needed for PCB extraction and analysis.
- 9.1.4 Wall and Ceiling Sampling: A team of two samplers will be required for wall and ceiling sampling. The second person will hold a clean catch surface (e.g. an aluminum pan) below the drill to collect the falling powder. Alternatively, use the chuck-end of the drill bit and punch a hole through the center of the collection pan. The drill bit is then mounted through the pan and into the drill. For ceilings, the drill may be held at an angle to collect the powder. Thus the driller can be drilling at an angle while the assistant steadies the pan to catch the falling powder. As a precaution, it may be advantageous to tape a piece of plastic around the drill, just below the chuck, to avoid dust contaminating the body of the drill and entering the drill's cooling vents. Caution must be taken to prevent obstruction of the drill's cooling vents.

9.2 Soft Porous Surfaces

- 9.2.1 The procedure for the hard porous surface may be used for certain soft porous surfaces, such as wood.
- 9.2.2 Samples should be collected at no more than ½-inch depth intervals using a metal chisel or sharp cutting knife. Thus, the initial surface sample should be collected from 0 – 0.5 inches. It is important to collect at least 10 grams for analysis.
- 9.2.3 For soft porous surfaces, such as caulking and rubber, a representative sample can be collected using a metal chisel or sharp cutting knife.

9.3 Multiple Depth Sampling

- 9.3.1 Multiple Depth Sampling may not be applicable to certain porous surfaces, such as caulking.
- 9.3.2 Collect the surface sample as outlined in Section 9.1 or 9.2.
- 9.3.3 Use the vacuum pump or cleaner to clean out the hole.
- 9.3.4 To collect multiple depths there are two options.

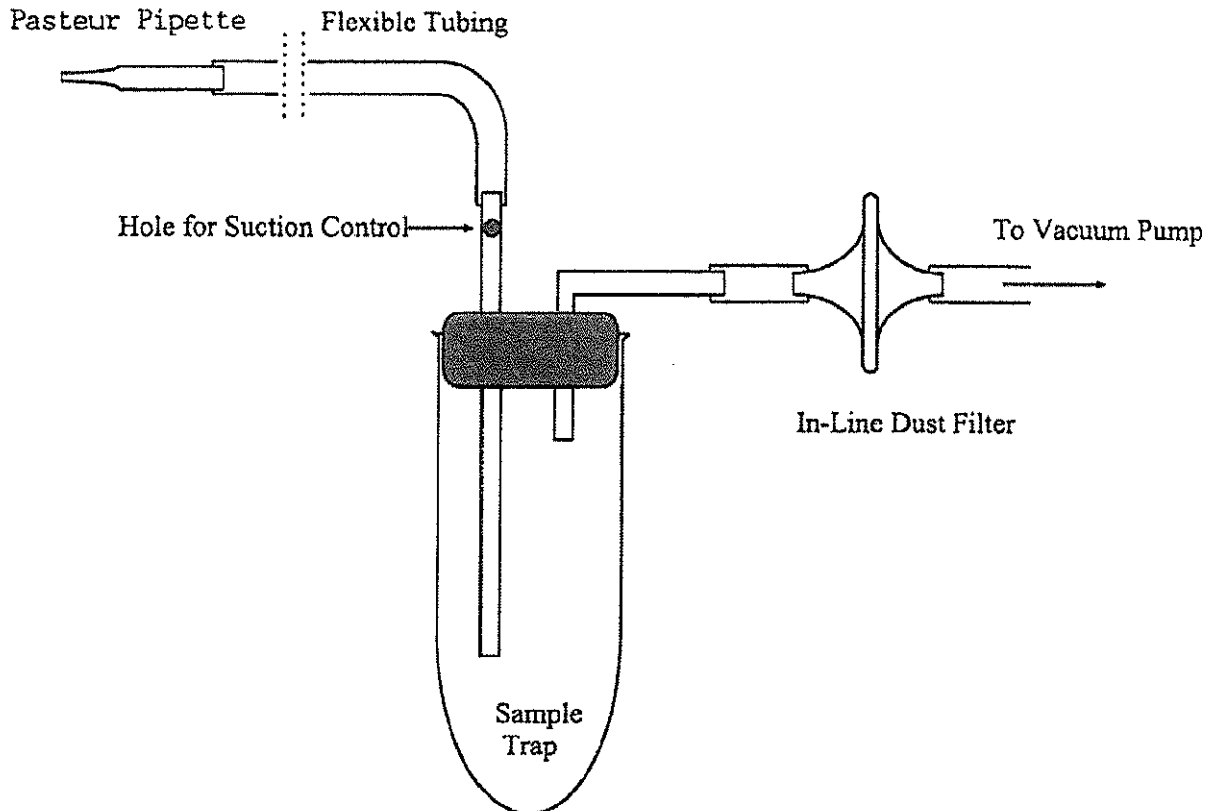
9.3.4.1 Option one: drill sequentially 1/2-inch increments with the 1 inch drill.

9.3.4.2 Option two: drill with the 1 inch bit and either make the hole larger or use a smaller bit to take the next 1/2- inch sample.

9.3.5 A stainless steel scoopula will make it easier to collect the sample from the bottom of the hole.

9.4 Vacuum Trap Design and Clean-out

The trap presented in Figure 1 is a convenient and thorough way for collecting and removing concrete powder from drilled holes. The trap system is designed to allow for control of the suction from the vacuum pump and easy trap clean-out between samples. Note, by placing a hole in the inlet tube (see Figure 1), a finger on the hand holding the trap can be used to control the suction at the sampling tip. Thus, when this hole is left completely open, there will be no suction, and the sampler can have complete control over where and what to sample. To change-out between samples the following steps should be taken: 1) the Pasteur pipette and piece of polyethylene tubing at the sample inlet should be replaced with new materials, 2) the portion of the rubber stopper and glass tubing that was in the trap should be wiped down with a clean damp paper towel (wetted with deionized water) and then dried with a fresh paper towel, 3) a clean pipe cleaner should be drawn through the glass inlet tube to remove any concrete dust present, and 4) the glass tube or flask used to collect the sample should be swapped out with a clean decontaminated sample trap. Having several clean tubes or flasks on hand will facilitate change-out between samples.

