EMERALD TRANSFORMER LOS ANGELES, LLC
Los Angeles, California

TSCA COMMERCIAL STORAGE PERMIT RENEWAL APPLICATION

November 2017

Revision 0

EMERALD TRANSFORMER

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1.0 PCB COMMERCIAL STORAGE INTRODUCTION

The Emerald Transformer Los Angeles, LLC 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 its present site since 1979. In 1980, pursuant to new EPA regulations, the facility 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 2010 and approved effective January 27, 2011.

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. 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 $10\mu g/100cm^2$, 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 contaminates

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, a Florida corporation, with its headquarters located at:

4509 State Highway 83, PO Box 507
Defuniak Springs, Florida 32435

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:

Jason Crawford	Executive V. P. Operations West
Steve Peterson	Facility Manager
Jose Flores	Operations Manager
Jesus Vela	Operations Supervisor

Note: Additional affiliations for Jason Crawford are the Emerald Transformer, LLC locations. These facilities include the following locations two:

Coffeyville, KS
Phoenix, AZ (not a permitted facility)

2.3 Principal Officers

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

Corporate Executive Officer:	Stuart Prior
Chief Financial Officer:	Mark Newman
Director of Human Resources:	Meredith Allred
Director of Safety / Environmental Compliance:	Jessica Pennington
Executive V. P. Operations:	Mike Burns
Executive V.P. Operations West:	Jason Crawford
Executive V.P. Product Sales and Marketing:	Shane Willis

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 member's officers do not own or operate any other companies. Affiliations of other key operating employees are shown in Section 2.2 and Section 2.7. The parent's 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 extant of which the certifying officer(s) are aware in these other corporate entities. The compliance history in Section 5.6 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.

Jason Crawford has worked for Emerald Transformer Los Angeles, LLC since June 2017 (former Clean Harbors Los Angeles, LLC from 2015 to 2017). Mr. Crawford's primary responsibilities includes securing short and long-term contracts with utilities and other businesses for the reclamation and disposal of electrical transformers, breakers, high voltage switchgear and other large electrical equipment which also included transportation, storage and disposal of hazardous waste. He also manages a regional sales team responsible for securing and managing accounts as well as backend oil and metals sales into various end user markets. He holds chief P&L responsibilities for the business, which includes five US service facilities located in Los Angeles, CA, Coffeyville, KS, Twinsburg, OH, Tucker, GA and Philadelphia. He also holds chief P&L responsibility for four regional field based business units responsible for substation dismantling operations.

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 over the past 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.

Jose Flores has been Operations Manager since June 2017. Mr. Flores has 23 years of industry experience. Jose has held several positions within the former Clean Harbors, Los Angeles, LLC facility, which includes Operations Manager.

Jesus Vela has been an Operations Supervisor since 2002 with the former Clean Harbors Los Angeles, LLC facility. From 1997 to 2002, Mr. Vela was a Treatment Supervisor. Prior to this, Mr. Vela held the position of Chemical Technician since 1987.

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
04/25/17	DTSC	RCRA	Inspection	DTSC conducted a 3-day inspection. Alleged violations noted: Open container that was holding waste. One transformer was found to be stored in an unpermitted area. Cracks were found in a containment berm. Two containers were found missing hazardous waste labels.	All findings were corrected without penalty.
11/03/16	DTSC	RCRA	Inspection	Alleged violations noted: Storage of hazardous waste in an unpermitted area.	All findings were corrected without penalty.
				Scrap metal	

Date	Agency	Program	Activity	Findings	Result
				leaking oil onto warehouse floor. Cracks found inside of a containment unit. Roll-off dumpster missing hazardous waste label.	
04/28/16	DTSC	RCRA	Inspection	Alleged violation noted: Failure to provide tank assessments for 3 out of service tanks.	Tank assessments for the tanks in question were provided to the DTSC and the violation was removed.
06/26/15	RWQCB	Storm Water	Inspection	Alleged violation noted: Failure to submit Notice of Intent.	The Los Angeles facility has a permit for industrial discharge issued by the City of Los Angeles Bureau of Sanitation. The facility submitted a Non-Exposure Certificatio n to the RWQCB and the

Date	Agency	Program	Activity	Findings	Result
					violation was resolved.
05/12/15	DTSC	RCRA	Inspection	Alleged violation noted: Violation of hazardous waste 10-day transfer rule.	DTSC inspector identified several manifests which were believed to have exceeded 10 days of transfer storage at the facility. The facility was able to demonstrat e that none of the manifests were ever transferred through the plant. The violation was removed.
10/21/13	DTSC	RCRA	Inspection	Alleged violations: Violation of hazardous waste 10-day transfer rule. Failure to submit Quarterly Used Oil Report.	DTSC inspector found a transfer tanker truck load that was shipped on its 11th day. The facility provided an explanation as to why the load was not shipped within 10

Date	Agency	Program	Activity	Findings	Result
					days. A monetary penalty was assessed. The used oil report requested by the Department was provided and the issue was resolved.
02/03/2010	City of Los Angeles	Wastewater	NOV	Sulfide exceedance from 10/26/09 storm water discharge	Closed. No violation.
01/14/2010	CA Air Resources Board	South Coast Air Quality Mgmt District	Inspection	No issues.	No issues.
11/17/2009	City of Los Angeles	Fire Department	NOV	Emergency exit light and alarm panel in need of repair.	Closed. No violations.
07/16/2009	EPA	TSCA	Inspection	No issues.	No issues.
05/15/2009	CA Air Resources Board	South Coast Air Quality Mgmt District	Inspection	No issues.	No issues.
03/24/2009	DTSC	RCRA	Inspection	Annual inspection. Alleged violations: Quantity in isotainer did not match pump record No	Resolved. No violations.

Date	Agency	Program	Activity	Findings	Result
				written procedure for annual tank integrity inspection Malfunction not recorded in the inspection log.	
03/24/200907/16/2009	DTSCEPA	RCRA/TSCA	Inspection / Inspection	Annual inspection. Alleged violations: Quantity in isotainer did not match pump record No written procedure for annual tank integrity inspection Malfunction not recorded in the inspection log. No issues.	Resolved. No violations. No issues.
05/15/2009	CA Air Resources Board	South Coast Air Quality Mgmt District	Inspection	No issues.	No issues.
03/24/2009	DTSC	RCRA	Inspection	Annual inspection. Alleged violations	Resolved. No violations.

Date	Agency	Program	Activity	Findings	Result
				: Quantity in isotainer did not match pump record No written procedure for annual tank integrity inspectio n Malfunction not recorded in the inspection log.	

Emerald Transformer, LLC (formerly Clean Harbors PPM, LLC)

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

This corporate entity has five locations as follows:

- The operation at Ashtabula, OH has had one notice of non-compliance within the last five years that was corrected and no further action was taken.
- The operations in Coffeyville, KS has had one notice of non-compliance within the last five years that was corrected and no further action was taken.
- The Philadelphia, PA facility has had one notices of violation within the last five years that was corrected and no further action was taken.
- The Tucker, GA has had one notice of violation within the last five years which resulted in a penalty. All violations were corrected.
- Twinsburg, OH has had had one notice of non-compliance within the last five years that was corrected and no further action was taken.

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:

Ashtabula, OH
Coffeyville, KS
Philadelphia, PA
Tucker, GA
Twinsburg, OH
Defuniak Springs, FL
Nabb, IN
Lexington, MS
Phoenix, AZ

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. 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 exceedence of design/permitted capacity.

The facility will be inspected to ensure 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.

To establish the maximum authorized storage capacity for the PCB storage areas, floor plans were developed and are shown in Figure 3-1included 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 two PCB storage areas and available containment volume for each area.

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

Location	Maximum Allowed PCB Storage	Containment Volume Required	Containment Volume Available

	(Gallons)	(Gallons)	(Gallons)[1]
Container Storage Warehouse Bay 1	7,920	3,300	5,423[2]

For the Los Angeles facility, the estimated maximum PCB waste inventories 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 (c)7(i).

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.

[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 if catastrophic failure). This results in a total containment requirement of 5,281 gallons.

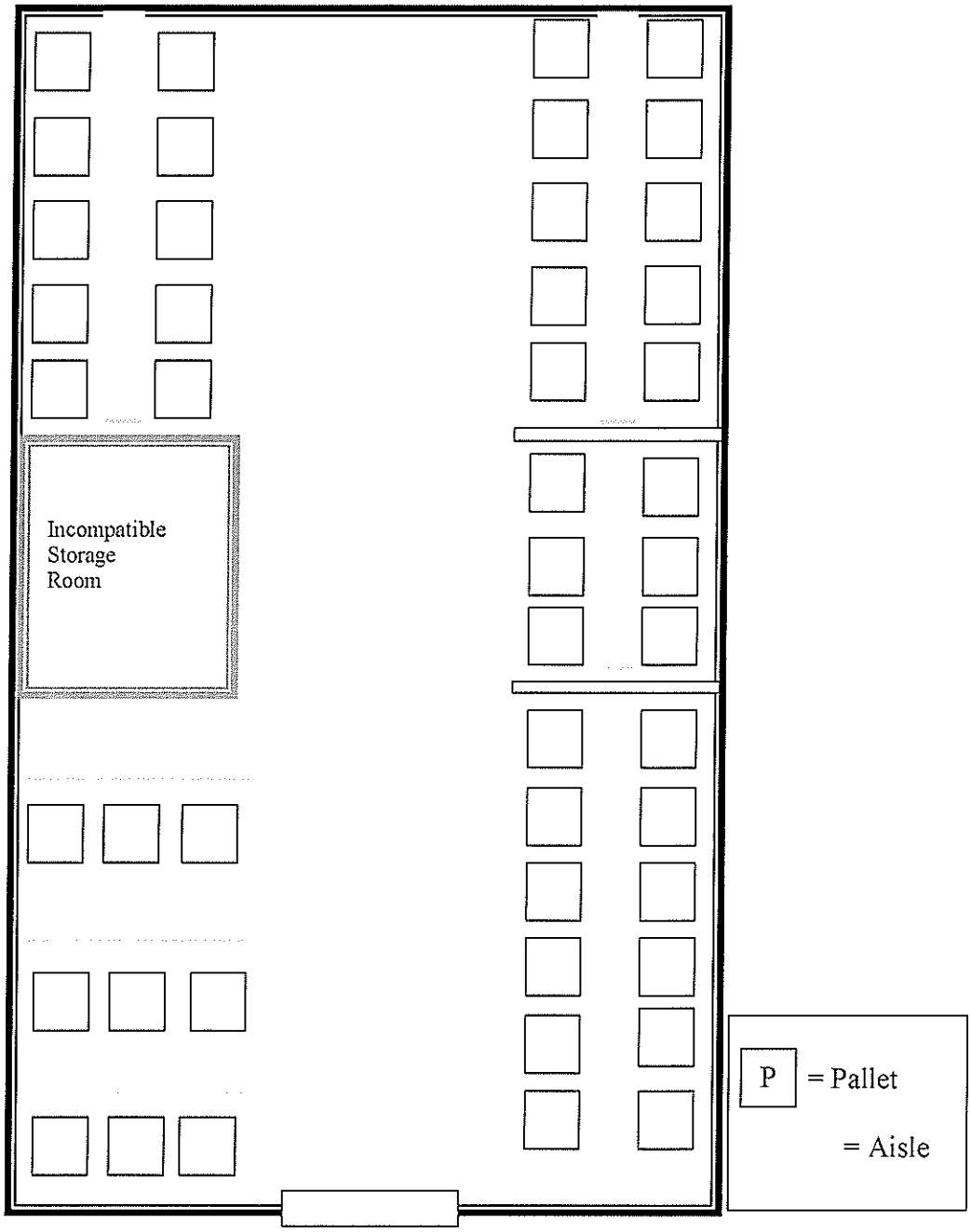


Figure 3-1

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: _____

Printed Name: Joe L. Christopher

Date: November , 2017

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 Attachment C).

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 has been 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. 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 Attachment C). The floor is inspected regularly and maintained to ensure the surface coating is intact. It was last coated in January of 2012.

3.3.5 100-Year Flood Water Elevation

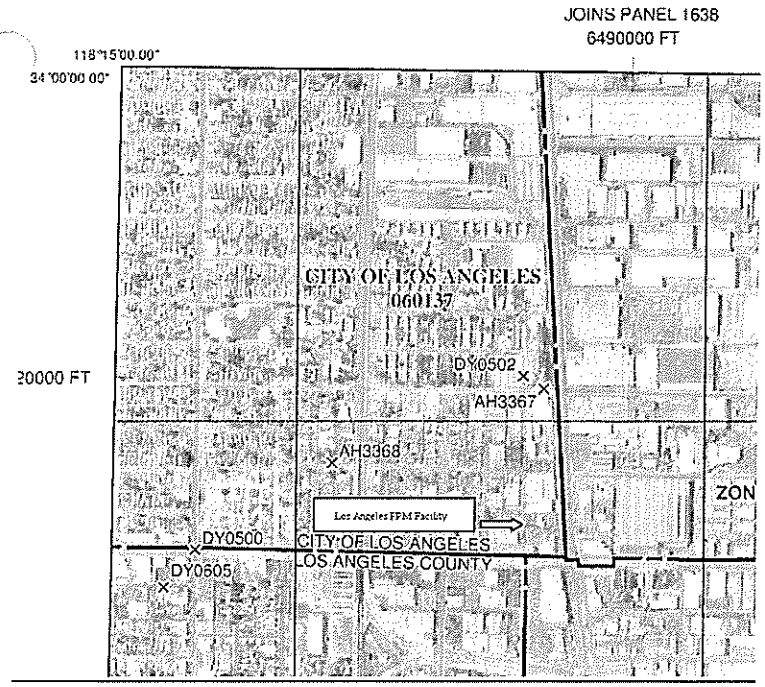
The entire site, including the Container Sludge Warehouse, is above the 100-year flood water elevation (see Figure 3-2).

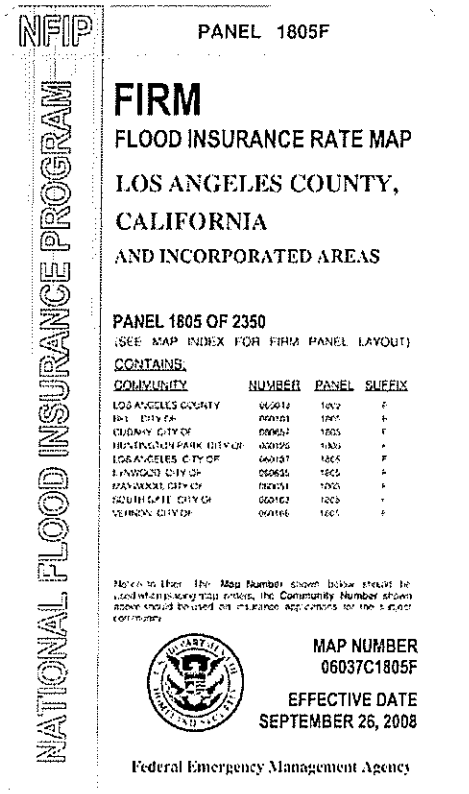
3.3.6 Storage Capacities

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 Temporary Storage/Staging

The facility may conduct staging (i.e. temporary storage) storage at the facility. This area would be located in the Northeast section of the facility (refer to Appendix B, drawing P003-CC-102) and will follow the requirements specified by 40 CFR 761.65(c)(1). Additionally, 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 at the Parking, Loading/Unloading, Receiving and Staging Area located just inside and North of the main gate. As previously noted the entire site is contained.





NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1805F

FIRM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 1805 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

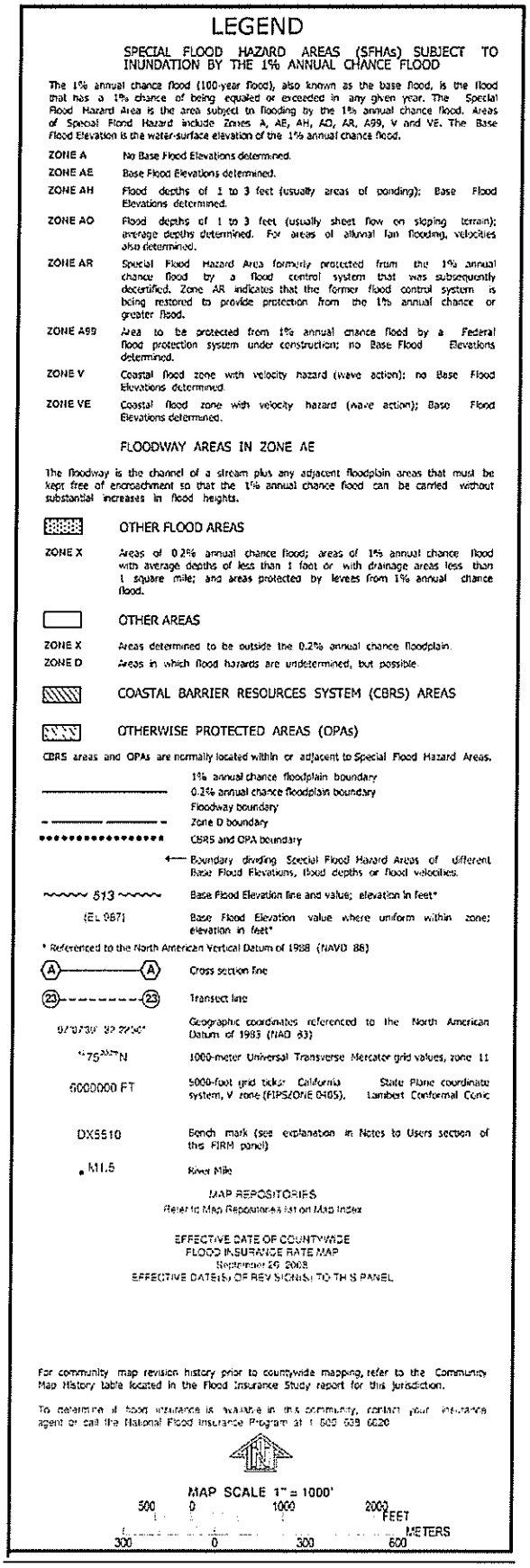
COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	[illegible]	[illegible]	F
[illegible] CITY OF	[illegible]	[illegible]	F
CUDAHY, CITY OF	[illegible]	[illegible]	F
HUNTINGTON PARK, CITY OF	[illegible]	[illegible]	F
LOS ANGELES, CITY OF	[illegible]	[illegible]	F
LYNWOOD, CITY OF	[illegible]	[illegible]	F
MAYWOOD, CITY OF	[illegible]	[illegible]	F
SOUTH GATE, CITY OF	[illegible]	[illegible]	F
VERNON, CITY OF	[illegible]	[illegible]	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C1805F

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
75000 FT N	1000-meter Universal Transverse Mercator grid values, zone 11
6000000 FT	5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
DX5510	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

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 7	(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

Other public agencies also have jurisdiction, at the federal and state level, include 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 truck 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 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 Clean Harbors' employees from an intruder or other unauthorized person. All persons, other than Clean Harbors' 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 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.

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: _____ at Telephone No. _____."

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 wastes 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 the heavily industrialized area and occupies approximately 2.3 acres. The perimeter is completed 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 as shown on Drawing P003-CC-102 (Attachment B). 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. Drawing P003-CC-102 (Attachment B) provides additional details about the property.

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.

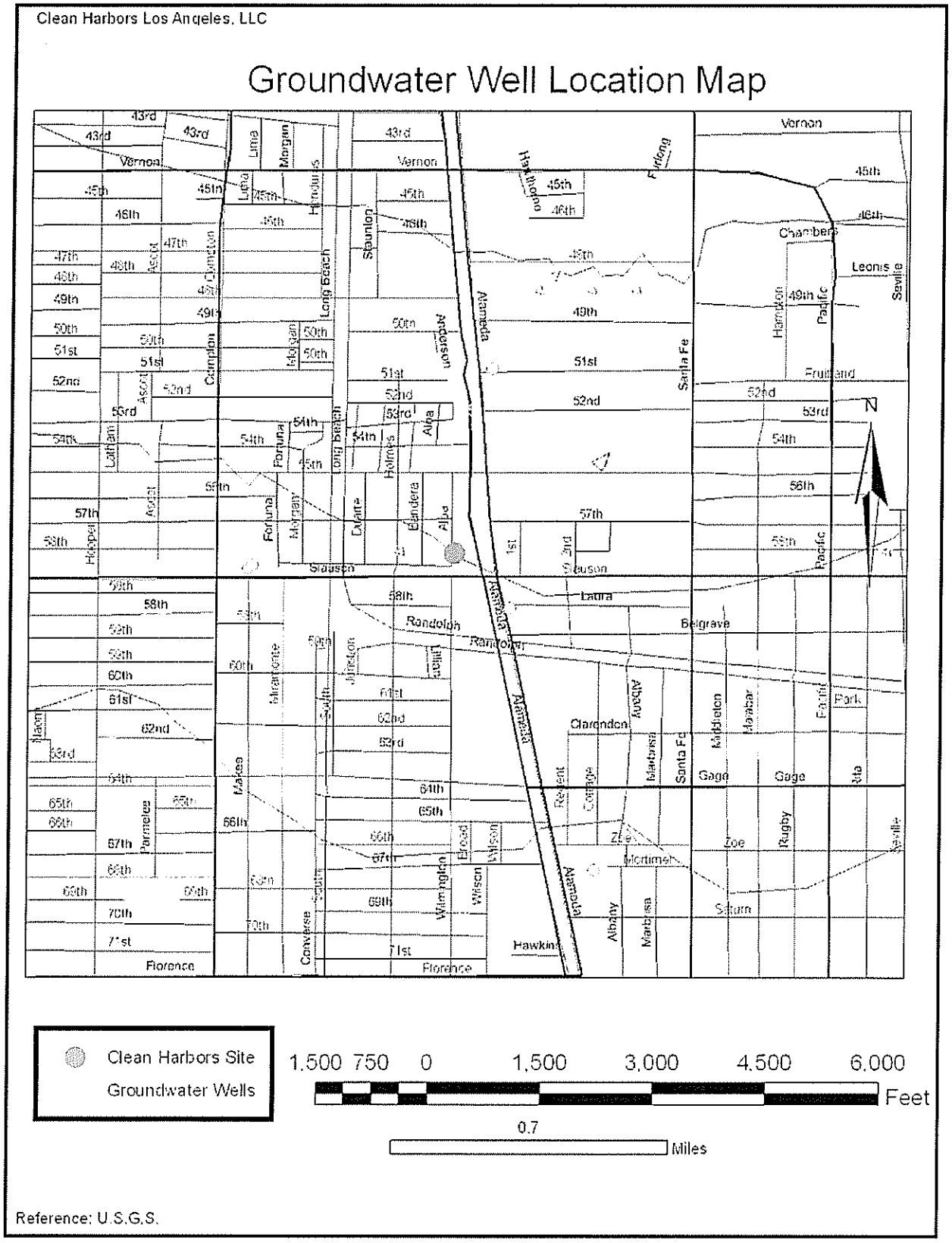


Figure 4-1: Well Location Map

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 comingled

[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 at closure. 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 $\mu g/100cm^2$ 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 Attachment C).

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

A detailed description of the activities that will be carried out to identify and remove a 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 $\mu g/100cm^2$ 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 spill have been noted in the past and will be included 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 CHLA 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 penetrate or	1 ppm

	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 CHLA at the time of closure. This safety plan will be prepared by the contractors at the time of closure and will be contractor specific.

A safety plan conforming to the requirements set forth in 40 CFR 1910.120(b) has been prepared for PCB activities occurring at this site currently and is available in Appendix H.

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, accident, 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 CHLA. 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 or sump.

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 it is felt that 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.

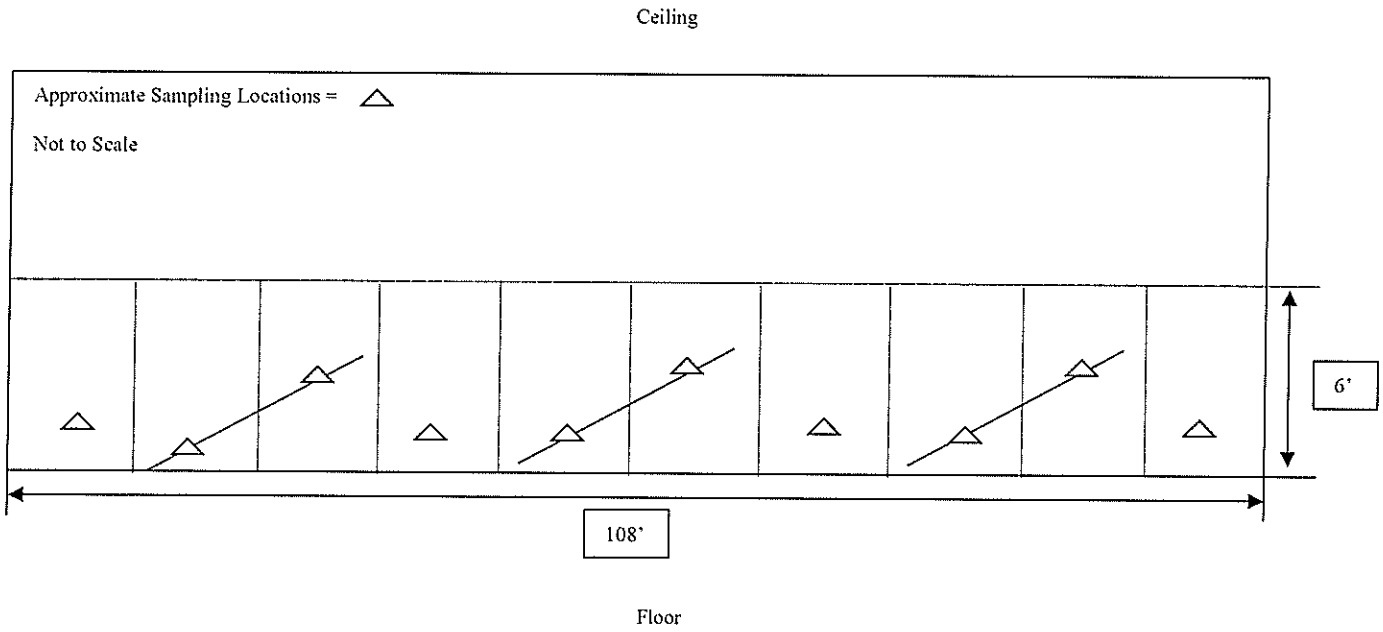
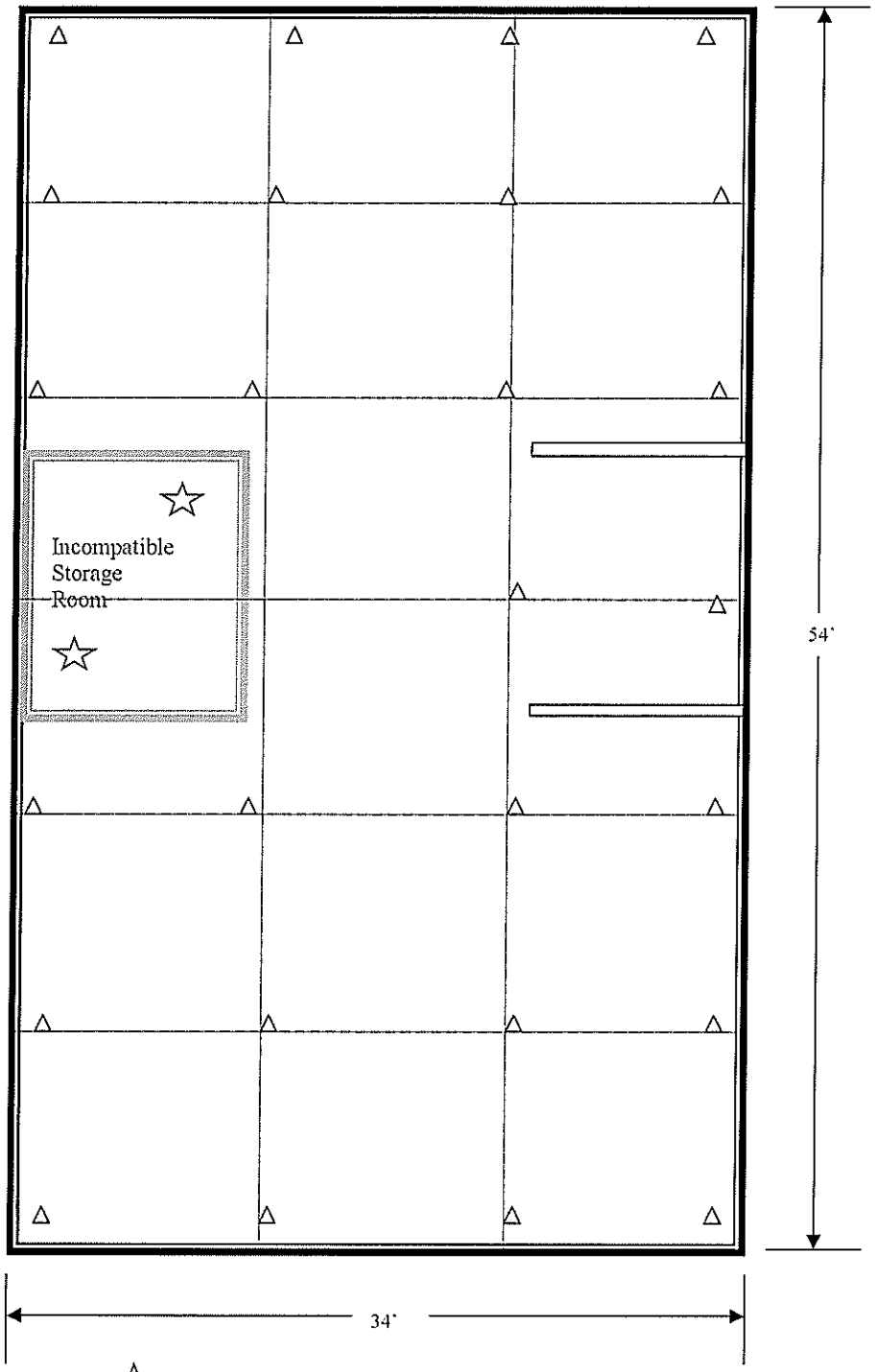


Figure 4-2: Typical Sampling Grid for Wall



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 floors) will be wipe samples. 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 spill 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. 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.

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.

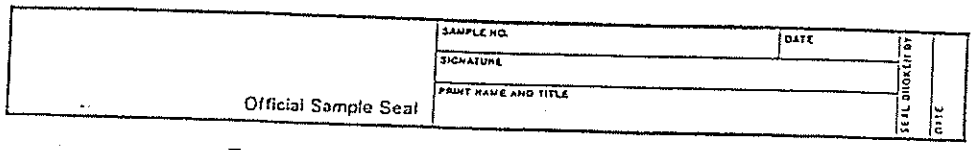
Sample Handling and Documentation
Proper handling and documentation of samples is important to assure that the data will be legally defensible and reproducible. Field logs will be used to record information concerning sample identification, evacuation, field analysis, and other aspects of the sampling 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 and custody seal as 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 as 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.



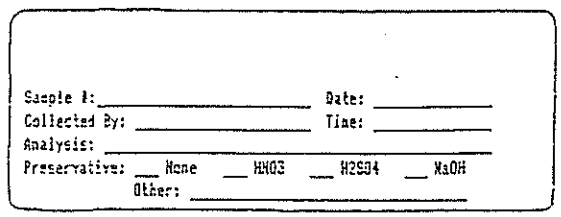


Figure 4-4: Jar Label and Sample Seal

CHAIN OF CUSTODY RECORD

PROJ. NO. | PROJECT NAME

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	REMARKS

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: White and Yellow Accompanies Shipment; Pink copy to Field Files

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 10μg/100cm^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 contaminates 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 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)
    - 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 contaminates 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 contaminates. 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 contaminate 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 contaminate 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, 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 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 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.

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.

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 (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 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

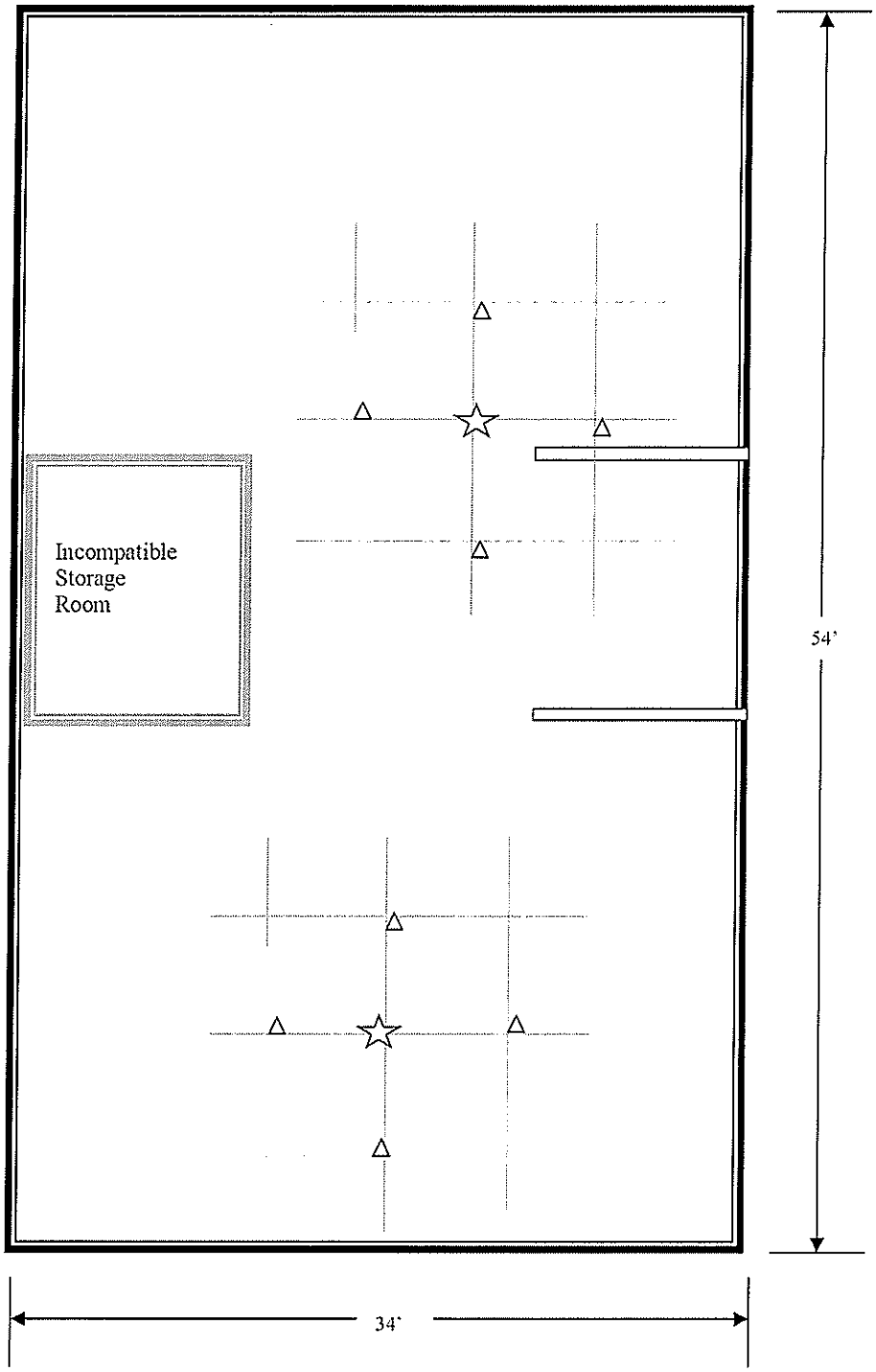
Before any post cleanup sampling begins, the records from the previous sampling will be reviewed to identify areas where elevated levels of PCBs were found. Samples will be taken, based on this review in accordance in a step out fashion, utilizing a 1.5 meter spacing grid, reorienting it, and collecting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

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 (e.g. 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 Clean Harbors 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.

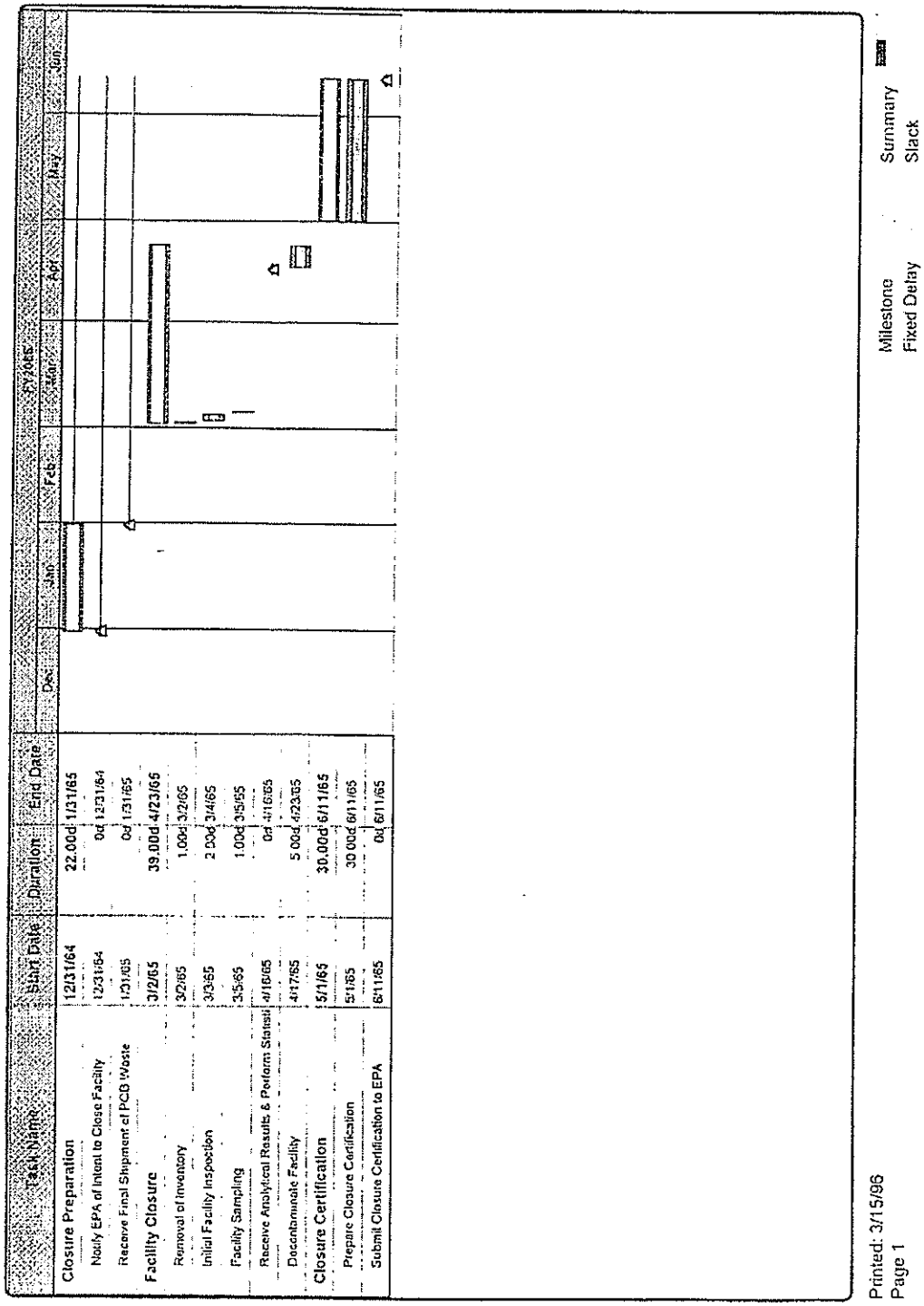


Figure 4-7 TSCA Closure Schedule

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

	Provided	Not Applicable	Comments
1.0 Facility Description:			
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

	Provided	Not Applicable	Comments
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:

	Use	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.)	4.3.1			
• Surrounding soil, pavement and vegetation	N/A			
• Containment systems and piping	4.3.1			
• Equipment	N/A			
• Pallets	N/A			
• Bulk tanks	N/A			
• OTHER	N/A			

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:**

	Provided	Not Applicable	Comments .
• Tanks		X	
• Valves and piping		X	
• Equipment		X	
• Containment areas	4.3.3		
• Soil		X	
• OTHER		X	

b) **Sampling survey should include:**

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

• Sampling for the penetration and contamination of PCBs into solid surfaces		X	
• 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:

	Provided	Not Applicable	Comments .
	4.3.4		

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	4.2.2		

5.0 <u>Other Activities Covered in the Closure Plan:</u>

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 <u>Schedule for Closure Detailing the Above Activities:</u> 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 2012 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 costs presented have been calculated by utilizing current 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 currently 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 $5.00 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 PCB AREA	Quantity	Unit	Cost	Unit	Total Cost
INVENTORY DISPOSAL Drums: Liquid/Solid + Miscellaneous PCB Equipment/Solids	79,400	lbs	0.50	lbs	$39,700
Transportation	3,276	Mile	5.00	Mile	$16,380
INVENTORY DISPOSAL SUB-TOTAL					**$56,080**
DECONTAMINATION (Floor Area = 1,836 ft^2, Wall Area to 6 ft = 462 ft^2)					
Records Review & Interviews – Manager	4	Hours	55.00	Hour	$220
Inventory Removal					$0
Laborers	36	Hours	45.00	Hour	$1,620
Foreman	36	Hours	65.00	Hour	$2,340
Initial Sampling					
Laborers	12	Hours	45.00	Hour	$540
Manager	12	Hours	65.00	Hour	$780
Equipment Rental (Scarifier)	1	Week	900.00	Week	$900
Grid (core) Samples (Note 1)	37	Each	57.00	Each	$2,109
Wipe Samples (Note 1)	15	Each	57.00	Each	$855
Field Blanks (one wipe, one core)	2	Each	57.00	Each	$114
Discretionary Samples (Note 1)	5	Each	57.00	Each	$285

Sample Shipment	2	Each	50.00	Each	100
Surface Decontamination (Floor Area= 1,836 ft^2					
Laborers	20	Hours	45.00	Hours	$900
Foreman	20	Hours	65.00	Hours	$1,300
Safety Manager	10	Hours	65.00	Hours	$650
Solid Waste	4	Drum	400.00	Drum	$1,600
Confirmation Sampling					
Grid (core) Samples (Note 1)	36	Each	57.00	Each	$2,052
Sample Shipment	2	Each	50.00	Each	100
Discretionary Samples (Note 1)	3	Each	57.00	Each	$171
Laborers	5	Hours	45.00	Hours	$225
Foreman	5	Hours	65.00	Hours	$325
Certification – 3rd Party Engineer	4	Hours	95.00	Hours	$380
Miscellaneous					
Expendable Supplies	1	Lot	500.00	Lot	$500
Equipment Decon Fluid (forktruck, sacrifier) (Note 2)	10	Gal	4.50	Gal	$45
Safety Equipment	20	Sets	50.00	Sets	$1,000
Project Management	32	Hours	55.00	Hours	$1,760
Per Diem Expenses	5	Days	125.00	Days	$625

Utilities	20	Days	10.00	Days	$200
Rental Equipment	4	Lot	250.00	Lot	$1,000
DECONTAMINATION SUB-TOTAL					**$22,696**
CONTAINER STORAGE WAREHOUSE–PCB AREA TOTAL					**$78,776**
CONTINGENCY					**$7,878**
GRAND TOTAL					**$86,654**

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: _____

Printed Name: Joe L. Christopher

Date: November 30, 2017

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 $86,654.