Figure 1

Note: the holes should be vacuumed thoroughly to minimize any cross-contamination between sample depths and the bits should be decontaminated between samples. (See Section 11.0)

10.0 Sample Handling, Preservation, and Storage

- 10.1 Samples must be collected in glass containers for PCB analyses. In general, a 2-ounce sample container with a Teflon-lined cap (wide-mouth jars are preferred) will hold sufficient mass for most analyses. A 2-ounce jar can hold roughly 90 grams of sample.
- 10.2 Samples are to be shipped refrigerated and maintained at $\leq 6^{\circ}\text{C}$ until the time of extraction and analysis.
- 10.3 The suggested holding time for PCB samples is 14 days to extraction.

11.0 Decontamination

- 11.1 Assemble two decontamination buckets. The first bucket contains a detergent and potable water solution, and the second bucket is for rinsate. Place all used drill bits, hose for the vacuum cleaner, and utensils in the detergent and water bucket. Scrub each piece thoroughly using the scrub brush. Note, the powder does cling to the metal surfaces, so care should be taken during this step, especially with the twists and curves of the drill bits. Next, rinse each piece with water and hexane. Place the rinsed pieces on clean paper towels and individually dry and inspect each piece. Note: all pieces should be dry prior to reuse.
- 11.2 Lightly contaminated drill bits and utensils may be wiped with a hexane soaked cloth and hexane rinsed for decontamination.

12.0 Data and Record Management

- 12.1 All data and information collection should follow a Field Data Management SOP or Quality Assurance Project Plan (QAPP).
- 12.2 Follow the chain of custody procedures to release the samples to the laboratory. A copy is kept with the sampling records.
- 12.3 The field data is stored for at least 3 years.

13.0 Quality Control and Quality Assurance

- 13.1 Representative samples are required. The sampler will evaluate the site specific conditions to assure the sample will be representative.
- 13.2 All sampling equipment must be decontaminated prior to use and between each discrete sample.
- 13.3 All field Quality Control (QC) sample requirements in a Sample and Analysis Plan (SAP) or QAPP must be followed. The SAP or QAPP may involve field blanks, equipment blanks, field duplicates and/or the collection of extra samples for the laboratory's quality control program.
- 13.4 Field duplicates should be collected at a minimum frequency of 1 per 20 samples or 1 per non-related porous matrix, whichever is greater.

14.0 Waste Management and Pollution Prevention

- 14.1 During field sampling events there may be PCB and/or hazardous waste produced from the sample collection. The waste must be handled and disposed of in accordance with federal, state, and local regulations. The dust filter, and tubing if a vacuum pump is used, is disposed after each site investigation. This waste will be treated as PCB waste if the samples are positive for PCBs. It may be possible to manage or dispose of the waste produced at the site where the work was performed. If the site does not meet regulatory requirements for these types of activities, the waste must be transported to a facility permitted to manage and/or dispose of the waste.

15.0 References

1. Guidance for the Preparation of Standard Operating Procedures for Quality-Related Operations, QA/G-6, EPA/600/R-96/027, November 1995.
2. 40 CFR Part 761 – Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, and Use Prohibitions
3. Sample Container and Holding Time: RCRA SW 846, Chapter 4, Table 4.1, Revision 4, February, 2007.

Example of Sample Label and Custody Seal

U.S. ENVIRONMENTAL PROTECTION AGENCY — REGION I BOSTON, MASS.	
LABEL	NAME OF UNIT AND ADDRESS ENVIRONMENTAL SERVICES DIVISION 60 WESTVIEW STREET LEXINGTON, MASSACHUSETTS 02173
	DATE, YR/MO/DAY TIME STATION NO.
SAMPLE	SOURCE OF SAMPLE
	SAMPLE NO. SUB NO. PRESERVATIVE
	AMOUNT
	ANALYSIS
SAMPLING CHEWY FIRST, INITIAL, LAST NAME	

 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY OFFICIAL SAMPLE SEAL	SAMPLE NO.	DATE
	SIGNATURE	
	PRINT NAME AND TITLE (Inspector, Analyst or Technician)	
	SEAL BROKEN BY	DATE

EPA FORM 7500-2 (R7-75)

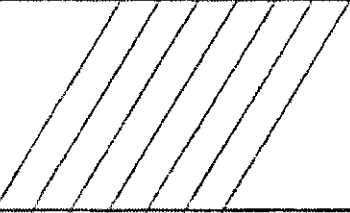
Example of Chain of Custody Form



ENVIRONMENTAL PROTECTION AGENCY

REGION 1

CHAIN OF CUSTODY RECORD

PROJ. NO.		PROJECT NAME				NO. OF CON- TAINERS											REMARKS	
SAMPLERS: (Signature)																		
STA NO	DATE	TIME	COMP	GRAB	STATION LOCATION													
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)								
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)								
Relinquished by: (Signature)		Date / Time		Received for Laboratory by: (Signature)		Date / Time		Remarks										

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

1-16940

APPENDIX II

CHRONOLOGY OF TASKS

COMPLETED PRIOR TO 12/01/2013

Clean Harbors – Transformer Services Division
Los Angeles Plant
5756 Alba Street
Los Angeles, CA 90058
(323)277-2500

Chronological List of Tasks Completed During the Closure of Containment Bay “E”

DATE/TIME:	TASK:	Completed BY:

11/22/2013 – 1000 Hours	Closure Planning Meeting	Scott Reed –SVP, Lin Longshore- VP of Compliance, Joe Christopher- Area Compliance MGR Don Kiefer – General MGR – L.A. Plant Abby Poursanian – Operations SUPV Edgar Militar – Plant Lab MGR

11/22/2013 – 1130 Hours	Wipe Sampling of Container 5 Photos of Wipe Areas per Figure 1 Photos listed as “IMG 3296 thru 3299”	Abby Poursanian and Edgar Militar

11/25/13 – 0730 Hours	Self Analysis Complete and Results Reviewed.	Edgar Militar, Joe Christopher and Don Kiefer

*** Results of the Self-Analysis returned in a “Non-Detect” Status for PCBs at <1. 3rd Party Sampling and Submission to be completed.

11/25/13 – 0945 Hours	Wipe Sampling of Container 5 Photos of Wipe Areas per Figure 1 Photos listed as “IMG 3300 thru 3305”	Abby Poursanian and Edgar Militar

*** Secondary Wipe Sample locations are Photo Documented as Photos 1A-5A and located approximately 2 inches below the initial sampling locations.

11/26/13 – 0800 Hours	Wood Floor Removal	Jose Rodriguez

*** The removal of the wooden floor has begun. During the removal of the initial right floor portion of the container, it was discovered that the metal outer container floor was still intact. This area will also have split sampling completed.

12/1/13 – 0630 Hours	Wood Floor Removal Ceased	

*** The removal of the floor has been stopped. Half of the floor is removed and the area restricted. The reason for the stoppage is to assess the results from the wall sampling and discuss further direction from the U.S. EPA.

12/11/13 – 0924 Hours Notification from U.S. EPA – Region 9

*** The U.S.EPA has notified Clean Harbors Compliance that Nathan Dadap would be passing along the Project Management duties to Omer Shalev, Environmental Engineer of the U.S.EPA Region 9 Office.

2/4/14 – 1430 Hours Notification and Discussion with Mr.Shalev

*** Joe Christopher and Don Kiefer contacted Mr.Shalev to discuss the status of the closure activities. An explanation of the process was provided to Mr.Shalev as well as the results from the split sampling. Clean Harbors was advised to send the photos, lab results and chrono to Mr.Shalev via email.

Attachments forwarded to Mr.Shalev:

- 1) Chronological List of Closure Tasks
- 2) 5 Photos of initial sampling locations, marked as "IMG 3296 thru IMG 3299".
- 3) 5 Photos of second sampling locations, marked as "IMG 3300 thru IMG 3305".
- 4) Clean Harbors "PCB Analytical Report" with the "Chain of Custody" attachment. (2 Pages)
- 5) DeMenno Kerdoon "PCB Analytical Report" with the "Chain of Custody" attachment. (3 Pages)

APPENDIX III
ENGINEER'S DAILY
OBSERVATIONS

DAILY OBSERVATION REPORT

OMEGA TECHNICAL SERVICES, INC.
2736 Via Sinaloa
Claremont, California 91711

Phone: (909)-223-5888
Fax: (909)-625-3009

CLIENT/LOCATION: Clean Harbors		PROJECT: PCB Containment Bay "E" Partial Closure		DATE/DAY: Thursday 3/20/14			
QTY	CLASSIFICATION	DESCRIPTION OF WORK					
1	Closure Engineer	Contractor (Metro Environmental Services) arrived onsite a 8:00 AM to commence					
1	Project Manager	dismantling the floor of the container. Approximately 25% of floor was dismantled. Five					
1	Technician	concrete samples were collected from the containment area between the walls of the container					
		and the containment dike wall per the Closure Plan. Samples were transported under chain of					
		custody to DeMenno-Kerdoon for laboratory analysis. Metro left site at 2:00 PM. Engineer					
		arrived at laboratory at 3:00 PM. Left laboratory at 3:15 PM and arrived back at office at					
		5:15 PM					
OBSERVATIONS							
Concrete core samples collected and transported to laboratory.							
ISSUES / CONCERNS							
None							
TRAVEL		SITE ARRIVAL		SITE DEPARTURE		DROP OFF SAMPLES? (Y/N)	
3.5 hours		10:00 AM		2:00 PM (left lab @ 3:15 PM)		Yes	

Signature: _____

DAILY OBSERVATION REPORT

OMEGA TECHNICAL SERVICES, INC.
2736 Via Sinaloa
Claremont, California 91711

Phone: (909)-223-5888
Fax: (909)-625-3009

CLIENT/LOCATION: Clean Harbors		PROJECT: PCB Containment Bay “E” Partial Closure		DATE/DAY: Friday 3/21/14	
QTY	CLASSIFICATION	DESCRIPTION OF WORK			
1	Closure Engineer	Contractor (Metro Environmental Services) arrived onsite a 8:00 AM to continue dismantling			
1	Project Manager	container floor. Approximately 85% of the floor was dismantled by end of day. Metro left			
2	Technician	site at 5:00 PM.			
OBSERVATIONS					
ISSUES / CONCERNS					
None					
TRAVEL		SITE ARRIVAL		SITE DEPARTURE	
2.0 hours		2:15 PM		2:45 PM	
				No	

Signature: _____

DAILY OBSERVATION REPORT

OMEGA TECHNICAL SERVICES, INC.
2736 Via Sinaloa
Claremont, California 91711

Phone: (909)-223-5888
Fax: (909)-625-3009

CLIENT/LOCATION: Clean Harbors		PROJECT: PCB Containment Bay "E" Partial Closure		DATE/DAY: Monday 3/24/14			
QTY	CLASSIFICATION	DESCRIPTION OF WORK					
1	Closure Engineer	Contractor (Metro Environmental Services) arrived onsite a 8:00 AM to complete dismantling					
1	Project Manager	container floor. 100% of the floor was dismantled by end of day. Left area broom clean. Metro					
2	Technician	left site at 1:00 PM.					
OBSERVATIONS							
Two cubic yard boxes of wood floor onsite to be shipped to Clean Harbors Aragonite facility for incineration.							
ISSUES / CONCERNS							
None							
TRAVEL		SITE ARRIVAL		SITE DEPARTURE		DROP OFF SAMPLES? (Y/N)	
2.0 hours		9:15 AM		9:45 AM		No	

Signature: _____

DAILY OBSERVATION REPORT

OMEGA TECHNICAL SERVICES, INC.
2736 Via Sinaloa
Claremont, California 91711

Phone: (909)-223-5888
Fax: (909)-625-3009

CLIENT/LOCATION: Clean Harbors		PROJECT: PCB Containment Bay “E” Partial Closure		DATE/DAY: Tuesday 3/25/14	
QTY	CLASSIFICATION	DESCRIPTION OF WORK			
1	Closure Engineer	Closure Engineer arrived onsite at 12:00 PM to collect samples. Wipe samples were collected from four locations on the container floor and two locations outside of the permitted PCB storage area per the Closure Plan. Samples were transported under chain of custody to DeMenno-Kerdoon for laboratory analysis. Engineer arrived at laboratory at 1:45 PM, left laboratory at 2:00 PM, and arrived at office at 3:30 PM.			
OBSERVATIONS					
Area appeared clean.					
ISSUES / CONCERNS					
None					
TRAVEL		SITE ARRIVAL	SITE DEPARTURE		DROP OFF SAMPLES? (Y/N)
3.0 hours		12:00 PM	1:30 PM (left lab @ 2:00 PM)		Yes