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

EMERALD TRANSFORMER

PROFESSIONAL RESUME

a.	**Name, Title & Local Company Address:**			
	Jason M. Crawford Executive Vice President, Operations West Emerald Transformer Los Angeles, LLC 5756 Alba Street Los Angeles, CA 90058			
b.	**Corporate Address:**			
	Emerald Transformer Western States, LLC 4509 State Highway 83, PO Box 507 DeFuniak Springs, FL 32435			
c.	**Years Experience – With This Firm:**	1	**With Other Firms:**	23
d.	**Education: Degree(s) / Specialization & Licenses / Registrations**			
	Bachelors of Business Administration, Concentration: Finance Sam Houston State University – Huntsville, TX			
e.	**Other Experience and Qualifications:**			
	Grew revenue from $23M to $50M and profits from $1.3M to an average of $7M annually for Coolgas, establishing the firm as a leading refrigerant distribution business and achieving a profitable acquisition within 3 years. Originated Excelerate Energy's first commercial project and developed South America's first liquefied natural gas import terminal, delivering the $100M+ multi-year contract on-time and on-budget. Lead turnaround of underperforming division of Clean Harbors growing revenues and profits, establishing the firm as the premier transformer services company and achieving a profitable acquisition within 2 years.			
f.	**Environmental & Health and Safety Training:**			
	ORGANIZATIONAL MANAGEMENT BUSINESS DEVELOPMENT STRATEGIC PLANNING P&L MANAGEMENT STRATEGIC PARTNERSHIPS PROGRAM / PROJECT MANAGEMENT SALES LEADERSHIP PRODUCT MANAGEMENT MARKETING STRATEGY OPERATIONS FINANCIAL ANALYSIS & PLANNING PROCESS IMPROVEMENT CHANGE MANAGEMENT GROWTH STRATEGY ORGANIZATIONAL DEVELOPMENT ORGANIZATIONAL RESTRUCTURING CROSS FUNCTIONAL TEAM LEADERSHIP			

EMERALD TRANSFORMER

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 4509 State Highway 83, PO Box 507 DeFuniak Springs, FL 32435			
c.	**Years Experience – With This Firm:**	1	**With Other Firms:**	23
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			

EMERALD TRANSFORMER

PROFESSIONAL RESUME

a.	**Name, Title & Local Company Address:**			
	Jose Flores Facility Operations Manager Emerald Transformer Los Angeles, LLC 5756 Alba St Los Angeles, Ca 90058			
b.	**Corporate Address:**			
	Emerald Transformer Western States, LLC 4509 State Highway 83, PO Box 507 DeFuniak Springs, FL 32435			
c.	**Years Experience – With This Firm:**	1	**With Other Firms:**	23
d.	**Education: Degree(s) / Specialization & Licenses / Registrations**			
	Victor Valley High school, Victorville Ca			
e.	**Other Experience and Qualifications:**			
	• Proactive leader with over 24 years of experience in Environmental Compliance and Hazardous Waste Management. • 24 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. Work with some radioactive material, Explosives, BIO and NORM material. • Very good understanding of all hazardous waste paperwork such as Manifest, TSCA, LDR in State, Federal, Recycle, Disposal, Incineration or landfill.			
f.	**Environmental & Health and Safety Training:**			
	• 40-hour HAZWOPER Training • DOT Training • First Aid/CPR Certificate • ICS-100 Incident Command System FEMA • ICS-200 Initial Action Incidents FEMA			

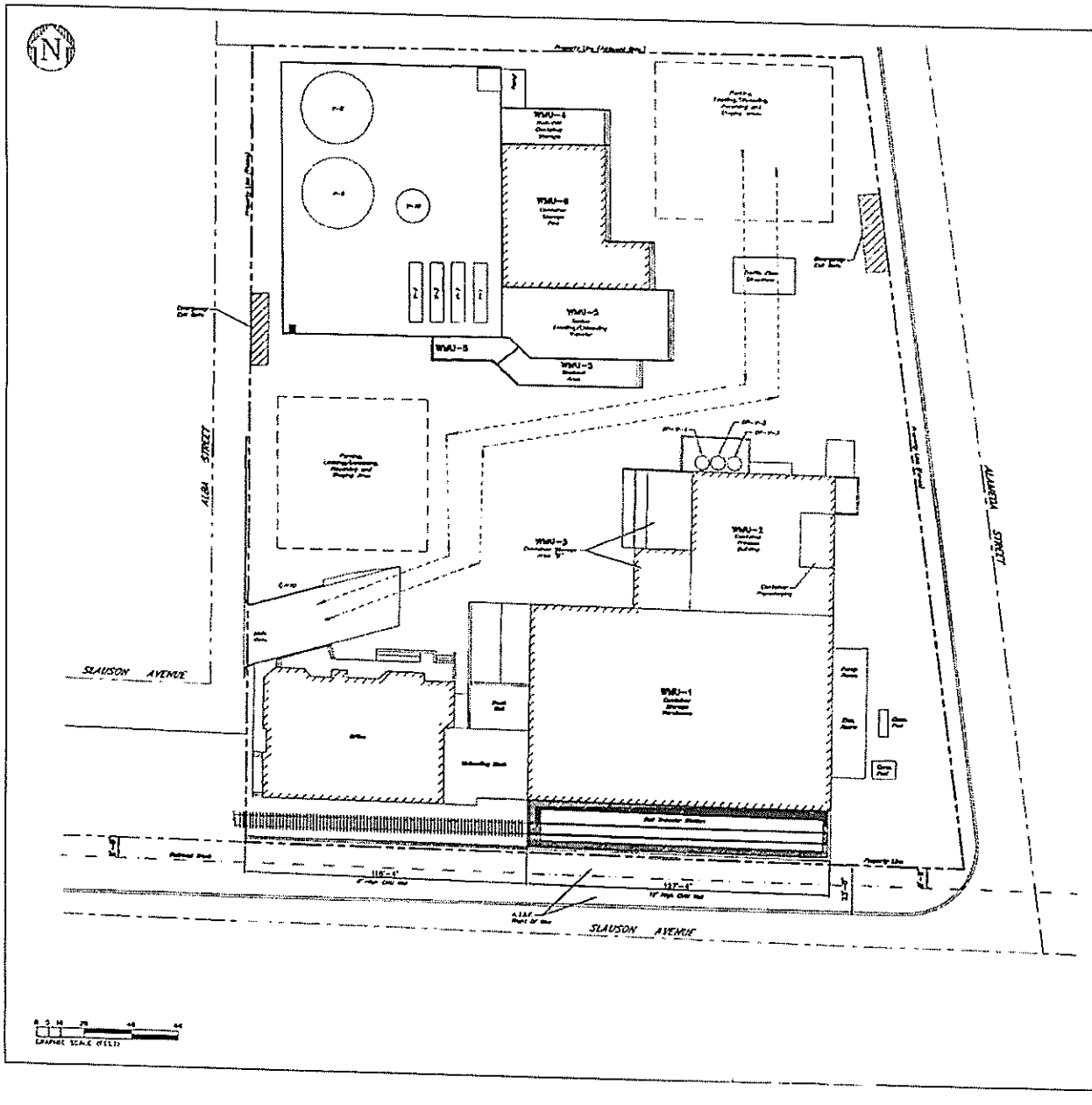
EMERALD TRANSFORMER

PROFESSIONAL RESUME

a.	**Name, Title & Local Company Address:**				
	Jesus Vela Facility Operations Supervisor Emerald Transformer Los Angeles, LLC 5756 Alba Street Los Angeles, CA 90058				
b.	**Corporate Address:**				
	Emerald Transformer Western States, LLC 4509 State Highway 83, PO Box 507 DeFuniak Springs, FL 32435				
c.	**Years Experience – With This Firm:**	1	**With Other Firms:**	24	
d.	**Education: Degree(s) / Specialization & Licenses / Registrations**				
	CDL Class A driver license, with Hazardous Materials and Tanker endorsements Forklift Driver certified Certificate of Completion on "Operation and Maintenance of Waste Water Treatment Plants" Certificate of Completion on "Treatment of Metal Waste Streams" 2 years, 48 college units Certificate of completion on "Electrical Construction and Maintenance" at Los Angeles Trade Technical College CPR, First Aid certified				
e.	**Other Experience and Qualifications:**				
	As the Facility Operations Supervisor, I have direct supervision of Facility Technicians at the Clean Harbors TSCA permitted Los Angeles plant. This includes: • The receiving, tanking, and recordkeeping for oil with various levels of PCB. • The management of containerized RCRA waste to include flammable, corrosive, and toxic waste. • The disassembly and processing pole mounted and pad mount transformers ranging in size from 5KVA to over 5,000 KVA. • Supervision of the system recordkeeping for manifest receipt, container bar coding, and facility processing logs. • Preparing and exporting shipments of resulting transformer cores and coils I also have working knowledge of OSHA, DOT, RCRA, and TSCA regulations. • I initially entered the transformer industry in 2005, and held various positions within Clean Harbors.' Prior to accepting my current Facility Operations Supervisor back on year 2000 I was a waste water treatment operator, crew leader, Shift leader, and Maintenance supervisor for the facility. • My related environmental experience has also included related utility / industrial service projects; such as tank cleaning,				

	• Experience on operation and maintenance of Air Pollution Control Systems • Installation of tanks level/metering systems • Experience on operation, Installation, and maintenance of Double Diaphragm Air Operated Pumps
f.	**Environmental & Health and Safety Training:**
	• 8-Hour OSHA HAZWOPER Annual Refresher • Annual RCRA Training • Annual Respirator Fit Test • DOT Training for Hazardous Materials Employees (w/triennial refreshers) • Confined Space Entry Protocols and Rescue Procedures • CDL Class A with Haz Mat and Tanker endorsements • 40-Hour OSHA HAZWOPER • Confined Space Entry Supervisor

APPENDIX B – FACILITY DRAWINGS



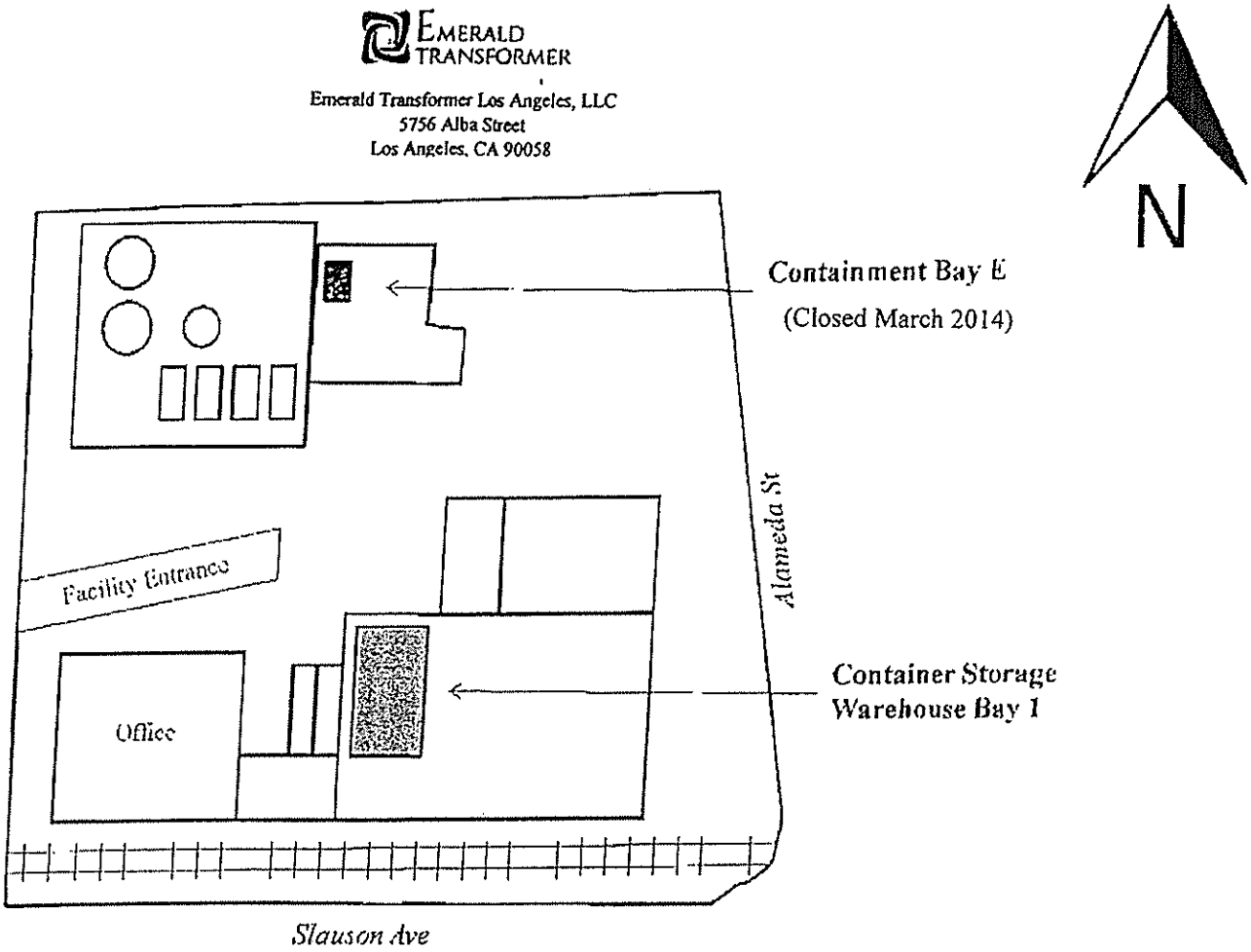
Site Plan

EMERALD TRANSFORMER Los Angeles, LLC

5756 Alba Street
Los Angeles, CA 90058

EMERALD TRANSFORMER

Emerald Transformer Los Angeles, LLC
5756 Alba Street
Los Angeles, CA 90058



Emerald Transformer Los Angeles, LLC
Facility Diagram

APPENDIX C – INSPECTION FORMS

EMERALD TRANSFORMER
5756 Alba St, Los Angeles Ca 90058

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 Conatiners stored in approved bermed areas?	
Are the roof and walls in god 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?	
Compliance Footer	
Inspector Signature	
Inspection Overall Assessment	Inspection Passed or Failed

APPENDIX D – SPCC PLAN

EMERALD TRANSFORMER

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
Signature:	
Registration Number:	CH004494
State:	California
Date:	11/17/2017

REGISTERED PROFESSIONAL ENGINEER
GEORGE ONEY
Exp 6/30/19
No. CH004494
CHEMICAL
STATE OF CALIFORNIA

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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.	_____	will / 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 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 is 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)

Name	Title	Telephone
Steve Peterson	Plant General Manager	(323) 277-2500
Jose Flores	Operations Supervisor	(323) 277-2500
Joe Christopher	Environmental Manager	(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 seven 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 Industrial Wastewater Treatment Plant 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 nine stationary aboveground storage tanks in use at the Los Angeles facility located in the Wastewater Treatment Plant tank farm (WMU-5). The locations of the tanks are shown on the SPCC Plan map (Figure 1). Of the nine tanks at the tank farm, seven are used for the storage of oils. The remaining two tanks are used for storm water management.

Tanks V-1 thru V-6 (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 designed tank capacities of 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 Warehouse B (WMU-3), Roll-off Container Area (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.

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 B (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.

The Roll-off Container Storage Area (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 wastewater treatment plant. 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 is 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 is 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 Warehouse B (WMU-3), Roll-off Container Area, (WMU-4), and Wastewater Treatment Plant (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. 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. <u>Container Storage Units</u>

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. <u>Container Transfer Areas</u>

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 wastewater treatment plant 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 concrete and measures approximately with 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. <u>Bulk Storage Facilities (includes waste transfers from containers)</u>

The facility storage tanks were manufactured in accordance with good engineering practices. Wastewater Treatment Plant (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 is 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 Warehouse B (WMU-3), Roll-off Container Area, (WMU-4), and Wastewater Treatment Plant (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. 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
Jose Flores	(323) 277-2500	(323) 216-0466	(323) 216-0466
Joe Christopher	(323) 277-2500	(323) 351-1017	(323) 351-1017

B. Emergency Response Contractors

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

C. External Contacts

AGENCY	PHONE NUMBER
National Response Center	(800) 424-8802
U.S. EPA Region 7	(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	

Container Storage Warehouse B (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	
Roll-off Container Area (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	
Wastewater Treatment Plant tank farm (WMU-5)	Complete Failure Tank (rupture)	100,000	280,000	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	25,740	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	
Truck (bulk liquid transfer)	Complete Failure (rupture)	6,000	12,000	Instantaneous	To Secondary Containment	Secondary Concrete dike (6,732 gal containment)
	Partial Failure			Gradual to Instantaneous	To Secondary Containment	

	(rupture)			(1 to 6,000 gal)		
	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 is 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 Warehouse B (WMU-3), Roll-off Container Area, (WMU-4), and Wastewater Treatment Plant (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. 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 thanks. 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 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.

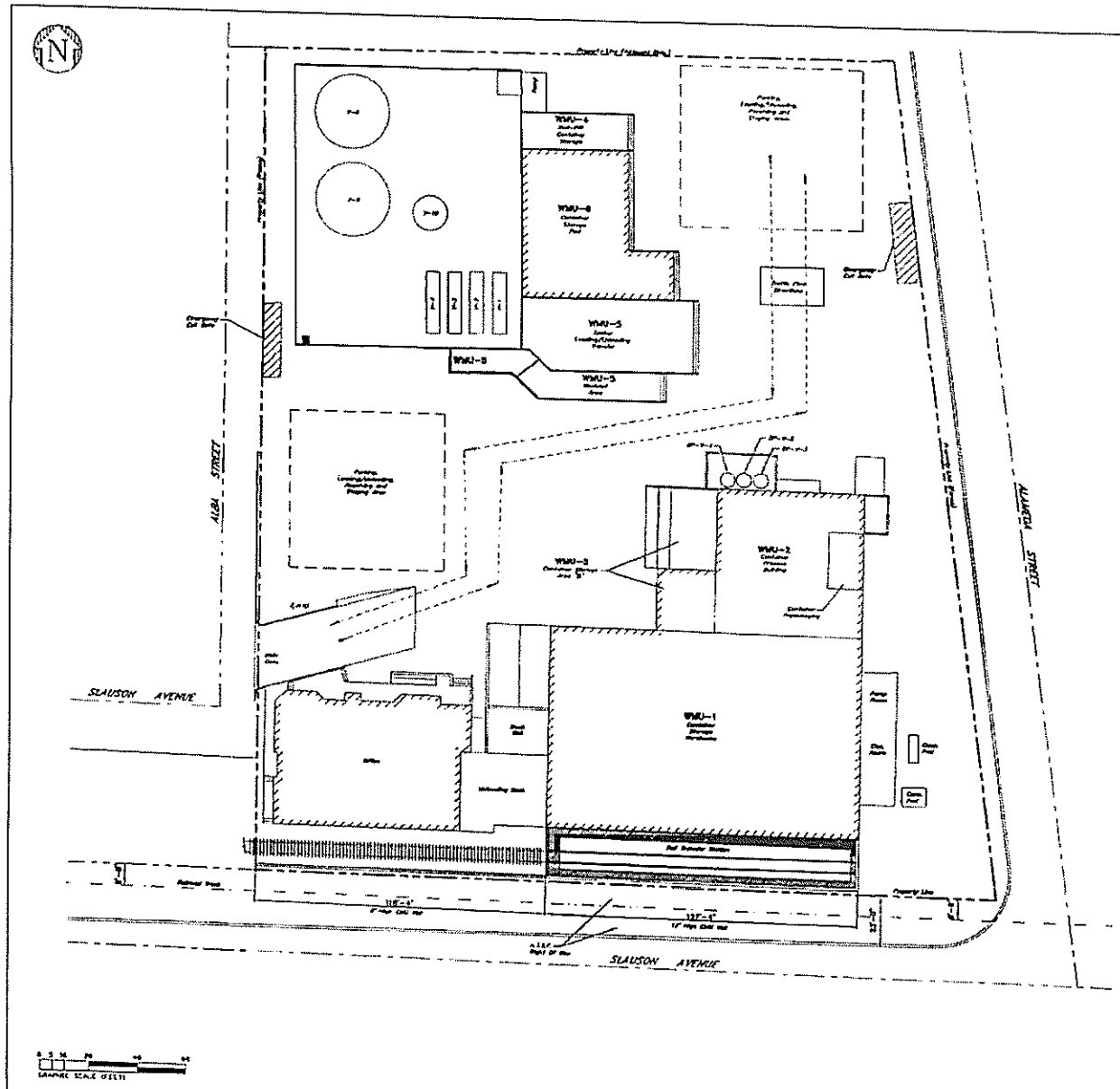
_____ Facility Manager
Signature Title

_____ _____
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	280,000	Secondary Concrete dike (250,148 gal containment)
New Container Storage Pad (WMU-6)	220	25,740	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



Site Plan

EMERALD TRANSFORMER Los Angeles, LLC

5756 Alba Street
Los Angeles, CA 90058

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 Ft. X 34 Ft. = 1836 SF

b. **Incompatible storage room dimensions floor area: 132 SF**

   12 Ft. x 11 Ft. = 132 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

   Trench area: 94Ft. x 6/12 Ft. = 47 SF
   Sump area: 1 x 1 x 6 = 6 SF

   Total Trench & Sump area; 47 SF + 6 SF = 53 SF

d. **Curb dividers area: 12 SF**

   There are two curb dividers within area: 12 Ft. x 6" wide
   2 (12 Ft. x 6/12 Ft.) = 12 SF

e. **Area available (contained storage): 1639 SF**

   e = a – (b + c + d)
   e = 1836 – (132 + 53 +12)
   e = 1639 SF

f. **Number of drums[1]:**

   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 drums + 120 drums = 192 drums
   192 drums/ 4 drums per pallet = 48 pallets

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

h. Floor area occupied by drums 553 SF

Area = πR^2
Drum area: 3.14 x (11.5 Ft. / 12 Ft.)^2 = 2.88 SF/drum
192 drums x 2.88 SF = 553 SF

i. Containment curb height: 6 inches

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

48 pallets x 0.33 CF/pallet = 16 CF or 120 gal.

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

Height considered = containment curb height – pallet height
Height considered = 6" – 4" = 2" drum in liquid

553 SF x 2/12 Ft. = 92 CF

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

Gross volume = contained storage area SF x containment curb height
Gross volume = 1,639 SF x 6/12 Ft. = 820 CF or 6,134 gallons

Less: Volume of Pallets: 16 CF
Volume of drums in liquid: 92 CF

Add: Volume of trenches: 8 CF or 60 gallons
47 SF x 2/12 Ft. = 8 CF

Volume of sumps: 5 CF or 37 gallons
6 SF x 10/12 = 5 CF

Net volume available = V Gross - (V pallets + V drums) + (V trench + V drums)
820 CF - (16 CF + 92 CF) + (8 CF + 5 CF) = 725 CF or 5,423 gallons

Net volume available = <u>725 CF</u> or (725CF x 7.48) = <u>5,423 gallons</u>

m. Maximum liquid volume

Maximum liquid volume - PCB
144 drums x 55 gal/drum = 7,920 gallons. or 1,059 CF

Maximum liquid volume – RCRA
240 drums x 55 gal/drum = 13,200 gallons or 1,765 CF

n. Require containment volume

PCB requirement at 25%: 1,980 gallons or 265 CF
7920 gal. x 0.25 = 1,980 gallons

RCRA requirements at 25%[2]: 3,300 gallons or 441 CF
13,200 gal. x 0.25 = 3,300 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

SAFETY DATA SHEET

B58W5100

Section 1. Identification

Product name	: COROBOND 100 Epoxy Primer/Sealer (Part A) Off White
Product code	: B58W5100
Other means of identification	: Not available.
Product type	: Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Not applicable.

Manufacturer	: THE SHERWIN-WILLIAMS COMPANY 101 W. Prospect Avenue Cleveland, OH 44115
National contact	: Sherwin-Williams Canada Inc. 180 Brunel Road Mississauga, Ontario L4Z 1T5 Canada
Emergency telephone number of the company	: US / Canada: (216) 566-2917 Mexico: SETIQ 01-800-00-214-00 / (52) 55-5559-1588 24 hours / 365 days a year
Product Information Telephone Number	: US / Canada: (800) 524-5979 Mexico: Not Available
Regulatory Information Telephone Number	: US / Canada: (216) 566-2902 Mexico: Not Available
Transportation Emergency Telephone Number	: US / Canada: (800) 424-9300 Mexico: SETIQ 01-800-00-214-00 / (52) 55-5559-1588 24 hours / 365 days a year

Section 2. Hazards identification

Classification of the substance or mixture : ACUTE TOXICITY (inhalation) - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
SKIN SENSITIZATION - Category 1
CARCINOGENICITY - Category 2
TOXIC TO REPRODUCTION (Unborn child) - Category 1B
TOXIC TO REPRODUCTION (Fertility) - Category 2
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

Percentage of the mixture consisting of ingredient(s) of unknown oral toxicity: 80.2%
Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 88.6%
Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 93.6%

GHS label elements

Hazard pictograms :

Signal word : Danger

Section 2. Hazards identification

Hazard statements : Harmful if inhaled.
Causes serious eye irritation.
Causes skin irritation.
May cause an allergic skin reaction.
May damage the unborn child.
Suspected of damaging fertility.
Suspected of causing cancer.
May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Wash hands thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace.

Response : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. FOR INDUSTRIAL USE ONLY. This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

Please refer to the SDS for additional information. Keep out of reach of children. Do not transfer contents to other containers for storage.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

CAS number/other identifiers

Ingredient name	% by weight	CAS number
Epoxy Polymer	68.87	25085-99-8
Alkyl Glycidyl Ether	8.37	68609-97-2
Epoxy Polymer	6.41	25068-38-6
Phenylmethanol	5.05	100-51-6
Butyl Benzyl Phthalate	5.05	85-68-7
Titanium Dioxide	4.94	13463-67-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
Inhalation	: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Skin contact	: Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	: Causes serious eye irritation.
Inhalation	: Harmful if inhaled.
Skin contact	: Causes skin irritation. May cause an allergic skin reaction.
Ingestion	: No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact	: Adverse symptoms may include the following: pain or irritation watering redness
Inhalation	: Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
Skin contact	: Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
Ingestion	: Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations

Indication of immediate medical attention and special treatment needed, if necessary

Section 4. First aid measures

Notes to physician	: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	: No specific treatment.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	: Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	: None known.
Specific hazards arising from the chemical	: In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide halogenated compounds metal oxide/oxides
Special protective actions for fire-fighters	: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill	: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits (OSHA United States)

Ingredient name	Exposure limits
Epoxy Polymer	None.
Alkyl Glycidyl Ether	None.
Epoxy Polymer	None.
Phenylmethanol	**AIHA WEEL (United States, 10/2011).** TWA: 10 ppm 8 hours.
Butyl Benzyl Phthalate	None.
Titanium Dioxide	**ACGIH TLV (United States, 3/2016).** TWA: 10 mg/m³ 8 hours. **OSHA PEL (United States, 6/2016).** TWA: 15 mg/m³ 8 hours. Form: Total dust

Occupational exposure limits (Canada)

Ingredient name	Exposure limits
benzyl alcohol	**AIHA WEEL (United States, 10/2011).** TWA: 10 ppm 8 hours.

Occupational exposure limits (Mexico)

Section 8. Exposure controls/personal protection

Ingredient name	Exposure limits
None.	

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Not available.

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Melting point : Not available.

Boiling point : 202°C (395.6°F)

Flash point : Closed cup: 104°C (219.2°F) [Tagliabue Closed Cup]

Evaporation rate : Not available.

Section 9. Physical and chemical properties

Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Lower: 1.3% Upper: 13%
Vapor pressure	: 0.02 kPa (0.15 mm Hg) [at 20°C]
Vapor density	: 3.72 [Air = 1]
Relative density	: 1.16
Solubility	: Not available.
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Kinematic (40°C (104°F)): >0.205 cm^2/s (>20.5 cSt)
Molecular weight	: Not applicable.
Aerosol product	
Heat of combustion	: 7.164 kJ/g

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: No specific data.
Incompatible materials	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Alkyl Glycidyl Ether	LD50 Oral	Rat	17100 mg/kg	-
Phenylmethanol	LD50 Dermal	Rabbit	2000 mg/kg	-
	LD50 Oral	Rat	1230 mg/kg	-
Butyl Benzyl Phthalate	LD50 Dermal	Rabbit	>10000 mg/kg	-
	LD50 Dermal	Rat	6700 mg/kg	-
	LD50 Oral	Rat	2330 mg/kg	-

Irritation/Corrosion

Section 11. Toxicological information

Product/ingredient name	Result	Species	Score	Exposure	Observation
Alkyl Glycidyl Ether	Skin - Moderate irritant	Rabbit	-	24 hours 500 microliters	-
Epoxy Polymer	Eyes - Mild irritant	Rabbit	-	100 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 microliters	-
	Skin - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
Phenylmethanol	Skin - Mild irritant	Man	-	48 hours 16 milligrams	-
	Skin - Moderate irritant	Pig	-	100 Percent	-
	Skin - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
Titanium Dioxide	Skin - Mild irritant	Human	-	72 hours 300 Micrograms Intermittent	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
Butyl Benzyl Phthalate	-	3	-
Titanium Dioxide	-	2B	-

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Phenylmethanol	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Phenylmethanol	Category 2	Not determined	Not determined

Aspiration hazard

Not available.

Information on the likely routes of exposure	: Not available.

Potential acute health effects

Eye contact	: Causes serious eye irritation.
Inhalation	: Harmful if inhaled.
Skin contact	: Causes skin irritation. May cause an allergic skin reaction.
Ingestion	: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: Adverse symptoms may include the following: pain or irritation watering redness
Inhalation	: Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
Skin contact	: Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
Ingestion	: Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Long term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Potential chronic health effects

Not available.

General	: May cause damage to organs through prolonged or repeated exposure. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	: Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: May damage the unborn child.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: Suspected of damaging fertility.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	3153 mg/kg
Dermal	4519.1 mg/kg
Inhalation (vapors)	13.86 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Phenylmethanol	Acute LC50 10000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours
Butyl Benzyl Phthalate	Acute EC50 0.22 ppm Marine water	Algae - Skeletonema costatum	72 hours
	Acute EC50 100 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 1000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 3.69 mg/l Fresh water	Crustaceans - Moina macrocopa - New born	48 hours
	Acute LC50 510 µg/l Marine water	Fish - Cymatogaster aggregata - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
	Chronic NOEC 0.17 mg/l Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 0.1 mg/l Fresh water	Fish - Fundulus heteroclitus	4 weeks
Titanium Dioxide	Acute LC50 >1000000 µg/l Marine water	Fish - Fundulus heteroclitus	96 hours

Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Phenylmethanol	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Alkyl Glycidyl Ether	-	160 to 263	low
Epoxy Polymer	-	31	low
Butyl Benzyl Phthalate	-	1693.25	high

Mobility in soil

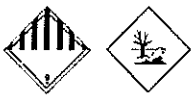
Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IATA	IMDG
UN number	UN3082	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Butyl Benzyl Phthalate). Marine pollutant (Butyl Benzyl Phthalate)	-	-	-	-
Transport hazard class(es)	9 	-	-	-	-
Packing group	III	-	-	-	-
Environmental hazards	Yes.	No.	No.	No.	No.
Additional information	Non-bulk packages of this product are not regulated as hazardous materials in package sizes less than the product reportable quantity, unless transported by inland waterway. The marine pollutant mark is not required when transported on inland waterways in sizes of ≤5 L or ≤5 kg. ERG No.	-	-	The environmentally hazardous substance mark may appear if required by other transportation regulations.	-

Special precautions for user : Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Proper shipping name : Not available.

Ship type : Not available.

Section 14. Transport information

Pollution category : Not available.

Section 15. Regulatory information

SARA 313

SARA 313 (40 CFR 372.45) supplier notification can be found on the Environmental Data Sheet.

California Prop. 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

*	2
Flammability	1
Physical hazards	0

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

Procedure used to derive the classification

Classification	Justification
ACUTE TOXICITY (inhalation) - Category 4	Calculation method
SKIN CORROSION/IRRITATION - Category 2	Calculation method
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A	Calculation method
SKIN SENSITIZATION - Category 1	Calculation method
CARCINOGENICITY - Category 2	Calculation method
TOXIC TO REPRODUCTION (Unborn child) - Category 1B	Calculation method
TOXIC TO REPRODUCTION (Fertility) - Category 2	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2	Calculation method

History

Date of printing : 9/8/2017

Date of issue/Date of revision : 9/8/2017

Date of previous issue : 4/19/2017

Version : 4

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Notice to reader

Section 16. Other information

It is recommended that each customer or recipient of this Safety Data Sheet (SDS) study it carefully and consult resources, as necessary or appropriate, to become aware of and understand the data contained in this SDS and any hazards associated with the product. This information is provided in good faith and believed to be accurate as of the effective date herein. However, no warranty, express or implied, is given. The information presented here applies only to the product as shipped. The addition of any material can change the composition, hazards and risks of the product. Products shall not be repackaged, modified, or tinted except as specifically instructed by Sherwin-Williams, including but not limited to the incorporation of non Sherwin-Williams products or the use or addition of products in proportions not specified by Sherwin-Williams. Regulatory requirements are subject to change and may differ between various locations and jurisdictions. The customer/buyer/user is responsible to ensure that his activities comply with all country, federal, state, provincial or local laws. The conditions for use of the product are not under the control of the manufacturer; the customer/buyer/user is responsible to determine the conditions necessary for the safe use of this product. The customer/buyer/user should not use the product for any purpose other than the purpose shown in the applicable section of this SDS without first referring to the supplier and obtaining written handling instructions. Due to the proliferation of sources for information such as manufacturer-specific SDS, the manufacturer cannot be responsible for SDSs obtained from any other source.

SAFETY DATA SHEET

B58V5100

Section 1. Identification

Product name	: COROBOND™ 100 Epoxy Primer/Sealer (Part B) Hardener
Product code	: B58V5100
Other means of identification	: Not available.
Product type	: Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Not applicable.

Manufacturer	: THE SHERWIN-WILLIAMS COMPANY 101 W. Prospect Avenue Cleveland, OH 44115
Emergency telephone number of the company	: (216) 566-2917
Product Information Telephone Number	: (800) 524-5979
Regulatory Information Telephone Number	: (216) 566-2902
Transportation Emergency Telephone Number	: (800) 424-9300

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: ACUTE TOXICITY (oral) - Category 4 SKIN CORROSION/IRRITATION - Category 1 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 SKIN SENSITIZATION - Category 1 TOXIC TO REPRODUCTION (Fertility) - Category 2 TOXIC TO REPRODUCTION (Unborn child) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 37.2%

GHS label elements

Hazard pictograms :

Signal word	: Danger
Hazard statements	: Harmful if swallowed. Causes severe skin burns and eye damage. May cause an allergic skin reaction. Suspected of damaging fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

Section 2. Hazards identification

Prevention	: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace.
Response	: Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
Storage	: Store locked up.
Disposal	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements	DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. WARNING: This product contains a chemical known to the State of California to cause cancer. FOR INDUSTRIAL USE ONLY. This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS. Please refer to the SDS for additional information. Keep out of reach of children. Do not transfer contents to other containers for storage.
Hazards not otherwise classified	: None known.

Section 3. Composition/information on ingredients

Substance/mixture	: Mixture
Other means of identification	: Not available.

CAS number/other identifiers

Ingredient name	% by weight	CAS number
Polyamidoamine	37.16	68953-36-6
4-Nonylphenol	20.71	84852-15-3
Diethylenetriamine	11.11	111-40-0
Phenylmethanol	8.36	100-51-6
Tetraethylene Pentamine	6.56	112-57-2
Hexylene Glycol	6.19	107-41-5
4,4'-Isopropylidenediphenol	5.98	80-05-7
Tri(dimethylaminomethyl)phenol	3.89	90-72-2

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
Inhalation	: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Skin contact	: Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	: Causes serious eye damage.
Inhalation	: No known significant effects or critical hazards.
Skin contact	: Causes severe burns. May cause an allergic skin reaction.
Ingestion	: Harmful if swallowed.

Over-exposure signs/symptoms

Eye contact	: Adverse symptoms may include the following: pain watering redness
Inhalation	: Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
Skin contact	: Adverse symptoms may include the following: pain or irritation redness blistering may occur reduced fetal weight increase in fetal deaths skeletal malformations

Section 4. First aid measures

Ingestion	: Adverse symptoms may include the following: stomach pains reduced fetal weight increase in fetal deaths skeletal malformations

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	: In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments	: No specific treatment.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	: Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	: None known.
Specific hazards arising from the chemical	: In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides
Special protective actions for fire-fighters	: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Section 6. Accidental release measures

Methods and materials for containment and cleaning up

Small spill	: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	: Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures	: Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
Advice on general occupational hygiene	: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
Conditions for safe storage, including any incompatibilities	: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits (OSHA United States)

Ingredient name	Exposure limits
Polyamidoamine	None.
4-Nonylphenol	None.
Diethylenetriamine	**ACGIH TLV (United States, 3/2015).** **Absorbed through skin.** TWA: 1 ppm 8 hours. TWA: 4.2 mg/m³ 8 hours. **NIOSH REL (United States, 10/2013).** **Absorbed through skin.** TWA: 1 ppm 10 hours. TWA: 4 mg/m³ 10 hours.
Phenylmethanol	**AIHA WEEL (United States, 10/2011).** TWA: 10 ppm 8 hours.
Tetraethylene Pentamine	**AIHA WEEL (United States, 10/2011).**

	Absorbed through skin. Skin sensitizer. TWA: 5 mg/m³ 8 hours.
Hexylene Glycol	**ACGIH TLV (United States, 3/2015).** C: 25 ppm C: 121 mg/m³ **NIOSH REL (United States, 10/2013).** CEIL: 25 ppm CEIL: 125 mg/m³
4,4'-Isopropylidenediphenol	None.
Tri(dimethylaminomethyl)phenol	None.

Occupational exposure limits (Canada)

Ingredient name	Exposure limits
Diethylenetriamine	**CA Alberta Provincial (Canada, 4/2009). Absorbed through skin.** 8 hrs OEL: 4.2 mg/m³ 8 hours. 8 hrs OEL: 1 ppm 8 hours. **CA British Columbia Provincial (Canada, 5/2015). Absorbed through skin. Skin sensitizer.** TWA: 1 ppm 8 hours. **CA Ontario Provincial (Canada, 7/2015). Absorbed through skin.** TWA: 1 ppm 8 hours. **CA Quebec Provincial (Canada, 1/2014). Absorbed through skin.** TWAEV: 1 ppm 8 hours. TWAEV: 4.2 mg/m³ 8 hours. **CA Saskatchewan Provincial (Canada, 7/2013). Absorbed through skin.** STEL: 2 ppm 15 minutes. TWA: 1 ppm 8 hours.
Phenylmethanol	**AIHA WEEL (United States, 10/2011).** TWA: 10 ppm 8 hours.
Tetraethylene Pentamine	**AIHA WEEL (United States, 10/2011). Absorbed through skin. Skin sensitizer.** TWA: 5 mg/m³ 8 hours.

Appropriate engineering controls : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure controls/personal protection

Eye/face protection	: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/ or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
Skin protection	
Hand protection	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	: Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance	
Physical state	: Liquid.
Color	: Not available.
Odor	: Not available.
Odor threshold	: Not available.
pH	: Not available.
Melting point	: Not available.
Boiling point	: 185°C (365°F)
Flash point	: Closed cup: 104°C (219.2°F) [Pensky-Martens Closed Cup]
Evaporation rate	: 0.003 (butyl acetate = 1)
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Lower: 1.2% Upper: 13%
Vapor pressure	: 0.0065 kPa (0.049 mm Hg) [at 20°C]
Vapor density	: 3.48 [Air = 1]
Relative density	: 0.96
Solubility	: Not available.
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Kinematic (room temperature): >0.205 cm^2/s (>20.5 cSt) Kinematic (40°C (104°F)): >0.205 cm^2/s (>20.5 cSt)
Molecular weight	: Not applicable.
Aerosol product	
Heat of combustion	: 25.76 kJ/g

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
4-Nonylphenol	LD50 Oral	Rat	1300 mg/kg	-
Diethylenetriamine	LD50 Dermal	Rabbit	1090 mg/kg	-
	LD50 Oral	Rat	1080 mg/kg	-
Phenylmethanol	LD50 Dermal	Rabbit	2000 mg/kg	-
	LD50 Oral	Rat	1230 mg/kg	-
Tetraethylene Pentamine	LD50 Oral	Rat	3990 mg/kg	-
Hexylene Glycol	LD50 Oral	Rat	3700 mg/kg	-
4,4'-Isopropylidenediphenol	LD50 Oral	Rat	1200 mg/kg	-
Tri(dimethylaminomethyl) phenol	LD50 Dermal	Rat	1280 mg/kg	-
	LD50 Oral	Rat	1200 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
4-Nonylphenol	Eyes - Severe irritant	Rabbit	-	100 milligrams	-
	Skin - Severe irritant	Rabbit	-	24 hours 500 milligrams	-
Diethylenetriamine	Skin - Moderate irritant	Rabbit	-	500 milligrams	-
Phenylmethanol	Skin - Mild irritant	Man	-	48 hours 16 milligrams	-
	Skin - Moderate irritant	Pig	-	100 Percent	-
	Skin - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
Tetraethylene Pentamine	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	5 milligrams	-
	Skin - Severe irritant	Rabbit	-	24 hours 5 milligrams	-
	Skin - Severe irritant	Rabbit	-	495 milligrams	-
Hexylene Glycol	Skin - Mild irritant	Rabbit	-	465 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
4,4'-Isopropylidenediphenol	Eyes - Severe irritant	Rabbit	-	24 hours 250	-

	Skin - Mild irritant	Rabbit	-	Micrograms 24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	250 milligrams	-
Tri(dimethylaminomethyl) phenol	Eyes - Severe irritant	Rabbit	-	24 hours 50 Micrograms	-
	Skin - Mild irritant	Rat	-	0.025 Mililiters	-
	Skin - Severe irritant	Rat	-	0.25 Mililiters	-
	Skin - Severe irritant	Rabbit	-	24 hours 2 milligrams	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Phenylmethanol	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
Hexylene Glycol	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Phenylmethanol	Category 2	Not determined	Not determined
Hexylene Glycol	Category 2	Not determined	Not determined

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes severe burns. May cause an allergic skin reaction.

Ingestion : Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: Adverse symptoms may include the following: pain watering redness
Inhalation	: Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
Skin contact	: Adverse symptoms may include the following: pain or irritation redness blistering may occur reduced fetal weight increase in fetal deaths skeletal malformations
Ingestion	: Adverse symptoms may include the following: stomach pains reduced fetal weight increase in fetal deaths skeletal malformations

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Long term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Potential chronic health effects

Not available.

General	: May cause damage to organs through prolonged or repeated exposure. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: Suspected of damaging the unborn child.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: Suspected of damaging fertility.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	1410.4 mg/kg
Dermal	3609.2 mg/kg

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
4-Nonylphenol	Acute EC50 0.03 mg/l Marine water	Algae - Skeletonema costatum	72 hours
	Acute EC50 0.027 mg/l Marine water	Algae - Skeletonema costatum	96 hours
	Acute EC50 137 µg/l Marine water	Crustaceans - Eohaustorius estuarius - Adult	48 hours
	Acute LC50 17 µg/l Marine water	Fish - Pleuronectes americanus - Larvae	96 hours
	Chronic EC10 0.012 mg/l Marine water	Algae - Skeletonema costatum	96 hours
	Chronic NOEC 5 µg/l Fresh water	Crustaceans - Gammarus fossarum - Adult	21 days
	Chronic NOEC 7.4 µg/l Fresh water	Fish - Pimephales promelas - Embryo	33 days
Diethylenetriamine	Acute EC50 345600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute LC50 53500 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 1014000 µg/l Fresh water	Fish - Poecilia reticulata	96 hours
Phenylmethanol	Acute LC50 10000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours
Hexylene Glycol	Acute EC50 2800000 µg/l Fresh water	Crustaceans - Ceriodaphnia reticulata - Larvae	48 hours
	Acute EC50 3200000 µg/l Fresh water	Daphnia - Daphnia magna - Larvae	48 hours
	Acute LC50 8000000 µg/l Marine water	Fish - Alburnus alburnus	96 hours
4,4'-Isopropylidenediphenol	Acute EC50 1000 µg/l Marine water	Algae - Skeletonema costatum	96 hours
	Acute EC50 1.506 mg/l	Algae - Prorocentrum minimum - Exponential growth phase	72 hours
	Acute EC50 7.75 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 1.34 mg/l Marine water	Crustaceans - Americamysis bahia - Larvae	48 hours
	Acute LC50 3.5 mg/l Marine water	Fish - Rivulus marmoratus - Embryo	96 hours
	Chronic NOEC 2 mg/l Fresh water	Algae - Chlorolobion braunii - Exponential growth phase	4 days
	Chronic NOEC 0.05 mg/l Fresh water	Crustaceans - Asellus aquaticus - Juvenile (Fledgling, Hatchling, Weanling)	21 days
	Chronic NOEC 30 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	21 days
	Chronic NOEC 0.2 µg/l Fresh water	Fish - Carassius auratus - Adult	90 days

Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Phenylmethanol	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
4-Nonylphenol	-	740	high
Diethylenetriamine	-	2.8 to 6.3	low
4,4'-Isopropylidenediphenol	-	20 to 67	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IATA	IMDG
UN number	UN3066	UN3066	UN3066	UN3066	UN3066
UN proper shipping name	PAINT	PAINT	PAINT	PAINT	PAINT. Marine pollutant (4-Nonylphenol)
Transport hazard class(es)	8	8	8	8	8
Packing group	III	III	III	III	III
Environmental hazards	No.	No.	No.	No.	Yes.
Additional information	- **ERG No.** 153	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.40-2.42 (Class 8). **ERG No.** 153	- **ERG No.** 153	The environmentally hazardous substance mark may appear if required by other transportation regulations.	The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg. **Emergency schedules (EmS)** F-A, S-B

Special precautions for user : Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.

Section 14. Transport information

Transport in bulk according to Annex II of MARPOL and the IBC Code	:	Not available.
Proper shipping name	:	Not available.
Ship type	:	Not available.
Pollution category	:	Not available.

Section 15. Regulatory information

SARA 313

SARA 313 (40 CFR 372.45) supplier notification can be found on the Environmental Data Sheet.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

*	3
Flammability	1
Physical hazards	0

The customer is responsible for determining the PPE code for this material.

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

Procedure used to derive the classification

Classification	Justification
ACUTE TOXICITY (oral) - Category 4	Calculation method
SKIN CORROSION/IRRITATION - Category 1	Calculation method
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1	Calculation method
SKIN SENSITIZATION - Category 1	Calculation method
TOXIC TO REPRODUCTION (Fertility) - Category 2	Calculation method
TOXIC TO REPRODUCTION (Unborn child) - Category 2	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2	Calculation method

History

Date of printing	:	6/16/2016
Date of issue/Date of revision	:	6/16/2016
Date of previous issue	:	6/4/2016
Version	:	3.01
Key to abbreviations	:	ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient

Section 16. Other information

MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Notice to reader

It is recommended that each customer or recipient of this Safety Data Sheet (SDS) study it carefully and consult resources, as necessary or appropriate, to become aware of and understand the data contained in this SDS and any hazards associated with the product. This information is provided in good faith and believed to be accurate as of the effective date herein. However, no warranty, express or implied, is given. The information presented here applies only to the product as shipped. The addition of any material can change the composition, hazards and risks of the product. Products shall not be repackaged, modified, or tinted except as specifically instructed by Sherwin-Williams, including but not limited to the incorporation of non Sherwin-Williams products or the use or addition of products in proportions not specified by Sherwin-Williams. Regulatory requirements are subject to change and may differ between various locations and jurisdictions. The customer/buyer/user is responsible to ensure that his activities comply with all country, federal, state, provincial or local laws. The conditions for use of the product are not under the control of the manufacturer; the customer/buyer/user is responsible to determine the conditions necessary for the safe use of this product. The customer/buyer/user should not use the product for any purpose other than the purpose shown in the applicable section of this SDS without first referring to the supplier and obtaining written handling instructions. Due to the proliferation of sources for information such as manufacturer-specific SDS, the manufacturer cannot be responsible for SDSs obtained from any other source.

SAFETY DATA SHEET

B58W910

Section 1. Identification

Product name	: STEEL-SEAM® FT910 Epoxy (Part A) White
Product code	: B58W910
Other means of identification	: Not available.
Product type	: Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Not applicable.

Manufacturer	: THE SHERWIN-WILLIAMS COMPANY 101 W. Prospect Avenue Cleveland, OH 44115
Emergency telephone number of the company	: US / Canada: (216) 566-2917 Mexico: SETIQ 01-800-00-214-00 / (52) 55-5559-1588 24 hours / 365 days a year
Product Information Telephone Number	: US / Canada: (800) 524-5979 Mexico: Not Available
Regulatory Information Telephone Number	: US / Canada: (216) 566-2902 Mexico: Not Available
Transportation Emergency Telephone Number	: US / Canada: (800) 424-9300 Mexico: SETIQ 01-800-00-214-00 / (52) 55-5559-1588 24 hours / 365 days a year

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: SKIN CORROSION/IRRITATION - Category 2 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A SKIN SENSITIZATION - Category 1 CARCINOGENICITY - Category 1A TOXIC TO REPRODUCTION (Fertility) - Category 2 TOXIC TO REPRODUCTION (Unborn child) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 Percentage of the mixture consisting of ingredient(s) of unknown oral toxicity: 71.6% Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 83.4% Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 83.4%

GHS label elements

Hazard pictograms :

Signal word : Danger

Section 2. Hazards identification

Hazard statements	: Causes serious eye irritation. Causes skin irritation. May cause an allergic skin reaction. May cause cancer. Suspected of damaging fertility or the unborn child. May cause respiratory irritation. May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention	: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Wash hands thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace.
Response	: Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
Storage	: Store locked up.
Disposal	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements	DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. FOR INDUSTRIAL USE ONLY. This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS. Adequate ventilation required when sanding or abrading the dried film. If Adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH approved). Follow respirator manufacturer's directions for respirator use. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release Crystalline Silica which has been shown to cause lung damage and cancer under long term exposure. This product contains a Significant New Use Rule (SNUR) Chemical. Do not allow this product to enter drains, sewers, wastewater treatment systems, groundwater, streams, lakes or ponds. See Environmental Data Sheet (EDS) for additional details. Please refer to the SDS for additional information. Keep out of reach of children. Do not transfer contents to other containers for storage.
Hazards not otherwise classified	: None known.

Section 3. Composition/information on ingredients

Substance/mixture	: Mixture
Other means of identification	: Not available.

CAS number/other identifiers

Section 3. Composition/information on ingredients

Ingredient name	% by weight	CAS number
Epoxy Polymer	55.45	25085-99-8
Ash Byproduct	11.13	68131-74-8
Phenylmethanol	7.8	100-51-6
Alkyl Glycidyl Ether	6.87	68609-97-2
Epoxy Polymer	2.83	25068-38-6
4-Nonylphenol	2.57	84852-15-3
Hexylene Glycol	2.37	107-41-5
Titanium Dioxide	2.23	13463-67-7
Unsaturated Fatty Acids	0.29	85711-46-2
Crystalline Silica, respirable powder	0.17	14808-60-7
Ethylbenzene	0.15	100-41-4

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : May cause respiratory irritation.

Skin contact : Causes skin irritation. May cause an allergic skin reaction.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Section 4. First aid measures

Eye contact	: Adverse symptoms may include the following: pain or irritation watering redness
Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing reduced fetal weight increase in fetal deaths skeletal malformations
Skin contact	: Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
Ingestion	: Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	: No specific treatment.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	: Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	: None known.
Specific hazards arising from the chemical	: In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide halogenated compounds metal oxide/oxides
Special protective actions for fire-fighters	: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : **This product contains a Significant New Use Rule (SNUR) Chemical. Do not allow this product to enter drains, sewers, wastewater treatment systems, groundwater, streams, lakes or ponds. See Environmental Data Sheet (EDS) for additional details.**

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits (OSHA United States)

Ingredient name	Exposure limits
Epoxy Polymer	None.
Ash Byproduct	None.
Phenylmethanol	**AIHA WEEL (United States, 10/2011).** TWA: 10 ppm 8 hours.
Alkyl Glycidyl Ether	None.
Epoxy Polymer	None.
4-Nonylphenol	None.
Hexylene Glycol	**ACGIH TLV (United States, 3/2016).** C: 25 ppm C: 121 mg/m³ **NIOSH REL (United States, 10/2016).** CEIL: 25 ppm CEIL: 125 mg/m³
Titanium Dioxide	**ACGIH TLV (United States, 3/2016).** TWA: 10 mg/m³ 8 hours. **OSHA PEL (United States, 6/2016).** TWA: 15 mg/m³ 8 hours. Form: Total dust
Unsaturated Fatty Acids	None.
Crystalline Silica, respirable powder	**OSHA PEL Z3 (United States, 6/2016).** TWA: 250 mppcf / (%SiO2+5) 8 hours. Form: Respirable TWA: 10 mg/m³ / (%SiO2+2) 8 hours. Form: Respirable **OSHA PEL (United States, 6/2016).** TWA: 50 µg/m³ 8 hours. Form: Respirable dust **ACGIH TLV (United States, 3/2016).** TWA: 0.025 mg/m³ 8 hours. Form: Respirable fraction **NIOSH REL (United States, 10/2016).** TWA: 0.05 mg/m³ 10 hours. Form: respirable dust
Ethylbenzene	**ACGIH TLV (United States, 3/2016).** TWA: 20 ppm 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 100 ppm 10 hours. TWA: 435 mg/m³ 10 hours. STEL: 125 ppm 15 minutes. STEL: 545 mg/m³ 15 minutes. **OSHA PEL (United States, 6/2016).** TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.

Occupational exposure limits (Canada)

Ingredient name	Exposure limits
benzyl alcohol	**AIHA WEEL (United States, 10/2011).** TWA: 10 ppm 8 hours.
2-methylpentane-2,4-diol	**CA Alberta Provincial (Canada, 4/2009).** C: 121 mg/m³ C: 25 ppm **CA British Columbia Provincial (Canada, 7/2016).** C: 25 ppm

Ethylbenzene	**CA Ontario Provincial (Canada, 7/2015).** C: 25 ppm **CA Québec Provincial (Canada, 1/2014).** STEV: 25 ppm 15 minutes. STEV: 121 mg/m³ 15 minutes. **CA Saskatchewan Provincial (Canada, 7/2013).** CEIL: 25 ppm **CA Alberta Provincial (Canada, 4/2009).** 8 hrs OEL: 100 ppm 8 hours. 8 hrs OEL: 434 mg/m³ 8 hours. 15 min OEL: 543 mg/m³ 15 minutes. 15 min OEL: 125 ppm 15 minutes. **CA British Columbia Provincial (Canada, 7/2016).** TWA: 20 ppm 8 hours. **CA Ontario Provincial (Canada, 7/2015).** TWA: 20 ppm 8 hours. **CA Québec Provincial (Canada, 1/2014).** TWAEV: 100 ppm 8 hours. TWAEV: 434 mg/m³ 8 hours. STEV: 125 ppm 15 minutes. STEV: 543 mg/m³ 15 minutes. **CA Saskatchewan Provincial (Canada, 7/2013).** STEL: 125 ppm 15 minutes. TWA: 100 ppm 8 hours.

Occupational exposure limits (Mexico)

Ingredient name	Exposure limits
2-methylpentane-2,4-diol	**NOM-010-STPS-2014 (Mexico, 4/2016).** CEIL: 25 ppm
Ethylbenzene	**NOM-010-STPS-2014 (Mexico, 4/2016).** TWA: 20 ppm 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : **This product contains a Significant New Use Rule (SNUR) Chemical. Do not allow this product to enter drains, sewers, wastewater treatment systems, groundwater, streams, lakes or ponds. See Environmental Data Sheet (EDS) for additional details.**

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure controls/personal protection

Eye/face protection	: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
Skin protection	
Hand protection	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	: Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance	
Physical state	: Liquid.
Color	: Not available.
Odor	: Not available.
Odor threshold	: Not available.
pH	: Not available.
Melting point	: Not available.
Boiling point	: 100°C (212°F)
Flash point	: Closed cup: 104°C (219.2°F) [Pensky-Martens Closed Cup]
Evaporation rate	: 0.09 (butyl acetate = 1)
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Lower: 1.2% Upper: 13%
Vapor pressure	: 2.3 kPa (17.5 mm Hg) [at 20°C]
Vapor density	: 1 [Air = 1]
Relative density	: 0.9
Solubility	: Not available.
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Kinematic (40°C (104°F)): >0.205 cm^2/s (>20.5 cSt)
Molecular weight	: Not applicable.
Aerosol product	
Heat of combustion	: 7.718 kJ/g

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: No specific data.
Incompatible materials	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Phenylmethanol	LD50 Dermal	Rabbit	2000 mg/kg	-
	LD50 Oral	Rat	1230 mg/kg	-
Alkyl Glycidyl Ether	LD50 Oral	Rat	17100 mg/kg	-
4-Nonylphenol	LD50 Oral	Rat	1300 mg/kg	-
Hexylene Glycol	LD50 Oral	Rat	3700 mg/kg	-
Ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Phenylmethanol	Skin - Mild irritant	Man	-	48 hours 16 milligrams	-
	Skin - Moderate irritant	Pig	-	100 Percent	-
	Skin - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
Alkyl Glycidyl Ether	Skin - Moderate irritant	Rabbit	-	24 hours 500 microliters	-
Epoxy Polymer	Eyes - Mild irritant	Rabbit	-	100 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 microliters	-
	Skin - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
4-Nonylphenol	Eyes - Severe irritant	Rabbit	-	100 milligrams	-
	Skin - Severe irritant	Rabbit	-	24 hours 500 milligrams	-
Hexylene Glycol	Skin - Mild irritant	Rabbit	-	465 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
Titanium Dioxide	Skin - Mild irritant	Human	-	72 hours 300 Micrograms Intermittent	-
Ethylbenzene	Eyes - Severe irritant	Rabbit	-	500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 15	-

				milligrams	

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
Titanium Dioxide	-	2B	-
Crystalline Silica, respirable powder	-	1	Known to be a human carcinogen.
Ethylbenzene	-	2B	-

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Ash Byproduct	Category 3	Not applicable.	Respiratory tract irritation
Phenylmethanol	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
Hexylene Glycol	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
Ethylbenzene	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Phenylmethanol	Category 2	Not determined	Not determined
Hexylene Glycol	Category 2	Not determined	Not determined
Crystalline Silica, respirable powder	Category 1	Inhalation	Not determined
Ethylbenzene	Category 2	Not determined	Not determined

Aspiration hazard

Name	Result
Ethylbenzene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure	: Not available.

Potential acute health effects

Eye contact	: Causes serious eye irritation.
Inhalation	: May cause respiratory irritation.
Skin contact	: Causes skin irritation. May cause an allergic skin reaction.
Ingestion	: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: Adverse symptoms may include the following: pain or irritation watering redness
Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing reduced fetal weight increase in fetal deaths skeletal malformations
Skin contact	: Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
Ingestion	: Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Long term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Potential chronic health effects

Not available.

General	: May cause damage to organs through prolonged or repeated exposure. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	: May cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: Suspected of damaging the unborn child.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: Suspected of damaging fertility.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	3168 mg/kg
Dermal	4249.8 mg/kg
Inhalation (vapors)	23.37 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Phenylmethanol	Acute LC50 10000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours
4-Nonylphenol	Acute EC50 0.03 mg/l Marine water	Algae - Skeletonema costatum	72 hours
	Acute EC50 0.027 mg/l Marine water	Algae - Skeletonema costatum	96 hours
	Acute EC50 137 µg/l Marine water	Crustaceans - Eohaustorius estuarius - Adult	48 hours
	Acute LC50 17 µg/l Marine water	Fish - Pleuronectes americanus - Larvae	96 hours
	Chronic EC10 0.012 mg/l Marine water	Algae - Skeletonema costatum	96 hours
	Chronic NOEC 5 µg/l Fresh water	Crustaceans - Gammarus fossarum - Adult	21 days
	Chronic NOEC 7.4 µg/l Fresh water	Fish - Pimephales promelas - Embryo	33 days
Hexylene Glycol	Acute EC50 2800000 µg/l Fresh water	Crustaceans - Ceriodaphnia reticulata - Larvae	48 hours
	Acute EC50 3200000 µg/l Fresh water	Daphnia - Daphnia magna - Larvae	48 hours
	Acute LC50 8000000 µg/l Marine water	Fish - Alburnus alburnus	96 hours
Titanium Dioxide	Acute LC50 >1000000 µg/l Marine water	Fish - Fundulus heteroclitus	96 hours
Ethylbenzene	Acute EC50 4600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 3600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 6530 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 2930 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours

Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Phenylmethanol	-	-	Readily
Ethylbenzene	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Alkyl Glycidyl Ether	-	160 to 263	low
Epoxy Polymer	-	31	low
4-Nonylphenol	-	740	high

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : **This product contains a Significant New Use Rule (SNUR) Chemical. Do not allow this product to enter drains, sewers, wastewater treatment systems, groundwater, streams, lakes or ponds. See Environmental Data Sheet (EDS) for additional details.**

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IATA	IMDG
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-	-
Transport hazard class(es)	-	-	-	-	-
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.
Additional information	-	-	-	-	-

Special precautions for user : Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Proper shipping name : Not available.

Ship type : Not available.

Pollution category : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 5(a)2 final significant new use rules:** 4-Nonylphenol

This product contains a Significant New Use Rule (SNUR) Chemical. Do not allow this product to enter drains, sewers, wastewater treatment systems, groundwater, streams, lakes or ponds. See Environmental Data Sheet (EDS) for additional details.

SARA 313

SARA 313 (40 CFR 372.45) supplier notification can be found on the Environmental Data Sheet.

California Prop. 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

[illegible]	* 3
Flammability	1
Physical hazards	0

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

Procedure used to derive the classification

Classification	Justification
SKIN CORROSION/IRRITATION - Category 2	Calculation method
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A	Calculation method
SKIN SENSITIZATION - Category 1	Calculation method
CARCINOGENICITY - Category 1A	Calculation method
TOXIC TO REPRODUCTION (Fertility) - Category 2	Calculation method
TOXIC TO REPRODUCTION (Unborn child) - Category 2	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2	Calculation method

History

Date of printing	: 9/6/2017
Date of issue/Date of revision	: 9/6/2017
Date of previous issue	: 5/18/2017
Version	: 7
Key to abbreviations	: ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations

Notice to reader

Section 16. Other information

It is recommended that each customer or recipient of this Safety Data Sheet (SDS) study it carefully and consult resources, as necessary or appropriate, to become aware of and understand the data contained in this SDS and any hazards associated with the product. This information is provided in good faith and believed to be accurate as of the effective date herein. However, no warranty, express or implied, is given. The information presented here applies only to the product as shipped. The addition of any material can change the composition, hazards and risks of the product. Products shall not be repackaged, modified, or tinted except as specifically instructed by Sherwin-Williams, including but not limited to the incorporation of non Sherwin-Williams products or the use or addition of products in proportions not specified by Sherwin-Williams. Regulatory requirements are subject to change and may differ between various locations and jurisdictions. The customer/buyer/user is responsible to ensure that his activities comply with all country, federal, state, provincial or local laws. The conditions for use of the product are not under the control of the manufacturer; the customer/buyer/user is responsible to determine the conditions necessary for the safe use of this product. The customer/buyer/user should not use the product for any purpose other than the purpose shown in the applicable section of this SDS without first referring to the supplier and obtaining written handling instructions. Due to the proliferation of sources for information such as manufacturer-specific SDS, the manufacturer cannot be responsible for SDSs obtained from any other source.

SAFETY DATA SHEET

B58V910

Section 1. Identification

Product name	: STEEL-SEAM® FT910 Epoxy (Part B) Black Hardener
Product code	: B58V910
Other means of identification	: Not available.
Product type	: Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Not applicable.

Manufacturer	: THE SHERWIN-WILLIAMS COMPANY 101 W. Prospect Avenue Cleveland, OH 44115
Emergency telephone number of the company	: US / Canada: (216) 566-2917 Mexico: SETIQ 01-800-00-214-00 / (52) 55-5559-1588 24 hours / 365 days a year
Product Information Telephone Number	: US / Canada: (800) 524-5979 Mexico: Not Available
Regulatory Information Telephone Number	: US / Canada: (216) 566-2902 Mexico: Not Available
Transportation Emergency Telephone Number	: US / Canada: (800) 424-9300 Mexico: SETIQ 01-800-00-214-00 / (52) 55-5559-1588 24 hours / 365 days a year

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN CORROSION/IRRITATION - Category 1B SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 SKIN SENSITIZATION - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 14.6% Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 37%

GHS label elements

Hazard pictograms :

Signal word : Danger

Section 2. Hazards identification

Hazard statements : Harmful if swallowed or if inhaled.
Causes severe skin burns and eye damage.
May cause an allergic skin reaction.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention : Wear protective gloves. Wear eye or face protection. Wear protective clothing. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace.

Response : Get medical attention if you feel unwell. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements

DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. WARNING: This product contains chemicals known to the State of California to cause cancer. FOR INDUSTRIAL USE ONLY. This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

Please refer to the SDS for additional information. Keep out of reach of children. Do not transfer contents to other containers for storage.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

CAS number/other identifiers

Ingredient name	% by weight	CAS number
Phenylmethanol	37.58	100-51-6
Isophorone Diamine	18.27	2855-13-2
Methylenedicyclohexylamine	14.62	1761-71-3
Fumed Amorphous Silica	6.32	112945-52-5
Tri(dimethylaminomethyl)phenol	4.14	90-72-2

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
Inhalation	: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Skin contact	: Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	: Causes serious eye damage.
Inhalation	: Harmful if inhaled. Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness. May cause respiratory irritation.
Skin contact	: Causes severe burns. May cause an allergic skin reaction.
Ingestion	: Harmful if swallowed. Can cause central nervous system (CNS) depression.

Over-exposure signs/symptoms

Eye contact	: Adverse symptoms may include the following: pain watering redness
Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
Skin contact	: Adverse symptoms may include the following: pain or irritation redness blistering may occur

Section 4. First aid measures

Ingestion	: Adverse symptoms may include the following: stomach pains

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	: In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments	: No specific treatment.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	: Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	: None known.
Specific hazards arising from the chemical	: In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	: Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides metal oxide/oxides
Special protective actions for fire-fighters	: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
Environmental precautions	: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Section 6. Accidental release measures

Small spill	: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	: Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures	: Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
Advice on general occupational hygiene	: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
Conditions for safe storage, including any incompatibilities	: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits (OSHA United States)

Ingredient name	Exposure limits
Phenylmethanol	**AIHA WEEL (United States, 10/2011).** TWA: 10 ppm 8 hours.
3-aminomethyl-3,5,5-trimethylcyclohexylamine	None.
Methylenedicyclohexylamine	None.
Fumed Amorphous Silica	**NIOSH REL (United States, 10/2016).** TWA: 6 mg/m³ 10 hours.
2,4,6-tris(dimethylaminomethyl)phenol	None.

Occupational exposure limits (Canada)

Ingredient name	Exposure limits
benzyl alcohol	**AIHA WEEL (United States, 10/2011).** TWA: 10 ppm 8 hours.

Occupational exposure limits (Mexico)

Section 8. Exposure controls/personal protection

Ingredient name	Exposure limits
None.	

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/ or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Not available.

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Melting point : Not available.

Boiling point : 202°C (395.6°F)

Flash point : Closed cup: 97°C (206.6°F) [Tagliabue Closed Cup]

Evaporation rate : Not available.

Section 9. Physical and chemical properties

Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Lower: 1.3% Upper: 13%
Vapor pressure	: 0.02 kPa (0.15 mm Hg) [at 20°C]
Vapor density	: 3.72 [Air = 1]
Relative density	: 1.05
Solubility	: Not available.
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Kinematic (40°C (104°F)): >0.205 cm^2/s (>20.5 cSt)
Molecular weight	: Not applicable.
Aerosol product	
Heat of combustion	: 29.489 kJ/g

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: No specific data.
Incompatible materials	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Phenylmethanol	LD50 Dermal	Rabbit	2000 mg/kg	-
	LD50 Oral	Rat	1230 mg/kg	-
Fumed Amorphous Silica	LD50 Oral	Rat	3160 mg/kg	-
2,4,6-tris (dimethylaminomethyl)phenol	LD50 Dermal	Rat	1280 mg/kg	-
	LD50 Oral	Rat	1200 mg/kg	-

Irritation/Corrosion

Section 11. Toxicological information

Product/ingredient name	Result	Species	Score	Exposure	Observation
Phenylmethanol	Skin - Mild irritant	Man	-	48 hours 16 milligrams	-
	Skin - Moderate irritant	Pig	-	100 Percent	-
	Skin - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
Methylenedicyclohexylamine	Eyes - Severe irritant	Rabbit	-	24 hours 10 microliters	-
2,4,6-tris (dimethylaminomethyl)phenol	Eyes - Severe irritant	Rabbit	-	24 hours 50 Micrograms	-
	Skin - Mild irritant	Rat	-	0.025 Mililiters	-
	Skin - Severe irritant	Rat	-	0.25 Mililiters	-
	Skin - Severe irritant	Rabbit	-	24 hours 2 milligrams	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
Fumed Amorphous Silica	-	3	-

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Phenylmethanol	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Phenylmethanol	Category 2	Not determined	Not determined
Methylenedicyclohexylamine	Category 2	Oral	Not determined

Aspiration hazard

Not available.

Information on the likely routes of exposure	: Not available.

Potential acute health effects

Eye contact	: Causes serious eye damage.
Inhalation	: Harmful if inhaled. Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness. May cause respiratory irritation.
Skin contact	: Causes severe burns. May cause an allergic skin reaction.
Ingestion	: Harmful if swallowed. Can cause central nervous system (CNS) depression.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: Adverse symptoms may include the following: pain watering redness
Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
Skin contact	: Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion	: Adverse symptoms may include the following: stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Long term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Potential chronic health effects

Not available.

General	: May cause damage to organs through prolonged or repeated exposure. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral Dermal Inhalation (vapors)	982.5 mg/kg 2210.2 mg/kg 18.43 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Phenylmethanol 3-aminomethyl-3,5, 5-trimethylcyclohexylamine	Acute LC50 10000 µg/l Fresh water Acute EC50 17.4 mg/l Fresh water	Fish - Lepomis macrochirus Daphnia - Daphnia magna	96 hours 48 hours

Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Phenylmethanol	-	-	Readily

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IATA	IMDG
UN number	UN3066	UN3066	UN3066	UN3066	UN3066
UN proper shipping name	PAINT RELATED MATERIAL	PAINT RELATED MATERIAL	PAINT RELATED MATERIAL	PAINT RELATED MATERIAL	PAINT RELATED MATERIAL

Section 14. Transport information

Transport hazard class(es)	8	8	8	8	8
Packing group	II	II	II	II	II
Environmental hazards	No.	No.	No.	No.	No.
Additional information	- **ERG No.** 153	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2. 40-2.42 (Class 8). **ERG No.** 153	- **ERG No.** 153	-	**Emergency schedules** F-A, S-B

Special precautions for user : Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Proper shipping name : Not available.
Ship type : Not available.
Pollution category : Not available.

Section 15. Regulatory information

SARA 313

SARA 313 (40 CFR 372.45) supplier notification can be found on the Environmental Data Sheet.

California Prop. 65

WARNING: This product contains chemicals known to the State of California to cause cancer.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

*	3
Flammability	1
	0

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

Section 16. Other information

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

Procedure used to derive the classification

Classification	Justification
ACUTE TOXICITY (oral) - Category 4	Calculation method
ACUTE TOXICITY (inhalation) - Category 4	Calculation method
SKIN CORROSION/IRRITATION - Category 1B	Calculation method
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1	Calculation method
SKIN SENSITIZATION - Category 1	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2	Calculation method

History

Date of printing	: 9/6/2017
Date of issue/Date of revision	: 9/6/2017
Date of previous issue	: 4/19/2017
Version	: 5
Key to abbreviations	: ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations

Notice to reader

It is recommended that each customer or recipient of this Safety Data Sheet (SDS) study it carefully and consult resources, as necessary or appropriate, to become aware of and understand the data contained in this SDS and any hazards associated with the product. This information is provided in good faith and believed to be accurate as of the effective date herein. However, no warranty, express or implied, is given. The information presented here applies only to the product as shipped. The addition of any material can change the composition, hazards and risks of the product. Products shall not be repackaged, modified, or tinted except as specifically instructed by Sherwin-Williams, including but not limited to the incorporation of non Sherwin-Williams products or the use or addition of products in proportions not specified by Sherwin-Williams. Regulatory requirements are subject to change and may differ between various locations and jurisdictions. The customer/buyer/user is responsible to ensure that his activities comply with all country, federal, state, provincial or local laws. The conditions for use of the product are not under the control of the manufacturer; the customer/buyer/user is responsible to determine the conditions necessary for the safe use of this product. The customer/buyer/user should not use the product for any purpose other than the purpose shown in the applicable section of this SDS without first referring to the supplier and obtaining written handling instructions. Due to the proliferation of sources for information such as manufacturer-specific SDS, the manufacturer cannot be responsible for SDSs obtained from any other source.

APPENDIX G - ON-SITE LAB SOP

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.

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)(1) and 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

§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

I. PURPOSE

This procedure is implemented for all PCB materials being received in order to actively comply with all facility permits and regulatory citations. Implementation of this procedure requires the imposition of mandatory procedures for generators and customers sending PCB material to this facility. This procedure is consistent with good corporate policy and operating discipline.

This procedure addresses pre-acceptance generator required actions, transportation required actions, acceptance related actions, storage related actions, outbound actions, disposal and record-keeping actions, and training requirements. Customer Service staff, material routers, operations personnel, and transporters utilized by the facility for shipping PCB packages will follow this procedure.

California regulated PCB's are not addressed with this Standard Operating Procedure. California regulated PCB's are 5-49 ppm in PCB concentration unless the material was originally derived from a TSCA regulated source, in which case it is TSCA regulated.

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. Health and Safety Manager

The Health and Safety Manager is responsible for Job Hazard Analysis (see Appendix A), assisting the determination of the proper Personal Protective Equipment that must be employed when handling PCB materials (see Appendix B). The Health and Safety Manager is also responsible for assisting in the development of procedures necessary to safely handle materials listed by this

procedure utilizing a Workplace Hazard and Personal Protective equipment Assessment (see Appendix C) and developing and implementing training.

D. Environmental Manager

Then Environmental Manager is responsible for assisting development of good operating procedures that comply with all relevant permits and regulatory citations.

E. 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

A. Pre-Acceptance

1. The waste profile evaluation process is used to prescreen waste prior to its acceptance at the Facility. To initiate the PE process, the waste generator is required to submit the following:

    a) A completed Waste Material Profile Sheet. This sheet provides information on the chemical and physical characteristics of the waste material. An example of this sheet is shown in Appendix D.
    b) A representative sample of the waste material with a chain-of-custody, if required. If sampling is required, waste generators are referred to 22 CCR 66261.20 for the appropriate sampling procedure. When necessary, this sample may be obtained upon arrival of the initial shipment of waste prior to acceptance at the Facility.
    c) A representative sample may not be required if the Facility determines the pre-acceptance documentation provides sufficient information to maintain compliance with permit and operational conditions and obtaining a sample would not aid in the waste management decision process.

2. Profile Group (PG) receives PCB profile from the customer.

3. PCB specific information Refer to the PCB Guidance Document (see Appendix D) for necessary information. Note: The Date-Removed-From-Service is the same as the Out-of-Service-Date (OSD).

4. The Profile is entered into the company's waste tracking system if it has not been submitted electronically.

5. PG reviews the profile for completeness and accuracy. For TSCA materials, PCB concentrations determinations are evaluated in accordance with the requirements of 40 CFR761.2

6. Incomplete profiles or other documentation will be corrected by the PG and returned to the customer. Reference the PCB Guidance Document which is attached at the end of this procedure for required information.

7. After the information is in place, the profile is approved.

B. Scheduling

1. The PCB load is scheduled once the profile is correct.

C. Receiving

1. Paperwork is reviewed upon load arrival and the information is reviewed for compliance with the requirements of 40CFR 761.208 – 211 and managed accordingly as follows:

   a) Sign and date each copy of the manifest to certify that the PCB waste covered by the manifest was received.
   b) Note any significant discrepancies in the manifest (as defined in §761.210(a)(1)) on each copy of the manifest.
   c) Immediately give the transporter at least one copy of the signed manifest.
   d) Within 30 days after the delivery, send a copy of the manifest to the generator.
   e) Retain a copy of each manifest among the facility's records in accordance with §761.209(d).

2. In the event that a manifest discrepancy is discovered as defined in 40CFR 761.210(a) the facility shall attempt to reconcile the discrepancy with the waste generator or transporter. If the discrepancy is not resolved within 15 days after receiving the PCB waste, the facility shall immediately submit

to the Regional Administrator for the Region in which the designated facility is located a letter describing the discrepancy and attempts to reconcile it, and a copy of the manifest or shipping paper at issue.

3. If the facility receives any shipment of PCB waste from an off-site source without an accompanying manifest or shipping paper (where required in place of a manifest), and any part of the shipment consists of any PCB waste regulated for disposal, the facility shall attempt to contact the generator, using information supplied by the transporter, to obtain a manifest or to return the PCB waste.

4. If the facility cannot contact the generator of the PCB waste, it will notify the Regional Administrator of the EPA region in which his facility is located of the unmanifested PCB waste so that the Regional Administrator can determine whether further actions are required before the owner or operator may store or dispose of the unmanifested PCB waste.

5. Within 15 days after receiving the unmanifested PCB waste, the facility shall prepare and submit a report to the Regional Administrator for the Region in which the commercial storage or disposal facility is located and to the Regional Administrator for the Region in which the PCB waste originated, if known. The report may be submitted on EPA Form 8700–13B, or by a written letter designated "Unmanifested Waste Report." The report shall include the following information:

   a) The EPA identification number, name, and address of the PCB commercial storage or disposal facility.
   b) The date the commercial storage or disposal facility received the unmanifested PCB waste.
   c) The EPA identification number, name, and address of the generator and transporter, if available.
   d) A description of the type and quantity of the unmanifested PCB waste received at the facility.
   e) A brief explanation of why the waste was unmanifested, if known.
   f) The disposition made of the unmanifested waste by the commercial storage or disposal facility, including:

6. The owner facility will retain at the facility for at least 3 years a copy of each manifest or shipping paper that the owner or operator signs for off-site shipments of PCB waste.

7. The PCB materials are unloaded and normal unloading procedures apply except for the following regarding PCB containers (Appendix E provides additional evaluation standards):

   a) Copies of manifest and continuation sheets shall be included with the normal receiving packet for piece count confirmation and QC by the receiving staff.

   b) PCB Containers shall be visually inspected for non-conforming conditions, such as exterior contamination or visible residues, missing Generator Unique Identification Number, hazardous Waste Markings and PCB Markings not completed properly, missing Emergency Contact information, not recorded on the container, or any information not clearly visible.

   c) Non-conforming information shall be listed on the QC Receiving Sheet and resolved as soon as possible.

   d) Samples will not be taken from PCB containers without authorization from the Facility Manager, Operations Manager, Environmental Manager and/or the Health and Safety Manager.

D. Storage

1. Any pallets received loaded with PCB containers shall be considered contaminated and go with the PCB containers to the PCB storage area.

2. Access to the PCB storage area is limited to authorized employees. A warning sign shall be located near the entrance to the PCB area stating "Restricted Area – Increased PPE Level Required".

3. A chain and standards, constructed of material that can readily be decontaminated, disposed, and/or replaced, shall provide a physical entry barrier to the PCB storage area.

4. PCB Warning Placards (i.e. M_L label) as required by 40 CFR 761.65(c)(3) shall be prominently displayed near the PCB storage area.

5. Emergency Contacts and evacuation routes shall be prominently displayed throughout the facility.

6. Personal protective equipment requirements for the warehouse shall be modified for the PCB storage area to include booties.

7. A satellite hazardous waste disposal container shall be located near the entrance to the PCB storage area for disposal of booties or other potentially PCB contaminated materials.

8. Pallets used to store PCB's shall be considered contaminated and disposed in accordance with all applicable regulations.

9. All equipment used when handling PCB's shall be dedicated to the PCB storage area and not removed from this area until properly decontaminated in accordance with 40 CFR 761.65(c)4. All equipment shall be marked with the appropriate M_L or M_S 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.

10. Inspection of the PCB Storage Area shall be conducted in accordance with the Inspection Plan.

11. PCB spills of any quantity shall be immediately reported to the Emergency Coordinator and the SPCC Plan shall be implemented.

    a) Any size or quantity PCB spill must be cleaned-up immediately and documented according to the TSCA Permit and 40 CFR 761 standards.

    b) 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. Any spilled PCBs with sufficient quantity to make its way to sumps or trenches will be either cleaned using sorbent material or pumped (if quantities are sufficient) to a container. The sumps and/or trenches will be cleaned as outlined above and the material will be managed in accordance with applicable regulatory requirements as outlined in this SOP.

    c) Records of inspections, maintenance, cleanup and disposal must be maintained in accordance with 40 CFR 761.180(a) and (b).

E. Transportation

1. The facility will comply with the manifest requirements as both receiving and shipping (generator) facility in accordance with the manifest requirement set forth in 40 CFR 761. Receiving requirements are detailed in Section C of this document. The facility will comply with the manifest requirement for all outbound shipments.

2. The facility will prepare a manifest on EPA Form 8700–22 (see Appendix F), and if necessary, a continuation sheet and specify:

   a) For each bulk load of PCBs, the identity of the PCB waste, the earliest date of removal from service for disposal, and the weight in kilograms of the PCB waste.
   b) For each PCB Article Container or PCB Container, the unique identifying number, type of PCB waste (*e.g.*, soil, debris, small capacitors), earliest date of removal from service for disposal, and weight in kilograms of the PCB waste contained.
   c) For each PCB Article not in a PCB Container or PCB Article Container, the serial number if available, or other identification if there is no serial number, the date of removal from service for disposal, and weight in kilograms of the PCB waste in each PCB Article.

3. The facility will:
   a) Sign the manifest certification by hand.
   b) Obtain the handwritten signature of the initial transporter and date of acceptance on the manifest.
   c) Retain one copy among its records in accordance with §761.209(a).
   d) Give to the transporter the remaining copies of the manifest that will accompany the shipment of PCB waste.

4. For outbound PCB waste, the facility will keep a copy of each manifest signed in accordance with §761.208(a)(1) until the generator receives a signed copy from the designated commercial storage or disposal facility which received the PCB waste. The copy signed by the commercial storer or disposer shall be retained for at least 3 years from the date the PCB waste was accepted by the initial transporter.

5. For outbound PCB waste, subject to the manifesting requirements, the facility will submit an Exception Report to the EPA Regional Administrator if copy of the manifest with the hand written signature of the owner or operator of the designated facility is not received within 45 days

of the date the waste was accepted by the initial transporter. The exception report shall be submitted to EPA no later than 45 days from the date on which the generator should have received the manifest. The Exception Report shall include the following:

a) A legible copy of the manifest for which the generator does not have confirmation of delivery.
b) A cover letter signed by the generator or his authorized representative explaining the efforts taken to locate the PCB waste and the results of those efforts.

6. The facility shall submit a One-year Exception Report to the EPA Regional Administrator for the Region in which the generator or commercial storer is located no later than 45 days from the date the following occurs:

a) The generator or commercial storer transferred the PCBs or PCB Items to the disposer of PCB waste on a date within 9 months from the date of removal from service for disposal of the affected PCBs or PCB Items, as indicated on the manifest or continuation sheet; and
b) The generator or commercial storer either has not received within 13 months from the date of removal from service for disposal a Certificate of Disposal confirming the disposal of the affected PCBs or PCB Items, or the generator or commercial storer receives a Certificate of Disposal confirming disposal of the affected PCBs or PCB Items on a date more than 1 year after the date of removal from service.

7. The One-year Exception Report shall include:

a) A legible copy of any manifest or other written communication relevant to the transfer and disposal of the affected PCBs or PCB Items.
b) A cover letter signed by the submitter or an authorized representative explaining:
   (1) The date(s) when the PCBs or PCB Items were removed from service for disposal.
   (2) The date(s) when the PCBs or PCB Items were received by the submitter of the report, if applicable.
   (3) The date(s) when the affected PCBs or PCB Items were transferred to a designated disposal facility.
   (4) The identity of the transporters, commercial storers, or disposers known to be involved with the transaction.

(5) The reason, if known, for the delay in bringing about the disposal of the affected PCBs or PCB Items within 1 year from the date of removal from service for disposal.

8. Liquid PCB's must be shipped in secondary containment or enclosed vans.

9. Necessary Emergency Response equipment may include, but is not limited to, a salvage drum and absorbent for all PCB shipments.

10. A chain and standards, constructed of material that can readily be decontaminated, disposed, and/or replaced, shall provide a physical entry barrier to the PCB storage area.

F. Disposal/Decontamination

1. PCB liquids at concentrations ≥50 ppm will be disposed at and incinerator in compliance with 40 CFR 761.70 or at an alternative facility (for concentrations between ≥50 ppm and <500 ppm) as set forth in 40 CFR 761.60(a) or at a TSCA permitted facility for dechlorination in accordance with 40 CFR 761.79

2. PCB articles shall be managed in accordance with 40 CFR 761.60(b). Concentration limits will be taken into consideration when determining the final disposal outlet (e.g. PCB Capacitors with concentrations ≥500ppm will be sent for incineration).

3. PCB Containers shall be managed in accordance with 40 CFR 761.60(c). Concentration limits will be taken into consideration when determining the final disposal outlet

G. Leaking Transformers

1. 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.

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

3. 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, prior to further storage or transportation off-site as outlined in Appendix E of this document.

4. 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 of pumped to an approved container. The outer packaging will be relabeled, maintaining the original information, prior to further storage or transportation off-site as outlined in Appendix E of this document.

5. 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 will silicone.

6. Transportation of emptied or contained units will be in accordance with Section E of this document.

7. At all times personnel will observe safe handling practices when dealing with PCBs and utilize the appropriate (PPE) (as identified in Appendix B).

8. Any spill associated with a leaking transformer will be managed as outlined in Section D.11 of this SOP.

9. 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.

IV. RECORDS

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

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

In addition to the information contained in the logs, the facility maintains a copy of all laboratory analyses, waste acceptance information Closure Cost Estimate, and Financial Assurance Documentation.

The information collected above is used to prepare reports and logs required under the 40 CFR 761.180(c) or in the facility operating permits.

V. REPORTING

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. The PCB Annual Report will be for the entire facility and will include the following items:

A list of all signed manifests of PCB waste initiated and/or received by the facility during that year.

The total weight in kilograms of:
Bulk PCB waste
PCB waste in PCB transformers
PCB Large High or Low Voltage Capacitors
PCB waste in PCB Article Containers
PCB waste in PCB Containers

in storage at the facility at the beginning of the calendar year, received or generated at the facility during the calendar year, transferred to another facility during the calendar year, disposed of at the facility during the calendar year, and remaining in storage for disposal at the facility at the end of the calendar year.

The total number of:
PCB transformers
PCB Large High or Low Voltage Capacitors
PCB Article Containers
PCB Containers

in storage at the facility at the beginning of the calendar year, received or generated at the facility during the calendar year, transferred to another facility during the calendar year, disposed of at the facility during the calendar year, and remaining in storage for disposal at the facility at the end of the calendar year.

VI. TRAINING

Personnel referenced in the SOP shall receive training based upon their assigned duties. Training records shall be maintained on-site.

VII. IMPACTS/CONSEQUENCES OF DEPARTURE FROM REQUIREMENTS

Improper implementation of this procedure could result in exceedance of facility permitted capacity and exposure to potential violations. The consequence of not following this procedure could result in environmental damage and costly violations and loss of company reputation.

VIII. REFERENCES

A. Emerald Transformer Los Angeles, LLC - PCB Commercial Storer Permit

B. 40 CFR 761

IX. APPENDICES

A. Job Hazard Analysis Worksheet

B. Personal Protective Equipment – Hazard Assessment Record

C. Workplace Hazard and Personal Protective Equipment Assessment

D. PCB Guidance Document

E. PCB Manifest and Continuation Sheet

APPENDIX A: JOB HAZARD ANALYSIS WORKSHEET

JOB HAZARD ANALYSIS WORKSHEET

FACILITY:	Emerald Transformer Los Angeles, LLC 5756 Alba Street, Los Angeles, California 90058		Polychlorinated Biphenyls SOP	

I. JOB/TASK DESCRIPTION: Polychlorinated Biphenyls SOP

TASK	PERSONNEL	EQUIPMENT	DURATION
• Properly manage the receipt, paperwork, storage, equipment, and shipping of PCB material.	• Operations Manager • Operations Supervisor • Facility Technician • Manifest Clerk	• Pallet Jack • Forklift and Attachments • Various Containers • Pallets • Small Tools	• 15 minutes to several hours.

JOB REQUIREMENT/OBJECTIVE: Safely manage the receipt, paperwork, storage, equipment, movement, and shipping of PCB material.

II. HAZARD IDENTIFICATION: Polychlorinated Biphenyls SOP

A. OCCUPATIONAL HEALTH CONCERNS

CHEMICAL AGENTS	PHYSICAL AGENTS	BIOLOGICAL AGENTS
• Polychlorinated Biphenyls, Polyhalogenated Biphenyls and various other PCB contaminated materials. • PCB cleaning solvents. • Other waste chemical hazards not associated with PCBs such as RCRA waste hazards.	• PCB spills • Dedicated PCB handling equipment • Heavy drums, transformers, etc. • Pallets • Sharps	• PCB agents ingested or absorbed by contact. • PCB carrier solvents easily absorbed through the skin.

HEALTH HAZARD EVALUATION: Health hazard risks are low for office personnel and moderate for facility technicians and equipment operators. Facility technicians must be trained in PCB handling and wear the proper personal protective equipment while handling any PCB related materials.

Dedicated equipment shall remain in the PCB storage area for use only for the movement of PCB materials.

All PCB related spills must be reported immediately to a supervisor and proper PPE must be worn during any remediation or response efforts.

B. SAFETY CONCERNS

ACTIONS	CONDITIONS	VEHICLE	PROPERTY
• Not processing the paperwork properly. • Improper sampling material that is labeled as PCB. • Misidentifying or misclassifying PCB related materials. • Using non-dedicated equipment to move PCB materials. • Not wearing the proper PPE for handling PCB materials.	• Heavy drums, transformers, material. • PCB material spills. • Heavily contaminated drums, pallets or equipment. • Poor personal hygiene. • Poor decontamination procedures. • Poor equipment maintenance. • Cross-contamination.	• Poor equipment maintenance. • Poor vehicle, truck or trailer maintenance.	• Poor PCB storage area maintenance. • Poor facility maintenance.

SAFETY EVALUATION: Safety risks are low for office personnel and moderate for facility technicians. Facility personnel must not handle or contact directly PCB materials unless they have been specially trained and a Job Safety Briefing conducted.

Personnel must not sample PCB material unless prior approval is obtained from a supervisor.

Personnel must not use PCB-dedicated equipment for moving other materials as cross-contamination could result. Proper material handling techniques must be used for moving heavy drums or transformers. Contaminated containers or equipment must be decontaminated with the proper cleaning agents while wearing proper PPE. If decontamination is not adequate or not practical, contaminated containers must be overpacked.

C. ENVIRONMENTAL CONCERNS

RELEASE TO AIR	RELEASE TO SOIL	RELEASE TO WATER	OTHER
• Environmental risks only exist if hazardous materials get released.	• Environmental risks only exist if hazardous materials get released.	• Environmental risks only exist if hazardous materials get released.	• Not applicable.

ENVIRONMENTAL EVALUATION: Impact to the environment will not occur if personnel follow procedures and eliminate possible dangers. No migration off-site may occur. Storage areas have secondary containment.

III. JOB HAZARD CONTROL: Polychlorinated Biphenyls SOP

ENGINEERING	PPE	TRAINING	DECONTAMINATION	OTHER
• Job Hazard Analysis is required. • Job Safety Briefing may be required. • Dedicated pallet jack is provided for movement of drums in the PCB storage area.	• Hard hat, safety glasses, steel toed shoes, work uniform at all times. • Polyethylene coated Tyvek, PVC gloves with Nitrile Inner Gloves, Tyvek booties. • All extremities shall be covered and taped.	• Job Hazard Analysis training required. • Job Safety Briefing required.	• Contaminated PPE must be disposed of in the provided accumulation drum in the PCB storage area. • Contaminated drums and equipment must be decontaminated with approved cleaning agents.	• None.

PERSONNEL RESPONSIBLE FOR CONTROLS: Engineering controls and training requirements are the responsibility of the Facility Manager, Operations Manager and Operations Supervisor.

IV. JOB HAZARD ANALYSIS SUMMARY & ACTION REQUIRED:	Polychlorinated Biphenyls SOP

There are low to moderate risks associated with handling PCB materials.

The risks of handling can be minimized with proper training, PPE, decontamination, and other procedures. The highest risk is associated with leaking or spilled materials. As long as exposed materials are readily identified and immediately remediated, risks will be minimized and prevent employee exposure risk. Personal protective equipment utilization as defined by this procedure will eliminate any exposures.

In short, there are low risks associated with handling PCB materials that expose workers to injury or illness. As long as all procedures are followed without deviation, there should be no such exposures. All workers have a responsibility to follow procedures and minimize any risks.

APPENDIX B: PERSONAL PROTECTIVE EQUIPMENT HAZARD ASSESSMENT RECORD

PERSONAL PROTECTIVE EQUIPMENT HAZARD ASSESSMENT RECORD

Task at Facility: Polychlorinated Biphenyls SOP		**Hazard Categories (Check All Appropriate Items)**														
		Mechanical / Physical Hazards (List)									**Chemical Hazards**			**Biological Hazards**		
		Manual Container Movements	Sharps from pallets or containers potential	Pinch points from container handling	Splash potential						Contact with PCB residues/materials	Other secondary chemical hazards		Contact with PCB residues/materials		
Parts of Body																
Head	Cranium															
	Ears															
	Eyes				X						X	X		X		
	Respiratory Tract										X	X		X		
	Face															
	Whole Head															
Upper Limbs	Hands	X	X	X							X	X		X		
	Arms		X													
Lower Limbs	Feet	X														
	Legs															
Various	Skin										X	X		X		
	Abdomen															
	Whole Body	X	X		X						X	X		X		

APPENDIX C: WORKPLACE HAZARD AND PERSONAL PROTECTIVE EQUIPMENT ASSESSMENT

1. **Location/Task:**
   Polychlorinated Biphenyls SOP – Handling of PCB materials.

2. **Hazards:**
   Potential carcinogenic hazards associated with PCB materials.

3. **PPE Required:**
   Respiratory protection and gloves only required when contamination or residues are present.

X	Gloves	X	Work Uniform
PVC w/ Inner Nitrile gloves	Specify Type	X	Tyvek
X	Hard Hat +	Polyethylene	Specify Type
X	Safety Glasses		Respirator
	Goggles		Cartridges/Type
	Face Shield	X	Steel Toed Boots
X – When containers are open.	SCBA/Airline	X	Metatarsal Guards

FACILITY GENERAL MANAGER: _____

HEALTH & SAFETY MANAGER: _____

APPENDIX D: WASTE PROFILE EXAMPLE

Page 1 of 3

FOR INTERNAL USE ONLY:
☐ Normal Profile ☐ X-Profile
☐ One Time Waste ☐ Repeat Waste
Fax X-Profiles only to 617-380-3581

WASTE MATERIAL PROFILE SHEET

Profile Number 195752

A. GENERAL INFORMATION

GENERATOR EPA ID #_____
GENERATOR CODE _____ GENERATOR NAME: _____
ADDRESS _____ CITY _____ STATE____ ZIP____
GENERATOR TECHNICAL CONTACT: _____ PHONE: _____
CUSTOMER CODE _____ CUSTOMER NAME: _____
ADDRESS _____ CITY _____ STATE____ ZIP____

B. WASTE DESCRIPTION

Common Name of Waste: _____
Process Generating Waste: _____

Process Generating Waste:
(check one) If spill, origin of spilled material

- ☐ Unused chemical or product
- ☐ Lab Pack
- ☐ Spent halogenated solvents
- ☐ Spent non-halogenated solvents
- ☐ Wastewater treatment sludge from electroplating or etching operations
- ☐ Spent plating bath solutions or residues of plating, stripping and cleaning baths where cyanides are used in the process
- ☐ Wood preservation
- ☐ Inorganic pigment production
- ☐ Organic chemical production
- ☐ Inorganic chemical production
- ☐ Pesticide production
- ☐ Explosives production
- ☐ Petroleum refining
- ☐ Iron or steel production or finishing
- ☐ Primary copper production
- ☐ Primary lead production
- ☐ Primary zinc production
- ☐ Primary Aluminum production
- ☐ Ferro alloy production
- ☐ Secondary lead smelting
- ☐ Veterinary pharmaceutical production
- ☐ Ink formulation
- ☐ Coking
- ☐ Other_____
- ☐ Unknown

Source of Waste:
(check one)

- ☐ Unused Product or Chemical
- ☐ Waste by-product from process
- ☐ Spill clean up
- ☐ Lab Pack
- ☐ Planned site remediation
- ☐ Other:_____

Other Process Information:
(check all that apply)

- ☐ Still bottoms
- ☐ Process scrap
- ☐ Process development
- ☐ Out of date product
- ☐ Spent solvent waste
- ☐ Treatment residues
- ☐ Filter cake
- ☐ Degreasing
- ☐ Exempt recyclable material
- ☐ Packaged consumer goods
- ☐ Off-spec chemical product
- ☐ Zinc, Al, or tin plating
- ☐ Anodizing
- ☐ Cleaning/stripping
- ☐ Wastewater treatment sludges
- ☐ Washwaters
- ☐ Pot liners

Other Process Information:
(check all that apply)

- ☐ Electroplating
- ☐ Conversion coating
- ☐ Carbon steel plating
- ☐ Printed circuit mfg.
- ☐ Cyanide process
- ☐ Heat treating
- ☐ Separator sludge
- ☐ Oven residue
- ☐ Catalyst waste
- ☐ Centrifuged solids
- ☐ Condensate
- ☐ Air, steam, or vacuum stripping
- ☐ Emission control dust
- ☐ Acid leaching
- ☐ Dipping operations
- ☐ Chemical manufacturing
- ☐ Carbon adsorption
- ☐ Incineration or thermal treatment
- ☐ Refining
- ☐ Drug mfg.
- ☐ Distillation
- ☐ Pesticide mfg.
- ☐ Reclamation
- ☐ Etching of metals
- ☐ Bag house dust

Profile Number 195752

C. PHYSICAL PROPERTIES (at 25°C or 77°F)

PHYSICAL STATE
- ☐ SOLID WITHOUT FREE LIQUID
- ☐ POWDER
- ☐ MONOLITHIC SOLID
- ☐ LIQUID WITH NO SOLIDS
- ☐ LIQUID/SOLID MIXTURE
  - % FREE LIQUID _____
  - % SETTLED SOLID _____
  - % TOTAL SUSPENDED SOLID _____
- ☐ GAS/AEROSOL

NUMBER OF PHASES/LAYERS
☐ 1 ☐ 2 ☐ 3
% BY VOLUME (APPROX.)
TOP____ MIDDLE____ BOTTOM____

VISCOSITY (If liquid present)
- ☐ LOW (e.g. WATER)
- ☐ MEDIUM (e.g. MOTOR OIL)
- ☐ HIGH (e.g. MOLASSES)

COLOR

ODOR
- ☐ NONE OR MILD
- ☐ STRONG

BOILING POINT (if liquid)
- ☐ ≤ 100°F
- ☐ > 100°F

MELTING POINT (for solids only)
- ☐ < 140°F
- ☐ 140-200°F
- ☐ > 200°F

FLASH POINT
- ☐ < 73°F
- ☐ 73-100°F
- ☐ 101-140°F
- ☐ 141-200°F
- ☐ > 200°F

pH
- ☐ ≤ 2
- ☐ 2.1 - 6.9
- ☐ 7 (neutral)
- ☐ 7.1 - 12.4
- ☐ ≥ 12.5

SPECIFIC GRAVITY
- ☐ < 0.8 (e.g. Gasoline)
- ☐ 0.8-1.0 (e.g. Ethanol)
- ☐ 1.0 (e.g. Water)
- ☐ 1.0-1.2 (e.g. Antifreeze)
- ☐ > 1.2 (e.g. Methylene Chloride)

TOTAL ORGANIC CARBON (If liquid)
- ☐ ≤ 1%
- ☐ 1-9%
- ☐ ≥ 10%

BTU/LB
- ☐ < 2,000
- ☐ 2,000-5,000
- ☐ 5,000-10,000
- ☐ > 10,000

VAPOR PRESSURE (for liquids only) _____ mm Hg

Profile Number 195752

D. COMPOSITION (Must add up to at least 100%. Include inert materials and/or debris if applicable. Actual percent or range is acceptable.)