Signature: _____

APPENDIX IV
CLOSURE ACTIVITY
PHOTOGRAPHS

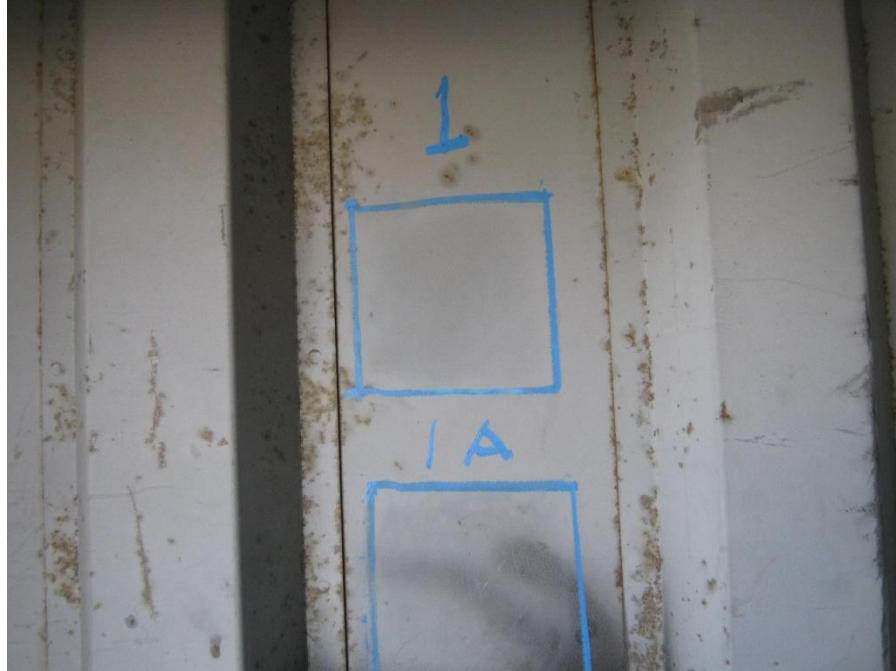


Figure #1 Wipe Sample Location – Inside Left Wall



Figure #2 Wipe Sample Location – Inside Left Rear Wall



Figure #3 **Wipe Sample Location – Outside Middle Column**



Figure #4 **Wipe Sample Location – Inside Right Rear Wall**

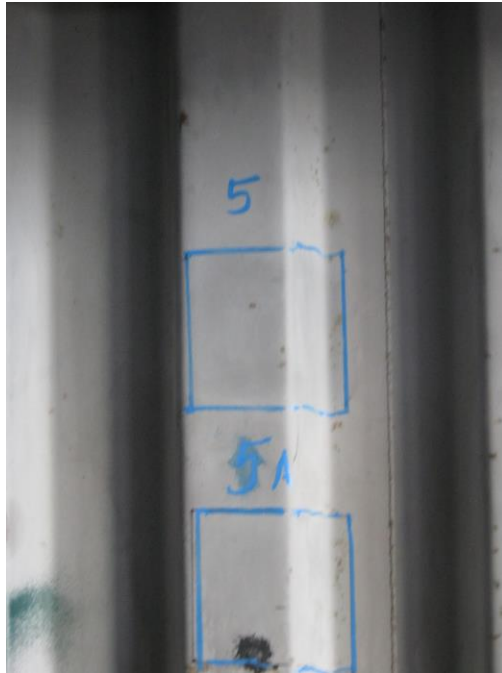


Figure #5 **Wipe Sample Location – Inside Right Wall**



Figure #6 **Concrete Sample Location – East Containment Area (South Side)**



Figure #7 **Concrete Sample Location – East Containment Area (North Side)**



Figure #8 **Concrete Sample Location – South Containment Area**



Figure #9 **Concrete Sample Location – North Containment Area**



Figure #10 **Concrete Sample Location – West Containment Area**



Figure #11 **Wipe Sample Location – Containment Floor Sample #1**

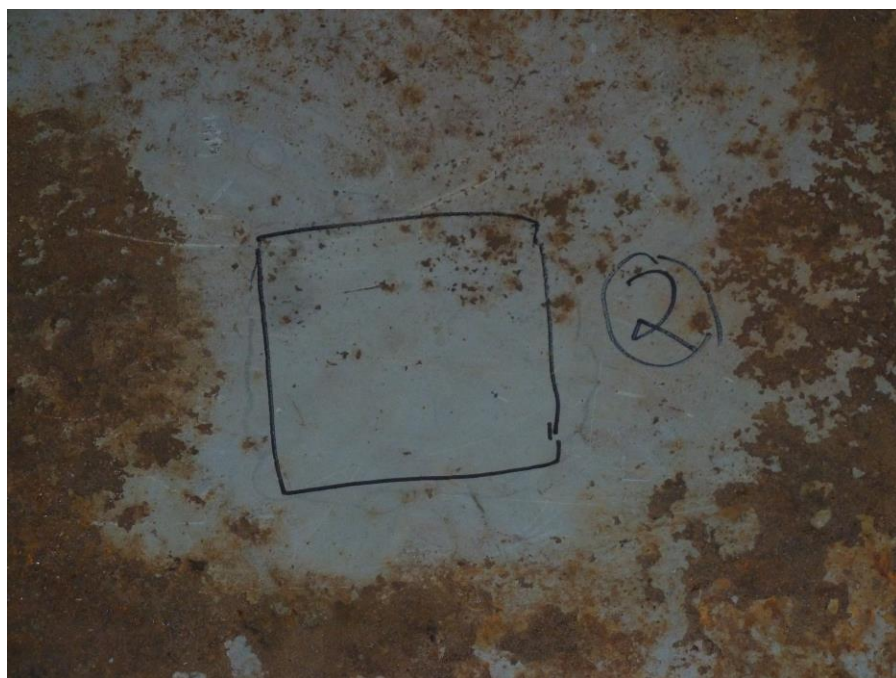


Figure #12 **Wipe Sample Location – Containment Floor Sample #2**

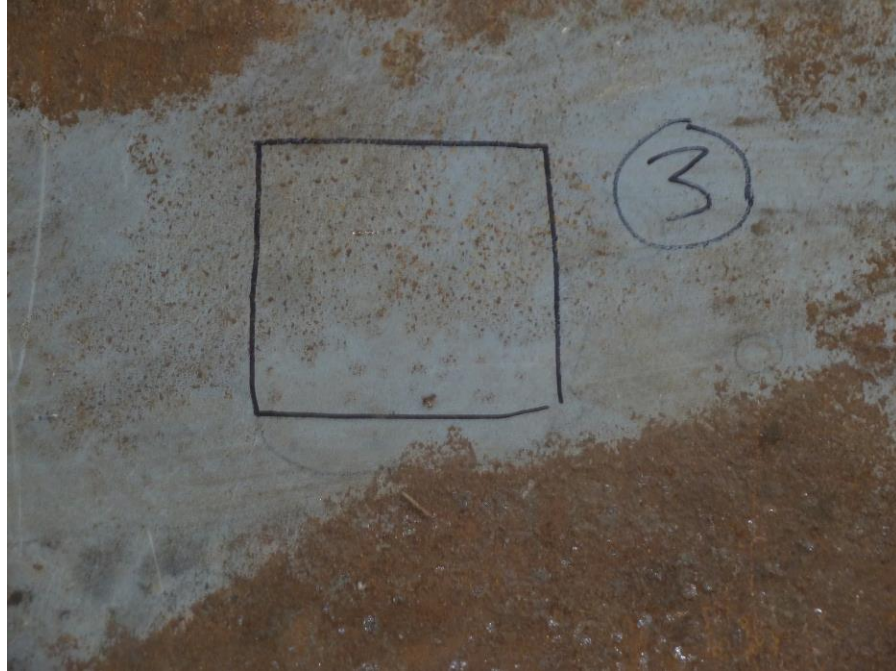


Figure #13 **Wipe Sample Location – Containment Floor Sample #3**



Figure #14 **Wipe Sample Location – Containment Floor Sample #4**



Figure #15 **Wipe Sample Location – Non-PCB Containment Area Floor – North**

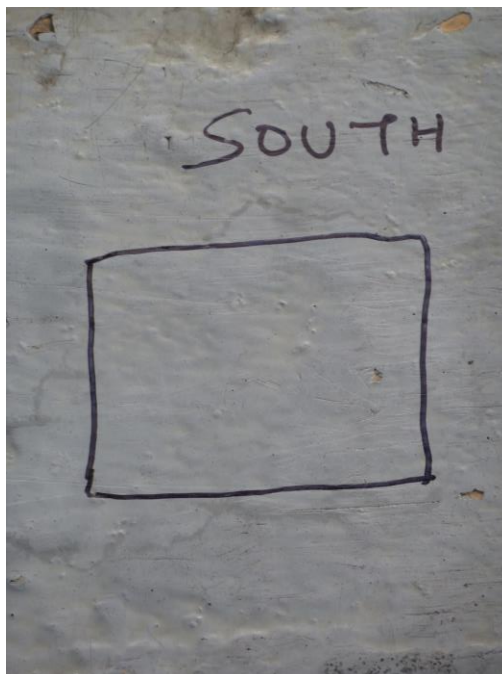


Figure #16 **Wipe Sample Location – Non-PCB Containment Area Floor – South**



Figure #17 **Container With Wooden Floor Removed**



Figure #18 **Cubic Yard Boxes Containing Wooden Floor**

APPENDIX V
HAZARDOUS WASTE
MANIFESTS

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved, OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST		Generator ID Number 006850	2. Page 1 of 3	3. Receipt Date 03/18	4. Manifest Tracking Number 006955554 FLE		
5. Generator Name and Address Clean Harbors Aragonite LLC 5756 Alba Street Los Angeles, CA 90058 (323) 277-2500			Generator's Site Address (if different than mailing address) SAME				
6. Generator's Phone: SLT Express Way Inc			U.S. EPA ID Number AZR000508515				
7. Transporter 1 Company Name Clean Harbors			U.S. EPA ID Number MA039B22295				
8. Designated Facility Name and Site Address Clean Harbors Aragonite LLC 11600 North Arroyo Road Grantsville, UT 84029 (435) 884-8100			U.S. EPA ID Number UTD981552177				
Facility's Phone:							
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
			No.	Type			
	X	UN3432. WASTE POLYCHLORINATED BIPHENYLS. SOLID. (BASE E TSCA STORAGE CLOSER), 9, PG III	002	CF	00381	K	261
14. Special Handling Instructions and Additional Information 1. CHST-DRY ERG#171 2XFBIN							
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.							
Generator's/Officer's Printed/Typed Name Nina H... Signature <i>[Signature]</i> Month 3 Day 31 Year 14							
TRANSPORTER	16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____						
	17. Transporter Acknowledgment of Receipt of Materials						
	Transporter 1 Printed/Typed Name Lorraine Lawes Signature <i>[Signature]</i> Month 3 Day 31 Year 14						
	Transporter 2 Printed/Typed Name Angela Rozell Signature <i>[Signature]</i> Month 4 Day 3 Year 14						
DESIGNATED FACILITY	18. Discrepancy						
	18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection						
	18b. Alternate Facility (or Generator) _____ U.S. EPA ID Number _____						
	Facility's Phone: _____						
	18c. Signature of Alternate Facility (or Generator) _____ Month _____ Day _____ Year _____						
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)							
1. H040		2. _____		3. _____		4. _____	
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a							
Printed/Typed Name Angela Turner Signature <i>[Signature]</i> Month 4 Day 11 Year 14							