_____ — _____% _____ — _____%
_____ — _____% _____ — _____%
_____ — _____% _____ — _____%
_____ — _____% _____ — _____%
_____ — _____% _____ — _____%

☐ Check if MSDS attached.

E. CONSTITUENTS — Attach any available analysis. Enter values or ranges where known. For TCLP values, BRL signifies below regulatory level. None, unknown, and present are also acceptable answers.

Are these values based on ☐ Knowledge or ☐ Testing?

INORGANIC

RCRA	REGULATED METALS	REGULATORY LEVEL (mg/l)	TCLP mg/l	TOTAL mg/l
D004	ARSENIC	5.0		
D005	BARIUM	100.0		
D006	CADMIUM	1.0		
D007	CHROMIUM	5.0		
D007	CHROMIUM CR+6			
D008	LEAD	5.0		
D009	MERCURY	0.2		
D010	SELENIUM	1.0		
D011	SILVER	5.0		

OTHER METALS	TOTAL
ALUMINUM	
ANTIMONY	
BERYLLIUM	
CALCIUM	
COPPER	
MAGNESIUM	
MOLYBDENUM	
NICKEL	
POTASSIUM	
SILICON	
SODIUM	
THALLIUM	
TIN	
VANADIUM	
ZINC	

NON-METALS	WT%
SULFUR	
BROMINE	
CHLORINE	
FLUORINE	
IODINE	
	PPM
AMMONIA	
REACTIVE SULFIDE	
CYANIDE-TOTAL	
CYANIDE AMENABLE	
CYANIDE REACTIVE	

ORGANIC

VOLATILE COMPOUNDS		REGULATORY LEVEL (mg/l)	TCLP mg/l	TOTAL mg/l
D018	BENZENE	0.5		
D019	CARBON TETRACHLORIDE	0.5		
D021	CHLOROBENZENE	100.0		
D022	CHLOROFORM	6.0		
D028	1,2-DICHLOROETHANE	0.5		
D029	1,1-DICHLOROETHYLENE	0.7		
D035	METHYL ETHYL KETONE	200.0		
D039	TETRACHLOROETHYLENE	0.7		
D040	TRICHLOROETHYLENE	0.5		
D043	VINYL CHLORIDE	0.2		

SEMI-VOLATILE COMPOUNDS		REGULATORY LEVEL (mg/l)	TCLP	TOTAL
D023	o-CRESOL	200.0		
D024	m-CRESOL	200.0		
D025	p-CRESOL	200.0		
D026	CRESOL (TOTAL)	200.0		
D027	1,4-DICHLOROBENZENE	7.5		
D030	2,4-DINITROTOLUENE	0.13		
D032	HEXACHLOROBENZENE	0.13		
D033	HEXACHLOROBUTADIENE	0.5		
D034	HEXACHLOROETHANE	3.0		
D036	NITROBENZENE	2.0		
D037	PENTACHLOROPHENOL	100.0		
D038	PYRIDINE	5.0		
D041	2,4,5-TRICHLOROPHENOL	400.0		
D042	2,4,6-TRICHLOROPHENOL	2.0		

PESTICIDES AND HERBICIDES		REGULATORY LEVEL (mg/l)	TCLP mg/l	TOTAL mg/l
D012	ENDRIN	0.02		
D013	LINDANE	0.4		
D014	METHOXYCHLOR	10.0		
D015	TOXAPHENE	0.5		
D016	2,4-D	10.0		
D017	2,4,5-TP (SILVEX)	1.0		
D020	CHLORDANE	0.03		
D031	HEPTACHLOR (AND ITS EPOXIDE)	0.008		

OTHER

PHENOL _____PPM

TOTAL PETROLEUM HYDROCARBONS (SOILS ONLY)_____ PPM

PCB'S
☐ NONE
☐ < 50 PPM
☐ ≥ 50 PPM

IF PCB'S ARE PRESENT <50 PPM, IS THE WASTE REGULATED BY TSCA 40 CFR 761?
☐ YES ☐ NO

HOC'S
☐ NONE
☐ < 1000 PPM
☐ ≥ 1000 PPM

OTHER HAZARDS	YES		YES		YES		YES
WATER REACTIVE	☐	PESTICIDE	☐	SHOCK SENSITIVE	☐	DEA REGULATED SUBSTANCE	☐
RADIOACTIVE	☐	HERBICIDE	☐	THERMALLY SENSITIVE	☐	OXIDIZER	☐
DIOXIN	☐	EXPLOSIVE	☐	INFECTIOUS, PATHOGENIC, OR ETIOLOGICAL AGENT	☐	REDUCING AGENT	☐
OSHA REGULATED CARCINOGENS	☐	SPONTANEOUSLY IGNITES WITH AIR	☐	ASBESTOS	☐	NONE OF THE ABOVE	☐

DOES THIS WASTE HAVE ANY UNDISCLOSED HAZARDS OR PRIOR INCIDENTS ASSOCIATED WITH IT, WHICH COULD AFFECT THE WAY IT SHOULD BE HANDLED? YES ☐ NO ☐ (If yes, explain)

Profile Number 195752

F. REGULATORY STATUS

Y N

☐ ☐ USEPA HAZARDOUS WASTE? (IF Yes List codes.) _____

☐ ☐ DO ANY GENERATOR STATE WASTE CODES APPLY? IF YES, LIST STATE CODES _____

LIST ANY FEDERAL OR STATE WASTE CODES WHICH MAY VARY FROM SHIPMENT TO SHIPMENT: _____

WILL THE DECISION TO VARY THESE WASTE CODES BE BASED ON ☐ KNOWLEDGE OR ☐ TESTING (check one).
IF KNOWLEDGE, DESCRIBE BASIS OF KNOWLEDGE: _____

☐ ☐ IS THIS WASTE PROHIBITED FROM LAND DISPOSAL WITHOUT FURTHER TREATMENT PER 40 CFR PART 268?
THIS WASTE IS A: ☐ WASTEWATER ☐ NON WASTEWATER PER USEPA DEFINITION IN 40 CFR 268.2.

☐ ☐ IF ANY WASTE CODES D001, D002, D003 (OTHER THAN REACTIVE CYANIDE OR REACTIVE SULFIDE), D004-D011, D012-D017 NON-WASTEWATERS, OR D018-D043 APPLY, ARE THERE ANY UNDERLYING HAZARDOUS CONSTITUENTS (UHC'S) PRESENT ABOVE UNIVERSAL TREATMENT STANDARDS (UTS)?

☐ ☐ DOES TREATMENT OF THIS WASTE GENERATE A F006 OR F019 SLUDGE?

☐ ☐ IS THIS WASTE SUBJECT TO CATEGORICAL PRETREATMENT DISCHARGE STANDARDS?
IF YES, SPECIFY POINT SOURCE CATEGORY LISTED IN 40 CFR PART 401. _____

☐ ☐ IS THIS WASTE REGULATED UNDER THE BENZENE NESHAP RULES? (IS THIS WASTE FROM A CHEMICAL MANUFACTURING, COKE BY-PRODUCT RECOVERY, OR PETROLEUM REFINERY PROCESS?)

☐ ☐ DOES THIS WASTE CONTAIN VOC'S IN CONCENTRATIONS ≥ 500 PPM?

☐ ☐ DOES THIS WASTE CONTAIN GREATER THAN 20% OF ORGANIC CONSTITUENTS WITH A VAPOR PRESSURE ≥ .3KPA (.044 psia)?

☐ ☐ DOES THIS WASTE CONTAIN AN ORGANIC CONSTITUENT WHICH IN ITS PURE FORM HAS A VAPOR PRESSURE GREATER THAN 77 KPa (11.2psia)?

G. D.O.T. INFORMATION: List all shipping names that may be used. Attach additional page if necessary.

D.O.T. SHIPPING NAME _____

_____ DOT HAZARD CLASS: _____

UN/NA #_____ PACKING GROUP (Circle 1) I II III HAZARD ZONE (Circle 1) A B C D

WILL THIS SHIPPING NAME VARY? ☐ Y ☐ N IF YES, WILL ASSIGNMENT OF PROPER SHIPPING NAME BE BASED ON ☐ KNOWLEDGE OR ☐ TESTING? (check one) IF KNOWLEDGE, DESCRIBE BASIS OF KNOWLEDGE: _____

H. TRANSPORTATION REQUIREMENTS

ESTIMATED SHIPMENT FREQUENCY: ☐ ONE TIME ☐ WEEKLY ☐ SEMI-MONTHLY ☐ MONTHLY ☐ QUARTERLY ☐ OTHER _____

☐ BULK LIQUID

GALLONS/SHIPMENT: _____GAL

_____ FROM TANKS: TANK SIZE _____GAL.

_____ FROM DRUMS

VEHICLE TYPE:

_____ VAC TRUCK

_____ TANK TRUCK

_____ RAILROAD TANK CAR

CHECK COMPATIBLE STORAGE MATERIALS:

_____ STEEL ___STAINLESS STEEL (316)

_____ RUBBER LINED ___FIBERGLASS LINED

_____ OTHER _____

☐ BULK SOLD

_____TON/YD PER SHIPMENT

STORAGE CAPACITY_____TON/YD

VEHICLE TYPE:

____ DUMP TRAILER

____ ROLL OFF BOX

____ INTERMODAL ROLLOFF BOX

____ CUSCO/VACTOR

____ OTHER _____

☐ CONTAINERIZED

_____CONTAINERS/SHIPMENT

STORAGE CAPACITY: _____ CONTAINERS

CONTAINER TYPE:

____ CUBIC YARD BOX

____ PALLET

____ TOTE TANK

____ DRUM SIZE: _____

CONTAINER MATERIAL:

____ STEEL

____ FIBER

____ PLASTIC

____ OTHER _____

I. SAMPLE STATUS

REPRESENTATIVE SAMPLE HAS BEEN SUPPLIED. ☐ YES ☐ NO SAMPLED BY _____ DATE SAMPLED _____

J. SPECIFIC DISPOSAL RESTRICTIONS OR REQUESTS: _____

SPECIAL WASTE HANDLING REQUIREMENTS: _____

OTHER COMMENTS OR REQUESTS: _____

K. BIENNIAL/ANNUAL REPORTING INFORMATION.

SIC CODE _____ SOURCE CODE _____ FORM CODE _____ ORIGIN CODE _____

GENERATOR'S CERTIFICATION

I hereby certify that all information submitted in this and attached documents is correct to the best of my knowledge. I also certify that any samples submitted are representative of the actual waste. If Clean Harbors discovers a discrepancy during the approval process, Generator grants Clean Harbors the authority to amend the profile, as Clean Harbors deems necessary, to reflect the discrepancy.

AUTHORIZED SIGNATURE	NAME (PRINT)	TITLE	DATE

REPRESENTATIVE COMPLETING PROFILE: _____

APPENDIX E: PCB GUIDANCE DOCUMENT

Labeling and Marking Requirements

Each generator offering a hazardous material for transportation shall mark and label packages in accordance with 49 CFR 172, 40 CFR 761.65(c)(8), and Emerald Transformer policies.

- Markings and labels must be clear and visible.
- Each continaer must be marked with the Date-of-Removal-From-Service for Disposal (Out-of-Service Date) or OSD.
- The Generator Unique Identification Number for the container (a generator supplied serial number).
- The generator name must be on the container. (The label is sufficient.)
- The profile number.
- A PCB marking shall be placed on every PCB package. Either the M_L or the M_S marking shall be used.
    - M_L – This label should always be used unless it cannot fit. Two sizes are available (6" x 6" or 2" x 2").
    - M_S – If the item is too small to use the M_L label (6" x 6"), then the small marking, M_S, is used.

Container Condition

No residue may be present on the exterior of the container. If the container is deemed to be contaminated, the container will be overpacked or de-contaminated at the expense of the customer.

Transportation When on Emerald Transformer Equipment

Liquid PCBs must be shipped in secondary containment, such as closed vans. Necessary Emergency Response equipment includes, but is not limited to, a salvage drum and absorbent for all PCB shipments. PCBs shall not be double stacked during transportation.

Required Shipping Paperwork

- PCBs must be manifested in kilograms (K).
- The PCB Continuation Sheet must be completed with a separate line for each package.
    - The Generator's Unique Identification Number
    - The facility Unique Identification Number (assigned upon arrival)
    - The profile number
    - The type of PCB item
    - A description of the contents
    - The weight in kilograms (K).
    - Date-of-Removal-from-Service
- Refer to the SOP.

Discrepancy Resolution

Generator authorization is required for any discrepancies, changes, cross-outs or additions to the shipping paperwork. All PCB containers must be weighed as manifest discrepancies for weight differences of greater than 10% apply for bulk and non-bulk containers regardless.

Surcharges

Surcharges may be assessed for paperwork discrepancies, poor container condition, or any of the non-conformities referenced in the SOP or above.

Elapsed Time from Date-of-Removal-from-Service to Received Date at Disposer	Surcharge to the Customer
Less than 9 months	None
Between 9 months and 12 months	Surcharge because Disposer only has 90 days to get a Certificate of Disposal back to generator.
After 1 year*	Surcharge because Disposer only has 90 days to get a Certificate of Disposal back to generator.

* Note: This is only in the event that the material, as received, is > 1 year

California Regulated PCB versus TSCA Regulated PCB

Generally TSCA only regulates PCB waste which contains more than 50 ppm of PCBs. Exceptions to this include the following:

- Any waste that has or had 50 ppm or more of PCB is always treated as if it contained more than 50 ppm, even if the concentration later drops below 50 ppm.
- If a waste concentration originally exceeds 50 ppm of PCB, then any resulting waste from dilution, spills, or leaks is regulated as if it were its original concentration. TSCA prohibits dilution of a PCB waste to avoid regulation.

California regulates PCB waste if it contains 5 ppm or greater of PCBs.

Sources for Additional Information

- Emerald Transformer Los Angeles, LLC - PCB Commercial Storer Permit
- 40 CFR 761

APPENDIX F: PCB MANIFEST AND CONTINUATION SHEET

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) : : : : : Form Approved OMB No. 2050-0039

GENERATOR

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number

5. Generator's Name and Mailing Address — Generator's Site Address (if different than mailing address)

Generator's Phone:

6. Transporter 1 Company Name — U.S. EPA ID Number

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address — U.S. EPA ID Number

Facility's Phone:

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1.					
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information

15a. 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 accordingment 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/Offeror's Printed/Typed Name — Signature — Month Day Year

INT'L

16. International Shipments — Import to U.S. — Export from U.S. — Port of entry/exit

Transporter signature (for exports only): : : : : : Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name — Signature — Month Day Year

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space — Quantity — Type — Residue — Partial Rejection — Full Rejection

Manifest Reference Number

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.	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 — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete — DESIGNATED FACILITY TO DESTINATION STATE (if REQUIRED)

Please print or type. (Form designed for use on elite (12-pitch typewriter.)) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page	23. Manifest Tracking Number

GENERATOR

24. Generator's Name

25. Transporter _____ Company Name — U.S. EPA ID Number

26. Transporter _____ Company Name — U.S. EPA ID Number

27a. Hm	27b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group if any)	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes

32. Special Handling Instructions and Additional Information

TRANSPORTER

33. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

34. Transporter _____ Acknowledgment of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

APPENDIX I – EXTERNAL LABORATORY QA/QC

Quality Assurance Manual

TestAmerica West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone No. (916) 373-5600
Fax No. (916) 372-1059

www.testamericainc.com

Approval Signatures:

Laboratory Director – Karla Buechler — Date: 12/16/11

Quality Manager - Douglas Weir — Date: 12/16/11

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SECTION 2. TABLE OF CONTENTS

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REFERENCED CORPORATE SOPs AND POLICIES

SOP / Policy Reference	Title
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CA-Q-S-002	Acceptable Manual Integration Practices
CA-Q-S-004	Method Compliance & Data Authenticity Audits
CA-Q-S-006	Detection Limits
CA-Q-S-008	Management Systems Review
CW-Q-S-001	Corporate Document Control and Archiving
CW-Q-S-002	Writing a Standard Operating Procedure (SOPs)
CW-L-S-002	Internal Investigation of Potential Data Discrepancies and Determination for Data Recall
CA-L-S-002	Subcontracting Procedures
CW-L-P-004	Ethics Policy
CA-L-P-002	Contract Compliance Policy
CW-F-P-002	Authorization Matrix
CW-F-P-004	Procurement and Contracts Policy
CA-C-S-001	Work Sharing Process
CA-T-P-001	Qualified Products List
CW-F-S-007	Controlled Purchases Policy
CW-F-S-018	Vendor Selection
CA-Q-M-002	Corporate Quality Management Plan
CW-E-M-001	Corporate Environmental Health & Safety Manual

REFERENCED LABORATORY SOPs

SOP Reference	Title
WS-PQA-013	Procedures to Address Customer Complaints
WS-QA-0050	Management of Change
WS-QA-0009	Document Archiving
WS-QA-0022	Employee Orientation and Training
WS-QA-0021	Preparation and Management of Standard Operating Procedures
WS-QA-0006	Method Detection Limits (MDL) and Instrument Detection Limits (IDL)
WS-PQA-0011	Manual Integration Documentation Procedures
WS-QA-0018	Subsampling and Compositing of Samples
WS-QA-0003	Sample Receipt and Procedures

SECTION 3. INTRODUCTION, SCOPE AND APPLICABILITY

3.1 Introduction and Compliance References

TestAmerica West Sacramento's Quality Assurance Manual (QAM) is a document prepared to define the overall policies, organization objectives and functional responsibilities for achieving TestAmerica's data quality goals. The laboratory maintains a local perspective in its scope of services and client relations and maintains a national perspective in terms of quality.

The QAM has been prepared to assure compliance with The NELAC Institute (TNI) Standard, dated 2009, Volume 1 Modules 2 and 4, and ISO/IEC Guide 17025:2005(E). In addition, the policies and procedures outlined in this manual are compliant with TestAmerica's Corporate Quality Management Plan (CQMP) and the various accreditation and certification programs listed in Appendix 3. The CQMP provides a summary of TestAmerica's quality and data integrity system. It contains requirements and general guidelines under which all TestAmerica facilities shall conduct their operations.

The QAM has been prepared to be consistent with the requirements of the following documents:

- 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.*
- *U.S. Department of Defense, Quality Systems Manual for Environmental Laboratories, Version 4.2, October 2010.*
- 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)*
- *Statement of Work for Inorganics & Organics Analysis, SOM, ISM, DLF and CBC, 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, and on-line Editions.
- U.S. Department of Defense, *Air Force Center for Environmental Excellence Quality Assurance Project Plan (QAPP),* Version 4.0.02, May 2006.
- Nuclear Regulatory Commission (NRC) Quality Assurance Requirements.
- Marine Protection, Research, and Sanctuaries Act (MPRSA).
- Toxic Substances Control Act (TSCA).

3.2 Terms and Definitions

A Quality Assurance Program is a company-wide 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 management level through company goals and management policies, and at the analytical level through Standard Operating Procedures (SOPs) and quality control. The TestAmerica program is designed to minimize systematic error, encourage constructive, documented problem solving, and provide a framework for continuous improvement within the organization.

Refer to Appendix 2 for the Glossary/Acronyms.

3.3 Scope / Fields of Testing

The laboratory analyzes a broad range of environmental and industrial samples every month. Sample matrices vary among air, drinking water, effluent water, groundwater, hazardous waste, sludge and soils. The Quality Assurance 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 4. 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 Director and the Quality Assurance (QA) Manager. In some cases, QAPPs and DQOs may specify less stringent requirements. The Laboratory Director and the QA Manager must determine if it is in the lab's best interest to follow the less stringent requirements.

3.4 Management of the Manual

3.4.1 Review Process

The template on which this manual is based is reviewed annually by Corporate Quality Management Personnel to assure that it remains in compliance with Section 3.1. This manual itself 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 CQMP. 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 No. WS-QA-0021).

SECTION 4. MANAGEMENT REQUIREMENTS

4.1 Overview

TestAmerica West Sacramento is a local operating unit of TestAmerica Laboratories, Inc.. The organizational structure, responsibilities and authorities of the corporate staff of TestAmerica Laboratories, Inc. are presented in the CQMP. The laboratory has day-to-day independent operational authority overseen by corporate officers (e.g., President, Chief Operating Officer, Corporate Quality, etc.). The laboratory operational and support staff work under the direction of the Laboratory Director. The organizational structure for both Corporate & TestAmerica West Sacramento is presented in Figure 4-1.

Roles and Responsibilities

In order for the Quality Assurance 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 following descriptions briefly define each role in its relationship to the Quality Assurance Program.

4.1.1 Additional Requirements for Laboratories

The responsibility for quality resides with every employee of the laboratory. All employees have access to the QAM, are trained to this manual, and are responsible for upholding the standards therein. Each person carries out his/her daily tasks in a manner consistent with the goals and in accordance with the procedures in this manual and the laboratory's SOPs. Role descriptions for Corporate personnel are defined in the CQMP. This manual is specific to the operations of TestAmerica's West Sacramento laboratory.

4.1.2 Laboratory Director / Technical Director

TestAmerica West Sacramento's Laboratory Director is responsible for the overall quality, safety, financial, technical, human resource and service performance of the whole laboratory and reports to their respective GM. The Laboratory Director provides the resources necessary to implement and maintain an effective and comprehensive Quality Assurance and Data Integrity Program.

4.1.3 Quality Assurance (QA) Manager or Designee

The QA Manager has responsibility and authority to ensure the continuous implementation of the quality system.

- Ensuring Communication & monitoring standards of performance to ensure that systems are in place to produce the level of quality as defined in this document.
- 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 QAM or laboratory SOPs are temporarily suspended following the procedures outlined in Section 12.
- Evaluation of the thoroughness and effectiveness of training.
- Compliance with ISO 17025.

4.1.4 Technical Manager (Operations Manager) or Designee

The Operations Manager has the responsibility for the day to day operations of the analytical staff within the laboratory. **The Operations Manager is responsible for compliance with the ISO 17025 Standard.** The Operations Manager reports directly to the Laboratory Director. The Operations Manager schedules analytical operations, ensures that the laboratory meets quality requirements, investigates technical issues as they arise, and performs other tasks as required by the NELAC standards.

4.1.5 Manager of Customer Services

The Manager of Customer Services has the responsibility for the day to day operations of the client services staff, which includes the Project Management and other administrative groups within the laboratory. The Manager of Customer Services reports directly to the Laboratory Director. The Manager of Customer Services has signature authority for contracts for laboratory services (as detailed in TestAmerica policy), and for laboratory reports.

4.1.6 Project Manager

Project Managers are a liaison between the laboratory's clients and the analytical staff. They report directly to the Manager of Customer Service. The Project Managers have signature authority for final reports, and review project data packages for completeness and compliance with client needs and quality requirements.

4.1.7 Project Administrator

Project Administrators are a liaison between the laboratory's clients and the analytical staff. They report directly to the Manager of Customer Service. The Project Administrators review project data packages for completeness and compliance with client needs and quality requirements.

4.1.8 Department Manager, Team Leader, or Supervisor

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

4.1.9 Analyst

Analysts report to their respective Department Managers. They perform sample analyses and generate analytical data in accordance with documented procedures.

4.1.10 Sample Custodian

The Sample Custodian ensures 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.

4.1.11 Report Production Staff

The Report Production Staff accurately generates and compiles analytical reports and the associated deliverables as required by the client.

4.1.12 Quality Assurance Staff

The QA Staff has responsibility and authority to ensure the continuous implementation of the quality system based on ISO 17025.

- Ensuring Communication & monitoring standards of performance to ensure that systems are in place to produce the level of quality as defined in this document.
- Notifying the QA manager of deficiencies in the quality system and ensuring corrective action is taken.
- Evaluation of the thoroughness and effectiveness of training.
- Compliance with ISO 17025. (where applicable)

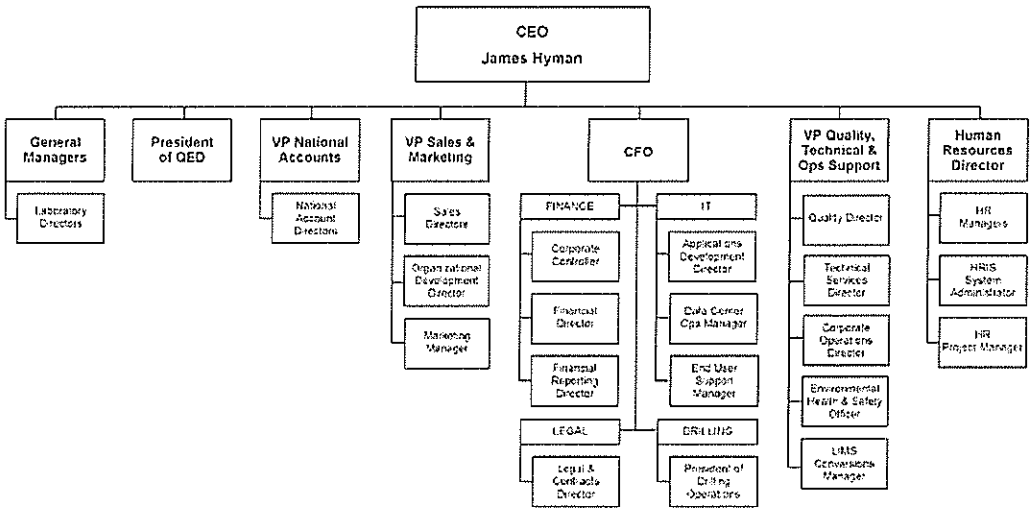
4.2 Deputies

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

Key Personnel	Deputy
Karla Buechler Laboratory Director	David J. Herbert Business Development Director
Douglas Weir Quality Manager	Lisa Stafford Quality Assurance Scientist
Karla Buechler Technical Director	Eric Redman Technical Director Robert Hrabak Environmental Operations Manager
Robert Hrabak Environmental Operations Manager	Steve Rogers Department Manager Kirby Garrett Department Manager
David Allameh Adv. Tech. Operations Manager	Robert Hrabak Environmental Operations Manager
David Herbert Business Development Manager	Eric Redman Technical Director
David Herbert Customer Service Manager	Jill Kellmann Program Management Department Manager
Joseph Schairer EHS Coordinator	Richard Kester Hazardous Materials Specialist

Figure 4-1. Corporate and Laboratory Organization Charts

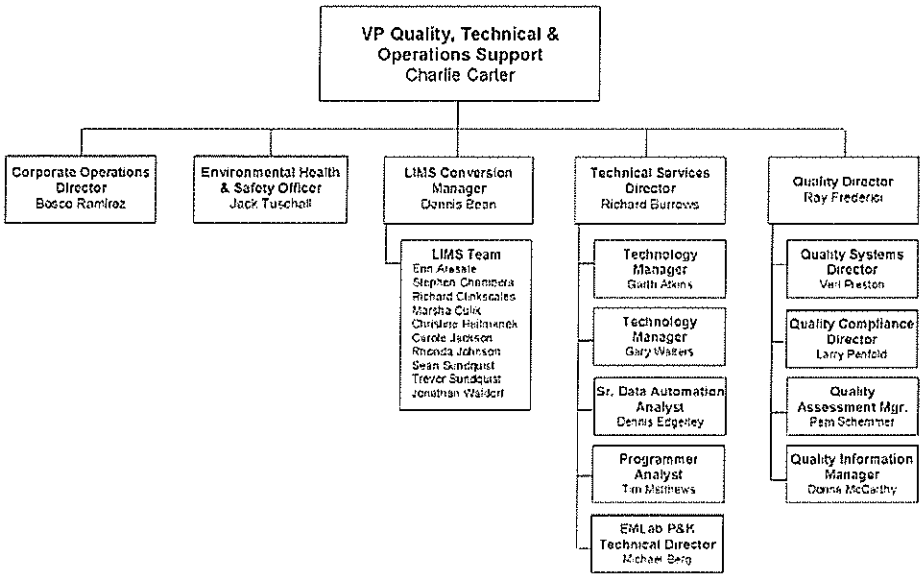
TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING



Aug 2011

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Quality, Technical & Operations Support



4 Aug 2011

West Sacramento Laboratory Organization

TestAmerica

General Manager
Belinda Vega
76

Laboratory Director/
Technical Director
Karla Buechler
75

Jack Fuschall
Corp EH&S

Vick Rubins
Corp HR

Ray Frederici
Corp QA

Office Mgr/HR/EH&S Coordinator
Joseph Schairer

Manager of Adv Tech Operations
David Allaman
19

- **Dioxin Extractions – 7**
  Elizabeth Nguyen – Supv
  - George Burkett
  - Tatyana Lobuga
  - Cesar Gomes
  - Brent Grier
  - Miroslava Lucena
  - Constantine Rust
- **Dioxin Instruments - 6**
  - John Barnett
  - Kyle Stephens
  - Adrian Massacar
  - Saleh Arghestani
  - Mark Grandfield
  - Noor Khan
- **Dioxin Data Review – 5**
  - Sylvia Preen
  - Sonia Guni
  - Virginia Grandfield
  - Mary West
  - Lisa Hernandez

Manager of Env Operations
Deputy Lab TD
Robert Hrabak
28

- **GCMS Inst - 7**
  Steven Rogers – Sr. Dept Mgr
  - Roger Young
  - Kenny Truong
  - Ajay Sharma
  - Paloma Rodriguez
  - Marc Onish
  - Wai Wong (T)
- **Org Prep/Gen Chem - 10**
  Kirby Garrett – Dept Mgr
  - Will Spaler
  - Jason Baynes
  - Ali Mamji
  - Austin Obie
  - Felix Francis
  - Nieco Palmore
  - Natalia Kuzmenko
  - Katie Lopez
  - Tuan Pham
- **Metals – 6**
  Sabine Hargrave – Supv
  - Natasha Merritt
  - Thep Phomsoorn
  - Cheng Vue
  - Brian Jones
  - Michael Ng
- **GC Inst - 4**
  - Victoria Nugent
  - Erica Larson
  - Robyn Noonan
  - Steve Valmontes

Technical Director/
Deputy Lab TD
Eric Redman - 5
- Dennis Gall
- Jonathan Reed
- Nathan Shafer
- Horacio Araiz

Customer Service Manager
David Herbert
17

- Nilo Lig
- **Project Management - 10**
  Jill Kelmann - Dept Mgr
  - Karen Dah
  - Karen Sellers
  - Linda Lawer
  - Robert Weisenfeld
  - David Albucker
  - Laurie Turpen
  - Bryanna Vandenberg
- **Info Services**
  - Kelly Gonyea
  - Kym Nelson
- **Internal Support – 4**
  Jeremy Sapien – Supv/PM
- **Sample Admin/SP**
  - Richard Kester
  - Cheryl Hytrek
  - Brandon Lewis
- **Purchasing/Facilities Mgr**
  Raymond Lucero

Manager of Quality Assurance
Douglas Weir
4

- Lisa Stafford
- Gary Cosley
- Russell Evans

Lisa Gonzalez Clerk
- Todd Greene
- Pam Sorenson
- Sherman Ruga
- Dennis Edgerley
- Karen Wilson
- Linda Leong
- Douglas Weir

Public/QA/Orgchart/Orgchart 2011-3, December 9, 2011

SECTION 5. QUALITY SYSTEM

5.1 Quality Policy Statement

It is TestAmerica's Policy to:

- Provide data of known quality to its clients 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 laboratory, administrative and managerial activities. TestAmerica 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 17025:2005(E) International Standard, the 2009 TNI Standard and to continually improve the effectiveness of the management system.

Every staff member at the laboratory plays an integral part in quality assurance and is held responsible and accountable for the quality of their work. It is, therefore, required that all laboratory personnel are trained and agree to comply with applicable procedures and requirements established by this document.

5.2 Ethics and Data Integrity

TestAmerica is committed to ensuring the integrity of its data and meeting the quality needs of its clients. The elements of TestAmerica's Ethics and Data Integrity Program include:

- An Ethics Policy (Corporate Policy No. CW-L-P-004) and Employee Ethics Statements.
- Ethics and Compliance Officers (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 (Corporate SOP No. CW-L-S-002).
- Procedures and guidance for recalling data if necessary (Corporate SOP No. CW-L-S-002).
- Effective external and internal monitoring system that includes procedures for internal audits (Section 15).
- 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.
- 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.

5.3 Quality System Documentation

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

- Quality Assurance Manual – Each laboratory has a lab-specific quality assurance manual.
- Corporate SOPs and Policies – Corporate SOPs and Policies are developed for use by all relevant laboratories. They are incorporated into the laboratory's normal SOP distribution, training and tracking system. Corporate SOPs may be general or 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).
- Laboratory SOPs – General and Technical
- Laboratory QA/QC Policy Memorandums

5.3.1 Order of Precedence

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

- Corporate Quality Management Plan (CQMP)
- Corporate SOPs and Policies
- Laboratory QA/QC Policy Memorandum
- Laboratory Quality Assurance Manual (QAM)
- 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. Where the CQMP conflicts with those regulatory requirements, the regulatory requirements of the jurisdiction shall hold primacy. The laboratory's QAM shall take precedence over the CQMP in those cases.

5.4 QA/QC Objectives for the Measurement of Data

Quality Assurance (QA) and Quality Control (QC) are activities undertaken to achieve the goal of producing data that accurately characterize the sites or materials that have been sampled. Quality Assurance is generally understood to be more comprehensive than Quality Control. Quality Assurance can be defined as the integrated system of activities that ensures that a product or service meets defined standards.

Quality Control 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. The client is responsible for developing the QAPP. 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. Additionally, 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).

5.4.1 Precision

The laboratory objective for precision is to meet the performance for precision demonstrated for the methods on similar samples and to meet data quality objectives 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). Precision is documented on the basis of replicate analysis, usually duplicate or matrix spike (MS) duplicate samples.

5.4.2 Accuracy

The laboratory objective for accuracy is to meet the performance for accuracy demonstrated for the methods on similar samples and to meet data quality objectives of the EPA and/or other regulatory programs. Accuracy is defined as the degree of bias in a measurement system. Accuracy 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.

5.4.3 Representativeness

The laboratory objective for representativeness 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. The laboratory may provide guidance to the client regarding proper sampling and handling methods in order to assure the integrity of the samples.

5.4.4 Comparability

The comparability 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.

The comparability objective 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.

5.4.5 Completeness

The completeness objective for data is 90% (or as specified by a particular project), expressed as the ratio of the valid 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. 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.

5.4.6 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), specific electrodes (separation and identification), etc..

5.4.7 Sensitivity

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

5.5 Criteria for Quality Indicators

The laboratory maintains a Reference Data Summary from the LIMS that summarizes 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 is contained in "Quality Control Pogram" Policy WS-PQA-003 and Section 24.

5.6 Statistical Quality Control

Statistically-derived precision and accuracy limits are required by selected methods (such as SW-846) and programs [such as the Ohio Voluntary Action Plan (VAP)]. The laboratory routinely utilizes statistically-derived limits to evaluate method performance and determine when corrective action is appropriate. The analysts are instructed to use the current limits in the laboratory (dated and approved by the Technical Manager and QA Manager) and entered into the Laboratory Information Management System (LIMS). The Quality Assurance 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 the LIMS following the guidelines described in Quality Control Program" Policy WS-PQA-003 and Section 24. 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.

5.6.1 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. WS-PQA-003, "Quality Control Program".

5.7 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 16). These metrics are used to drive continuous improvement in the laboratory's Quality System.

SECTION 6. DOCUMENT CONTROL

6.1 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 Manual
- Laboratory Standard Operating Procedures (SOP)
- Laboratory Policies
- Work Instructions and Forms
- Corporate Policies and Procedures distributed outside the intranet

Corporate Quality posts Corporate Manuals, SOPs, Policies, Work Instructions, White Papers and Training Materials on the company intranet site. These Corporate 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. A detailed description of the procedure for issuing, authorizing, controlling, distributing, and archiving Corporate documents is found in Corporate SOP No. CW-Q-S-001, Corporate Document Control and Archiving. 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.

6.2 Document Approval and Issue

The pertinent elements of a document control system for each document include 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 (or list other mgmt. if applicable). In order to develop a new document, a 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 retains that document as the official document on file. That document is then provided to all applicable operational units (may include electronic access). 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 year and revised as appropriate. Changes to documents occur when a procedural change warrants.

6.3 Procedures for Document Control Policy

For changes to the QA Manual, refer to SOP No. WS-QA-0021, "Preparation and Management of Standard Operating 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. CW-Q-S-002, Writing a Standard Operating Procedure SOP and SOP No. WS-QA-0021, Preparation and Management of Standard Operating Procedures". The SOPs 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 a hard drive in the QA department; hard copies are kept in QA files. The procedure for the care of these documents is in SOP No. WS-QA-0021, "Preparation and Management of Standard Operating Procedures".

6.4 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.

SECTION 7. SERVICE TO THE CLIENT

7.1 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.

The laboratory must determine if it has the necessary physical, personnel and information resources to meet the contract, and if the personnel have the expertise needed to perform the testing requested. Each proposal is checked for its impact on the capacity of the laboratory's equipment and personnel. As part of the review, the proposed turnaround time will be checked for feasibility.

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 TestAmerica facility or to an outside firm, this will be documented and discussed with the client prior to contract approval. (Refer to Section 8 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 TestAmerica, 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.

7.2 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 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.

If the project is an air, drinking water, or high resolution opportunity, a message describing the opportunity will be immediately sent to the appropriate specialty market distribution list.

New opportunities with an estimated value greater than $100K are passed to the laboratory CSM or BDM, and a message regarding the project details is immediately forwarded to the Large Opportunity Tracking (LOT) distribution list. Specialty market distribution will be included in this notification as appropriate, as well as the associated sales person.

The contract review process is outlined in TestAmerica's Corporate SOP No. CA-L-P-002, Contract Compliance Policy.

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):

- Legal & Contracts Director
- General Manager
- The Customer Service Manager
- The Business Development Manager
- Laboratory and/or Corporate Technical Managers / Directors
- Laboratory and/or Corporate Information Technology Managers/Directors
- Account Executives
- Laboratory and/or Corporate Quality
- Laboratory and/or Corporate Environmental Health and Safety Managers/Directors
- The Laboratory Director reviews the formal laboratory quote and makes final acceptance for their facility.

The Sales Director, Legal Contracts Director, Account Executive, Proposal Coordinator or local account representative then submits the final proposal to the client.

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.

The Legal & Contracts Director maintains copies of all signed contracts, as does the local Business Development Manager.

7.3 Documentation

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. Contract negotiations and finalization is the responsibility of the Business Development Manager. 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.

7.3.1 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, the laboratory assigns a PM 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. Quality Assurance Project Plans, if submitted by the client, will be evaluated per policy WS-PQA-0018.

PM's are the primary client contact and they ensure resources are available to meet project requirements. Although PM's do not have direct reports or staff in production, 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. Project management is positioned between the client and laboratory resources.

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 projects to the laboratory staff through project kick-off meetings or to the supervisory staff during production meetings. These meetings provide direction to the laboratory staff in order to maximize production and client satisfaction, while maintaining quality. In addition,

project notes may be associated with each sample batch as a reminder upon sample receipt and analytical processing.

During the project, 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 updated to the QAS and introduced to the managers at these meetings. The laboratory staff is then introduced to the modified requirements via the PM or the individual laboratory Technical Manager. 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.

7.4 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 15 and 25).

Note: ISO/IEC 17025 states that a laboratory "shall afford clients or their representatives cooperation to clarify the client's request". This topic is discussed in Section 7.

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.
- Assist 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.

7.5 Client Communication

Project managers 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.

Any member of the laboratory's senior staff, or any of the laboratory's identified technical experts is available to discuss any technical questions or concerns that the client may have.

7.6 Reporting

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

7.7 Client Surveys

The laboratory assesses both positive and negative client feedback. The results are used to improve overall laboratory quality and client service. TestAmerica's Sales and Marketing teams periodically develops lab and client specific surveys to assess client satisfaction.

SECTION 8. SUBCONTRACTING OF TESTS

8.1 Overview

For the purpose of this quality manual, the phrase subcontract laboratory refers to a laboratory external to the TestAmerica laboratories. The phrase "work sharing" refers to internal transfers of samples between the TestAmerica 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 TestAmerica's Corporate SOP's on Subcontracting Procedures (CA-L-S-002) and the Work Sharing Process (CA-C-S-001).

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.

Project Managers (PMs), Customer Service Managers (CSM), or Account Executives (AE) for the Export Lab are responsible for obtaining client approval prior to outsourcing any samples. The laboratory will advise the client of a subcontract or work sharing arrangement in writing and when possible approval from the client shall be retained in the project folder.

Note: In addition to the client, some regulating agencies (e.g, USDA) or contracts (e.g, certain USACE projects) may require notification prior to placing such work. Documentation of approval is stored electronically in the quote folder within SACSALES share on a local laboratory server.

8.2 Qualifying and Monitoring Subcontracators

Whenever a PM or Customer Service 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:

- The first priority is to attempt to place the work in a qualified TestAmerica laboratory;
- Firms specified by the client for the task (Documentation that a subcontractor was designated by the client must be maintained with the project file. This documentation can be as simple as placing a copy of an e-mail from the client in the project folder);
- Firms listed as pre-qualified and currently under a subcontract with TestAmerica: A listing of all approved subcontracting laboratories is available on the TestAmerica intranet site.

Supporting documentation is maintained by corporate offices and by the TestAmerica laboratory originally requesting approval of the subcontract lab. Verify necessary accreditation, where applicable, (e.g., on the subcontractors TNI, A2LA accreditation or State Certification).

- Firms identified in accordance with the company's Small Business Subcontracting program as small, women-owned, veteran-owned and/or minority-owned businesses;
- TNI or A2LA accredited laboratories.
- In addition, the firm must hold the appropriate certification to perform the work required.

All TestAmerica laboratories are pre-qualified for work sharing provided they hold the appropriate accreditations, can adhere to the project/program requirements, and the client approved sending samples to that laboratory. 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. (Corporate SOP No. CA-C-S-001, Work Sharing Process).

When the potential sub-contract laboratory has not been previously approved, PMS or CSMs may nominate a laboratory as a subcontractor based on need. The decision to nominate a laboratory must be approved by the Laboratory Director. The Laboratory Director requests that the QA Manager begin the process of approving the subcontract laboratory as outlined in Corporate SOP No. CA-L-S-002, Subcontracting Procedures. 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).

8.2.1 Once the appropriate accreditation and legal information is received by the laboratory, it is evaluated for acceptability (where applicable) and forwarded to Corporate Contracts for formal contracting with the laboratory. They will add the lab to the approved list on the intranet site and notify the finance group for JD Edwards.

8.2.2 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. TestAmerica does not certify laboratories. The subcontractor is on our approved list and can only be recommended to the extent that we would use them.

8.2.3 The status and performance of qualified subcontractors will be monitored periodically by the Corporate Contracts and/or Quality Departments. Any problems identified will be brought to the attention of TestAmerica's Corporate Finance or Corporate Quality personnel.

- 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. The QA Manager will notify all TestAmerica laboratories, Corporate Quality 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 Laboratory Directors, QA Managers and Sales Personnel.

8.3 Oversight and Reporting

The PM must request that the selected subcontractor be presented with a subcontract, if one is not already executed between the laboratory and the subcontractor. The subcontract must include terms which flow down the requirements of our clients, either in the subcontract itself or through the mechanism of work orders relating to individual projects. A standard subcontract and the Lab Subcontractor Vendor Package (posted on the intranet) can be used to accomplish this, and the Legal & Contracts Director can tailor the document or assist with negotiations, if needed. The PM (or CSM) responsible for the project must advise and obtain client consent to the subcontract as appropriate, and provide the scope of work to ensure that the proper requirements are made a part of the subcontract and are made known to the subcontractor.

Prior to sending samples to the subcontracted laboratory, the PM confirms their certification status to determine if it's current and scope-inclusive. The information is stored electronically in the quote folder within the SACSALES share on a local laboratory server. For TestAmerica laboratories, certifications can be viewed on the company's TotalAccess Database.

The Sample Control department is responsible for ensuring compliance with QA requirements and applicable shipping regulations when shipping samples to a subcontracted laboratory.

All subcontracted samples must be accompanied by a TestAmerica Chain of Custody (COC). A copy of the original COC sent by the client must also be included with all samples workshared within TestAmerica. 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 laboratories EDD (i.e., imported), the report must explicitly indicate which lab produced the data for which methods and samples. Results submitted by a network work-sharing laboratory on the same LIMS will be designated in the case narrative.

Note: The results submitted by a TestAmerica work sharing laboratory may be transferred electronically and the results reported by the TestAmerica 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.

8.4 Contingency Planning

The Laboratory Director may waive the full qualification of a subcontractor process temporarily to meet emergency needs; however, this decision & 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 Chain-of-Custody. 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 with TestAmerica at this time. The comprehensive approval process must then be initiated within 30 calendar days of subcontracting.

Figure 8-1.

Example 1 - Subcontracted Sample Form – form

Date/Time: _____

Subcontracted Laboratory Information:

- Subcontractor's Name: _____
- Subcontractor Point of Contact: _____
- Subcontractor's Address: _____
- Subcontractor's Phone: _____
- Analyte/Method: _____
- Certified for State of Origin: _____
- TNI Certified: Yes_____No_____
- **USDA Permit (__Domestic __ Foreign)** **Yes**_____**No**_____
- A2LA (or ISO 17025) Certified: Yes_____No_____
- CLP-like Required: Yes_____No_____
  (Full doc required)
- Requested Sample Due Date: _____
  (Must be put on COC)
- **Client POC Approval on-file to Subcontract Samples to Sub Laboratory:** **Yes**_____**No**_____

Project Manager: _____

Laboratory Sample # Range: _____
(Only of Subcontracted Samples)

Laboratory Project Number (Billing Control #): _____

All subcontracted samples are to be sent via bonded carrier and Priority Overnight. Please attach tracking number below and maintain these records in the project files.

PM Signature_____**Date**_____

Example 1 - Subcontracted Sample Form – Within TestAmerica

TestAmerica	Work Sharing Agreement (Include with every sample shipment)		Exporting Lab	TAL Chicago
			Project Name	
Import Lab Information		Export Lab Information		
Lab Name	TAL Chicago		PM Contact Name	
PM Contact Name			Backup Contact Name	
Backup Contact Name			Agreement Date	
Pricing Information		Project Information		
QA/QC (i.e. MS/MSD) Billable?	No		Client Company Name	
Raw Data Surcharge	%		Date First Samples to Arrive	
EDD Surcharge	%		Est. Duration of Sampling Event	
TAL Surcharges	%			
Penalty Terms	None			
Other Charges Not in Unit Price (e.g. variable level IV, subpoena, setup)	None		Quote or Contract Reference ID	
Project Details				
Non-Standard Work Product	No			
Quality Assurance Plan	No			
List Certifications Required				
Analyte/Compd. List with RLs Attached	No			
Results Dry-Weight Corrected	No			
Special Method Holding Times	None			
Internal Chain of Custody Required	No			
Known Hazards/High Analyte Level	No			
Saturday/Special Delivery Options	None			
Special Instructions	None			
Reporting Limit Value Convention	Report to MDL with "U" Values up to	"Non-Detect" Presentation Convention		U

Deliverable Requirements		Transmittal Medium	Format Code	Date Due to Export Lab
Preliminary Report	No			
Final Report	No			
EDD	No		Type Format Name	
Total Access Reporting	No	N/A	N/A	
Custom Forms	No	N/A	Type Format Name	
"Other" Deliverable Definitions or Notes				

Import and Export Lab Agreement

Import lab must acknowledge receipt of Agreement and samples via E-Mail

Analyte	Method	Matrix	# of Samples	Import Lab's Unit Price	Unit Price w/Surcharges	Extended Price
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					$ -	$ -
					Approximate Total Project Value	$ -

Work Instruction No. CA-WI-010/B-10/08

SECTION 9. PURCHASING SERVICES AND SUPPLIES

9.1 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 made in accordance with TestAmerica's Corporate Controlled Purchases Procedure, SOP No. CW-F-S-007.

Contracts will be signed in accordance with TestAmerica's Corporate Authorization Matrix Policy, Policy No. CW-F-P-002. Request for Proposals (RFP's) will be issued where more information is required from the potential vendors than just price. Process details are available in TestAmerica's Corporate Procurement and Contracts Policy (Policy No. CW-F-P-004). RFP's allow TestAmerica to determine if a vendor is capable of meeting requirements such as supplying all of the TestAmerica 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.

9.2 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.

9.3 Reagents, Standards & Supplies

Purchasing guidelines for equipment 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 TestAmerica's Corporate SOP on Solvent & Acid Lot Testing & Approval, SOP No. CA-Q-S-001.

9.3.1 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 the on-site consignment system.

For items not available from the consignment system, or items that are not used routinely, an order in placed in the JDE ordering system. Only personnel trained in the ordering program JDE may place orders using the program. All relevant information, including quantity, must be entered. Only approved vendors may be used. A vendor must be approved by corporate to be

on the approved vendor list in JDE. The Laboratory Director or designee approves all orders placed in JDE.

9.3.2 Receiving

It is the responsibility of the purchasing manager to receive the shipment. It is the responsibility of the analyst who ordered the materials to document the date materials here 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. Material Safety Data Sheets (MSDSs) 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.

9.3.3 Specifications

Methods in use 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 unless noted otherwise by the manufacturer or by the reference source method. Chemicals should not be used past the manufacturer's or SOP's expiration date unless 'verified'. See laboratory SOP No. WS-QA-0017, "Standards and Reagent Preparation and Quality Control Check Procedures", for standard verification procedures.)

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 every other day. For single tanks in use at the bench, the minimum total pressure must be 500 psig or the tank must be replaced. To prevent a tank from going to dryness, close observation of the tank gauge must take place as pressure decreases towards 500 psig, or the tank must be replaced. For the automated "tank farm" in use through most of the laboratory, the minimum total pressure at which the system switches to the next bank of tanks is 250 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 standards or reagents must have a specific conductivity of less than 1- µmho/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 bottleware used for sampling must be certified clean and the certificates must be maintained. If uncertified sampling bottleware is purchased, all lots must be verified clean prior to use. This verification must be maintained.

Records of manufacturer's certification and traceability statements are maintained in files or binders in each laboratory section. Certificates of analysis are also scanned and stored electronically. These records include date of receipt, lot number (when applicable), and expiration date (when applicable).

9.3.4 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 Corporate Environmental Health & Safety Manual (Corp. Doc. No. CW-E-M-001) and method SOPs or manufacturer instructions.

9.4 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/Director and/or the Laboratory Director. If they agree with the request, the procedures outlined in TestAmerica's Corporate Policy No. CA-T-P-001, Qualified Products List, are followed. 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 19). 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.

9.5 Services

Service to analytical instruments (except analytical balances) is performed on an as needed basis. Routine preventative maintenance is discussed in Section 20. 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.

9.6 Suppliers

TestAmerica selects vendors through a competitive proposal / bid process, strategic business alliances or negotiated vendor partnerships (contracts). This process is defined in the Corporate Finance documents on Vendor Selection (SOP No. CW-F-S-018) and Procurement & Contracts Policy (Policy No. CW-F-P-004). The level of control used in the selection process is dependent on the anticipated spending amount and the potential impact on TestAmerica 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 JD Edwards 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 Corporate Purchasing Group by completing a Vendor Performance Report.

The Corporate 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.

As deemed appropriate, the Vendor Performance Reports will be summarized and reviewed 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 JD Edwards purchasing system.

9.6.1 New Vendor Procedure

TestAmerica employees who wish to request the addition of a new vendor must complete a J.D. Edwards 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 TestAmerica employees that would make it prohibitive to do business with them as well as their financial stability. The QA Department and/or the Technology Director are consulted with vendor and product selection that have an impact on quality.

SECTION 10. COMPLAINTS

10.1 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 12 (Corrective Actions) and is documented following laboratory policy WS-PQA-013, Procedure to Address Customer Complaints.

10.2 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
- 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.

10.3 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 12. In addition, Corporate Management, Sales and Marketing and IT may initiate a complaint by contacting the laboratory or through the corrective action system described in Section 12.

10.4 Management Review

The number and nature of client complaints is reported by the QA Manager to the laboratory and QA 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 Review (Section 16).

SECTION 11. CONTROL OF NON-CONFORMING WORK

11.1 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 12).

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 Director 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 laboratories corrective action system described in Section 12. 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 19. 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 Director 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.

11.2 Responsibilities and Authorities

TestAmerica's Corporate SOP entitled *Internal Investigation of Potential Data Discrepancies and Determination for Data Recall* (SOP No. CW-L-S-002) outlines the general procedures for the reporting and investigation of data discrepancies and alleged incidents of misconduct or violations of TestAmerica's data integrity policies as well as the policies and procedures related to the determination of the potential need to recall data.

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 Ethics and Compliance Officer (ECO), Director of Quality & Client Advocacy 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, Corporate Quality, the COO, General Managers 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.

11.3 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.

TestAmerica's Corporate Data Investigation & Recall Procedure (SOP No. CW-L-S-002) distinguishes between situations when it would be appropriate for laboratory management to make the decision on the need for client notification (written or verbal) and data recall (report revision) and when the decision must be made with the assistance of the ECO's and Corporate Management. 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 TestAmerica's Corporate SOP No. CW-L-S-002.

11.4 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, (or add the lab's schedule; i.e., monthly, weekly) 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.

11.5 Method Suspension / Restriction (Stop Work Procedures)

In some cases, it may be necessary to suspend/restrict the use of a method or target compound which constitutes significant risk and/or liability to the laboratory. Suspension/restriction procedures can be initiated by any of the persons noted in Section 11.2, Paragraph 5.

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 12 if one has not already been started. A copy of any meeting notes and agreed upon steps should be faxed or e-mailed by the laboratory to the appropriate General Manager and member of Corporate QA. This fax/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 (Laboratory Director, Technical Manager/Director, 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. This approval is given by final signature on the completed corrective action report.

SECTION 12. CORRECTIVE ACTION

12.1 Overview

A major component of TestAmerica's Quality Assurance (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. Corrective actions are documented using Non-Conformance Memos (NCM) and Corrective Action Reports (CAR) (refer to Figure 12-1).

12.2 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(s) 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.

12.2.1 Non-Conformance Memo (NCM) - is used to document the following types of corrective actions:

- Deviations from an established procedure or SOP
- QC outside of limits (non-matrix related)
- Isolated reporting / calculation errors
- Client complaints
- Discrepancies in materials / goods received vs. manufacturer packing slips.

12.2.2 Corrective Action Report (CAR) - is used to document the following types of corrective actions:

- Questionable trends that are found in the review of NCMs.
- Issues found while reviewing NCMs that warrant further investigation.
- Internal and external audit findings.
- Failed or unacceptable PT results.
- Corrective actions that cross multiple departments in the laboratory.
- Systematic reporting / calculation errors
- Client complaints

- Data recall investigations
- Identified poor process or method performance trends
- Excessive revised reports
- Health and Safety violations

This will provide background documentation to enable root cause analysis and preventive action.

12.3 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.

12.3.1 Cause Analysis

- Upon discovery of a non-conformance event, the event must be defined and documented. An NCM or CAR must be initiated, someone is assigned to investigate the issue and the event is investigated for cause. Laboratory SOP No. WS-QA-0023, Nonconformance and Corrective Action System, 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.

12.3.2 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 NCM or CAR is used for this documentation.

12.3.3 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.

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 5 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.

12.3.4 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.
- Each NCM and CAR is entered into a database for tracking purposes and are periodically reviewed to ensure that the corrective actions have taken effect.
- The QA Manager reviews monthly NCMs and CARs for trends. Highlights are included in the QA monthly report (refer to Section 16). 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 Corporate Quality Director by the QA Manager, indicating the nature of the out-of-control situation and problems encountered in solving the situation.

12.3.5 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 15.1.4, Special Audits.)

12.4 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 11). The documentation of these procedures is through the use of an NCM or CAR.

Laboratory SOP No. WS-QA-0023, "Nonconformance and Corrective Action System" 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.

Laboratory SOP No. WS-QA-0023, "Nonconformance and Corrective Action System" provides some general guidelines for identifying the individual(s) responsible for assessing each QC type and initiating corrective action. The SOP 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, QAM 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 Project Manager is notified by an NCM and appropriate corrective action (e.g., reanalysis) is taken and documented.

12.5 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.

Figure 12-1.
Example - Corrective Action Report

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento
Corrective Action Report

Title: <Enter Title Here>

Reference: <tracking information>

Initiated by: Date:

Responsible Party: Date: <date report submitted>

Description of Problem:
[enter text to briefly explain how the problem was discovered, who discovered it and when, and what work, if any, is affected]

Investigation Planned or Completed:
[enter text to briefly what was examined to determine the extent of the problem, when the investigation was conducted, what was the proximate cause(s), and what were the root causes The key is to demonstrate that the investigation is comprehensive]

Root Cause Analysis
[True root cause analysis should involve multiple layers of questioning]
Examples:
- *Why did this problem occur?*
- *What weaknesses are indicated by this problem?*
- *What Quality Systems mechanisms are in place that should have prevented this problem from occurring?*
- *Is this issue acute or chronic?*
- *Are changes needed to existing SOPs to correct this problem and prevent its recurrence?*
- *Are other departments affected by this issue?*

Corrective Action Plan
[Based on the Root Cause Analysis outlined above, what action items need to be completed to correct this deficiency, and prevent its recurrence?]
Examples:
- *Identify impacted lots*
- *Revise results/reports*
- *Initiate formal Data Recall*
- *Revise SOP*
- *Re-train staff*

QA Monitoring of Corrective Action Status
[If an anomalous or isolated event, and no further action required, this section may be omitted. Otherwise, note the need for a routine follow-up assessment and the associated details (responsible party, due date, documentation necessary), or the need to add to the internal audit checklist for reassessment at a later date.

Closed by: _____ _____
Douglas Weir, QA Manager Date

Table 12-1. 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.
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.

QC Activity *(Individual Responsible for Initiation/Assessment)*	Acceptance Criteria	Recommended Corrective Action
Laboratory Control Sample (LCS) *(Analyst, Data Reviewer)*	- % Recovery within limits documented 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.
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.

QC Activity ***(Individual Responsible for Initiation/Assessment)***	**Acceptance Criteria**	**Recommended Corrective Action**
Reporting / Calculation Errors (Depends on issue – possible individuals include: Analysts, Data Reviewers, Project Managers, Technical Managers, QA Manager, Corporate QA, Corporate Management)	- SOP CW-L-S-002, Internal Investigation of Potential Data Discrepancies and Determination for Data Recall.	- Corrective action is determined by type of error. Follow the procedures in SOP CW-L-S-002.
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).
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 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 in 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

SECTION 13. PREVENTIVE ACTION / IMPROVEMENT

13.1 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 Quality Program. It is beneficial to identify and address negative trends before they develop into complaints, problems and corrective actions. Additionally, customer service and client satisfaction can be improved through continuous improvements to laboratory systems.

Opportunities for improvement may be discovered during management reviews, the monthly QA Metrics Report, evaluation of internal or external audits, results & evaluation of proficiency testing (PT) performance, data analysis & review processing operations, client complaints, staff observation, etc..

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.. 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.

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 provides a valuable mechanism for identifying preventive action opportunities.

13.1.1 The following elements are part of a preventive action system:

- Identification of an opportunity for preventive action.
- Process for the preventive action.
- Define the measurements of the effectiveness of the process once undertaken.
- Execution of the preventive action.
- Evaluation of the plan using the defined measurements.
- Verification of the effectiveness of the preventive action.
- Close-Out by documenting any permanent changes to the Quality System as a result of the Preventive Action. Documentation of Preventive Action is incorporated into the monthly QA reports, corrective action process and management review.

13.1.2 Any Preventive Actions 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.

13.2 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.

SECTION 14. 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.

14.1 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 14-1. Quality records are maintained by the QA department in a database or in specific folders on the QA share on the local 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 14-1. Record Index[1]

	Record Types [1]:	Retention Time:
Technical Records	- Raw Data - Logbooks[2] - 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	5 Years from document retirement date*
QA Records	- Internal & External Audits/Responses - Certifications - Corrective/Preventive Actions - Management Reviews - Method & Software Validation / Verification Data - Data Investigation	5 Years from archival* **Data Investigation:** 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 Documentation - Contracts and Amendments - Correspondence - QAPP - SAP - Telephone Logbooks - Lab Reports	5 Years from analytical report issue*

	Record Types [1]:	Retention Time:
Administrative Records	Finance and Accounting	10 years
	EH&S Manual, Permits	7 years
	Disposal Records (Add Permits?)	Indefinitely
	Employee Handbook	Indefinitely
	Personnel files, Employee Signature & Initials, Administrative Training Records (e.g., Ethics)	7 Years (HR Personnel Files must be maintained indefinitely)
	Administrative Policies Technical Training Records	7 years

[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 14-2.

14.1.1 All records are stored and retained in such a way that they are secure and readily retrievable at the laboratory facility or the Iron Mountain data storage 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. Records archived off-site are stored in a secure location where a record is maintained of any entry into the storage facility. Whether on-site or off-site storage is used, logs are maintained in each storage box to note removal and return of records. Records before 09/09/2009 were maintained on-site at the laboratory for at least 1 month after their generation and moved offsite for the remainder of the required storage time. Records generated after 09/09/2009 are maintained on-site at the laboratory for at least 1 month after their generation and then scanned into PDF files. The electronic files are stored on-site and backed up daily offsite. 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 Controlled 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 14-2 have lengthier retention requirements and are subject to the requirements in Section 14.1.3.

14.1.2 Programs with Longer Retention Requirements

Some regulatory programs have longer record retention requirements than the standard record retention time. These are detailed in Table 14-2 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 14-2. Example: Special Record Retention Requirements

Program	[1]Retention Requirement
Drinking Water – All States	5 years (project records) 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
NY Potable Water NYCRR Part 55-2	10 years
Ohio VAP	10 years and State contacted prior to disposal
TSCA - 40 CFR Part 792	10 years after publication of final test rule or negotiated test agreement

[1]Note: Extended retention requirements must be noted with the archive documents or addressed in facility-specific records retention procedures.

14.1.3 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 19.14.1 and WS-PQA-017 for more information.

14.1.4 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 (Records stored off site should be accessible within 2 days of a request for such records). 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. 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 by project, except for inorganics and calibration data. Inorganics and calibration data is stored sequentially by instrument as appropriate. 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 the 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 19.14.1 'Computer and Electronic Data Related Requirements'.

14.2 Technical and Analytical Records

14.2.1 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.

14.2.2 Observations, data and calculations are recorded real-time and are identifiable to the specific task.

14.2.3 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, on a benchsheet or in the LIMS.

- 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 the LIMS and on specific analytical report formats.

14.3 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

14.3.1 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.

14.4 Administrative Records

The laboratory also maintains the administrative records in either electronic or hard copy form. Refer to Table 14-1.

14.5 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 a logbook or using the Veritas Electronic Standards Logbook. Records are considered archived when noted as such in the records management system (a.k.a., document control.)

14.5.1 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 corporate headquarters. 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.

14.5.2 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 14-1 and 14-2).

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.

SECTION 15. AUDITS

15.1 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 corporate management.

Audits are conducted and documented as described in the TestAmerica Corporate SOP on performing Internal Auditing, SOP No. CA-Q-S-004. The types and frequency of routine internal audits are described in Table 15-1. Special or ad hoc assessments may be conducted as needed under the direction of the QA staff.

Table 15-1. Types of Internal Audits and Frequency

Description	Performed by	Frequency
Quality Systems Audits	QA Department, QA approved designee, or Corporate QA	All areas of the laboratory annually
Method Audits	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to CA-Q-S-004)	Methods Audits Frequency: 100% of methods annually (DoD Labs)
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

15.1.1 Annual Quality Systems Audit

An annual quality systems audit is required to ensure compliance to analytical methods and SOPs, TestAmerica's Data Integrity and Ethics Policies, 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.

15.1.2 QA Technical Audits

QA technical 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., MintMiner and 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.

15.1.3 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. 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.

15.1.4 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.

15.1.5 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, Air, and round-robin studies for sediments and biological materials.

It is TestAmerica's 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 responses to 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.

15.2 External Audits

External audits are performed when certifying agencies or clients conduct on-site inspections or submit performance testing samples for analysis. It is TestAmerica's 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 for any deficiencies discovered during an external audit. Audit responses are due in the time allotted by the client or agency performing the audit. When requested, a copy of the audit report and the labs corrective action plan will be forwarded to Corporate Quality.

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.

15.2.1 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 in within the 2009 TNI standards.

15.3 Audit Findings

Audit findings are documented using the corrective action process and database. The laboratory's corrective action responses for both types of audits 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. When requested, a copy of the audit report and the labs corrective action plan will be forwarded to Corporate Quality.

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.

SECTION 16. MANAGEMENT REVIEWS

16.1 Quality Assurance Report

A comprehensive QA Report shall be prepared each month by the laboratory's QA Department and forwarded to the Laboratory Director, Technical Managers, their Quality Director as well as the General Manager. All aspects of the QA system are reviewed to evaluate the suitability of policies and procedures. During the course of the year, the Laboratory Director, General Manager or Corporate QA may request that additional information be added to the report.

On a monthly basis, Corporate QA compiles information from all the monthly laboratory reports. The Corporate Quality Directors prepare a report that includes a compilation of all metrics and notable information and concerns regarding the QA programs within the laboratories. The report also includes a listing of new regulations that may potentially impact the laboratories. This report is presented to the Senior Management Team and General Managers.

16.2 Annual Management Review

The senior lab management team (Laboratory Director, Technical Managers, QA Manager) conducts a review annually of its quality systems and LIMS 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. Corporate Operations and Corporate QA personnel is 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 the LIMS. The laboratory will summarize any critical findings that can not be solved by the lab and report them to Corporate IT.

This management systems review (Corporate SOP No. CA-Q-S-008 & Work Instruction No. CA-Q-WI-020) 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:
    - Adequacy of staff, equipment and facility resources.
    - Adequacy of policies and procedures.
    - 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.

A report is generated by the QA Manager and management. The report is distributed to the appropriate General Manager and the Quality Director. 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.

16.3 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. TestAmerica's Corporate Data Investigation/Recall SOP shall be followed (SOP No. CW-L-S-002). 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.

TestAmerica's COO, VP of Client & Technical Services, General Managers and Quality Directors receive a monthly report from the Director of Quality & Client Advocacy summarizing any current data integrity or data recall investigations. The General Manager's are also made aware of progress on these issues for their specific labs.

SECTION 17. PERSONNEL

17.1 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 as outlined in the organization chart in Figure 4-1.

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.

17.2 Education and Experience Requirements for Technical Personnel

The laboratory makes every effort to hire analytical staffs that possess a college degree (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 TestAmerica employees are outlined in job descriptions and are generally summarized for analytical staff in the table below.

The laboratory maintains job descriptions for all personnel who manage, perform or verify work affecting the quality of the environmental testing the laboratory performs. Job Descriptions are located on the TestAmerica intranet site's Human Resources web-page (Also see Section 4 for position descriptions/responsibilities).

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, Conductivity, etc.), or Titrimetric and Gravimetric Analyses	H.S. Diploma	On the job training (OJT)
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, 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 – **General**	Bachelors Degree in an applied science or engineering with 24 semester hours in chemistry An advanced (MS, PhD.) degree may substitute for one year of experience	And 2 years experience in environmental analysis of representative analytes for which they will oversee
Technical Managers – **Wet Chem** only (no advanced instrumentation)	Associates degree in an applied science or engineering or 2 years of college with 16 semester hours in chemistry	And 2 years relevant experience

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.

17.3 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	90 days of hire	All
Data Integrity	30 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 are maintained in their training file.
- 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 & records; benefit programs; timekeeping/payroll; and employee conduct (e.g., ethics). 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.
- Analysts 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, Employee Orientation and Training).

17.4 Data Integrity and Ethics Training Program

Establishing and maintaining a high ethical standard is an important element of a Quality System. Ethics and data integrity training is integral to the success of TestAmerica and is provided for each employee at TestAmerica. It is a formal part of the initial employee orientation within 1 week of hire followed by technical data integrity training within 30 days, comprehensive training within 90 days, and an annual refresher for all employees. Senior management at each facility performs the ethics training for their staff.

In order to ensure that all personnel understand the importance TestAmerica places on maintaining high ethical standards at all times; TestAmerica has established a Corporate Ethics Policy (Policy No. CW-L-P-004) and an Ethics Statement. All initial and annual training is documented by signature on the signed Ethics Statement demonstrating that the employee has participated in the training and understands their obligations related to ethical behavior and data integrity.

Violations of this Ethics Policy will not be tolerated. Employees who violate this policy will be subject to disciplinary actions up to and including termination. Criminal violations may also be referred to the Government for prosecution. In addition, such actions could jeopardize TestAmerica's ability to do work on Government contracts, and for that reason, TestAmerica has a Zero Tolerance approach to such violations.

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.

Additionally, a data integrity hotline (1-800-736-9407) is maintained by TestAmerica and administered by the Corporate Quality Department.

SECTION 18. ACCOMMODATIONS AND ENVIRONMENTAL CONDITIONS

18.1 Overview

The laboratory is a 66,000 ft^2 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.

18.2 Environment

Laboratory accommodation, test areas, energy sources, 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 back up power supply for sample storage, as detailed in SOP No. WS-QA-0005, Temperature Monitoring and Corrective Action for Refrigerators and Freezers.

When any of the method or regulatory required environmental conditions change 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.

18.3 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.

18.4 Floor Plan

A floor plan can be found in Appendix 1.

18.5 Building Security

Building keys and alarm codes are distributed to employees as necessary.

Employees wear photographic identification name cards 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. In addition to signing into the laboratory, the Environmental, Health and Safety Manual contains requirements for visitors and vendors. There are specific safety forms that must be reviewed and signed. 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.

SECTION 19. 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 TestAmerica's Corporate SOP entitled 'Writing a Standard Operating Procedure', No. CW-Q-S-002 or 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 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 Project Manager. 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.

The analytical methods used by the laboratory are those currently accepted and approved by the U. S. EPA and the state or territory from which the samples were collected. Reference methods include:

- *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, and Appendix A-C; 40 CFR Part 136, USEPA Office of Water. Revised as of July 1, 1995. Appendix A to Part 136 - Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (EPA 600 Series)*
- *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*
- *NIOSH Manual of Analytical Methods, 4th ed., August 1994.*
- *Statement of Work for Inorganics & Organics Analysis, SOM, DLM, CBC, 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.*
- *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*
- *Underground Storage Tanks Procedures Manual, State of Alaska Department of Environmental Conservation, Division of Spill Prevention and Response Contaminated Sites Program, November 7, 2002*
- *Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Tank Sites, North Coast Regional Water Quality Control Board, San Francisco Bay Regional Water Quality Control Board and Central Valley Regional Water Quality Control Board, August 10, 1990*
- *Analytical Methods for Petroleum Hydrocarbons, Washington State Department of Ecology, June 1997*
- *Compendium of Methods for the Determination of Air Pollutants in Indoor Air, (EPA 600/4-90-10, April 1990)*
- *Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air, (EPA 625/R-96/010a, June 1999*
- *Methods for Determining Emissions of Toxic Air Contaminants from Stationary Sources, Stationary Source Test Methods, Volume 3, California Air Resources Board*

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.

19.4.2 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), method or personnel (e.g., analyst hasn't performed the test within the last 12 months).

The initial demonstration of capability must be thoroughly documented and approved by the Technical Director and QA Manager prior to independently analyzing client samples. All associated documentation must be retained in accordance with the laboratories 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 (i.e., 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.

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.

A certification statement (refer to Figure 19-1 as an example) shall be used to document the completion of each initial demonstration of capability. A copy of the certification is archived in the analyst's training folder.

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.

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. Where estimations and/or demonstrations of sensitivity are required by regulation or client agreement, such as the procedure in 40 CFR Part 136 Appendix B, under the Clean Water Act, these shall be followed.

19.6.1.3 Relationship of Limit of Detection (LOD) to the Quantitation Limit (QL)

An important characteristic of expression of sensitivity is the difference in the LOD and the QL. The LOD is the minimum level at which the presence of an analyte can be reliably concluded. The QL is the minimum concentration of analyte that can be quantitatively determined with acceptable precision and bias. 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 QL. 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 QL, 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 Limits (MDL) / Limits of Detection (LOD)

Method detection limits (MDL) are initially determined in accordance with 40 CFR Part 136, Appendix B or alternatively by other technically acceptable practices that have been accepted by regulators. MDL is also sometimes referred to as Limit of Detection (LOD). The MDL theoretically represents the concentration level for each analyte within a method at which the Analyst is 99% confident that the true value is not zero. The MDL is determined for each analyte initially during the method validation process and updated as required in the analytical methods, whenever there is a significant change in the procedure or equipment, or based on project specific requirements. Generally, the analyst prepares at least seven replicates of solution spiked at one to five times the estimated method detection limit (most often at the lowest standard in the calibration curve) into the applicable matrix with all the analytes of interest. Each of these aliquots is extracted (including any applicable clean-up procedures) and analyzed in the same manner as the samples. Where possible, the seven replicates should be analyzed over 2-4 days to provide a more realistic MDL.

Alternatively, the MDL may be determined using a series (ideally 50-100) of method blanks for "uncensored" methods which always return a signal (i.e., ICP).

Refer to the Corporate SOP No. CA-Q-S-006 or the laboratory's SOP No. WS-QA-0006 for details on the laboratory's MDL process.

19.8 Instrument Detection Limits (IDL)

The IDL is sometimes used to assess the reasonableness of the MDLs or in some cases required by the analytical method or program requirements. IDLs are most 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.

If IDL is > than the MDL, it may be used as the reported MDL.

19.9 Verification of Detection and Reporting Limits

Once an MDL is established, it must be verified, on each instrument, by analyzing a quality control sample (prepared as a sample) at no more than 3 times the calculated MDL for single analyte analyses (e.g. most wet chemistry methods, Atomic Absorption, etc.) and no more than 4 times the calculated MDL for multiple analyte methods (e.g. GC, GCMS, ICP, etc.). The analytes must be qualitatively identified. This verification does not apply to methods that are not readily spiked (e.g. pH, turbidity, etc.) or where the lab does not report to the MDL. The analytes must be qualitatively identified or see SOP No. WS-QA-0006 for other options. If the MDL does not verify, then the lab will not report to the MDL, or redevelop their MDL or use the level where qualitative identification is established. MDLs must be verified at least annually.

For DoD ELAP certified methods: Once the MDL is determined, it must be verified on each instrument used for the given method. TestAmerica defines the DoD QSM Detection Limit (DL) as being equal to the MDL. TestAmerica also defines the DoD QSM Limit of Detection (LOD) as being equal to the lowest concentration standard that successfully verifies the MDL, also referred to as the MDLV standard. MDL and MDLV standards are extracted/digested and analyzed through the entire analytical process. The MDL and MDLV determinations do not apply to methods that are not readily spiked (e.g. pH, turbidity, etc.) or where the lab does not report to the MDL. If the MDLV standard is not successful, then the laboratory will redevelop their MDL or perform and pass two consecutive MDLVs at a higher concentration and set the LOD at the higher concentration. Initial and quarterly verification is required for all methods listed in the laboratory's DoD ELAP Scope of Accreditation. Refer to the laboratory SOP WS-QA-0006, Method Detection Limits (MDL) and Instrument Detection Limits (IDL) for further details.

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 and annually thereafter. The annual requirement is waved for methods that have an annually verified MDL. The laboratory will comply with any regulatory requirements.

For DoD ELAP certified methods: The laboratory quantitation limit is equivalent to the DoD Limit of Quantitation (LOQ), which is at a concentration equal to or greater than the lowest non-zero calibration standard. The DoD QSM requires the laboratory to perform an initial characterization of the bias and precision at the LOQ and quarterly LOQ verifications thereafter. If the quarterly verification results are not consistent with three-standard deviation confidence limits established initially, then the bias and precision will be reevaluated and clients contacted for any on-going projects. For DoD projects, TestAmerica makes a distinction between the

Reporting Limit (RL) and the LOQ. The RL is a level at or above the LOQ that is used for specific project reporting purposes, as agreed to between the laboratory and the client. The RL cannot be lower than the LOQ concentration, but may be higher.

19.10 Retention Time Windows

Most organic analyses and some inorganic analyses use chromatography techniques for qualitative and quantitative determinations. For every chromatography analysis or as specific 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 with the files associated with an instrument for later quantitation of the analytes. Complete details are available in the laboratory SOPs.

19.11 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.

19.12 Estimation of Uncertainty of Measurement

19.12.1 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": 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.

19.12.2 Uncertainty is not error. Error is a single value, 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.

19.12.3 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.

19.12.4 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. As an example, for a reported result of 1.0 mg/L with an LCS recovery range of 50 to 150%, the estimated uncertainty in the result would be 1.0 +/- 0.5 mg/L.

19.12.5 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.

19.13 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 ≤ 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 Department Manager *or* Laboratory Director if unsure.

19.14 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.

19.14.1 Computer and Electronic Data Related Requirements

The three basic objectives of our computer security procedures and policies are shown below. More detail is outlined in SOP Nos. S-ITQ-005, "QuantIMS/JDE user Profile Setup and Maintenance", and S-ITQ-007, "Software Testing, Validation and Verification." The laboratory is currently running QuantIms which is a custom in-house developed LIMS system that has been highly customized to meet the needs of the laboratory. It is referred to as LIMS for the remainder of this section. The LIMS utilizes DB2 which is an industry standard relational database platform. It is referred to as Database for the remainder of this section.

19.14.1.1 **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, 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.

19.14.1.2 **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.

19.14.1.3 **Maintain Confidentiality:** Ensure data confidentiality through physical access controls such as password protection or website access approval when electronically transmitting data.

19.14.2 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 in accordance with the TestAmerica Corporate SOP No. CA-Q-S-002, *Acceptable Manual Integration Practices* and WS-PQA-011, Manual Integration Documentation Procedures.

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.

19.14.2.1 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.

19.14.2.2 In general, concentration results are reported in milligrams per liter (mg/L) or micrograms per liter (µg/L) for liquids and milligrams per kilogram (mg/kg) or micrograms per kilogram (µg/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.

19.14.2.3 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.

19.14.2.4 For those methods that do not have an instrument printout or an instrumental output compatible with the LIMS System, 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 defined significant figure criterion for each analyte.

19.14.2.5 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 the 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 prints a copy of what has been entered to check for errors. This printout and the instrument's printout of calibrations, concentrations, retention times, chromatograms, and mass spectra, if applicable, are retained with the data file. The data file is stored in a monthly folder on the instrument computer; periodically, this file is transferred to the server and, eventually, to a tape file.

19.14.3 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 12.
- 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 Director/QA Manager at the facility. The QA Manager controls all worksheets following the procedures in Section 6.

19.14.4 Review / Verification Procedures

Review procedures are out lined in several SOPs (WS-PQA-003, "Quality Control Program", WS-PQA-012, "Technical Data Review Requirements", WS-PM-0004, "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-0011, "Manual Integration Documentation and Practices"). The general review concepts are discussed below, more specific information can be found in the SOPs.

19.14.4.1 The data review process at the laboratory starts at the Sample Control level. Sample Control personnel review chain-of-custody forms and input the sample information and required analyses into a computer LIMS. The Sample Control Supervisor reviews the transaction of the chain-of-custody forms and the inputted information. The Project Managers perform final review of the chain-of-custody forms and inputted information.

19.14.4.2 The next level of data review occurs with the Analysts. As results are generated, analysts review their work to ensure that the results generated meet QC requirements and relevant EPA methodologies. The Analysts transfer the data into the LIMS and add data qualifiers if applicable. To ensure data compliance, a different analyst performs a second level of review. Second level review is accomplished by checking reported results against raw data and evaluating the results for accuracy. During the second level review, blank runs, QA/QC check results, initial and continuing calibration results, laboratory control samples, sample data, qualifiers and spike information are evaluated. Where calibration is not required on a daily basis, secondary review of the initial calibration results may be conducted at the time of calibration. One hundred percent of all sample data from manual methods and from automated methods, all GC/MS spectra and all manual integrations are reviewed. Manual integrations are also electronically reviewed utilizing auditing software to help ensure compliance to ethics and manual integration policies. 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

19.14.4.3 Unacceptable analytical results may require reanalysis of the samples. Any problems are brought to the attention of the Laboratory Director, Project Manager, Quality Assurance Director/Manager, Technical Manager, or Supervisor for further investigation. Corrective action is initiated whenever necessary.

19.14.4.4 The results are then entered or directly transferred into the computer database and a hard copy (or .pdf) is printed for the client.

19.14.4.5 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 chemical relationships are evaluated, COC is followed, cover letters/ narratives are present, flags are appropriate, and project specific requirements are met.

19.14.4.6 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.

19.14.4.7 A visual summary of the flow of samples and information through the laboratory, as well as data review and validation, is presented in Figure 19-2.

<u>Manual Integrations</u>

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 TestAmerica's Corporate SOP (CA-Q-S-002) as the guideline for our internal SOP No. WS-PQA-0011, entitled "Manual Integration Documentation and Practices.

19.14.4.8 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 and common sense to determine when manual integrating is required. Analysts are encouraged to ask for assistance from a senior analyst or manager when in doubt.

19.14.4.9 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 principals and policy and is grounds for immediate termination.

19.14.4.10 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.

19.14.4.11 All manual integrations receive a second level review. Manual integrations must be indicated on an expanded scale "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.) unless the laboratory has another documented corporate approved procedure in place that can demonstrate an active process for detection and deterrence of improper integration practices.

Figure 19-1. Example - Demonstration of Capability Documentation

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Demonstration of Capability Certification Statement

TestAmerica West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
(916) 373-5600

Date: 28 June 2011
Method: 1613B
Matrix: Aqueous
SOP: WS-ID 0007 rev. 3.6

Analyst(s): M. GRANDFIELD

We, the undersigned, CERTIFY that:

1: The analyst(s) identified above, using the cited test method, with the specifications in the cited SOP, which is in use at the facility for the analysis of samples under the TestAmerica West Sacramento Quality Assurance Manual, has met the Demonstration of Capability.

2: The test method was performed by the analyst(s) identified on this certification following the TestAmerica West Sacramento SOP.

3: A copy of the laboratory-specific SOP is available for all personnel on-site.

4: The data associated with the demonstration of capability are true, accurate, complete and self-explanatory (*). These data are attached to this certification statement.

5: All raw data (including a copy of this certificaton form) necessary to reconstruct and validate these analyses have been retained at the facility, and that the associated information is well organized and available for review by authorized inspectors.

Comments/ Observations: Prep Chemists: B. GINN, M. LOERA.

Karla Buechler Technical Director	Technical Director Signature	7/15/11 Date
Douglas Weir QA Manager	QA Manager Signature	07/15/11 Date

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TestAmerica

West Sacramento
Method Proficiency Demonstration (MPD)

Note: Both Amount and Percent Recovery are calculated based on the amount recovered, not the calculated concentration.
RSDs are calculated based on the amount recovered, not the calculated concentration.

Date Completed:	6-Jun-11	Prep Analyst	
Method ID	1613B	Analytical Analyst: Mark Sprecklelt	
Method Description	1613B	SOP (Include revision #):	WS-ICP-0007 Rev. 1.3, WS-ID-0007 Rev. 3.5
Prep Method	Soxhlet		

Analyte	Spike pg/L	Amount Recovered LCS 1 pg/L	LCS 2 pg/L	LCS 3 pg/L	LCS 4 pg/L	Percent Recovery LCS 1 %	LCS 2 %	LCS 3 %	LCS 4 %	AVE %	AVE pg/L	RSD %	Control Limits Lower	Upper	RSD
2,3,7,8-TCDF	200.000	234.215	200.470	215.280	194.810	117	100	107	97	107	214.954	7.0	75	138	50
2,3,7,8-TCDD	200.000	218.000	211.573	214.000	188.000	110	106	107	94	104	210.018	8.0	67	158	50
1,2,3,7,8-PeCDF	1000.000	1087.254	978.357	1077.424	1117.421	109	98	108	112	106	1064.129	5.4	80	134	50
2,3,4,7,8-PeCDF	1000.000	1020.476	1000.000	1064.204	1084.276	102	100	106	108	104	1044.164	4.0	68	130	50
1,2,3,7,8-PeCDD	1000.000	1089.441	1008.994	994.696	1105.304	109	101	99	111	104	1061.258	10.1	70	142	50
1,2,3,4,7,8-HxCDF	1000.000	1104.400	1082.117	1073.450	1084.160	110	108	107	108	107	1072.032	3.1	72	134	50
1,2,3,6,7,8-HxCDF	1000.000	1120.142	1087.208	989.011	1069.491	112	109	99	107	106	1067.338	5.1	84	130	50
2,3,4,6,7,8-HxCDF	1000.000	1116.312	1075.007	1001.690	1066.319	112	107	100	106	106	1064.266	5.2	70	156	50
1,2,3,7,8,9-HxCDF	1000.000	1150.000	1034.101	1003.556	1097.010	115	103	101	109	107	1073.921	5.5	78	142	50
1,2,3,4,7,8-HxCDD	1000.000	908.507	1081.704	989.660	1002.725	91	108	99	100	99	993.608	7.7	70	164	50
1,2,3,6,7,8-HxCDD	1000.000	1173.043	1072.800	1081.908	1111.672	118	107	108	111	110	1109.718	3.1	78	136	50
1,2,3,7,8,9-HxCDD	1000.000	1049.111	1100.192	979.026	1062.910	105	110	98	106	102	1023.605	7.5	64	162	50
1,2,3,4,6,7,8-HpCDF	1000.000	1092.111	1203.274	1048.314	1078.691	109	120	105	107	109	1103.923	4.9	82	122	50
1,2,3,4,7,8,9-HpCDF	1000.000	1016.467	1069.428	1050.363	1030.882	102	107	105	103	103	1041.035	2.3	78	138	50
1,2,3,4,6,7,8-HpCDD	1000.000	979.093	1024.692	959.704	1000.274	98	102	96	100	97	990.692	3.5	70	140	50
OCDF	2000.000	2198.850	2068.275	2198.371	2050.227	110	103	110	103	110	2127.685	4.8	66	120	50
OCDD	2000.000	2210.811	2071.832	2221.564	2131.153	111	104	111	107	108	2144.745	3.4	78	144	50
13C-2,3,7,8-TCDF	2000.000	440.396	927.075	790.108	689.140	22	46	39	34	34	688.180	29.0	32	152	50
13C-2,3,7,8-TCDD	2000.000	427.004	920.957	661.130	571.350	21	46	33	29	32	645.100	22.2	30	175	50
13C-1,2,3,7,8-PeCDF	2000.000	454.547	1000.000	995.001	572.104	23	50	31	29	34	690.890	36.0	21	192	50
13C-2,3,4,7,8-PeCDF	2000.000	516.316	1066.358	697.136	590.711	26	53	35	29	37	738.130	33.8	19	258	50
13C-1,2,3,7,8-PeCDD	2000.000	480.224	1165.456	684.730	541.481	24	58	34	27	36	720.811	44.0	21	227	50
13C-1,2,3,4,7,8-HxCDF	2000.000	711.258	961.341	862.134	792.273	36	48	43	39	40	829.947	19.0	19	202	50
13C-1,2,3,6,7,8-HxCDF	2000.000	693.018	954.300	725.042	787.923	35	48	36	39	39	789.235	19.2	21	158	50
13C-2,3,4,6,7,8-HxCDF	2000.000	672.280	1007.600	780.546	845.145	34	54	39	42	42	826.600	21.8	22	176	50
13C-1,2,3,7,8,9-HxCDF	2000.000	701.486	1129.689	776.756	810.984	35	56	39	41	43	854.029	21.9	17	205	50
13C-1,2,3,4,7,8-HxCDD	2000.000	845.358	934.167	1041.356	657.304	42	47	52	33	42	881.026	15.8	21	192	50
13C-1,2,3,6,7,8-HxCDD	2000.000	638.365	1165.147	871.548	732.452	32	58	44	37	44	794.541	31.7	25	163	50
13C-1,2,3,4,6,7,8-HpCDF	2000.000	720.319	1195.003	690.695	654.018	36	60	34	33	41	765.535	27.0	7	158	50
13C-1,2,3,4,7,8,9-HpCDF	2000.000	750.260	1139.016	656.420	676.401	38	57	33	34	40	674.008	27.0	20	186	50
13C-1,2,3,4,6,7,8-HpCDD	2000.000	651.657	1144.846	687.641	636.501	33	57	34	32	39	780.916	31.2	28	166	50
13C-OCDD	4000.000	1277.571	2140.519	1446.825	1378.559	32	54	36	34	40	1608.210	23.7	13	199	50

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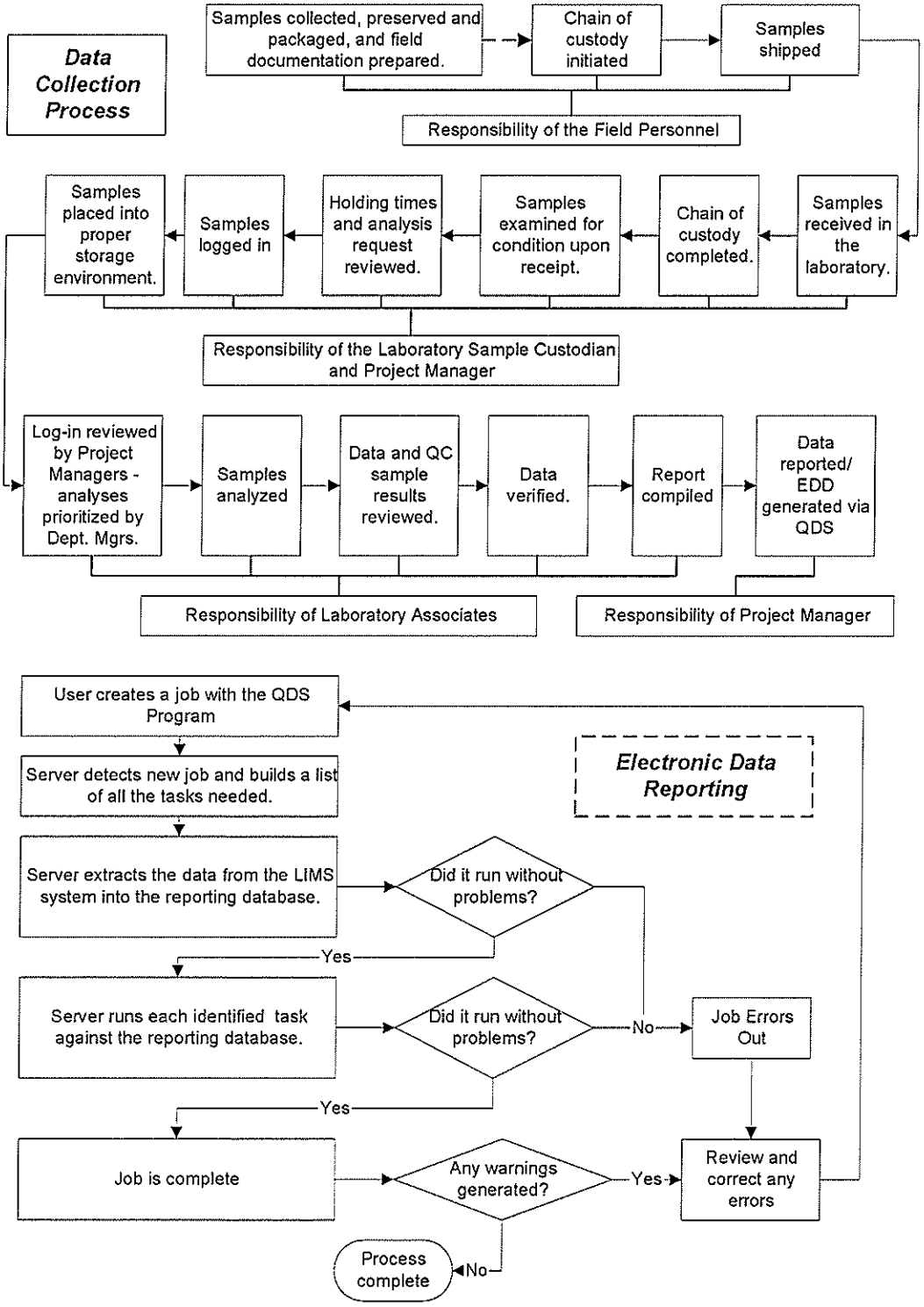
Figure 19-2. Example: Work Flow



SECTION 20. 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 laboratory instrumentation is presented in Table 20-1.