PCB Continuation Sheet

Generator: Clean Harbors Los Angeles LLC (CAD050806850)
5756 Alba Street
Los Angeles, CA 90058

Wkorder: LS9567265

Manifest:

Vehicle: LSVAN25

Mnfst Line	Trackg No	Serial / Custmr Ctrl No.	Waste Class	Description	Container Type	Wgt in KG	Out of Svc Date
	37084777	n/a /	CHSI	PCB Solids For Incineration	1CF	120	3/28/2014
	37084778	n/a /	CHSI	PCB Solids For Incineration	1CF	262	3/28/2014

APPENDIX VI

LABORATORY ANALYTICAL

RESULTS



DeMenno/Kerdoon

DEMENNO/KERDOON
LABORATORY REPORT

ELAP CERTIFICATE NO.: 2037

Polychlorinated Biphenyls

PROJECT: CONTAMINATED BAY E CLOSURE

MATRIX: WIPE

SUBMITTED BY: CLEANHARBORS

DATE SAMPLED: 11/25/13

SAMPLE I.D.: SEE BELOW

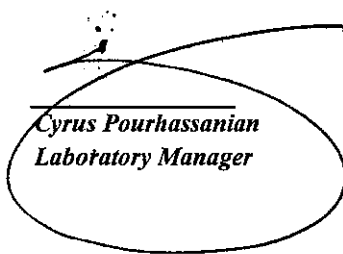
DATE RECEIVED: 11/25/13

DATE OF REPORT: 11/27/13

ANALYTE	METHOD	UNITS	PQL	DATE EXTRACTED	DATE ANALYZED	1A	2A	3A
AROCLOR-1016	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND	ND
AROCLOR-1221	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND	ND
AROCLOR-1232	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND	ND
AROCLOR-1242	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND	ND
AROCLOR-1248	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND	ND
AROCLOR-1254	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND	ND
AROCLOR-1260	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND	ND

PQL = Practical Quantitation Limit

ND = Non-detected or below the PQL


Cyrus Pourhassanian
Laboratory Manager



DeMenno/Kerdoon

DEMENNO/KERDOON
LABORATORY REPORT
ELAP CERTIFICATE NO.: 2037
Polychlorinated Biphenyls

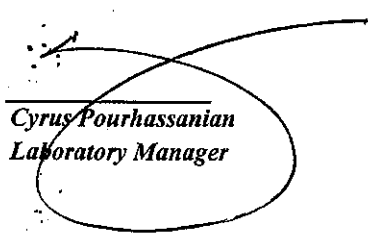
PROJECT: CONTAMINATED BAY E CLOSURE
MATRIX: WIPE
SUBMITTED BY: CLEANHARBORS
DATE SAMPLED: 11/25/13

SAMPLE I.D.: SEE BELOW
DATE RECEIVED: 11/25/13
DATE OF REPORT: 11/27/13

ANALYTE	METHOD	UNITS	PQL	DATE EXTRACTED	DATE ANALYZED	4A	5A
AROCLOR-1016	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND
AROCLOR-1221	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND
AROCLOR-1232	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND
AROCLOR-1242	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND
AROCLOR-1248	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND
AROCLOR-1254	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND
AROCLOR-1260	SW-8082	ug/Wipe	2.0	11/26/13	11/26/13	ND	ND

PQL = Practical Quantitation Limit

ND = Non-detected or below the PQL


Cyrus Pourhassanian
Laboratory Manager



CHAIN OF CUSTODY RECORD

PAGE

OF

1 Hill Avenue, Braintree, MA 02184

Tel. (781) 849-1800

1 RTE. 2, Box 170, Waynoka, OK 73860

Tel. (580) 697-3500

12400 247th Avenue SE, Sawyer, ND 58781

Tel. (701) 624-5622

2202 Genoa Red Bluff Road, Houston, TX 77034 Tel. (281) 478-7700

5295 S. Garvey Road, Westmorland, CA 92281 Tel. (760) 344-9400

Other

Client: Clean Harbors Project Name: Containment Bay E Closure Work Order/P.O. #: 12234 Date: 11/25/13
Report To: Donald Kiefer Address: 5701 Allen St, Los Angeles, CA 90058 Phone #: 323-277-2500
Edgar Milten

Sample I.D.	Sampling Information				Analysis												CHES Sample #
	Date	Time	Station Location	Sample Matrix												# of con.	
1A - Inside Left Wall	11/25/13	1215	Allen St	Wipe	X											1	
2A - Inside Left Rear Wall	11/25/13	1216			X											1	
3A - Outside Middle Column	11/25/13	1216			X											1	
4A - Inside Right Rear Wall	11/25/13	1215			X											1	
5A - Inside Right Wall	11/25/13	1215			X											1	
Relinquished by Sampler: <u>Edgar Milten</u>					VOA Vial												COMMENTS: (Fax Number, cautions, special instructions)
Date: <u>11/25/13</u> Time: <u>12:30</u>					Glass Bottle												
Received by: <u>Donald Kiefer</u>					Plastic Bottle												
Date: <u>11/25/13</u> Time: <u>12:30</u>					Preservation												
Relinquished by Sampler: <u>Edgar Milten</u>					Volume												
Date: <u>11/25/13</u> Time: <u>12:30</u>					DOT Shipping Name:												
Received by: <u>Donald Kiefer</u>																	
Date: <u>11/25/13</u> Time: <u>12:30</u>																	
Standard laboratory turnaround time is 1 week from date of receipt. Accelerated turnaround may be assessed a surcharge.																	
Location of samples: _____																	
Turnaround: 24 Hrs. 48 Hrs. 1 Week Other: _____																	

OFFICE COPY



CHAIN OF CUSTODY RECORD

PAGE 1 OF 1☐ 1 Hill Avenue, Braintree, MA 02184

Tel. (781) 849-1800

☐ RTE. 2, Box 170, Waynoka, OK 73860

Tel. (580) 697-3500

☐ 12400 247th Avenue SE, Sawyer, ND 58781

Tel. (701) 624-5622

☐ 2202 Genoa Red Bluff Road, Houston, TX 77034 Tel. (281) 478-7700☐ 5295 S. Garvey Road, Westmorland, CA 92281 Tel. (760) 344-9400☒ OtherClient: Clean Harbors Project Name: PCB Containment Bay "E" Work Order/P.O. #: _____ Date: 3/20/14Report To: George Oney 909-223-5888 Address: 5756 Alba St, Los Angeles, CA 90058 Phone #: _____

Sample I.D.	Sampling Information				Analysis										CHES Sample #	
	Date	Time	Station Location	Sample Matrix	PCB 8082											# of con.
East Containment Area South side	3-20-14	1:00	5756 Alba St.	Concrete	X										1	EAST - S
East Containment Area North side		1:15			X										1	EAST - N
South Containment Area		1:30			X										1	SOUTH
North Containment Area		1:45			X										1	NORTH
West Containment Area		2:00			X										1	WEST
East Containment Area North Side - Duplicate		1:45			X										1	EAST - N (Dup)
Relinquished by Sampler: _____ Date: <u>3-20-14</u> Time: <u>3:00 PM</u>					VOA Vial										COMMENTS: (Fax Number, cautions, special instructions) <u>Email results to George Oney</u> <u>at georgeoney2736@gmail.com</u> <u>(909)-223-5888</u>	
Received by: <u>Eduardo Martinez</u> Date: <u>3/20/14</u> Time: <u>3:00 PM</u>					Glass Bottle					X						
Relinquished by Sampler: _____ Date: _____ Time: _____					Plastic Bottle											
					Preservation											
					Volume					<u>24</u>						
Received by: _____ Date: _____ Time: _____					DOT Shipping Name:					<u>N/A</u>						
Standard laboratory turnaround time is 1 week from date of receipt. Accelerated turnaround may be assessed a surcharge.										Location of samples: _____						
										Turnaround: 24 Hrs. <u>48 Hrs.</u> 1 Week Other: _____						



DEMENNO/KERDOON
LABORATORY REPORT
ELAP CERTIFICATE NO.: 2037

PROJECT: PCB CONTAINMENT BAY "E"

SAMPLE I.D.: EAST CONTAINMENT AREA

MATRIX: SOLID

SOUTH SIDE

SUBMITTED BY: CLEAN HARBORS ENVIRONMENTAL SERVICES

LAB I.D.: 032114-01

DATE SAMPLED: 3-20-14

DATE RECEIVED: 3/20/2014

DATE OF REPORT: 3/21/2014

ANALYTE	METHOD	UNITS	PQL	DATE ANALYZED	RESULT
AROCLOR-1016	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1221	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1232	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1242	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1248	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1254	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1260	SW-8082	mg/Kg	0.2	03/21/14	ND

PQL = Practical Quantitation Limit

ND = Non-detected or below the PQL


Cyrus Pourhassanian
Laboratory Manager



DEMENNO/KERDOON
LABORATORY REPORT
ELAP CERTIFICATE NO.: 2037

PROJECT: PCB CONTAINMENT BAY "E"

SAMPLE I.D.:

EAST CONTAINMENT AREA

MATRIX: SOLID

NORTH SIDE

SUBMITTED BY: CLEAN HARBORS ENVIRONMENTAL SERVICES

LAB I.D.:

032114-02

DATE SAMPLED: 3-20-14

DATE RECEIVED:

3/20/2014

DATE OF REPORT:

3/21/2014

ANALYTE	METHOD	UNITS	PQL	DATE ANALYZED	RESULT
AROCLOR-1016	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1221	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1232	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1242	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1248	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1254	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1260	SW-8082	mg/Kg	0.2	03/21/14	ND

PQL = Practical Quantitation Limit

ND = Non-detected or below the PQL


Cyrus Pourhassanian
Laboratory Manager

DEMENNO/KERDOON
LABORATORY REPORT
ELAP CERTIFICATE NO.: 2037

PROJECT: PCB CONTAINMENT BAY "E"

MATRIX: SOLID

SUBMITTED BY: CLEAN HARBORS ENVIRONMENTAL SERVICES

DATE SAMPLED: 3-20-14

SAMPLE I.D.: SOUTH CONTAINMENT AREA

LAB I.D.: 032114-03

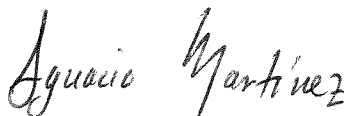
DATE RECEIVED: 3/20/2014

DATE OF REPORT: 3/21/2014

ANALYTE	METHOD	UNITS	PQL	DATE ANALYZED	RESULT
AROCLOR-1016	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1221	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1232	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1242	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1248	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1254	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1260	SW-8082	mg/Kg	0.2	03/21/14	ND

PQL = Practical Quantitation Limit

ND = Non-detected or below the PQL



Cyrus Pourhassanian FOR
Laboratory Manager

DEMENNO/KERDOON
LABORATORY REPORT
ELAP CERTIFICATE NO.: 2037

PROJECT: PCB CONTAINMENT BAY "E"

MATRIX: SOLID

SUBMITTED BY: CLEAN HARBORS ENVIRONMENTAL SERVICES

DATE SAMPLED: 3-20-14

SAMPLE I.D.: NORTH CONTAINMENT AREA

LAB I.D.: 032114-04

DATE RECEIVED: 3/20/2014

DATE OF REPORT: 3/21/2014

ANALYTE	METHOD	UNITS	PQL	DATE ANALYZED	RESULT
AROCLOR-1016	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1221	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1232	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1242	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1248	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1254	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1260	SW-8082	mg/Kg	0.2	03/21/14	0.2

PQL = Practical Quantitation Limit

ND = Non-detected or below the PQL



Cyrus Pourhassanian
Laboratory Manager

FOR



DEMENNO/KERDOON
LABORATORY REPORT
ELAP CERTIFICATE NO.: 2037

PROJECT: PCB CONTAINMENT BAY "E"

MATRIX: SOLID

SUBMITTED BY: CLEAN HARBORS ENVIRONMENTAL SERVICES

DATE SAMPLED: 3-20-14

SAMPLE I.D.: WEST CONTAINMENT AREA

LAB I.D.: 032114-05

DATE RECEIVED: 3/20/2014

DATE OF REPORT: 3/21/2014

ANALYTE	METHOD	UNITS	PQL	DATE ANALYZED	RESULT
AROCLOR-1016	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1221	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1232	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1242	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1248	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1254	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1260	SW-8082	mg/Kg	0.2	03/21/14	ND