Equipment is only operated by authorized and trained personnel. Manufacturers' 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.

Table 20-2 lists examples of scheduled routine maintenance. 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 may be / 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.

If an instrument is sent out for service or transferred to another facility, it must be recalibrated and verified (including new initial MDL study) 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, water baths, field sampling devices, 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 are also calibrated before each use with a known standard to demonstrate the meters do not exceed an error of 1% or one umhos/cm.

Turbidity meters are also calibrated before each use. All of this information is documented in logs.

Consult pH and Conductivity, and Turbidity SOPs for further information.

20.3.3 Thermometers

All thermometers are calibrated on an annual basis with a NIST-traceable thermometer. IR thermometers, digital probes and thermocouples are calibrated quarterly.

The digital NIST thermometer is recalibrated every five years (choose based on thermometer type or insert your own frequency) (unless thermometer has been exposed to temperature extremes or apparent separation of internal liquid) by an approved outside service and the provided certificate of traceability is kept on file. The NIST thermometer(s) have increments of 1 degree (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, Waterbaths, 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 waterbaths 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 ± 5% of set temperature for DoD work.

All of this equipment has a unique identification number, and is assigned a unique thermometer for monitoring.

Sample storage refrigerator temperatures are kept between > 0°C and ≤ 6 °C.

Specific temperature settings/ranges for other refrigerators, ovens, and waterbaths can be found in method specific SOPs.

All of this information is documented in Daily Temperature Logbooks and method-specific logbooks.

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 is 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.

20.3.6 Autoclaves

Autoclaves used for sample digestion are capable of maintaining conditions of 15 psi at 120°C for 15 minutes. The temperature of the autoclave is verified quarterly.

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. Further details regarding the calculations involved are present in SOP No. CA-Q-S-005, "Calibration Curves (General)."

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, type of calibration (Avg 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 12).

Note: Instruments are calibrated initially and as needed after that and at least annually however, 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 (exception being ICP and ICP/MS methods) 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 exception to these rules is ICP methods or other methods where the referenced method does not specify two or more 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 air 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 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 is with a standard source secondary (second source standard) to the calibration standards, but continuing calibration verifications 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 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 (basically GCMS) then bracketing standards are not required, only daily verifications are needed. The results from these verification standards must meet the calibration verification criteria and the retention time criteria (if applicable).

Generally, the initial calibrations must be verified at the beginning of each 12-hour analytical shift during which samples are analyzed. (Some methods may specify more or less frequent verifications). 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.

A continuing instrument calibration verification (CCV) must be repeated at the beginning and, for methods that have quantitation by external calibration models, at the end of each analytical batch. Some methods have more frequent CCV requirements see specific SOPs. Most Inorganic methods require the CCV to be analyzed after ever 10 samples or injections, including matrix or batch QC samples.

Note: If an internal standard calibration is being used (basically GCMS) then bracketing standards are not required, only daily verifications are needed. The results from these verification standards must meet the calibration verification criteria and the retention time criteria (if applicable).

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 & 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 unacceptable calibration verification may be fully useable under the following special conditions, and reported based upon discussion and approval of the client:

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 with a footnote or case narrative 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. Detailed calculations for each fitting method can be found in CA-T-P-002.

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).

For example, the RCRA permit or waste delisting requirements may require the reporting of non-target analytes. Only after visual comparison of sample spectra with the nearest library searches may the analyst assign a tentative identification.

20.6 GC/MS Tuning

Prior to any GCMS 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 spec, the parameters may be adjusted within the specifications set by the manufacturer or the analytical method. These generally don't 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. Example: Instrumentation List[1]

Instrument Type	Number in Use
Autoanalyzer	2
Autotitrator	1
Cold-Vapor Analyzers	2
GC/HRMS	8
GC/MS - Semivolatiles	6
GC/MS - Volatiles	5
GC/MS/MS	1
GC-ECD/ECD	7
GC-FID/FID	2
HPLC	5
HPLC/MS/MS	4
ICP	1
ICP/MS	2
Ion Chromatograph	3
Spectrometer	1
TOC Analyzer	1

Table 20-2. Example: Schedule of Routine Maintenance

INSTRUMENT	MAINTENANCE	FREQUENCY
APCI/ESI LC/MS/MS	Change pump seals. Change in-line filters in autosampler (HPLC). Check/replace in-line frit if excessive pressure or poor performance. Replace column if no change following in-line frit change. Clean corona needle. Replace sample inlet tube in APCI (10.1 cm). Replace fused silica tube in ESI interface. Clean lenses. Clean skimmer. Ballast rough pump 30 minutes.	As Needed
	Check solvent reservoirs for sufficient level of solvent. Verify that pump is primed, operating pulse free. Check needle wash reservoir for sufficient solvent. Verify capillary heater temperature functioning. Verify vaporizer heater temperature. Verify rough pump oil levels. Verify turbo-pump functioning. Verify nitrogen pressure for auxiliary and sheath gasses. Verify that corona and multiplier are functioning.	Daily(2)
	Replace rough-pump oil (4-6 months). Replace oil mist and odor elements. Replace activated alumina filter if applicable.	Semi-Annually
	Vacuum system components including fans and fan covers. Clean/replace fan filters, if applicable.	Annually
HIGH PRESSURE LIQUID CHROMATOGRAPH(1)	Replace columns when peak shape and resolution indicate that chromatographic performance of column is below method requirements. Rinse flow cell with 1N nitric acid if dirty flow cell. Change pump seals when flow becomes inconsistent. Backflush column if applicable. Change in-line filters for solvents.	As Needed
	Check level of solution in reservoirs. If adding, verify that solvent is from the same source. If changing, rinse delivery lines to prevent contamination of the new solvent. Check gas supply if applicable. Flush with an appropriate solvent to remove all bubbles. Pre-filter all samples.	Daily(2)
	Change pump seals.	Every 6-9 Months

INSTRUMENT	MAINTENANCE	FREQUENCY
GAS CHROMATOGRAPH(1)	Replace septum. Clean injector port Cut off front portion of capillary columns. Replace column if this fails to restore column performance or when column performance (e.g. peak tailing, poor resolution, high backgrounds, etc.) indicates it is required. Change glass wool plug in injection port and/or replace injection port liner when front portion of capillary column is removed. Replace or repair flow controller if constant gas flow cannot be maintained. Detectors: clean when baseline indicates contamination or when response is low. FID: clean/replace jet, replace ignitor. ECD: follow manufacturers suggested maintenance schedule Replace fuse. Reactivate external carrier gas dryers. HP 7673 Autosampler: replace syringe, fill wash bottle, dispose of waste bottle contents. Check inlets, septa.	As Needed
	Check for sufficient supply of carrier and detector gases. Check for correct column flow and/or inlet pressures. Check temperatures of injectors and detectors. Verify temperature programs. Check baseline level. Inspect chromatogram to verify symmetrical peak shape and adequate resolution between closely eluting peaks.	Daily(2)
	ECD: perform wipe test.	Semi-Annually
PURGE AND TRAP SYSTEMS	Change trap. Check purge flow. Flush lines (after foaming sample). Periodic leak checks (when replace traps/spargers) Replace/condition traps and/or spargers (when poor response or disappearance of reactive or poorly trapped compounds), clean sample lines, valves (if they become contaminated), and clean or replace glassware/spargers. Bake trap as needed to correct for high background. Change trap whenever loss of sensitivity, or erratic response or failing resolution is observed. Purge & trap autosamplers: leak check system, clean sample lines, valves.	As Needed
	Bake out trap & analyze primers (as needed) prior to commencing analysis.	Daily(2)
GAS CHROMATOGRAPHY/LOW-RESOLUTION MASS SPECTROMETER(1)	Replace septum. Clean injector port. Cut off front portion of capillary columns. Replace column if this fails to restore column performance or when column performance (e.g. peak tailing, poor resolution, high backgrounds, etc.) indicates it is required. Replace injection port liner when front portion of capillary column is removed. Check level of oil in mechanical pumps and diffusion pump if vacuum is insufficient. Add oil if needed. Replace electron multiplier when the tuning voltage approaches the maximum and/or when sensitivity falls below required levels.	As Needed

INSTRUMENT	MAINTENANCE	FREQUENCY
	Clean Source, including all ceramics and lenses - the source cleaning is indicated by a variety of symptoms including inability of the analyst to tune the instrument to specifications, poor response, and high background contamination. Replace filaments when both filaments burn out or performance indicates need for replacement. Check mass calibration (PFTBA or FC-43). Check ion source and analyzer (clean, replace parts as needed). Check vacuum, relays, gas pressures and flows. Change oil in the mechanical rough pump. Relubricate the turbomolecular pump-bearing wick. HP 7673 Autosampler: Replace syringe.	
	Check for sufficient gas supply. Check for correct column flow and/or inlet pressure. Check temperatures of injector, detector. Verify temperature programs. Check inlets, septa. Check baseline level. Check values of lens voltages, electron multiplier, and relative abundance and mass assignments of the calibration compounds. Inspect chromatogram to verify symmetrical peak shape and adequate resolution between closely eluting peaks. Autosampler: fill wash bottle, dispose of waste bottle contents.	Daily(2)
	Replace the exhaust filters on the mechanical rough pump every 1-2 years.	Annually
GAS CHROMATOGRAPHY/HIGH-RESOLUTION MASS SPECTROMETER(1)	Full Bake-Out. Change oil in rotary pump. Change oil in diffusion pump. Replace o-rings. Solvent rinse the flight tube. Clean the first field free region. Check detector voltages. Clean and dust connectors, etc on the outside of the instrument. Check the vacuum: ~5 x. 10^{-7} MBAR on both analyzer ion gauges, and ~5 x 10^{-6} MBAR on the source, with no helium flowing. Check isolation valve for leaks, correct if needed. Check for thermal trip by taking the magnet to maximum current, and verify that the coolant flow is acceptable. Replace septum. Clean injector port. Cut off front portion of capillary columns. Replace column if this fails to restore column performance or when column performance (e.g. peak tailing, poor resolution, high backgrounds, etc.) indicates it is required. Replace injection port liner when front portion of capillary column is removed. Clean Source, including all ceramics and lenses - the source cleaning is indicated by a variety of symptoms including inability of the analyst to tune the instrument to specifications, poor response, and high background contamination. Replace filaments when performance indicates need for replacement.	As Needed

INSTRUMENT	MAINTENANCE	FREQUENCY
	Check resolution sensitivity. Check stability. Check for sufficient gas supply. Check for correct column flow and/or inlet pressure. Check temperatures of injector, detector. Verify temperature programs. Check inlets, septa. Check baseline level. Check values of lens voltages, electron multiplier, and relative abundance and mass assignments of the calibration compounds. Inspect chromatogram to verify symmetrical peak shape and adequate resolution between closely eluting peaks.	Daily[2]
COLD VAPOR ATOMIC ABSORPTION (LEEMAN PS 200) [1]	Change pump tubing. Check/change Hg lamp. Clean optical cell. Change drying tube. Grease pump.	As Needed
	Check sample tip for clogs. Check drying tube. Check pump tubing/drain tubing. Check gas pressure. Check liquid/gas separator. Check tubing.	Daily[2]
INDUCTIVELY COUPLED ARGON PLASMA/MASS SPECTROMETRY (ICAP/MS)[1]	Check electronic settings for optimum sensitivity: resolution, mass calibration, ion optics. Measure quartz torch for proper alignment when removed and cleaned. Clean spray chamber and nebulizer. Clean all filters and fans. Check chiller coolant level. Check and drain oil mist eliminator on roughing pumps.	As Needed
	Check sample waste container level. Check quartz torch condition. Check RF coil. Check peristaltic pump: proper roller pressure, sample introduction tubing, correct pump rotation, condition of drain tubing. Check condition of sampler and skimmer cones. Check oil level of roughing pumps.	Daily[2]
	Replace oil in roughing pumps.	Every 2-3 Months
ICP[1]	Check that argon feed pressure is 80-120 psi. Check that chiller coolant pressure is 45-80 psig, no leaks. Check purge and shear gasses. Nitrogen purge gas pressure 40-120 psig, compressed air shear gas pressure 80-120 psig. Check radial purge and axial windows for deposits. Check that nebulizer is not clogged. Check that capillary tubing is clean and in good condition. Check that peristaltic pump windings are secure. Check that exhaust vent is operational Check that torch, glassware, aerosol injector tube are clean.	Daily[2]
	Clean plasma torch assembly to remove accumulated deposits. Check RF coil. Clean nebulizer and drain chamber; keep free flowing to maintain optimum performance.	Monthly or As Needed

INSTRUMENT	MAINTENANCE	FREQUENCY
	Clean filters on back of power unit to remove dust. Replace when needed: peristaltic pump tubing. sample capillary tubing. autosampler sipper probe. Check performance with manganese. Check O-rings. Clean/lubricate pump rollers	
	Check chiller coolant filter. (may require more or less frequently)	Semi-Annually
	Notify manufacturer service engineer for scheduled preventive maintenance service.	Annually
ION CHROMATOGRAPH[1]	Clean micromembrane suppressor when decreases in sensitivity are observed. Check fuses when power problems occur. Change column when peak shape and resolution deteriorate or when retention time shortening indicates that exchange sites have become deactivated. De-gas pump head when flow is erratic. Check all air and liquid lines for discoloration and crimping, if indicated. Check/change bed supports guard and analytical columns, if indicated.	As Needed
	Check plumbing/leaks. Check eluent level. Check gases. Check pump pressure. Check conductivity meter.	Daily[2]
	Check pump heads for leaks. Check filter (inlet).	Weekly
	Change pump seals. Change injection valve. Clean conductivity cell. Check conductivity cell for calibration.	Annually
ALPKEM COLORIMETRIC AUTO ANALYZER[1]	Prepare fresh reagents. Replace tubing. (About every 100 hours of use)	As Needed
	Check detector. Make sure there are no trapped bubbles in detector cell. Check Valves Check peristaltic tubing. Check sampler.	Daily[2]
	Clean pump, and XYZ Sampler.	Weekly
	Lubricate pump roller.	Monthly
	Clean pump rollers with steel wool and lubricate.	Semi-Annually
SYSTEA COLORIMETRIC AUTO ANALYZER[1]	Prepare fresh reagents. Replace waste tubing. Replace probes. Replace lamp	As Needed
	Perform washes. Perform filters autozero. Check temperatures.	Daily[2]
CHEMICAL OXYGEN DEMAND (COD) REACTOR[1]	Electronics serviced.	As Needed
	Check temperature with NIST reference thermometer.	Annually

INSTRUMENT	MAINTENANCE	FREQUENCY
AUTO TITRATOR[1]	Electronics serviced.	As Needed
	Calibrate with check standards. Inspect electrodes daily, clean as needed. Inspect electrode proper levels of filling solutions daily, fill as needed. Clean probe, each use. Prime buret Check rinse water reservoir.	Daily[2] (When Used)
CONDUCTANCE METER[1]	Electronics serviced. Replace batteries	As Needed
SPECTROPHOTOMETER[1]	Replace lamp. Replace fuse.	As Needed
	Check instrument manual. Perform wavelength calibration. Replace lamp annually or when erratic response is observed.	Annually
PH METER[1]	Clean electrode. Refill reference electrode.	As Needed
	Inspect electrode. Verify electrodes are properly connected and filled. Inspect electrode proper levels of filling solutions. Make sure electrode is stored in buffer.	Daily[2]
TOTAL ORGANIC CARBON ANALYZER (OI 1010 AND SOLIDS)	Check injection port septum after 50-200 runs. Perform leak test. Calibrate reagent pumps. Change sample loops. Adjust flow. Indicating drying tube. NDIR zero, after 100 hours of use. Sample pump, after 2000 hours for use. Digestion vessel/condensation chamber. Permeation tube, after 2000 hours of use. NDIR cell, after 2000 hours of use.	As Needed
	Check: Nitrogen supply, (oxygen supply for solids). Persulfate supply (1010 unit). Acid supply (1010 unit). Rinse water reservoir supply (1010 unit). IR millivolts for stability (after 30 min. warm-up).	Daily[2]
TURBIDIMETER[1]	Electronics serviced.	As Needed
	Clean instrument housing.	Monthly
DIGESTION BLOCK	Check temperature with NIST thermometer.	Annually
SONICATOR [1]	Replace probe tip. Disassemble and clean sonicator probe tips. Tune sonicator assembly (if recommended by manufacturer)	As Needed
	Inspect probe tips for inconsistencies (etching/pitting).	Daily[2] (When Used)
ANALYTICAL/TOP LOADING BALANCES[1]	Check using ASTM Class 3 weights once daily or before use. Clean pan and weighing compartment.	Daily[2]
REFRIGERATORS/WALK-IN COOLERS[1]	Manufacturer cleaning and calibration.	Annually
	Refrigerant system and electronics serviced.	As Needed
	Temperatures checked and logged.	Daily[2]

INSTRUMENT	MAINTENANCE	FREQUENCY
OVENS[1]	Electronics serviced.	As Needed
	Temperatures checked and logged.	Daily[2]
ZYMARK PE WORKSTATION	Change O-rings whenever there are visible leaks or poor sealing on the SPE columns. Sample lines are clean after samples have been extracted by SPE with a program "Clean Sample Lines" with methanol followed by water. Occasionally for a more rigorous cleaning, or after a highly contaminated sample, a mixture of methanol/DCM at 50:50 may be used in place of methanol, follow by methanol, then water (never use acetone). Syringe pump may be primed using a program "Prime Solvent Lines" whenever air bubbles are suspected in the lines from running out of solvents and whenever solvents are changed. Syringe pump in good condition – replace if showing signs of wear or suspected of poor performance. Sample pumps may be re-calibrated whenever major repairs are performed, or whenever the pumps are suspected to be out of calibration. Follow manufacturer's procedure for re-calibrating the sample pumps. For method 8330, the pump loads 1050 mL of sample on the SPE. It should used up the whole sample bottle (quart bottles and 1-L bottles).	As Needed
SONICATION WATER BATH[1]	If the water bath is dirty, empty and refill with tap water. A couple drops of anti-bacterial solution may be added to inhibit the growth of bacteria in the water. The water level in the sonication batch should be about 1.2 to 1 inch from the top while in operation. Do not allow sonication batch to operate with water bath at lower levels. If the level is low, add more water, if the levels is too high, remove water to the proper level.	As Needed

Footnotes to Preventive Maintenance Tables

(1) Refer to manufacturer's instructions for each instrument to identify and perform maintenance operations.

(2) Daily checks and verifications are performed prior to instrument startup and are not documented in maintenance logs unless problems are noted.

SECTION 21. 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, NVLAP (National Voluntary Laboratory Accreditation Program), APLAC (Asia-Pacific Laboratory Accreditation Cooperation), or EA (European Cooperation for Accreditation). A certificate and scope of accreditation is kept on file at the laboratory.

The calibration laboratory's policy for achieving measurement traceability is defined and includes the subsequent elements of uncertainty.

The uncertainty calculations of the calibration laboratory are supported by uncertainty budgets and are represented by expanded uncertainties typically using a coverage factor of k=2 to approximate the 95% confidence level. This explanation accompanies the measurement result and the associated uncertainty.

The tolerance uncertainty ratio (TUR) is calculated using the expanded uncertainty of the measurement, not the collective uncertainty of the measurement standards. A statement to this effect accompanies the TUR along with the coverage factor and confidence level.

The calibration report or certificate submitted to TestAmerica West Sacramento contains, in a well designed format, a traceability statement, the conditions under which the calibrations were made in the context of any potential influence, a compliance statement with an identified metrological specification and the pertinent clauses, a clearly identified record of the quantities and functional test results before and after re-calibration, and no recommendation on the calibration interval. Opinions and interpretations of results are presented along with the basis upon which they were made and identified as such. The report may be submitted by facsimile or other electronic means as long as the requirements of the International Standard are

achieved. If significant amendments are made to a calibration certificate, a supplemental certificate for the serial-number-specified piece of equipment is so identified. When a new certificate is offered, it uniquely identifies and references the one it replaces. All calibration reports are filed in the QA Office.

The calibration laboratory supports in-house calibration systems: documented procedures for in-house calibrations, evidence by a report, certificate, or sticker, for an appropriate amount of time; training records of calibration personnel; certificates from accreditation services demonstrating traceability to national or international standards of measurement; procedures for evaluating measurement uncertainty; timely and documented recalibration of reference standards. When subcontracting to a calibration laboratory, TestAmerica West Sacramento does not use a firm who subcontracts the work.

An external certified service engineer services laboratory balances on an annual basis. This service is documented on each balance with a signed and dated certification sticker. Balance calibrations are checked each day of use. All mercury thermometers are calibrated annually against a traceable reference thermometer. Temperature readings of ovens, refrigerators, and incubators are checked on each day of use.

21.3 Reference Standards / Materials

Reference standards/materials, where commercially available, are traceable to certified reference materials. Commercially prepared standard materials are purchased from vendors accredited by A2LA, NVLAP, with an accompanying Certificate of Analysis that documents the standard 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 air 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 Corporate Environmental Health & Safety Manual or laboratory SOPs. For safety requirements, please refer to method SOPs and the laboratory 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 TestAmerica's Corporate SOP (CA-Q-S-001), Solvent and Acid Lot Testing and Approval.]

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 maintained in the departments, and on the local server. 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 Reagent Preparation 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 system, and are assigned a unique identification number. The following information is typically recorded in the electronic database or standards logbook.

- 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 or in logbooks 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 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 MSDS section of OASIS.

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 raw data.

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.

SECTION 22. 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. Any certificates of cleanliness that are provided by the supplier are maintained at the laboratory.

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

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. The first day of holding time ends twenty-four hours after sampling. Holding times for analysis include any necessary reanalysis. However, there are some programs and regulators, such as the Alaska Department of Environmental Conservation, which 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, "Multi-Incremental Subsampling of Soils and Sediments".

Table 22-1.
Holding Times, Preservation and Container Requirements: Drinking Water (SDWA)

PARAMETER	CONTAINER	PRESERVATION[1,2] Temp. [23]	Chemical	HOLDING TIME[3]	SAMPLE VOLUME
Asbestos	Plastic/Glass	4°C	None	48 hours[5]	1 L
Coliforms (Total and Fecal)	Plastic/Glass[20]	10°C	$Na_2S_2O_3$	30 hours[21]	120 mL
Cyanide	Plastic/Glass	4°C	NaOH to pH >12 Ascorbic acid [9] or Sodium arsenite [9]	14 days	500 mL
Fluoride	Plastic/Glass	None	None	None	250 mL
Perchlorate (EPA 331.0)	Plastic/Glass[20]	4°C	None Filtered, 1/3 Headspace to minimize anaerobic conditions	28 days	250 mL
Heterotrophic Plate Count	Plastic/Glass[20]	10°C	$Na_2S_2O_3$	8 hours (24 hours[22])	120 mL
Mercury	Plastic/Glass	None	HNO_3 to pH<2	28 days	250 mL
Metals [4]	Plastic/Glass	None	HNO_3 to pH<2 [24]	6 months	250 mL
Nitrate	Plastic/Glass	4°C	None	48 hours[6]	250 mL
Nitrate-Nitrite	Plastic/Glass	None	H_2SO_4 to pH<2	28 days	250 mL
Nitrite	Plastic/Glass	4°C	None	48 hours	250 mL
THMs Only	Glass[8]	4°C	$Na_2S_2O_3$ [9] HCl to pH <2 may also be used	14 days	3 X 40 mL
Volatile Organic Compounds	Glass[8]	4°C	HCl to pH <2 $Na_2S_2O_3$ [9] or Ascorbic acid [9]	14 days / 24 hrs[25]	3 X 40 mL
EDB, DBCP, 1,2,3-TCP (EPA 504.1)	Glass[8]	4°C	$Na_2S_2O_3$	14 days[11]	3 X 40 mL
Organochlorine Pesticides/PCBs (EPA 505)[10]	Glass[8]	4°C	$Na_2S_2O_3$	14 days[11]	3 X 40 mL

PARAMETER	CONTAINER	PRESERVATION[1,2] Temp. [23]	Chemical	HOLDING TIME[3]	SAMPLE VOLUME
Nitrogen and Phos. Pesticides (EPA 507)	Glass-Amber[8]	4°C	$Na_2S_2O_3$	14 days[12]	1 L
Total PCBs (EPA 508A)	Glass-Amber[8]	4°C	None	14 days[13]	1 L
Pesticides and PCBs (EPA 508.1)[14]	Glass-Amber[8]	4°C	HCl to pH <2 $Na_2S_2O_3$[9]	14 days[13]	1 L
Chlorinated Acids (EPA 515.1)	Glass-Amber[8]	4°C	$Na_2S_2O_3$	14 days[12]	1 L
Nitrosamines (EPA 521)	Glass-Amber[8]	4°C	$Na_2S_2O_3$	14 days[12]	1 L
Semivolatiles (EPA 525.2)	Glass-Amber[8]	4°C	HCl to pH <2 $Na_2S_2O_3$[9]	14 days[13]	1 L
N-Methylcarbamoyloxamines and N-Methylcarbamates (EPA 531.1)	Glass[8]	4°C	$Na_2S_2O_3$, Monochloroacetic Acid buffer to pH<3	28 days	3 X 60 mL
Acetamide Herbicide Degradates (EPA 535)	Glass-Amber[8]	4°C	Ammonium Chloride	14 days[12]	250 mL
Glyphosate (EPA 547)	Glass[8]	4°C	$Na_2S_2O_3$	14 days	3 X 60 mL
Endothall (EPA 548)	$Na_2S_2O_3$	4°C	None	7 days[15]	1 L
Diquat/Parquat (EPA 549.1)	Glass-Amber[8] (Silanized or PVC amber)	4°C	H_2SO_4 to PH <2 $Na_2S_2O_3$[9]	7 days[16]	1 L
Chlorinated Disinfection Byproducts, Chlorinated Solvents, and Halogenated Pesticides/Herbicides (EPA 551)	Glass[8]	4°C	Phosphate Buffer and Ammonium Chloride[19]	14 days[17]	3 X 60 mL
Haloacetic Acids (EPA 552.1)	Glass-Amber[8]	4°C	Ammonium Chloride	28 days[18]	250 mL
2,3, 7, 8 TCDD	Glass-Amber[8]	4°C	$Na_2S_2O_3$	1 year	1 L

Key to Table

1. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.
2. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the

Key to Table

preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

3. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
4. All metals except Hg.
5. Instructions for containers, preservation procedures and holding times as specified in Method 100.2 must be adhered to for all compliance analysis including those conducted with Method 100.1.
6. If the sample is chlorinated, the holding time for an un-acidified sample kept at 4°C is extended to 14 days.
7. Nitrate-Nitrite refers to a measurement of total nitrite.
8. With Teflon lined septum.
9. If chlorinated, add reagent prior to acidification (for Cyanide, add before NaOH).
10. Heptachlor has a 7 day hold time.
11. 14 days until extraction. 24 hours after extraction.
12. 14 days until extraction. 28 days after extraction.
13. 14 days until extraction. 30 days after extraction.
14. For cyanazine, cool to 4°C only.
15. 7 days until derivitization. 1 day after derivitization.
16. 7 days until extraction. 21 days after extraction.
17. 14 days until extraction. 14 days after extraction.
18. 28 days until extraction. 48 hours after extraction.
19. Sodium Sulfite may be used as a dechlorinating agent in some instances. Verify with laboratory prior to sampling.
20. Sterilized. Plastic must be Polypropylene.
21. 40 CFR part 141.74 regulations to avoid filtration or disinfection state 8 hours (DW compliance testing). Most facilities are using either disinfection or filtration so the 8 would not apply in most cases.
22. 40 CFR part 141.74 regulations for Disinfection By-Product rule state 8 hours (DW compliance testing) where SM 9215 allows up to 24 hours if sample is stored between > 0 and ≤ 4° C.
23. For samples with a temperature requirement of 4°C, a sample temperature of just above the water freezing temperature to ≤ 6°C is acceptable.
24. Acid preservation may be omitted for shipping and laboratory will acidify at least 24 hours prior to analysis.
25. Holding Time is 24 hours if pH adjustment is not performed.

Table 22-2
Holding Times, Preservation and Container Requirements: NPDES – Bacteria, Protozoa, Toxicity Tests

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Total, Fecal, and E.coli Coliforms	Plastic/Glass	10°C	0.0008 % $Na_2S_2O_3$[6]	6 hours	100 mL
Fecal Streptococci	Plastic/Glass	10°C	0.0008 % $Na_2S_2O_3$[6]	6 hours	100 mL
Enterococci	Plastic/Glass	10°C	0.0008 % $Na_2S_2O_3$[6]	6 hours	100 mL
Cryptosporidium	LPDE Plastic	0-8°C	None	96 Hours	500 mL
Giardia	LPDE Plastic	0-8°C	None	96 Hours	500 mL
Toxicity – Acute/Chronic	Plastic/Glass	≤ 6°C[5]	None	36 Hours	2 L

Key to Table

1. Plastic should be Polypropylene or other sterilizable plastic.
2. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.
3. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
4. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
5. Samples must not be frozen. Sufficient ice should be placed with the samples in the shipping container to ensure that ice is still present when the samples arrive at the laboratory. However, even if ice is present, when samples arrive, it is necessary to measure the temperature of the samples and confirm that the ≤ 6°C temperature has not been exceeded.
6. Should only be used in the presence of residual chlorine.

Table 22-3
Holding Times, Preservation and Container Requirements: NPDES - Inorganic

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp[14].	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Acidity	Plastic/Glass	≤ 6°C	None	14 days	100 mL
Alkalinity	Plastic/Glass	≤ 6°C	None	14 days	100 mL
Ammonia	Plastic/Glass	≤ 6°C	H_2SO_4 to pH<2	28 days	400 mL
BOD 5 Day	Plastic/Glass	≤ 6°C	None	48 hours	1000 mL
Boron	Plastic[5]	None	HNO_3 to pH<2	6 months	200 mL
Bromide	Plastic/Glass	None	None	28 days	100 mL
CBOD 5 Day	Plastic/Glass	≤ 6°C	None	48 hours	1000 mL
COD	Plastic/Glass	≤ 6°C	H_2SO_4 to pH<2	28 days	100 mL
Chloride	Plastic/Glass	None	None	28 days	50 mL
Chlorine, Residual	Plastic/Glass	None	None	15 min.[6]	200 mL
Color	Plastic/Glass	≤ 6°C	None	48 hours	50 mL
Cyanide –Total [16, 17]	Plastic/Glass	≤ 6°C	NaOH to pH >12, 0.6 g Ascorbic Acid[7]	14 days	100 mL
Cyanide – Amenable [16, 17]	Plastic/Glass	≤ 6°C	NaOH to pH >12, 0.6 g Ascorbic Acid[7]	14 days	100 mL
Fluoride	Plastic	None	None	28 days	300 mL
Hardness	Plastic/Glass	None	HNO_3 to pH<2[8]	6 months	100 mL
Hexavalent Chromium	Plastic/Glass	≤ 6°C	Ammonium sulfate buffer pH = 9.3 - 9.7	28 days / 24 hrs[15]	200 mL
Hydrogen Ion (pH)	Plastic/Glass	None	None	15 min.[6]	200 mL
Kjeldahl and organic Nitrogen	Plastic/Glass	≤ 6°C	H_2SO_4 to pH <2	28 days	500 mL
Mercury[11]	Plastic/Glass	None	HNO_3 to pH<2	28 days	200 mL
Metals[9,10]	Plastic/Glass	None	HNO_3 to pH<2 [18]	6 months	200 mL
Nitrate	Plastic/Glass	≤ 6°C	None	48 hours	100 mL
Nitrate-Nitrite	Plastic/Glass	≤ 6°C	H_2SO_4 to pH <2	28 days	100 mL
Nitrite	Plastic/Glass	≤ 6°C	None	48 hours	100 mL
Oil and Grease	Glass	≤ 6°C	H_2SO_4 or HCl to pH <2	28 days	1 L

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp[14].	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Organic Carbon (TOC)	Plastic/Glass	≤ 6°C	H_2SO_4 or HCl to pH <2[12]	28 days	250 mL
Orthophosphate	Plastic/Glass	≤ 6°C	Filter within 15 min.	48 hours	250 mL
Oxygen, Dissolved Probe	Glass[13]	None	None	15 min.[6]	200 mL
Oxygen, Winkler	Glass[13]	None	Fix on site and store in dark.	8 hours	300 mL
Phenols	Glass	≤ 6°C	H_2SO_4 to pH <2	28 days	500 mL
Phosphorus, Elemental	Glass	≤ 6°C	None	48 hours	250 mL
Phosphorus, Total	Plastic/Glass	≤ 6°C	H_2SO_4 to pH <2	28 days	250 mL
Residue, Total	Plastic/Glass	≤ 6°C	None	7 days	1 L
Residue, Filterable	Plastic/Glass	≤ 6°C	None	7 days	1 L
Residue, Non-Filterable	Plastic/Glass	≤ 6°C	None	7 days	1 L
Residue, Settleable	Plastic/Glass	≤ 6°C	None	48 hours	1 L
Residue, Volatile	Plastic/Glass	≤ 6°C	None	7 days	1 L
Silica	Plastic[5]	≤ 6°C	None	28 days	250 mL
Specific Conductance	Plastic/Glass	≤ 6°C	None	28 days	250 mL
Sulfate	Plastic/Glass	≤ 6°C	None	28 days	250 mL
Sulfide	Plastic/Glass	≤ 6°C	Zinc acetate plus NaOH to pH>9	7 days	500 mL
Sulfite	Plastic/Glass	None	None	15 min.[6]	200 mL
Surfactants	Plastic/Glass	≤ 6°C	None	48 hours	1 L
Temperature	Plastic/Glass	None	None	N/A	100 mL
Turbidity	Plastic/Glass	≤ 6°C	None	48 hours	1 L

Key to Table

1. Plastic should be Polyethylene.
2. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at ≤ 6°C until compositing and sample splitting is completed.

Key to Table

3. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
4. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
5. May also be collected in quartz or PFTE Plastic.
6. For compliance testing, the analysis must be performed in the field at the time of analysis. If transported to the laboratory for analysis, the analysis will be performed as soon as practical and reported qualified.
7. Should only be used in the presence of residual chlorine. (Alternatively, sodium arsenite may be used.)
8. H_2SO_4 to a pH <2 is also acceptable.
9. Except Mercury and Hexavalent Chromium.
10. For dissolved metals, samples must be filtered on site before adding HNO_3 preservative (or before shipping to laboratory).
11. Samples collected for determination of trace level mercury (100 ng/L) using EPA 1631 must be collected in tightly capped Fluor polymer or glad bottles and preserved with BrCl or HCl solution within 48 hours of sample collection. The time to preservation may be extended to 28 days if a sample is oxidized in the sample bottle. Samples collected for dissolved trace level mercury should be filtered in the laboratory. However, if circumstances prevent overnight shipping, samples should be filtered in a designated clean area in the field in accordance with procedures given in Method 1669. Samples that been collected for determination of total or dissolved trace level mercury must be analyzed within 90 days of sample collection.
12. Phosphoric acid (H_3PO_4) may also be used.
13. Should have glass lid or top.
14. Aqueous samples must be preserved at ≤6 °C unless otherwise indicated, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. Also, for purposes of NPDES monitoring, the specification of "≤ °C" is used in place of the "4 °C" and "<4 °C" sample temperature requirements listed in some methods. It is not necessary to measure the sample temperature to three significant figures (1/100th of 1 degree); rather, three significant figures are specified so that rounding down to 6 °C may not be used to meet the ≤6 °C requirement. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).
15. Holding time is 24 hours if pH adjustment is not performed.
16. In the Field: Samples are to be tested for Sulfide using lead acetate paper prior to the addition of Sodium Hydroxide (NaOH). If sulfide is present, the sample must be treated with Cadmium Chloride and filtered prior to the addition of NaOH. If the sulfide test and treatment is not performed in the field, the lab will test the samples for sulfide using lead acetate paper at the time of receipt and if sulfide is present in the sample, the client will be notified and given the option of retaking the sample and treating in the field per the method requirements or the laboratory can analyze the samples as delivered (with sulfide treatment by laboratory) and qualify the results in the final report.
17. It is the responsibility of the client to notify the laboratory if thiosulfate, sulfite, or thiocyanate are known or suspected to be present in the sample. This notification may be on the chain of custody. The samples may need to be subcontracted to a laboratory that performs a UV digestion. If the lab does not perform the UV digestion on samples that contain these compounds, the results must be qualified in the final report.
18. Acid preservation may be omitted for shipping and laboratory will acidify at least 24 hours prior to analysis.

Table 22-4
Holding Times, Preservation and Container Requirements: NPDES - Organic

PARAMETER	CONTAINER	PRESERVATION[1,2] Temp.[15]	Chemical	HOLDING TIME[3]	SAMPLE VOLUME
Purgeable Halocarbons	Glass[4]	≤ 6°C	0.0008 % $Na_2S_2O_3$[5]	14 days	40 mL
Purgeable Aromatic Hydrocarbons	Glass[4]	≤ 6°C	0.0008 % $Na_2S_2O_3$[5], HCl to pH<2	14 days[6]	40 mL
Acrolein and Acrylonitrile	Glass[4]	≤ 6°C	0.0008 % $Na_2S_2O_3$[5], adjust pH to 4-5[7]	14 days	40 mL
Phenols[9]	Glass[4]	≤ 6°C	0.0008 % $Na_2S_2O_3$[5]	7 days[8]	1 L
Benzidines[9]	Glass[4]	≤ 6°C	0.0008 % $Na_2S_2O_3$[5]	7 days[8, 11]	1 L
Phthalate esters[9]	Glass[4]	≤ 6°C	None	7 days[8]	1 L
Nitrosamines[9,12]	Glass[4]	≤ 6°C	0.0008 % $Na_2S_2O_3$[5,13]	7 days[8]	1 L
PCBs[9]	Glass[4]	≤ 6°C	None	1 year[8]	1 L
Nitroaromatics and Isophorone[9]	Glass[4]	≤ 6°C	0.0008 % $Na_2S_2O_3$[5,13]	7 days[8]	1 L
Polynuclear Aromatic Hydrocarbons[9]	Glass[4]	≤ 6°C	0.0008 % $Na_2S_2O_3$[5,13]	7 days[8]	1 L
Haloethers[9]	Glass[4]	≤ 6°C	0.0008 % $Na_2S_2O_3$[5]	7 days[8]	1 L
Chlorinated Hydrocarbons[9]	Glass[4]	≤ 6°C	None	7 days[8]	1 L
CDD/CDFs[9] – Aqueous: Field/Lab Preservation	Glass	≤ 6°C	pH <9, 0.0008 % $Na_2S_2O_3$[5]	1 year	1 L
CDD/CDFs[9] – Solids/Mixed Phase/ - Field Preservation	Glass	≤ 6°C	None	7 days	1 L
CDD/CDFs[9] – Tissue – Field Preservation	Glass	≤ 6°C	None	24 hours	
CDD/CDFs[9] – Solids/Mixed Phase/Tissue - Lab Preservation	Glass	< -10°C	None	1 year	1 L
Pesticides[9]	Glass	≤ 6°C	pH 5-9 [14]	7 days[8]	1 L

Key to Table

1. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at $\leq 6^{\circ}C$ until compositing and sample splitting is completed.
2. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
3. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
4. With Teflon lined septum.
5. Should only be used in the presence of residual chlorine. Ascorbic may be used instead.
6. Samples receiving no pH adjustments must be analyzed within 7 days. If 2-chlorovinylethylether is a target analyte, the sample should not be acidified.
7. The pH adjustment is not required if acrolein is not being measured. Samples for acrolein receiving no pH adjustment must be analyzed within three days of sampling.
8. 7 days until extraction, 40 days after extraction. (PCB only – 1 year after extraction)
9. When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity. When the analytes of concern fall within two or more categories, the sample may be preserved by cooling to $\leq 6^{\circ}C$ reducing residual chlorine with 0.0008 % sodium thiosulfate, storing in the dark, and adjusting the pH to 6-9. Samples preserved in this manner may be held for 7 days before extraction and for 40 days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (re the requirement for thiosulfate reduction of residual chlorine) and footnotes 10 and 11(re the analysis of Benzidine).
10. If 1,2-diphenylhydrazine is likely to be present, adjust pH to of the sample to 4.0 ± 0.2 to prevent rearrangement to benzidine.
11. Extracts may be stored up to 30 days before analysis if storage temperature is $< 0^{\circ}C$.
12. For the analysis of diphenylnitrosamine, add 0.008 % $Na_2S_2O_3$ and adjust pH to 7-10 with NaOH within 24 hours of sampling.
13. Store in dark.
14. The pH adjustment may be performed upon receipt in the laboratory and may be omitted if the samples are extracted within 72 hours of collection. For the analysis of aldrin, add 0.0008 % $Na_2S_2O_3$.
15. Aqueous samples must be preserved at ≤6 °C unless otherwise indicated, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. Also, for purposes of NPDES monitoring, the specification of "≤ °C" is used in place of the "4 °C" and "<4 °C" sample temperature requirements listed in some methods. It is not necessary to measure the sample temperature to three significant figures (1/100th of 1 degree); rather, three significant figures are specified so that rounding down to 6 °C may not be used to meet the ≤6 °C requirement. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

Table 22-5.
Holding Times, Preservation and Container Requirements: NPDES - Radiological

PARAMETER	CONTAINER	PRESERVATION[1,2] Temp.	Chemical	HOLDING TIME[3]	SAMPLE VOLUME
Alpha, Beta, Radium	Plastic/Glass	None	HNO_3 to pH<2	6 months	1 L

Key to Table

1. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.
2. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater).
3. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.

Table 22-6.
Holding Times, Preservation and Container Requirements: RCRA - Aqueous

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.[12]	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Chloride	Plastic/Glass	4°C	None	28 days	100 mL
Cyanide -Total	Plastic/Glass	4°C	NaOH to pH >12[5]	14 days	250 mL
Cyanide -Amenable	Plastic/Glass	4°C	NaOH to pH >12[5]	14 days	250 mL
Hydrogen Ion (pH)	Plastic/Glass	4°C	None	24 hours[11]	100 mL
Nitrate	Plastic/Glass	4°C	None	48 hours	28 days
Oil and Grease	Glass	4°C	HCl	28 days	1 L
Organic carbon (TOC)	Plastic/Glass	4°C	pH to <2[6] Store in dark	28 days	28 days
Sulfate	Plastic/Glass	4°C	None	28 days	400 mL
Sulfide	Plastic/Glass	4°C	Add Zn Acetate	7 days	400 mL
Chromium VI	Plastic/Glass	4°C	None	24 hours	250 mL
Mercury	Plastic/Glass	None	HNO_3 to pH<2	28 days	250 mL
Other Metals	Plastic/Glass	None	HNO_3 to pH<2[15]	6 months	250 mL
Acrolein and Acrylonitrile	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7] Adjust pH to 4-5[13]	14 days	1 L
Benzidines	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7]	7 days[8]	1 L
Chlorinated Hydrocarbons	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7]	7 days[8]	1 L
Dioxins and Furans	Glass[10]	4°C	None	30 days[8]	1 L
Haloethers	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7]	7 days[8]	1 L
Nitroaromatics and cyclic ketones	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7], store in dark	7 days[8]	1 L
Nitrosamines	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7], store in dark	7 days[8]	1 L
Organochlorine Pesticides	Glass[10]	4°C	None	7 days[8]	1 L
Organophosphorus Pesticides	Glass[10]	4°C	Adjust pH[9]	7 days[8]	1 L
PCBs	Glass[10]	4°C	None	None[14]	1 L
Phenols	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7]	7 days[8]	1 L

PARAMETER	CONTAINER [1]	PRESERVATION[2,3] Temp.[12]	Chemical	HOLDING TIME[4]	SAMPLE VOLUME
Phthalate Esters	Glass[10]	4°C	None	7 days[8]	1 L
Polynuclear Aromatic Hydrocarbons	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7], store in dark	7 days[8]	1 L
Purgeable Hydrocarbons	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7] Adjust pH <2[2]	14 days	40 mL
Purgeable Halocarbons	Glass[10]	4°C	0.0008 % $Na_2S_2O_3$[7]	14 days	40 mL
Total Organic Halides (TOX)	Glass[10]	4°C	Adjust pH to <2 with H_2SO_4	28 days	1 L
Radiological Tests (Alpha, Beta, Radium)	Plastic/Glass	None	HNO_3 to pH<2	6 months	250 mL

Key to Table

1. Plastic should be Polyethylene.
2. Sample preservation should be performed immediately upon sample collection. For composite chemical samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.
3. When any sample is to be shipped by common carrier or sent through the United States mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For the preservation requirements of Table 6-8, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid, (HCl) in water, solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).
4. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
5. If oxidizing agents are present, add 5 mL 0.1 N $NaAsO_2$ or 0.06 g of ascorbic acid per L. See Cyanide SOP for additional information about other interferences.
6. Adjust pH to <2 with H_2SO_4, HCl, or solid $NaHSO_4$. Free Chlorine must be removed prior to adjustment.
7. Free Chlorine must be removed by the appropriate addition of $Na_2S_2O_3$.
8. 7 days until extraction. 40 days after extraction.
9. Adjust pH to 5-8 using NaOH or H_2SO_4.
10. With Teflon lined septum.
11. Holding Time is listed as "As Soon as Possible" in SW 846. Per EPA MICE, the recommended maximum holding time for pH in water is 24 hours and pH in soil is 7 days. There are no mandated regulatory requirements.
12. For samples with a temperature requirement of 4°C, a sample temperature of just above the water freezing temperature to $\leq$ 6°C is acceptable.
13. Based on guidance from EPA MICE, if samples are received without pH adjustment, the holding time is 7 days.
14. Analysis to be completed within 40 days after extraction.
15. Acid preservation may be omitted for shipping and laboratory will acidify at least 24 hours prior to analysis.

Table 22-7.
Holding Times, Preservation and Container Requirements: RCRA – Non-Aqueous

PARAMETER	CONTAINER [1]	PRESERVATION Temp.[7]	PRESERVATION Chemical	HOLDING TIME[2]	SAMPLE WEIGHT
Chloride	Glass	4°C	None	28 days	50 g
Cyanide -Total	Glass	4°C	None	14 days	50 g
Cyanide - Amenable	Glass	4°C	None	14 days	50 g
Hydrogen Ion (pH)	Glass	4°C	None	7 days[6]	50 g
Nitrate	Glass	4°C	None	N/A	50 g
Oil and Grease	Glass	4°C	None	28 days	50 g
Sulfide	Glass	4°C	Add Zn Acetate, zero headspace	7 days	50 g
Chromium VI	Glass	4°C	None	30 days	50 g
Mercury	Plastic/Glass	None	None	28 days	50 g
Other Metals	Plastic/Glass	None	None	6 months	50 g
Acrolein and Acrylonitrile	Glass[4]	4°C	None	14 days	50 g
Benzidines	Glass[4]	4°C	None	14 days[3]	50 g
Chlorinated Hydrocarbons	Glass[4]	4°C	None	14 days[3]	50 g
Dioxins and Furans	Glass[4]	4°C	None	30 days[3]	50 g
Haloethers	Glass[4]	4°C	None	14 days[3]	50 g
Nitroaromatics and cyclic ketones	Glass[4]	4°C	None	14 days[3]	50 g
Nitrosamines	Glass[4]	4°C	None	14 days[3]	50 g
Organochlorine Pesticides	Glass[4]	4°C	None	14 days[3]	50 g
Organophosphorus Pesticides	Glass[4]	4°C	None	14 days[3]	50 g
PCBs	Glass[4]	4°C	None	None[8]	50 g
Phenols	Glass[4]	4°C	None	14 days[3]	50 g
Phthalate Esters	Glass[4]	4°C	None	14 days[3]	50 g
Polynuclear Aromatic Hydrocarbons	Glass[4]	4°C	None	14 days[3]	50 g

PARAMETER	CONTAINER [1]	PRESERVATION Temp.[7]	Chemical	HOLDING TIME[2]	SAMPLE WEIGHT
Purgeable Hydrocarbons	Glass[4]	4°C	None	14 days[5]	50 g
Purgeable Halocarbons	Glass[4]	4°C	None	14 days[5]	50 g
Total Organic Halides (TOX)	Glass[4]	4°C	None	28 days	50 g

Key to Table

1. Plastic should be Polyethylene.
2. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
3. 14 days until extraction. 40 days after extraction.
4. With Teflon Lined Septum.
5. See Volatile SOP for more detailed preservation requirements.
6. Holding Time is listed as "As Soon as Possible" in SW 846. Per EPA MICE, the recommended maximum holding time for pH in water is 24 hours and pH in soil is 7 days. There are no mandated regulatory requirements.
7. For samples with a temperature requirement of 4°C, a sample temperature of just above the water freezing temperature to $\leq$ 6°C is acceptable.
8. Analysis to be completed within 40 days after extraction.

Table 22-8.
Holding Times, Preservation and Container Requirements: Air Samples

PARAMETER	CONTAINER [1]	PRESERVATION Temp.	Chemical	HOLDING TIME[2]	SAMPLE WEIGHT
Volatile Organics	Summa Canister	None	None	30 days	6L or 1L
Volatile Organics	Tedlar Bag	None	None	72 hrs[3,4]	1 L

Key to Table

1. Plastic should be Polyethylene.
2. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid.
3. Holding Time is based on SW 846 Method 0040 "SAMPLING OF PRINCIPAL ORGANIC HAZARDOUS CONSTITUENTS FROM COMBUSTION SOURCES USING TEDLAR® BAGS". Some states specifically enforce this holding time (e.g. Florida, New Jersey) and others have not specified this information in their regulatory requirements.
4. The holding time is 72 hours unless the laboratory has a documented validation study that indicates a longer HT is acceptable for the analytes of interest.

SECTION 23. HANDLING OF SAMPLES

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. An example of a COC form may be found in Figure 23-1.

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 (see Figure 23-1). 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 TestAmerica 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 TestAmerica 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 lab 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, legal COCs will be generated per the Manual for Certification of Laboratories Analyzing Drinking Water, Fifth Edition, January 2005, Appendix A, and SOP No. WS-QA-0003, "Sample Receipt and Procedures".

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 summarized in the following sections and in SOP No. WS-QA-0003, "Sample Receipt and Procedures".

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.

23.2.1.1 Unique Sample Identification

When samples arrive at the laboratory, they are assigned a tracking ID consisting of the Lot ID and a sample number. The lot ID is a 9 character alphanumeric identifier, with the composition as follows:

Character Position	Valid Values	Significance
First	"G"	Assigned to TestAmerica West Sacramento, to distinguish from other laboratories using the Quantims LIMS.
Second	0-9	Last digit of the year in which the samples are received.
Third	A – L	Corresponds to the month in which the samples are received. A = January, B= February, etc.
Fourth & Fifth	01 – 31	Corresponds to the day of the month in which samples are received.
Sixth	0	Separator between day and sequence values.
Seventh through Ninth	400 – 999	Sequence value denoting the order in which lots were logged into Quantims on a given day. Each lot will have a unique sequence number, no matter which Quantims Laboratory logged in the lot.

From the table above, the lot ID G0F100544 is for TestAmerica West Sacramento, logged in in 2010, June, the tenth day, and sequence number 544 for that day.

Once a lot ID is assigned and samples are individually logged in, a workorder(5) and bottle number are assigned to each container. In addition, workorder(8) values are assigned for each analysis requested. The workorder(8) is used to distinguish extracts and digestates produced from the sample. The workorder(5) consists of 5 alphanumeric characters assigned by the LIMS. The LIMS assigns these values sequentially as samples are logged in across the network, using 0-9, and letters of the alphabet excluding "B", "O" and "I", as these may be mistaken for numbers. In addition, sample containers are labeled with the lot ID and a sample number (from 1 to 99).

The workorder(8) consists of the workorder(5), plus 3 additional alphanumeric characters, beginning with "1AA". The first digit of the additional characters denotes the analysis number, such that "1" is the first analysis, "2" is a reanalysis, etc. The second and third characters are assigned sequentially as test requests are added to the sample.

23.3 Sample Acceptance Policy

The laboratory has a written sample acceptance policy (Figure 23-2) 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. A copy of the sample acceptance policy is provided to each client prior to shipment of samples.

23.3.1 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.

23.3.2 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 or empty container 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 "DIT" (destroyed in testing) on the sample receiving check out form 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 TestAmerica.

23.5 Hazardous Samples and Foreign Soils

Foreign soil samples are sent out 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 TestAmerica 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. 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 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.

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, 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: Chain of Custody (COC)

TestAmerica

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel 916 373-5600 Fax 916 372-1059

Chain of Custody Record

Client Contact	Project Manager:	Site Contact:	Date:	COC No:
Your Company Name here	Tel/Fax:	Lab Contact:	Carrier:	____ of ____ COCs
Address	Analysis Turnaround Time			Job No.
City/State/Zip	Calendar (C) or Working Days (W) _____			
(xxx) xxx-xxxx Phone	TAT if different from below _____			COS No.
(xxx) xxx-xxxx FAX	☐ Standard			
Project Name:	☐ 1 week			
Site:	☐ 3 days			
P.O.#	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	# of Matrix	# of Cont.	Filtered Sample														Sample Specific Notes:

Preservation Used: 1= Ice, 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other _____

Possible Hazard Identification:
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For _____ Months*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Figure 23-2. Example: Sample Acceptance Policy

NELAC and TestAmerica West Sacramento have specific requirements under which all samples will be received by the laboratory for analysis. TestAmerica West 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.

TestAmerica West Sacramento 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.
- ✓ Each sample shall be collected in the appropriate sample container and labeled with unique, durable and indelible identification.
- ✓ Drinking waters samples for Method 1613B that may have residual chlorine must be checked and treated in the field, or collected in sodium thiosulfate preserved containers.
- ✓ 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.
- ✓ For samples undergoing chemical warfare degradate analysis, the sample must be screened for agent prior to shipment in accordance with appendix 10 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 11 of our Sample Receipt Procedure (WS-QA-0003).

The laboratory will notify the client/Project Manager upon sample receipt if the samples fail to meet any of the above requirements.

When completing the chain of custody form, please do not forget to sign your name in the "relinquished by" box.

Figure 23-3. Example: Cooler Receipt Form

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT _____ PM _____ LOG # _____

LOT# (QUANTIMS ID) _____ QUOTE# _____ LOCATION _____

Checked (✓)

DATE RECEIVED _____ TIME RECEIVED _____ ☐

DELIVERED BY ☐ FEDEX ☐ ON TRAC ☐ CLIENT
☐ GOLDENSTATE ☐ UPS ☐ GO-GETTERS ☐ OTHER
☐ TAL COURIER ☐ TAL SF ☐ VALLEY LOGISTICS ☐

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☐

CUSTODY SEAL #(S) _____

SHIPPPING CONTAINER(S) ☐ TAL ☐ CLIENT ☐ N/A ☐

COC #(S) _____ ☐

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☐ #5 ☐ ☐ OTHER _____ ☐

Initials Date

==========

pH MEASURED ☐ YES ☐ ANOMALY ☐ N/A ☐
LABELED BY..... ☐
LABELS CHECKED BY..... ☐
PEER REVIEW _____ ☐ NA

SHORT HOLD TEST NOTIFICATION SAMPLE RECEIVING ☐
WETCHEM ☐ N/A ☐
VOA-ENCORES ☐ N/A ☐

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☐ N/A ☐

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH ☐ N/A ☐
APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES

☐ CLOUSEA ☐ TEMPERATURE EXCEEDED (2 °C – 6 °C)** ☐ N/A
☐ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☐ PM NOTIFIED

Initials Date

Notes _____

** Acceptable temperature range for State of Wisconsin samples is ±4°C

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID:_____

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB																				
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ																				
250AGJ																				
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____°CT																				
Encore																				
Folder/filter																				
PUF																				
Petr/Filter																				
XAD Trap																				
Z pipe																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

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SECTION 24. 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. 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, distillation, reflux, evaporation, drying and ashing. During these pre-treatment steps, samples are arranged into discreet 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 Blank (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). Additionally, trip blanks may be prepared and analyzed for volatile analysis of air samples, when required by the client. 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 (such as Phosphorus), 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/A2LA 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 PCBs in Method 608), 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 24-3. 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).
	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 20-30 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 ≤ 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 Policy WS-PQA-003 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 Department Of Defense (DOD) 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 exceedences 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 Additonal 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 15).

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 9 and 21.
- A discussion on selectivity of the test is included in Section 5.
- Constant and consistent test conditions are discussed in Section 18.
- The laboratories sample acceptance policy is included in Section 23.

SECTION 25. 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 7.

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 or prepared electronically 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 For Samples) with a "sample results" column header.

25.2.2 Each report cover page printed on company letterhead, which includes the laboratory name, address and telephone number.

25.2.3 A unique identification of the report (e.g. work order number) 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.
- In most cases, the applicable COC is an integral part of the report.
- Any additional addenda to the report must be treated in a similar fashion so it is a recognizable part of the report and cannot accidentally get separated from the report (e.g., Sampling information).

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.

25.2.19 A statement that the report shall not be reproduced except in full, without prior express written approval by the laboratory coordinator.

25.2.20 A signature and title of the person(s) accepting responsibility for the content of the report and date of issue. Signatories are appointed by the Lab Director.

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). A complete report must be sent once all of the work has been completed.

25.2.27 Any non-TestAmerica subcontracted analysis results are provided as a separate report on the official letterhead of the subcontractor. All TestAmerica subcontracting is clearly identified on the report as to which laboratory performed a specific analysis.

25.2.28 A clear statement notifying the client that non-accredited tests were performed and directing the client to the laboratory's accreditation certificates of approval shall be provided when non-accredited tests are included in the report.

Note: Refer to the Corporate SOP on Electronic Reporting and Signature Policy (No. CA-I-P-002) for details on internally applying electronic signatures of approval.

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 II is a report with the features described in Section 25.2 above, plus summary information, including results for the method blank reported to the laboratory MDL if required, 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. No raw data is provided unless it is necessary to provide the relevant calibration information.
- 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 electronic deliverable form via e-mail, posting to an FTP site, or CD ROM. Initial reports may be provided to clients by facsimile. All faxed reports are followed by hardcopy. Procedures used to ensure client confidentiality are outlined in Section 25.6.

25.3.1 Electronic Data Deliverables (EDDs)

EDDs are routinely offered as part of TestAmerica's services. TestAmerica West Sacramento offers a variety of EDD formats including Environmental Restoration Information Management System (ERPIMS), New Agency Standard (NAS), Format A, Excel, Dbase, GISKEY, and Text 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.

25.4 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.

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.

25.5 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 Corporate SOP on Subcontracting (SOP No. CA-L-S-002).

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 TestAmerica are reported to the client on the subcontract laboratory's original report stationery and the report includes any accompanying documentation.

25.6 Client Confidentiality

In situations involving the transmission of environmental test results by telephone, facsimile or other electronic means, client confidentiality must be maintained.

TestAmerica 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 TestAmerica or any information disclosed to TestAmerica 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 TestAmerica under the compulsion of legal process. TestAmerica 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.

25.6.1 Report deliverable formats are discussed with each new client. If a client requests that reports be faxed or e-mailed, the reports are faxed with a cover sheet or e-mailed with the following note that includes a confidentiality statement similar to the following:

> *This material is intended only for the use of the individual(s) or entity to whom it is addressed, and may contain information that is privileged and confidential. If you are not the intended recipient, or the employee or agent responsible for delivering this material to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by telephone at the 1-916-373-5600*

(or for e-mails: please notify us immediately by e-mail or by phone (1-916-373-5600) and delete this material from any computer).

25.7 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.

25.8 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 the Archive data server, as is the original report. The revised report is stored in the Archive data server under the sample number followed by "Amend". The revised report will have the word "revised" or "amended" next to the date in the footer.

When the report is re-issued, a notation of "Amended" 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 11/3/11 to include toluene in sample NQA1504 per client's request. This final report replaces the final report generated on 10/27/11.*

25.9 Policies on Client Requests for Amendments

25.9.1 Policy on Data Omissions or Reporting Limit Increases

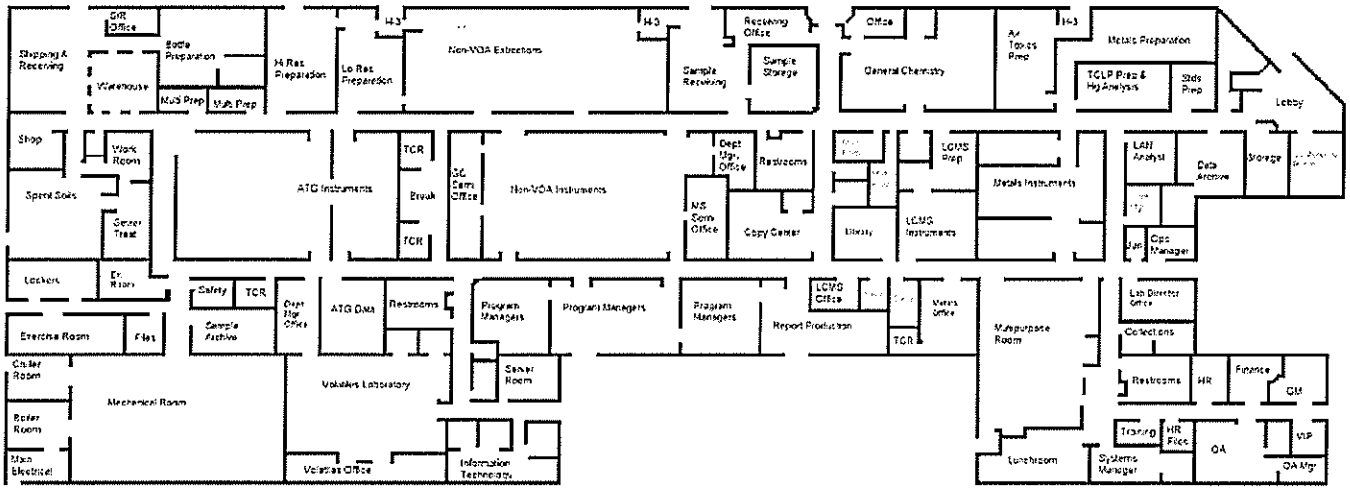
Fundamentally, our policy is simply to not omit previously reported results (including data qualifiers) or to not raise reporting limits and report sample results as ND. This policy has few exceptions. Exceptions are:

- 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.

25.9.2 Multiple Reports

TestAmerica 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. Laboratory Floor Plan



Facility Size	Square Feet
Total Area	66,000
Lab Area	43,000
Storage Area	5,200
	Linear Feet
Bench Top	3,000
Hoods	500

Appendix 2. Glossary/Acronyms (EL-V1M2 Sec. 3.1)

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)

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 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 safeguarding 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 Audit: A qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data re 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)

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 if 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 filing 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 ± 100%. The IDL represents a <u>range</u> where <u>qualitative</u> 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)]: A laboratory's estimate of the minimum amount of an analyte in a given matrix that an analytical process can reliably detect in their facility. (TNI)

LOD Verification [a.k.a., MDL Verification]: A processed QC sample in the matrix of interest, spiked with the analyte at no more than 3X the LOD for single analyte tests and 4X the LOD for multiple analyte tests and processed through the entire analytical procedure.

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. (TNI)

(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 sorbant 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: The minimum concentration of a substance (an analyte) that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte. (40 CFR Part 136, Appendix B)

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.

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 axis. 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 for 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
MSDS - Material Safety Data Sheet
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
SOP – Standard Operating Procedure
TAT – Turn-Around-Time
VOA – Volatiles
VOC – Volatile Organic Compound

Appendix 3. Laboratory Certifications, Accreditations, Validations

TestAmerica West Sacramento 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:

TestAmerica

TestAmerica Certifications

Laboratory	Program	Authority	Identification	Expiration Date
TestAmerica West Sacramento	Alaska UST	Alaska	UST-065	12/08/2011
TestAmerica West Sacramento	DoD ELAP	ADLA	3205-01	01/31/2012
TestAmerica West Sacramento	NELAC	California	1119CA	01/31/2012
TestAmerica West Sacramento	NELAC	Florida	E87570	06/30/2011
TestAmerica West Sacramento	NELAC	Illinois	200060	03/17/2012
TestAmerica West Sacramento	NELAC	Kansas	E-10375	10/31/2011
TestAmerica West Sacramento	NELAC	Louisiana	30512	06/30/2011
TestAmerica West Sacramento	NELAC	New Jersey	CA005	06/30/2012
TestAmerica West Sacramento	NELAC	New York	11666	04/01/2012
TestAmerica West Sacramento	NELAC	Oregon	CA200006	03/28/2012
TestAmerica West Sacramento	NELAC	Pennsylvania	68-01272	03/31/2012
TestAmerica West Sacramento	NELAC	Texas	T104704399-06-TX	05/31/2012
TestAmerica West Sacramento	NELAC	Utah	QUAN1	01/31/2012
TestAmerica West Sacramento	State Program	Arizona	AZ0705	05/11/2012
TestAmerica West Sacramento	State Program	Arkansas	88-0691	06/17/2011
TestAmerica West Sacramento	State Program	Colorado	N/A	03/31/2011
TestAmerica West Sacramento	State Program	Connecticut	PH-0691	06/30/2011
TestAmerica West Sacramento	State Program	Georgia	962	01/31/2010
TestAmerica West Sacramento	State Program	Guam	N/A	03/31/2011
TestAmerica West Sacramento	State Program	Hawaii	N/A	01/31/2012
TestAmerica West Sacramento	State Program	Michigan	9947	01/31/2012
TestAmerica West Sacramento	State Program	Nevada	CA44	07/31/2011
TestAmerica West Sacramento	State Program	New Mexico	N/A	06/30/2011
TestAmerica West Sacramento	State Program	South Carolina	87014	01/31/2012
TestAmerica West Sacramento	State Program	Virginia	175	06/30/2011
TestAmerica West Sacramento	State Program	Washington	C681	08/06/2012
TestAmerica West Sacramento	State Program	Wisconsin	999044680	08/31/2011
TestAmerica West Sacramento	State Program	Wyoming	8TMS-Q	01/31/2012
TestAmerica West Sacramento	US Fish & Wildlife	US Fish & Wildlife	LE148388-0	02/28/2012
TestAmerica West Sacramento	USDA	USDA	P330-09-00055	03/10/2012
TestAmerica West Sacramento	USEPA UCMR	USEPA UCMR	CA00044	12/18/2011
TestAmerica West Sacramento	West Virginia DEP	West Virginia	334	07/31/2012
TestAmerica West Sacramento	West Virginia DHHR (DW)	West Virginia	9930C	12/31/2011

For more information, or to contact a local TestAmerica representative nearest you, please visit our website at www.testamericainc.com

The certificates and parameter lists (which may differ) are available, upon request, from a laboratory representative for each organization may be found on the corporate web site, the laboratory's public server, the final report review table, and in the following offices: QA, marketing, and project management.

Appendix 4: Listing of Methods Performed

Preparation Only Methods

Method	Aqueous	Solid	Waste	Biological	Air
Organics					
Calif. CAM-WET	X	X	X		
EPA 1311	X	X	X		
EPA 3510C	X				
EPA 3520C	X				
EPA 3535	X				
EPA 3540B		X			
EPA 3542					X
EPA 3550B		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	X	X	X		
EPA 5035	X	X	X		
Inorganics					
Calif. CAM WET	X	X	X		
EPA 1311	X	X	X		
EPA 1312 (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	SW846 8260B	X	X	X		
Base Neutrals and Acids (BNAs)	SW846 8270B	X	X	X	X	
	TO-13A					X
	IP-7					X
	EPA 23					X
Organochlorine Pesticides	SW846 8081A	X	X	X	X	
	TO-4A					X
	TO-10A					X
	IP-8					X
	WS-ID-0014	X	X	X	X	
	EPA 1669 (Mod)	X	X	X		
PCBs	EPA 8082	X	X	X	X	
	TO-4A					X
	TO-10A					X
Petroleum Hydrocarbons	EPA 8015B	X	X	X		
	CA LUFT	X	X	X		
	AK101	X	X	X		
	Ak102	X	X	X		
	AK103	X	X	X		
	NWTPH-Gx	X	X	X		
	NWTPH-Dx	X	X	X		
	GRO/DRO	X	X	X		
Nitroaromatics and Nitroamines	EPA 8330	X	X	X		X
	EPA 8330A	X	X	X		
	EPA 8330B	X	X	X		
	EPA 8321A (modified)	X	X	X		
	WS-LC-0001	X	X	X		
	WS-LC-0009	X	X	X		
	WS-LC-0010	X	X	X		
Nitrosamines	WS-MS-0012	X	X			
PAHs	EPA 8270C (SIM Isotope dilution)	X	X	X	X	X
	EPA 8270C (SIM)	X	X	X		
	CARB 429	X	X	X	X	X
	TO-13A					X
	IP-7					X
1,4-Dioxane	WS-MS-0010	X				
Alkyl Phenols	WS-MS-0013	X	X		X	
CBSA	WS-LC-0013	X	X			

Parameter	Method	Aqueous	Solid	Waste	Biological	Air
Chemical Warfare Degradates	WS-LC-0004	X	X			
Organosulfur Degradates	EPA 8270C	X	X			
	WS-MS-0003	X	X			
PFOA/PFOS	WS-LC-0020	X	X			
PPCPs (Pharmaceuticals & Personal Care Products)	EPA 1694	X				
Steroids & Hormones	EPA 1698	X				
PCB Congeners	EPA 1668A	X	X	X	X	X
	EPA 1668C	X	X	X	X	X
	CBC1.2	X	X	X		
Dioxins & Furans	EPA 1613B	X	X			
	EPA 8290	X	X	X	X	
	EPA 8290A	X	X	X	X	
	EPA 8280A	X	X	X	X	
	EPA 8280B	X	X	X	X	
	DLFM2.2	X	X	X		
	EPA 0023A					X
	EPA 23					X
	TO-9					X

Metals Methods Performed

Parameter	Methods	Aqueous	Solid	Waste	Biological	Air
Trace Metals	EPA 200.7	X				
	EPA 200.8	X				
	EPA 6010B	X	X	X	X	X
	EPA 6020	X	X	X	X	X
	EPA 0060					X
	EPA 12					X
	CARB 12					X
	EPA 29					X
	CARB 436					X
Hardness	SM 2340B	X				
	EPA 200.7	X				
	EPA 200.8	X				
Mercury	EPA 245.1	X				
	EPA 200.8	X				
	EPA 7470A	X				
	EPA 7471A		X	X	X	X
	EPA 101A					X
	ASTM D6784-02					X
	Ontario-Hydro					X
	EPA 0060					X
	EPA 29					X
	CARB 436					X

Inorganics Methods Performed

Parameter	Method	Aqueous	Solid	Waste	Biological	Air
Alkalinity (Carbonate, Bicarbonate, Total)	SM 2320B	X				
Ammonia	EPA 350.1	X				X
Bromide	EPA 300.0	X				
	EPA 9056	X	X			
	EPA 9057					X
	EPA 26A					X
	CARB 421					X
Carbon, Total Inorganic	EPA 9060	X	X			
Carbon, Total Organic	EPA 9060	X	X			
	SM 5310 C	X				
Chloride	EPA 300.0	X				
	EPA 9056	X	X			
	EPA 9057					X
	EPA 26A					X
	CARB 421					X
Chromium, Hexavalent	EPA 7196A	X	X			
	EPA 0061					X
	EPA 306					X
	CARB 426					X
Conductivity	EPA 9050A	X				
	SM 2510 B	X				
Cyanide, Free	EPA 9012A	X	X			
	SM 4500 CN E	X				
Cyanide, Total	EPA 335.4	X				
	EPA 9012A	X	X			
	CARB 426					X
Demand, Chemical Oxygen	EPA 410.4	X				
Flouride	EPA 300.0	X	X			
	EPA 9056	X	X			
	SM 4500 F C	X				
	EPA 9057					X
	EPA 26A					X
	CARB 421					X
n-Hexane Extractable Materials	EPA 1664A	X				
	EPA 9070A	X				
	EPA 9071B		X			
Moisture	ASTM 2216		X			

Nitrate	EPA 353.2	X				
	EPA 300.0	X				
	EPA 9056	X	X			
	CARB 421					X
Nitrate-Nitrite	EPA 353.2	X				
Nitrite	EPA 353.2	X				
	EPA 300.0	X				
	EPA 9056	X	X			
	CARB 421					X
Nitrocellulose	EPA 353.2	X	X			
	WS-WC-0050	X	X			
Total Kjeldahl Nitrogen	EPA 351.2	X				
Orthophosphate	EPA 300.0	X				
	EPA 9056	X	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			
	WS-LC-0012	X	X			
pH	SM 4500 H+ B	X				
	EPA 150.2	X				
	EPA 9040A	X				
	EPA 9041A	X				
	EPA 9045C		X	X		
Phosphorus, Total	EPA 365.4	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 9065	X				
Sulfide	SM 4500 S2- D	X				

Appendix 5 . Data Qualifiers

Qualifier Organic	Qualifier Inorganic	Footnote
U	U	Analyte analyzed for but was not detected.
G	G	Elevated reporting limit. The reporting limit is elevated due to matrix interference.
J	B	Estimated result. Result is less than RL.
E	I	Estimated result. Result concentration exceeds the calibration range.
B	J	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
P	*	Relative percent difference (RPD) is outside stated control limits.
a	N	Spiked analyte recovery is outside stated control limits.
*		Surrogate recovery is outside stated control limits.
PG		The percent difference between the original and confirmation analyses is greater than 40%.

APPENDIX J – FINACIAL ASSURANCE

FOR YOUR RECORDS

GENERAL SURETY RIDER

To be attached and form a part of

Type of Bond: Closure/Post Closure Bonds

Bond No. : 1143852

Dated effective: 6/30/2017
(MONTH, DAY, YEAR)

executed by: Emerald Transformer Western States LLC , as Principal,
(PRINCIPAL)

and by: Lexon Insurance Company , as Surety,
(SURETY)

and in favor of : U.S. Environmental Protection Agency (EPA) .
(OBLIGEE)

In consideration of the mutual agreements herein contained the Principal and the Surety hereby consent to changing

INFORMATION	FROM	TO
Description	EPA Identification Number CAD 050 806 850, Clean Harbors Los Angeles, 5756 Alba St., Los Angeles, CA 90058	Emerald Transformer LA, LLC; 5756 Alba Street Los Angeles, CA 90058; EPA ID CAD 050 806 850

Nothing herein contained shall vary, alter or extend any provision or condition of this bond except as herein expressly stated.

This rider is effective 6/30/2017
(MONTH, DAY, YEAR)

Signed and Sealed 8/22/2017
(MONTH, DAY, YEAR)

Emerald Transformer Western States LLC
PRINCIPAL

BY: Robin Nelson VP of Finance
TITLE

Lexon Insurance Company
SURETY

BY: Kristin D. Thurber
Kristin D. Thurber, ATTORNEY-IN-FACT

POWER OF ATTORNEY

LX- 296041

Lexon Insurance Company

KNOW ALL MEN BY THESE PRESENTS, that **LEXON INSURANCE COMPANY**, a Texas Corporation, with its principal office in Louisville, Kentucky, does hereby constitute and appoint: David G. Jensen, Erin Brown, Kristin D. Thurber its true and lawful Attorney(s)-In-Fact to make, execute, seal and deliver for, and on its behalf as surety, any and all bonds, undertakings or other writings obligatory in nature of a bond.

This authority is made under and by the authority of a resolution which was passed by the Board of Directors of **LEXON INSURANCE COMPANY** on the 1st day of July, 2003 as follows:

Resolved, that the President of the Company is hereby authorized to appoint and empower any representative of the Company or other person or persons as Attorney-In-Fact to execute on behalf of the Company any bonds, undertakings, policies, contracts of indemnity or other writings obligatory in nature of a bond not to exceed $4,500,000.00, Four Million Five Hundred Thousand dollars, which the Company might execute through its duly elected officers, and affix the seal of the Company thereto. Any said execution of such documents by an Attorney-In-Fact shall be as binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company. Any Attorney-In-Fact, so appointed, may be removed for good cause and the authority so granted may be revoked as specified in the Power of Attorney.

Resolved, that the signature of the President and the seal of the Company may be affixed by facsimile on any power of attorney granted, and the signature of the Assistant Secretary, and the seal of the Company may be affixed by facsimile to any certificate of any such power and any such power or certificate bearing such facsimile signature and seal shall be valid and binding on the Company. Any such power so executed and sealed and certificate so executed and sealed shall, with respect to any bond of undertaking to which it is attached, continue to be valid and binding on the Company.

IN WITNESS THEREOF, **LEXON INSURANCE COMPANY** has caused this instrument to be signed by its President, and its Corporate Seal to be affixed this 5th day of August, 2015.

LEXON INSURANCE COMPANY

LEXON INSURANCE COMPANY CORPORATE SEAL MARCH 15, 1994 STATE OF TEXAS

BY _____
David E. Campbell
President

ACKNOWLEDGEMENT

On this 5th day of August, 2015, before me, personally came David E. Campbell to me known, who be duly sworn, did depose and say that he is the President of **LEXON INSURANCE COMPANY**, the corporation described in and which executed the above instrument; that he executed said instrument on behalf of the corporation by authority of his office under the By-laws of said corporation.

AMY TAYLOR STATE OF TENNESSEE NOTARY PUBLIC DAVIDSON COUNTY

AMY TAYLOR
Notary Public- State of Tennessee
Davidson County
My Commission Expires 07-08-19

BY _____
Amy Taylor
Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of **LEXON INSURANCE COMPANY**, A Texas Insurance Company, DO HEREBY CERTIFY that the original Power of Attorney of which the forgoing is a true and correct copy, is in full force and effect and has not been revoked and the resolutions as set forth are now in force.

Signed and Seal at Mount Juliet, Tennessee this 22nd Day of August, 20 17.

LEXON INSURANCE COMPANY CORPORATE SEAL MARCH 15, 1994 STATE OF TEXAS

BY _____
Andrew Smith
Assistant Secretary

"WARNING: Any person who knowingly and with intent to defraud any insurance company or other person, files and application for insurance of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact material thereto, commits a fraudulent insurance act, which is a crime and subjects such person to criminal and civil penalties."

FOR YOUR RECORDS

GENERAL SURETY RIDER

To be attached and form a part of

Type of Bond: Closure/Post Closure Bonds

Bond No. : 1143853

Dated effective: 6/30/2017
(MONTH, DAY, YEAR)

executed by: Emerald Transformer Western States LLC, as Principal,
(PRINCIPAL)

and by: Lexon Insurance Company, as Surety,
(SURETY)

and in favor of : U.S. Environmental Protection Agency (EPA).
(OBLIGEE)

In consideration of the mutual agreements herein contained the Principal and the Surety hereby consent to changing

INFORMATION	FROM	TO
Description	EPA Identification Number CAD 050 806 850, Clean Harbors Los Angeles, 5756 Alba St., Los Angeles, CA 90058	Emerald Transformer LA, LLC; 5756 Alva Street Los Angeles, CA 90058; EPA ID CAD 050 806 850

Nothing herein contained shall vary, alter or extend any provision or condition of this bond except as herein expressly stated.

This rider is effective 6/30/2017
(MONTH, DAY, YEAR)

Signed and Sealed 8/22/2017
(MONTH, DAY, YEAR)

Emerald Transformer Western States LLC
PRINCIPAL

BY: Robert Wilson / VP of Finance
TITLE

Lexon Insurance Company
SURETY

BY: Kristin D. Thurber
Kristin D. Thurber, ATTORNEY-IN-FACT

POWER OF ATTORNEY

LX- 296042

Lexon Insurance Company

KNOW ALL MEN BY THESE PRESENTS, that **LEXON INSURANCE COMPANY**, a Texas Corporation, with its principal office in Louisville, Kentucky, does hereby constitute and appoint: David G. Jensen, Erin Brown, Kristin D. Thurber its true and lawful Attorney(s)-In-Fact to make, execute, seal and deliver for, and on its behalf as surety, any and all bonds, undertakings or other writings obligatory in nature of a bond.

This authority is made under and by the authority of a resolution which was passed by the Board of Directors of **LEXON INSURANCE COMPANY** on the 1st day of July, 2003 as follows:

Resolved, that the President of the Company is hereby authorized to appoint and empower any representative of the Company or other person or persons as Attorney-In-Fact to execute on behalf of the Company any bonds, undertakings, policies, contracts of indemnity or other writings obligatory in nature of a bond not to exceed $4,500,000.00, Four Million Five Hundred Thousand dollars, which the Company might execute through its duly elected officers, and affix the seal of the Company thereto. Any said execution of such documents by an Attorney-In-Fact shall be as binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company. Any Attorney-In-Fact, so appointed, may be removed for good cause and the authority so granted may be revoked as specified in the Power of Attorney.

Resolved, that the signature of the President and the seal of the Company may be affixed by facsimile on any power of attorney granted, and the signature of the Assistant Secretary, and the seal of the Company may be affixed by facsimile to any certificate of any such power and any such power or certificate bearing such facsimile signature and seal shall be valid and binding on the Company. Any such power so executed and sealed and certificate so executed and sealed shall, with respect to any bond of undertaking to which it is attached, continue to be valid and binding on the Company.

IN WITNESS THEREOF, **LEXON INSURANCE COMPANY** has caused this instrument to be signed by its President, and its Corporate Seal to be affixed this 5th day of August, 2015.

LEXON INSURANCE COMPANY

LEXON INSURANCE COMPANY CORPORATE SEAL MARCH 18, 1964 STATE OF TEXAS

BY _____
David E. Campbell
President

ACKNOWLEDGEMENT

On this 5th day of August, 2015, before me, personally came David E. Campbell to me known, who be duly sworn, did depose and say that he is the President of **LEXON INSURANCE COMPANY**, the corporation described in and which executed the above instrument; that he executed said instrument on behalf of the corporation by authority of his office under the By-laws of said corporation.

AMY TAYLOR STATE OF TENNESSEE NOTARY PUBLIC DAVIDSON COUNTY

AMY TAYLOR
Notary Public- State of Tennessee
Davidson County
My Commission Expires 07-08-19

BY _____
Amy Taylor
Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of **LEXON INSURANCE COMPANY**, A Texas Insurance Company, DO HEREBY CERTIFY that the original Power of Attorney of which the forgoing is a true and correct copy, is in full force and effect and has not been revoked and the resolutions as set forth are now in force.

Signed and Seal at Mount Juliet, Tennessee this 22nd Day of August, 2017.

LEXON INSURANCE COMPANY CORPORATE SEAL MARCH 18, 1964 STATE OF TEXAS

BY _____
Andrew Smith
Assistant Secretary

"WARNING: Any person who knowingly and with intent to defraud any insurance company or other person, files and application for insurance of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact material thereto, commits a fraudulent insurance act, which is a crime and subjects such person to criminal and civil penalties."

APPENDIX K - EPA GUIDANCE DOCUMENT ON SAMPLING

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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STANDARD OPERATING PROCEDURE FOR SAMPLING POROUS SURFACES FOR POLYCHLORINATED BIPHENYLS (PCBs)

May 2011

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STANDARD OPERATING PROCEDURE FOR SAMPLING POROUS SURFACES FOR POLYCHLORINATED BIPHENYLS (PCBs)

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Revision Page

Date	Rev#	Summary of Changes	Sections
12/97	1	Initial Approval, draft	
3/20/08	2	Major update, only for PCBs, added TSCA sampling	All sections
7/17/08	3	Disposal of dust filter and decon of vac hose	11.0 and 14.0
5/04/11	4	Vacuum Trap Design and Clean-out	9.4

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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 (ft^2).

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.

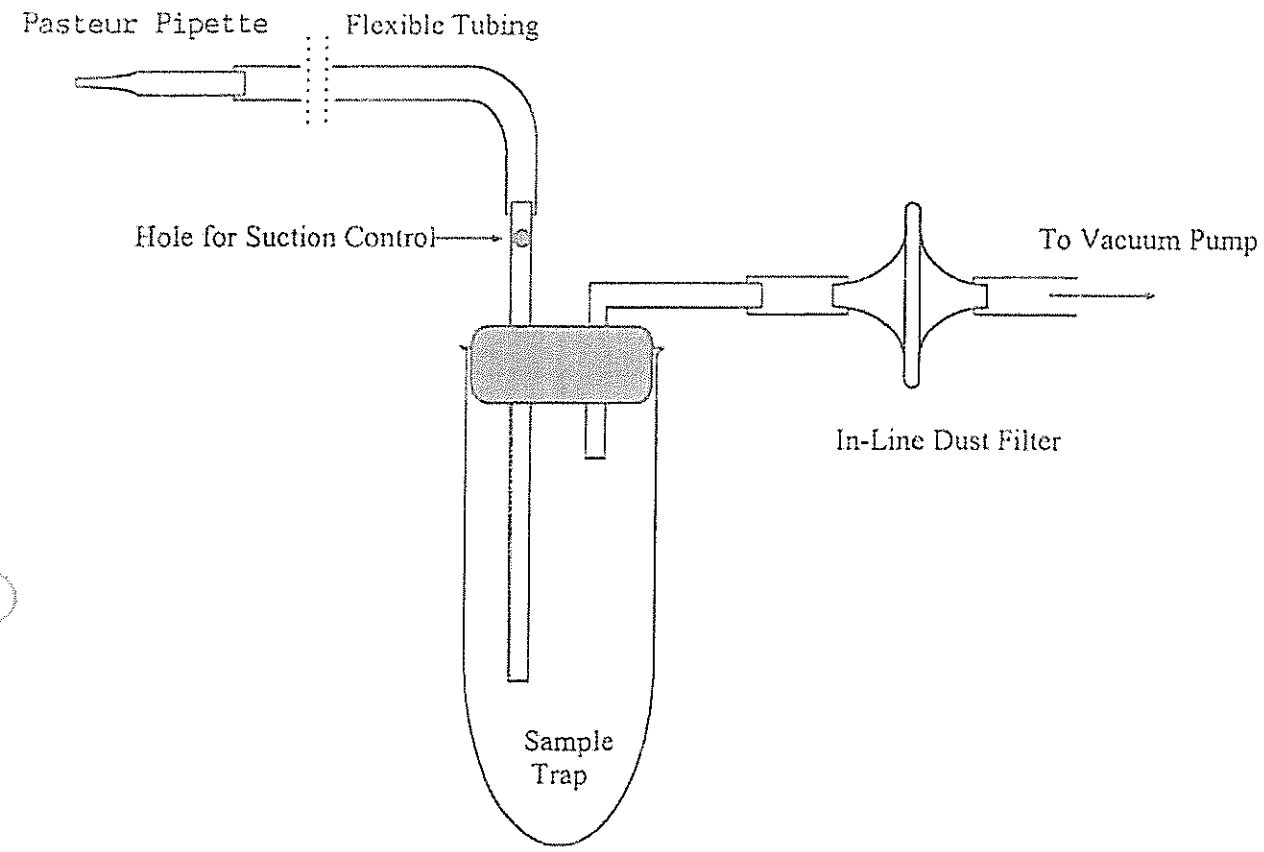
9.3.4.2 Option two: drill with the 1 inch bit and either make the hole larger or use a smaller bit to take the next ½- inch sample.

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 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°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.

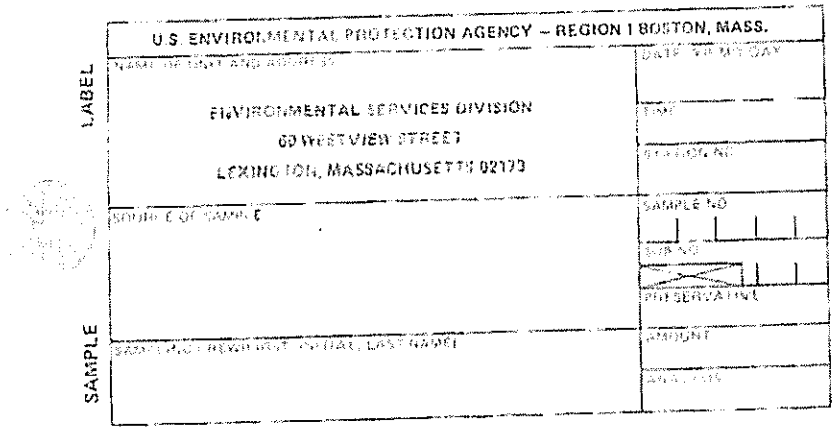
15.0 References

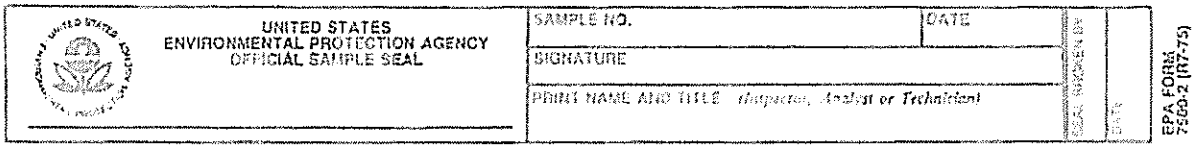
1. Guidance for the Preparation of Standard Operating Procedures for Quality-Related Operations, QA/G-6, EPA/600/R-96/027, November 1995.

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





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)				
	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 L – FACILITY SOP ON WIPE SAMPLING

I. PURPOSE

This procedure is implemented for the permitted TSCA storage area to ensure that there are no contaminates above the regulatory threshold of $10\mu g/100cm^2$ 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

Responsible for selection sample locations, marking sample location on grid map, collecting samples and analyzing (or sending then 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, 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).

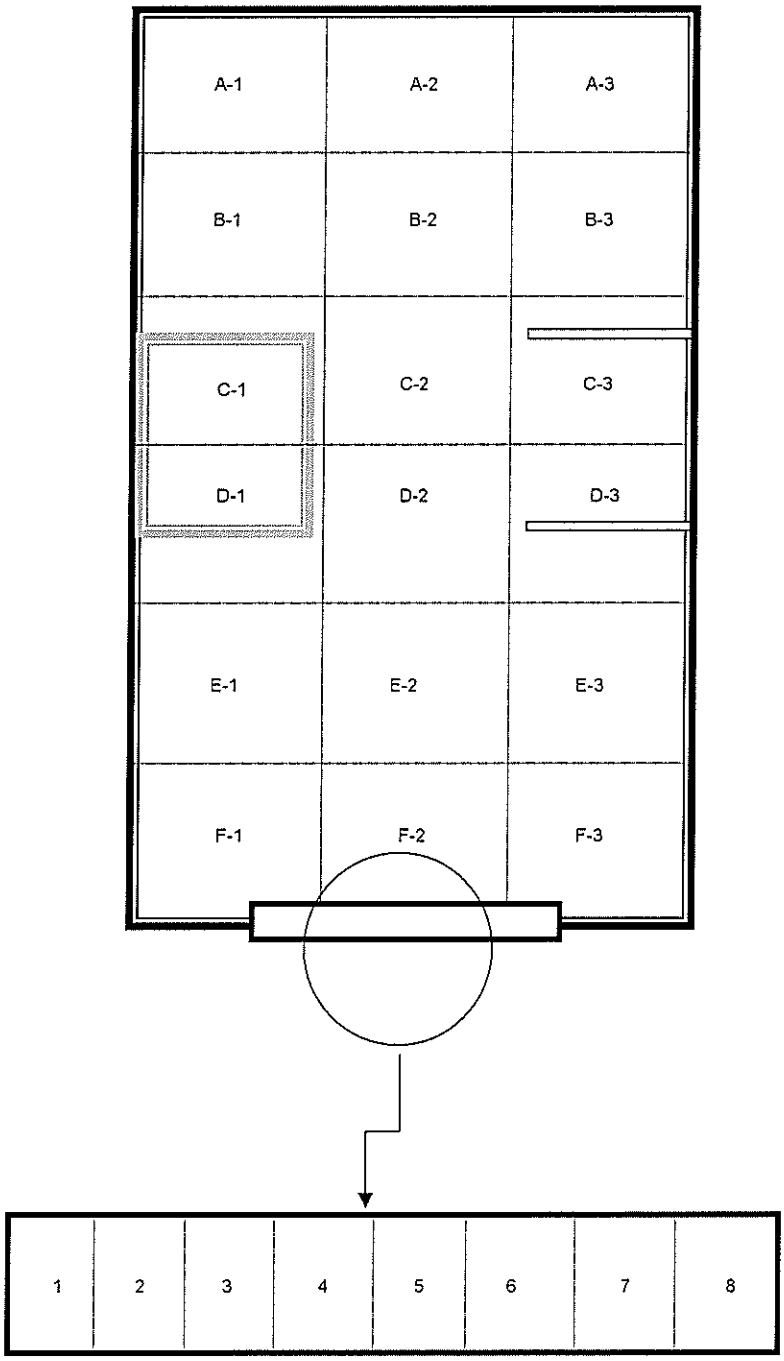


Figure 1

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 10µg/100cm^2 will be considered not contaminated and require no further action. Concentrations above 10ug/100cm^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:
   Manager, RCRA Facilities Management
   U.S. Environmental Protection Agency Region 9
   75 Hawthorne St (WST-4)
   San Francisco, CA 94105

b. 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 10µg/100 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 were 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 $10\mu g/100cm^2$, 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 contaminates

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

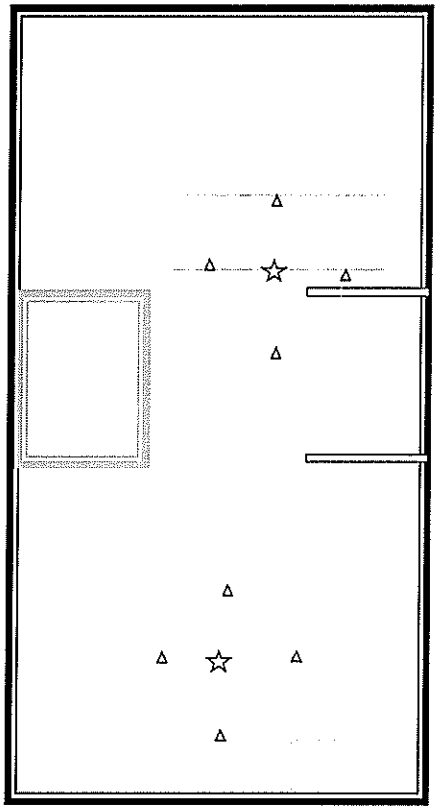


Figure 2

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

TSCA storage area known as Containment Bay E has been closed and removed from the facility. The closure activity was performed under the guidance of the previous facility operator, Clean Harbors. The area was closed in accordance with the information detailed in this section and with applicable TSCA standards. The final closure report is located in Appendix M of this application.