PQL = Practical Quantitation Limit

ND = Non-detected or below the PQL

Cyrus Pourhassanian
Laboratory Manager

For



DEMENNO/KERDOON
LABORATORY REPORT
ELAP CERTIFICATE NO.: 2037

PROJECT: PCB CONTAINMENT BAY "E"

SAMPLE I.D.:

EAST CONTAINMENT AREA

MATRIX: SOLID

NORTH SIDE DUPLICATE

SUBMITTED BY: CLEAN HARBORS ENVIRONMENTAL SERVICES

LAB I.D.:

032114-06

DATE SAMPLED: 3-20-14

DATE RECEIVED:

3/20/2014

DATE OF REPORT:

3/21/2014

ANALYTE	METHOD	UNITS	PQL	DATE ANALYZED	RESULT
AROCLOR-1016	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1221	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1232	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1242	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1248	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1254	SW-8082	mg/Kg	0.2	03/21/14	ND
AROCLOR-1260	SW-8082	mg/Kg	0.2	03/21/14	ND

PQL = Practical Quantitation Limit

ND = Non-detected or below the PQL

Aguacio Martinez

Cyrus Pourhassanian
Laboratory Manager

For

☐ 1 Hill Avenue, Braintree, MA 02184

Tel. (781) 849-1800

☐ RTE. 2, Box 170, Waynoka, OK 73860

Tel. (580) 697-3500

☐ 12400 247th Avenue SE, Sawyer, ND 58781

Tel. (701) 624-5622

☐ 2202 Genoa Red Bluff Road, Houston, TX 77034 Tel. (281) 478-7700

☐ 5295 S. Garvey Road, Westmorland, CA 92281 Tel. (760) 344-9400

☒ Other

Client: Clean Harbors Project Name: PCB Containment Bay "E" Work Order/P.O. #: _____ Date: 3/25/14

Report To: George Oney 909-223-5888 Address: 5756 Alba Street, Los Angeles, CA 90058 Phone #: _____

Sample I.D.	Sampling Information				Analysis												# of con.	CHES Sample #
	Date	Time	Station Location	Sample Matrix	PCB													
Container Floor #1	3/25/14	12:55 PM	032514-09	Wipe	X												1	
Container Floor #2		1:00 PM	032514-10		X												1	
Container Floor #3		1:05 PM	032514-11		X												1	
Container Floor #4		1:10 PM	032514-12		X												1	
Non-PCB Area - North		1:15 PM	032514-13		X												1	
Non-PCB Area - South		1:30 PM	032514-14		X												1	

Relinquished by Sampler: _____

Date: 3/25/14 Time: 1:45 PM

Received by: JL

Date: 03/25/14 Time: 1:45 PM

Relinquished by Sampler: _____

Date: _____ Time: _____

Received by: _____

Date: _____ Time: _____

VOA Vial

Glass Bottle

Plastic Bottle

Preservation

Volume

DOT Shipping Name:

COMMENTS: (Fax Number, cautions, special instructions)

Email results to George Oney
at georgeoney2736@gmail.com
909-223-5888

Standard laboratory turnaround time is 1 week from date of receipt. Accelerated turnaround may be assessed a surcharge.

Location of samples: _____

Turnaround: 24 Hrs. 48 Hrs. 1 Week Other: _____

DEMENNO/KERDOON
LABORATORY REPORT
ELAP CERTIFICATE NO.: 2037
Polychlorinated Biphenyls

PROJECT: CLEAN HARBORS - PCB CONTAINMENT BAY "E"

MATRIX: WIPE

SUBMITTED BY: CLEAN HARBORS

DATE SAMPLED: 03/25/14

LAB I.D.: 032514-09 TO 11

SAMPLE I.D.: SEE BELOW

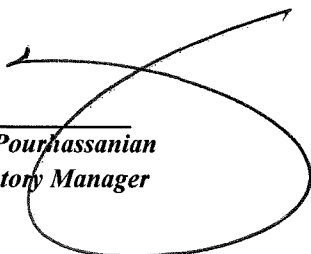
DATE RECEIVED: 03/25/14

DATE OF REPORT: 03/27/14

ANALYTE	METHOD	UNITS	PQL	DATE EXTRACTED	DATE ANALYZED	CONTAINER FLOOR #1	CONTAINER FLOOR #2	CONTAINER FLOOR #3
AROCLOR-1016	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1221	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1232	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1242	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1248	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1254	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1260	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND

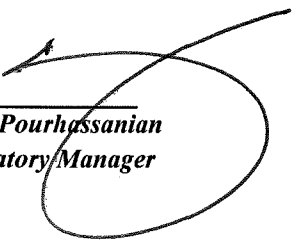
PQL = Practical Quantitation Limit

ND = Non-detected or below the PQL


Cyrus Pourhassanian
Laboratory Manager

**DEMENNO/KERDOON
LABORATORY REPORT****ELAP CERTIFICATE NO.: 2037****Polychlorinated Biphenyls****PROJECT: CLEAN HARBORS - PCB CONTAINMENT BAY "E"****MATRIX: WIPE****SUBMITTED BY: CLEAN HARBORS****DATE SAMPLED: 03/25/14****LAB I.D.: 032514-12 TO 14****SAMPLE I.D.: SEE BELOW****DATE RECEIVED: 03/25/14****DATE OF REPORT: 03/27/14**

ANALYTE	METHOD	UNITS	PQL	DATE EXTRACTED	DATE ANALYZED	CONTAINER FLOOR #4	NON PCB AREA NORTH	NON PCB AREA SOUTH
AROCLOR-1016	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1221	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1232	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1242	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1248	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1254	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND
AROCLOR-1260	SW-8082	ug/Wipe	2.0	03/26/14	03/27/14	ND	ND	ND

PQL = Practical Quantitation Limit**ND = Non-detected or below the PQL**
Cyrus Pourhassanian
Laboratory Manager