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 (79 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 μg / 100 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 10μg/100cm^2 for non-porous surfaces.

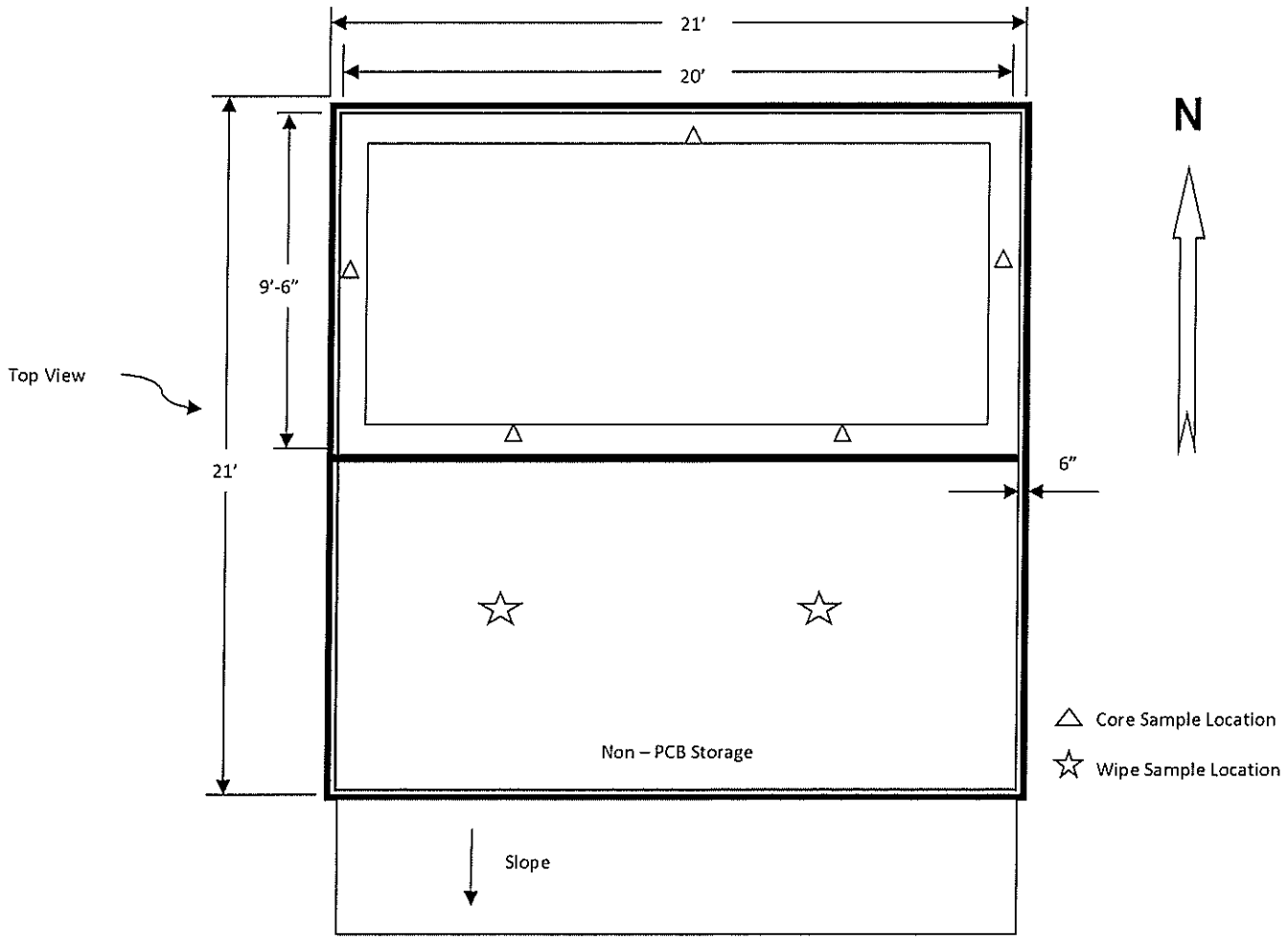
QA/QC Procedures

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 mg/kg for porous surfaces or 10μg/100cm^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

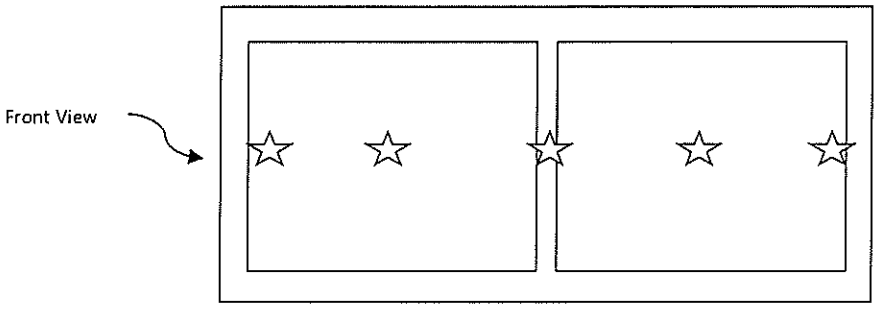
It is anticipated that data from certain samples may not be usable (e.g. lost samples, broken bottles, instrument failure, lab mistakes, etc.). In that event the data set will be evaluated to ensure that a minimum of 90% of the data is complete so that determinations of contaminates can be evaluated. 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 $\mu g/100\ cm^2$ for wipe samples
- All solid sample results must be reported by Dry weight
- Use TSCA-specified extraction methods 3550C or 3540C (Soxhlet is preferred)



PCB Storage
Container



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 contaminates 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 contaminates. Since these area 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 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 were 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**

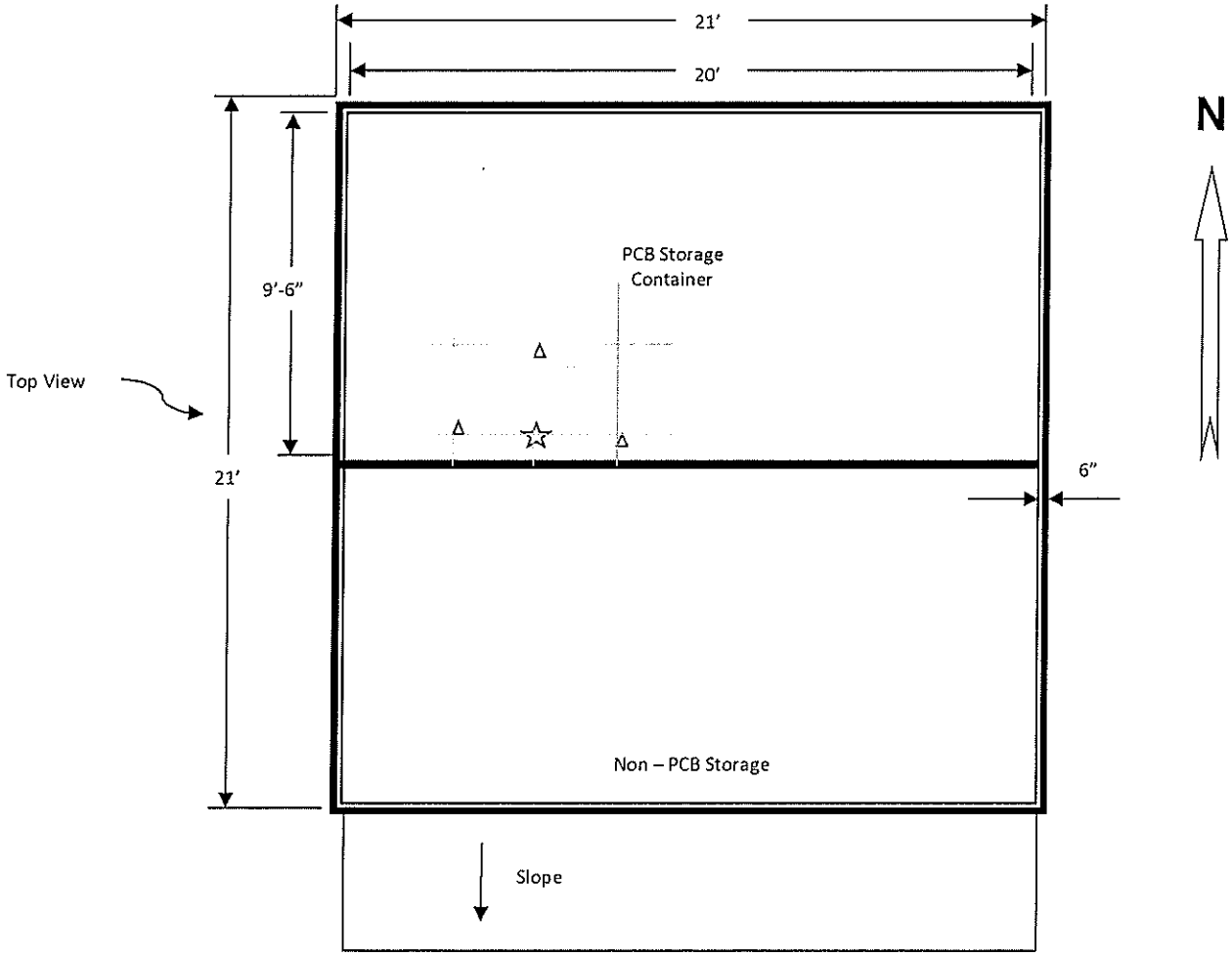
All waste generated during the post cleanup sampling will be collected, containerized, and disposed in accordance with all Federal (e.g. 40 CFR 761.65(e)(7)), State, and Local regulations.

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

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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Appendix II Chronology of Tasks Completed Prior to 12/01/2013

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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) — April 25, 2014 (Date)

CH004494
(Professional Engineering License Number)

Omega Technical Services, Inc.
2736 Via Sinaloa
Claremont, California 91711
(Business Address)

909-223-5888
(Telephone Number)

REGISTERED PROFESSIONAL ENGINEER
GEORGE ONEY
exp 6/30/15
No. CH004494
CHEMICAL
STATE OF CALIFORNIA

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) — April 25, 2014 (Date)

(Name) — (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 (79 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 μg / 100 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 10μg/100cm^2 for non-porous surfaces.

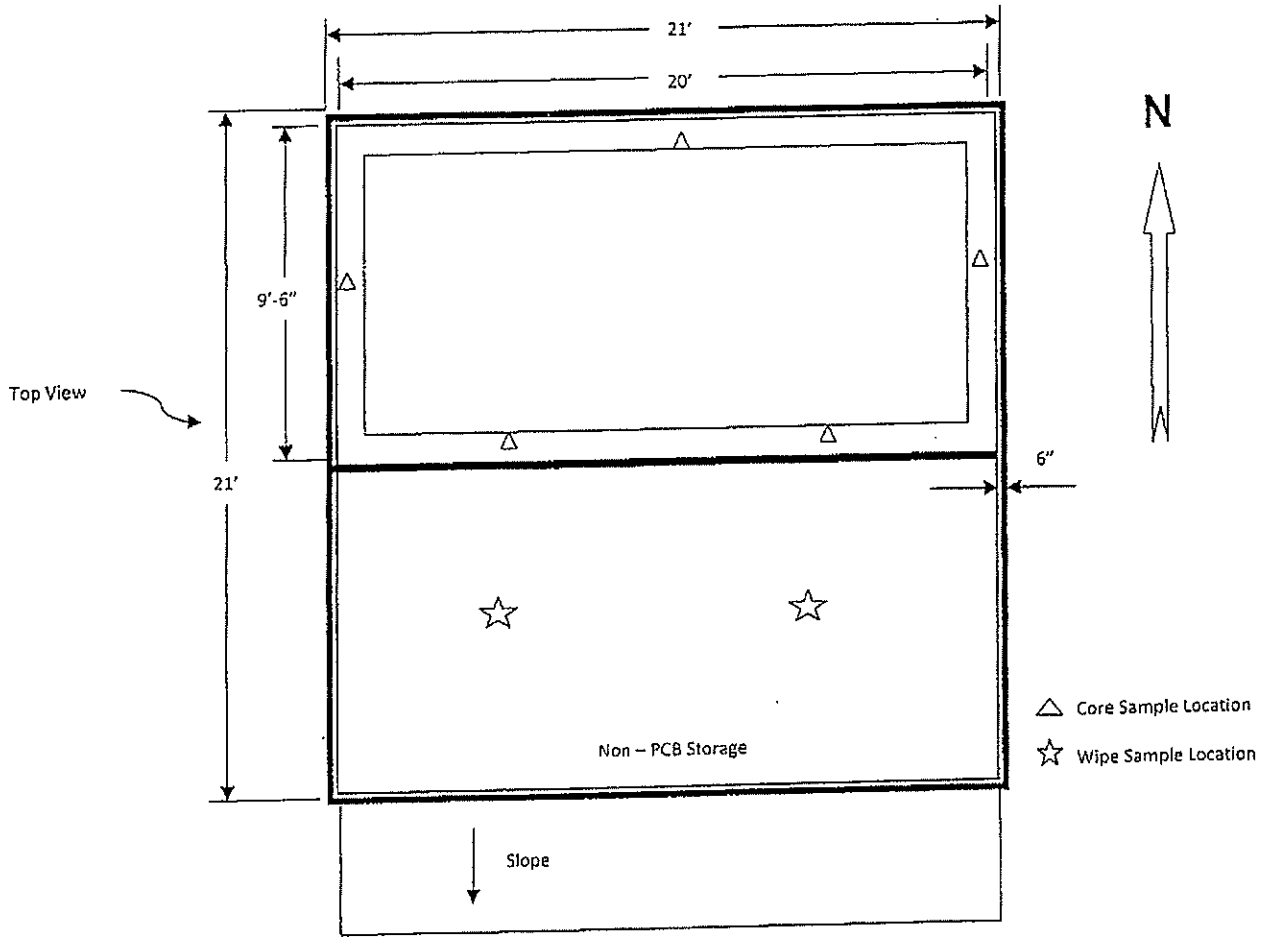
QA/QC Procedures

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 mg/kg for porous surfaces or 10μg/100cm^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 contaminates 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 μg/100 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)



PCB Storage
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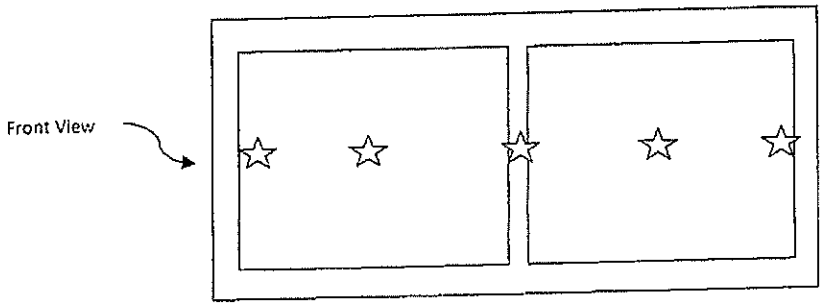

Wipe samples (left to right):

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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 contaminates 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.

- <u>Scarification/Cutting and Removal</u>
  For porous surfaces the facility will concentrate on removal of contaminates. Since these area 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 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.

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- **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 were 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**

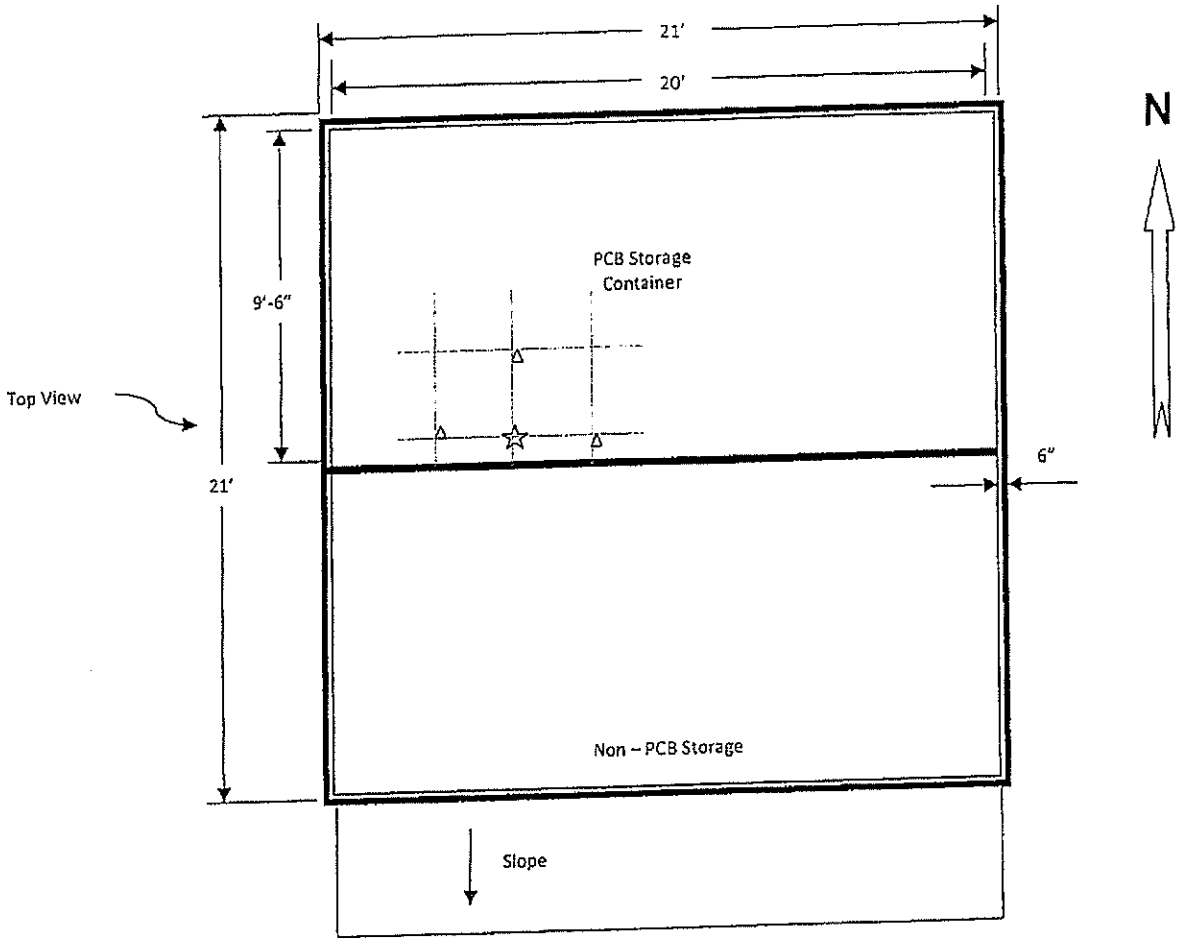
All waste generated during the post cleanup sampling will be collected, containerized, and disposed in accordance with all Federal (e.g. 40 CFR 761.65(e)(7)), State, and Local regulations.

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

△ - 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 — Date: 5/5/11

Reviewed by: Kim Tisa, TSCA PCB Coordinator — Date: 5/5/11

Reviewed by: Jerry Keefe – EIA Team Leader — Date: 05/23/11

Approved by: Dan Boudreau, EIA Chemistry Team Leader — Date: 5/23/11

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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.

Revision Page

Date	Rev#	Summary of Changes	Sections
12/97	1	Initial Approval, draft	
3/20/08	2	Major update, only for PCBs, added TSCA sampling	All sections
7/17/08	3	Disposal of dust filter and decon of vac hose	11.0 and 14.0
5/04/11	4	Vacuum Trap Design and Clean-out	9.4

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15.0 References 12

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 (ft^2).

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.

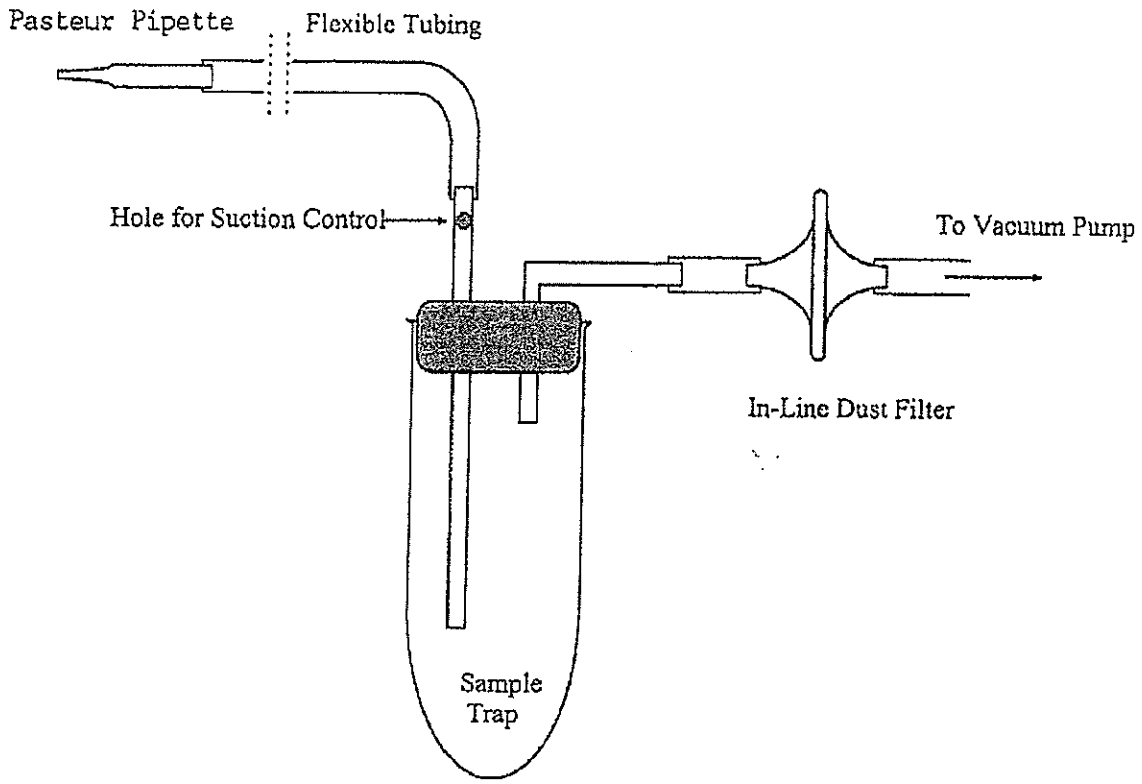
9.3.4.2 Option two: drill with the 1 inch bit and either make the hole larger or use a smaller bit to take the next ½- inch sample.

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 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°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

SAMPLING CREW(FIRST INITIAL, LAST NAME)

AMOUNT

ANALYSIS

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

SAMPLERS: (Signature)

NO. OF CONTAINERS

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	REMARKS

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	DROP OFF SAMPLES? (Y/N)
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**

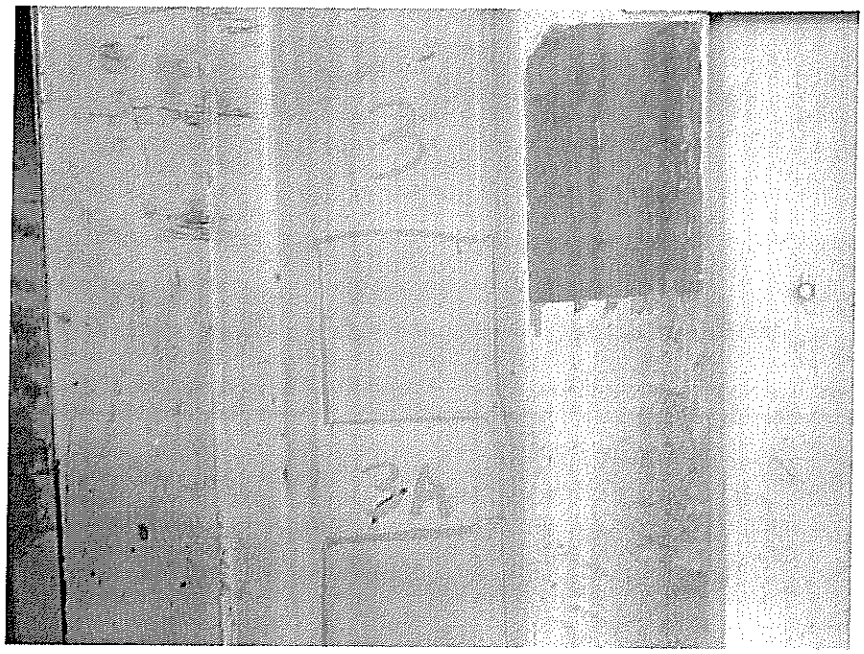


Figure #3 Wipe Sample Location – Outside Middle Column

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)

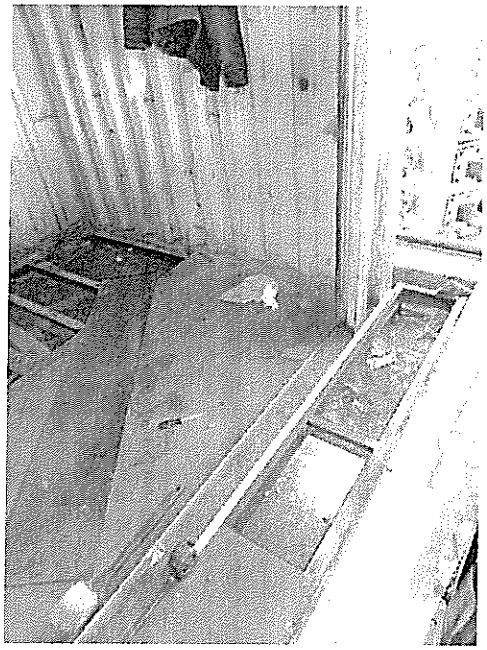


Figure #7 Concrete Sample Location – East Containment Area (North Side)

Figure #8 Concrete Sample Location – South Containment Area

Figure #9 Concrete Sample Location – North Containment Area

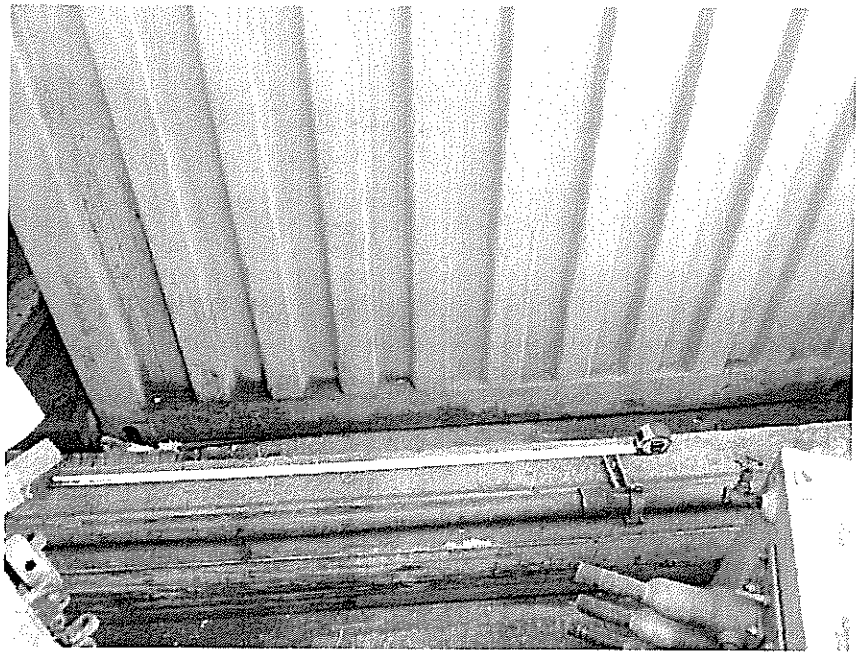


Figure #10 Concrete Sample Location – West Containment Area

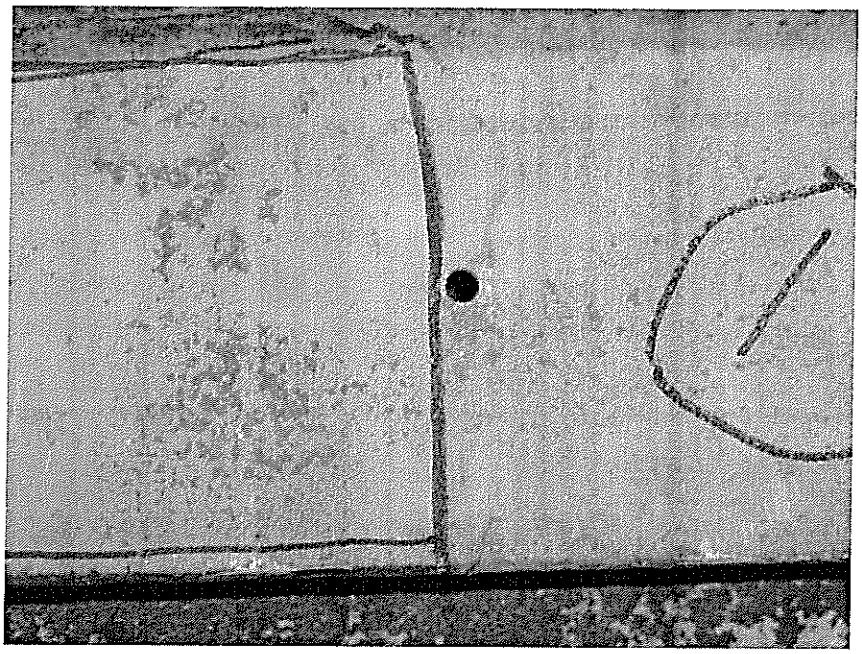


Figure #11 Wipe Sample Location – Containment Floor Sample #1

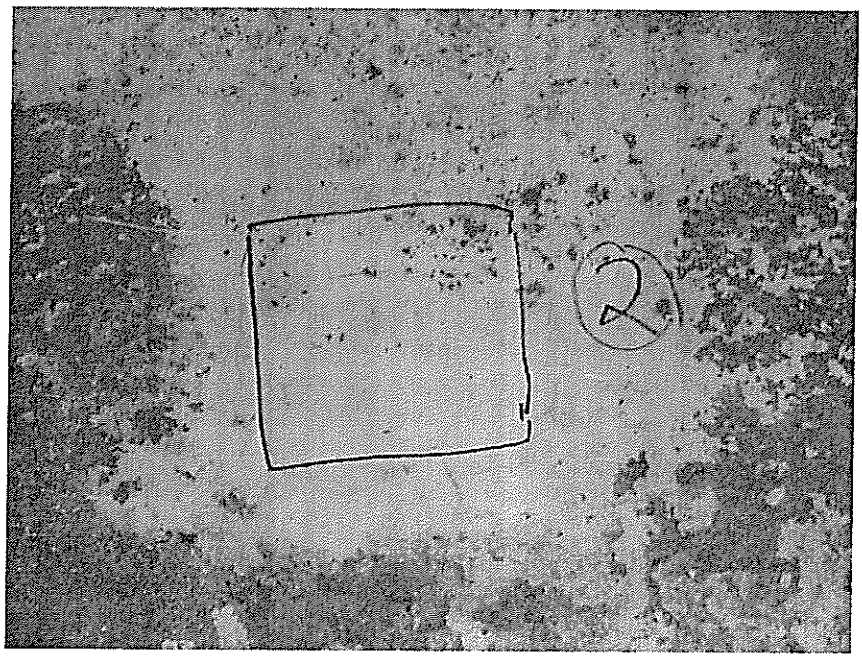


Figure #12 Wipe Sample Location – Containment Floor Sample #2

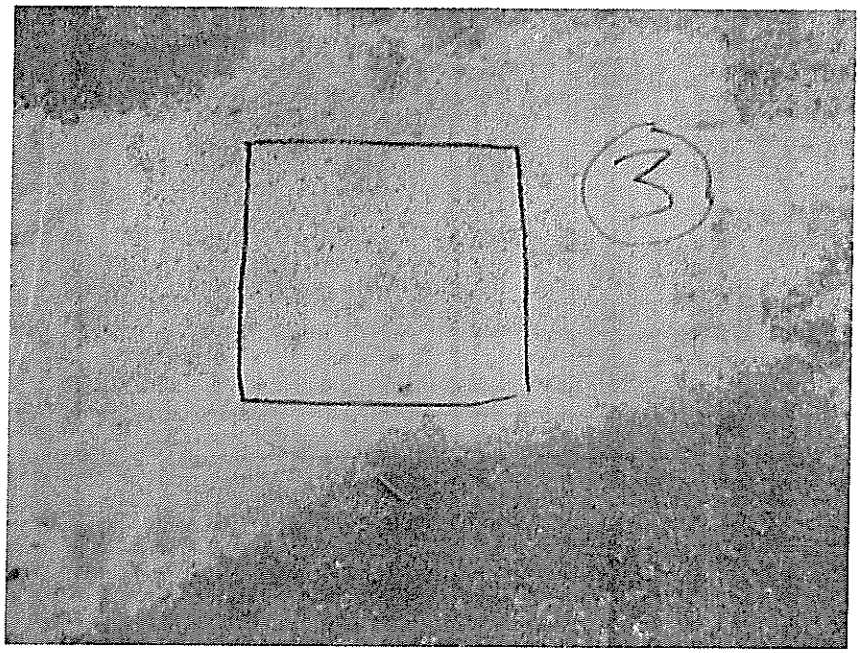


Figure #13 Wipe Sample Location – Containment Floor Sample #3

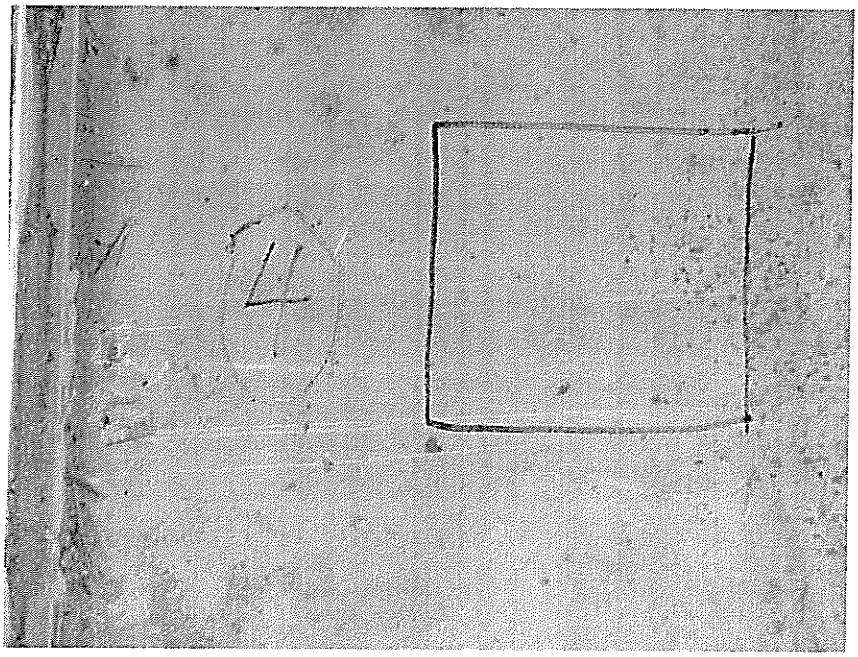


Figure #14 Wipe Sample Location – Containment Floor Sample #4

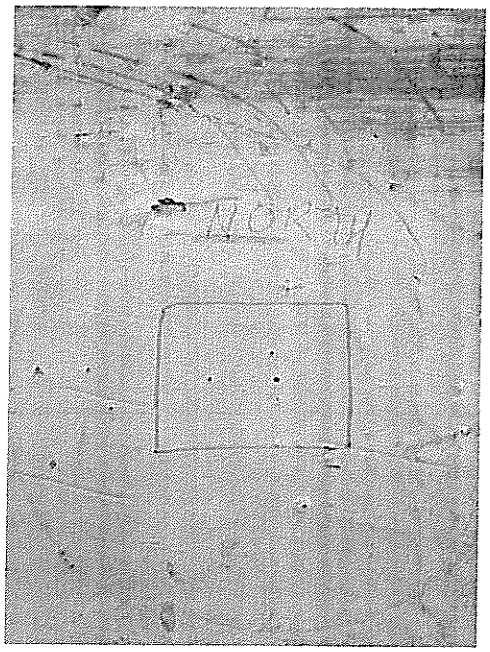


Figure #15 Wipe Sample Location – Non-PCB Containment Area Floor – North

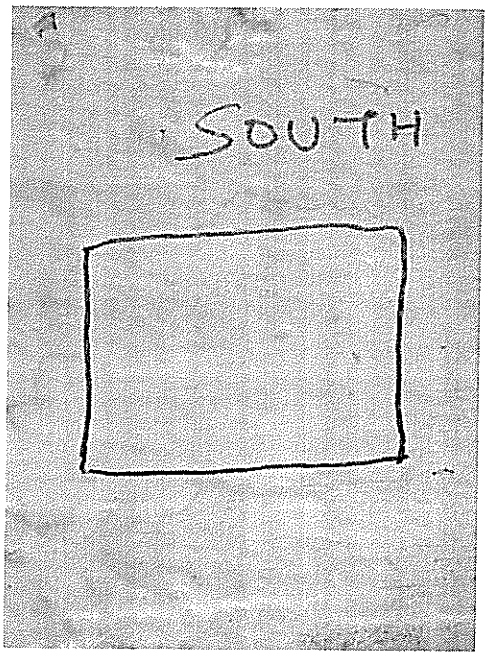


Figure #16 Wipe Sample Location – Non-PCB Containment Area Floor – South

Figure #17 Container With Wooden Floor Removed

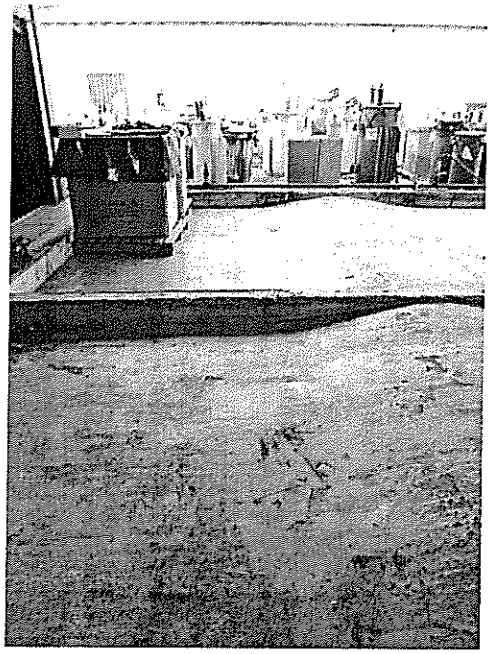


Figure #18 Cubic Yard Boxes Containing Wooden Floor

APPENDIX V

HAZARDOUS WASTE MANIFESTS

LS9567265 SC PPW 12/11/2013

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number 8 0 6 8 5 0	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number 006955554 FLE

5. Generator's Name and Mailing Address
Clean Harbors Los Angeles LLC
5756 Alba Street
Los Angeles, CA 90058
(323) 277-2500

Generator's Site Address (if different than mailing address)
SAME

Generator's Phone:

6. Transporter 1 Company Name
SLT Express Way Inc — U.S. EPA ID Number: AZR000508515

7. Transporter 2 Company Name
Clean Harbors — U.S. EPA ID Number: MAD039322290

8. Designated Facility Name and Site Address
Clean Harbors Aragonite LLC
11600 North Aptus Road
Grantsville, UT 84029
(435) 884-8100
U.S. EPA ID Number: UTD981552177

Facility's Phone:

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. UN3432, WASTE POLYCHLORINATED BIPHENYLS, SOLID, (BASE E TSCA STORAGE CLOSER), 9, PG III	002	CF	00381	K	261
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1-CHSI-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/Offeror's Printed/Typed Name: Nina Hee — Signature: [signature] — Month 3 Day 31 Year 14

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Lorraine Lawes — Signature: [signature] — Month 3 Day 31 Year 14
Transporter 2 Printed/Typed Name: Angela Rozell — Signature: [signature] — Month 4 Day 3 Year 14

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
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: [signature] — Month 4 Day 11 Year 14

GENERATOR — TRANSPORTER — INT'L — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Clean Harbors has the appropriate permits for and will accept the waste the generator is shipping.

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 Quanitation Limit
ND = Non-detected or below the PQL

Cyrus Pourhassanian
Laboratory Manager

2000 North Alameda Street, Compton, California 90222-2799 • (310) 537-7100 • FAX (310) 639-2946

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 Quanitation Limit
ND = Non-detected or below the PQL

Cyrus Pourhassanian
Laboratory Manager

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ENVIRONMENTAL SERVICES®

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

☐ 1 Hill Avenue, Braintree, MA 02184 Tel. (781) 849-1800
☐ 2202 Genoa Red Bluff Road, Houston, TX 77034 Tel. (281) 478-7700
☐ RTE. 2, Box 170, Wayroka, OK 73860 Tel. (580) 697-3500
☐ 5295 S. Garvey Road, Westmorland, CA 92281 Tel. (760) 344-9400
☐ 12400 247th Avenue SE, Sawyer, ND 58781 Tel. (701) 624-5622
☐ Other

Client: Clean Harbors Project Name: Containment Bag & Closure Work Order/P.O. #: 12234 Date: 11/25/13

Report To: Ronald Kurtz, Edgar Mulder Address: 5746 Alba St, Los Angeles, CA 90058 Phone #: 323 277 2450

Sample I.D.	Sampling Information: Date	Time	Station Location	Sample Matrix	Analysis: PCB											# of con	CHES Sample #
1A – Inside Left Wall	11/25/13	1215	Alba St	Wipe	X	LAB ID	112013-01									1	
2A – Inside Left Rear Wall	11/25/13	1216			X		112013-02									1	
3A – Outside Middle Column	11/25/13	1217			X		112013-03									1	
4A – Inside Right Rear Wall	11/25/13	1215			X		112013-04									1	
5A – Inside Right Wall	11/25/13	1215			X		112013-05									1	

Relinquished by Sampler: [signature]
Date: 11/25/13 Time:
Received by: [signature]
Date: 11/25/13 Time: 12:30
Relinquished by Sampler: [signature]
Date: Time:
Received by: [signature]
Date: 11/25/13 Time: 4:35 pm

VOA Vial	
Glass Bottle	
Plastic Bottle	
Preservation	
Volume	
DOT Shipping Name:	

COMMENTS. (Fax Number, cautions, special instructions)

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

CH 119

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CHAIN OF CUSTODY RECORD PAGE 1 OF 1

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❑ RTE. 2, Box 170, Waynoka, OK 73860 Tel. (580) 697-3500
❑ 5295 S. Garvey Road, Westmorland, CA 92281 Tel. (760) 344-9400
❑ 12400 247th Avenue SE, Sawyer, ND 58781 Tel. (701) 624-5622
❑ Other

Client: Clean Harbors Project Name: PCB Containment Bldg E Work Order/P.O. #: Date: [illegible]

Report To: Energy Corp [illegible] Address: 5756 Alba St Los Angeles CA 90058 Phone #:

Sample I.D.	Sampling Information: Date	Time	Station Location	Sample Matrix	Analysis: PCB 8082											# of con.	CHES Sample #
East Containment Area South side	3-20-14	1:00	5756 Alba St	Concrete	X	032114-01										1	[illegible]
East Containment Area North side	↓	1:15	↓	↓	X	↓		02								1	[illegible]
South Containment Area	↓	1:30	↓	↓	X	↓		03								1	[illegible]
North Containment Area	↓	1:45	↓	↓	X	↓		04								1	[illegible]
West Containment Area	↓	2:00	↓	↓	X	↓		05								1	[illegible]
East Containment Area North side - Duplicate	↓	1:15	↓	↓	X	↓		06								1	[illegible] (Dup)

Relinquished by Sampler: [signature]
Date: 3-20-14 Time: 3:00 pm

Received by: [illegible]
Date: 3-20-14 Time: 3:00 pm

Relinquished by Sampler:
Date: Time:

Received by:
Date: Time:

VOA Vial									
Glass Bottle	X								
Plastic Bottle									
Preservation									
Volume	2L								

DOT Shipping Name: N/A

COMMENTS: (Fax Number, cautions, special instructions)

[illegible]

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:

CH 119

DeMenno/Kerdoon

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.: EAST CONTAIMENT AREA SOUTH SIDE

LAB I.D.: 032114-01

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 Quanitation Limit

ND = Non-detected or below the PQL

Ignacio Martinez

Cyrus Pourhassanian For

Laboratory Manager

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DeMenno/Kerdoon

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.: EAST CONTAIMENT AREA NORTH SIDE

LAB I.D.: 032114-02

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

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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 CONTAIMENT 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 Quanitation Limit

ND = Non-detected or below the PQL

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Laboratory Manager

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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 CONTAIMENT 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 Quanitation Limit

ND = Non-detected or below the PQL

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Cyrus Pourhassanian FOR

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DeMenno/Kerdoon

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LABORATORY REPORT

ELAP CERTIFICATE NO.: 2037

PROJECT: PCB CONTAINMENT BAY "E"

MATRIX: SOLID — *SAMPLE I.D.: WEST CONTAIMENT AREA*

SUBMITTED BY: CLEAN HARBORS ENVIRONMENTAL SERVICES — *LAB I.D.: 032114-05*

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 Quanitation Limit

ND = Non-detected or below the PQL

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Cyrus Pourhassanian for

Laboratory Manager

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DeMenno/Kerdoon

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.: EAST CONTAIMENT AREA NORTH SIDE DUPLICATE

LAB I.D.: 032114-06

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

Ignacio Martinez

Cyrus Pourhassanian for

Laboratory Manager

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☐ 5205 S. Garvey Road, Westmorland, CA 92281 Tel. (760) 344-9100
☐ 12400 247th Avenue SE, Sawyer, ND 58781 Tel. (701) 624-5622
☐ Other

Client: [illegible] Project Name: [illegible] Work Order/P.O. #: Date: [illegible]

Report To: [illegible] Address: [illegible] Phone #:

Sample I.D.	Sampling Information: Date	Time	Station Location	Sample Matrix	Analysis: [illegible]											# of con.	CHES Sample #
[illegible]	[illegible]	[illegible]	032514-09	[illegible]	✓											1	
[illegible]	[illegible]	[illegible]	032514-10		✓											1	
[illegible]	[illegible]	[illegible]	032514-11		✓											1	
[illegible]	[illegible]	[illegible]	032514-12		✓											1	
[illegible]	[illegible]	[illegible]	032514-13		✓											1	
[illegible]	[illegible]	[illegible]	032514-14	[illegible]	✓											1	

Relinquished by Sampler: [illegible]	VOA Vial							
Date: [illegible] Time: [illegible]	Glass Bottle	✓						
Received by: [illegible]	Plastic Bottle							
Date: [illegible] Time: 1:45 PM	Preservation	[illegible]						
Relinquished by Sampler:	Volume	3						
Date: Time:								
Received by:	DOT Shipping Name:							
Date: Time:								

COMMENTS: (Fax Number, cautions, special instructions)

[illegible]

Standard laboratory turnaround time is 1 week from date of receipt. Accelerated turnaround may be assessed a surcharge

Location of samples: [illegible]

Turnaround: 24 Hrs 48 Hrs 1 Week Other:

CH 119

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

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

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