

# Technical Memorandum

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**TO:** Steve Teal, Washington State Department of Ecology  
**CC:** Amy Sikora, Washington State Department of Natural Resources  
**FROM:** Katie Gauglitz, LG  
**DATE:** October 8, 2021  
**RE:** **Third Quarter 2021 Groundwater Monitoring Results**  
**Webster Nursery Site, Site Identification 3380**  
**Tumwater, Washington**  
**Project No. 0774006.040.047**

## Introduction

This technical memorandum summarizes the results of quarterly groundwater monitoring completed by Landau Associates, Inc. (LAI) at the Washington State Department of Natural Resources Webster Nursery site, a former pesticide-storage warehouse in Tumwater, Washington (site; Figure 1). The site is associated with past releases of organochlorine pesticides to soil and groundwater. Constituents of concern include the organochlorine pesticides heptachlor epoxide (HE; breakdown product of heptachlor) and technical chlordane.

Remedial action excavation and disposal of HE-contaminated soil was completed in August 2018. A summary of the remedial action is provided in a draft Cleanup Action Completion Report (LAI 2018).

## Groundwater Monitoring Summary

Third quarter 2021 (3Q21) groundwater monitoring was completed on August 25, 2021 in accordance with the framework established by Washington State Department of Ecology (Ecology) Agreed Order Number DE 00TCP-SR295, the Remedial Action Work Plan (LAI 2017), and the Compliance Monitoring Plan (LAI 2019). Groundwater samples were collected from two wells (SW-10R and SW-11R). Analytical Resources, Inc. of Tukwila, Washington analyzed the groundwater samples for organochlorine pesticides using U.S. Environmental Protection Agency Method 8081B low-level.

Groundwater samples were collected using a peristaltic pump and dedicated tubing following low-flow groundwater sampling procedures. Low-flow groundwater monitoring consists of measuring the depth-to-water with an electronic groundwater level indicator, monitoring field parameters with a YSI Professional Plus multi-parameter instrument, and measuring turbidity with a handheld meter. One duplicate sample (SW-99 at SW-11R) was collected for quality control purposes.

## Groundwater Monitoring Results

Groundwater monitoring results are summarized below:

- HE was detected in SW-10R at a concentration of 0.0060 micrograms per liter (µg/L), above the cleanup level (CUL; 0.00481 µg/L).

- HE was detected in SW-11R at a concentration of 0.0052 µg/L, above the CUL. HE was detected in the SW-11R duplicate sample at a concentration of 0.0055 µg/L, also above the CUL.
- No analytes other than HE were detected in either well during 3Q21 groundwater monitoring.

August 2021 organochlorine pesticide data are provided in Table 1, and the laboratory data package is provided in Attachment 1. Time series data of recent HE concentrations in groundwater at SW-10R and SW-11R (dating back to January 2010) are presented on Figure 3.

Groundwater elevations at SW-10R and SW-11R were 182.04 and 181.74 feet mean sea level, respectively. This represents an approximate 3.5-foot decrease from the previous monitoring event, completed in May 2021. Depth-to-water and groundwater elevation data are provided in Table 2 and SW-10R groundwater elevation data collected since the remedial action is shown on Figure 3.

## **Environmental Information Management Submittal**

An Environmental Information Management (EIM) submittal is required. The submittal was completed on September 30, 2021 and confirmation that the results have been uploaded to the EIM database is pending.

LANDAU ASSOCIATES, INC.



Katie Gauglitz, LG  
Project Geologist

KMG/SEF/kjg

[\\TACOMA3\PROJECT\774\006\R\QUARTERLY GW MONITORING REPORTS\2021\_08\_3Q21\LAI\_WEBSTER NURSERY 3Q21 GW MONITORING\_TM\_10-8-21.DOCX]

## **References**

- LAI. 2017. Remedial Action Work Plan, Webster Nursery, 9805 Blomberg Street SW, Tumwater, Washington. Landau Associates, Inc. October 31.
- LAI. 2018. Draft Cleanup Action Completion Report, Washington State Department of Natural Resources Webster Nursery, Tumwater, Washington. Landau Associates, Inc. October 12.
- LAI. 2019. Compliance Monitoring Plan, Washington State Department of Natural Resources Webster Nursery, Tumwater, Washington. Landau Associates, Inc. July 24.

## **Attachments**

Figure 1. Vicinity Map

Figure 2. Monitoring Well Network

Figure 3. Heptachlor Epoxide and Groundwater Elevation Time Series, SW-10(R) and SW-11(R)

Table 1. Groundwater Analytical Results

Table 2. Groundwater Level Measurements

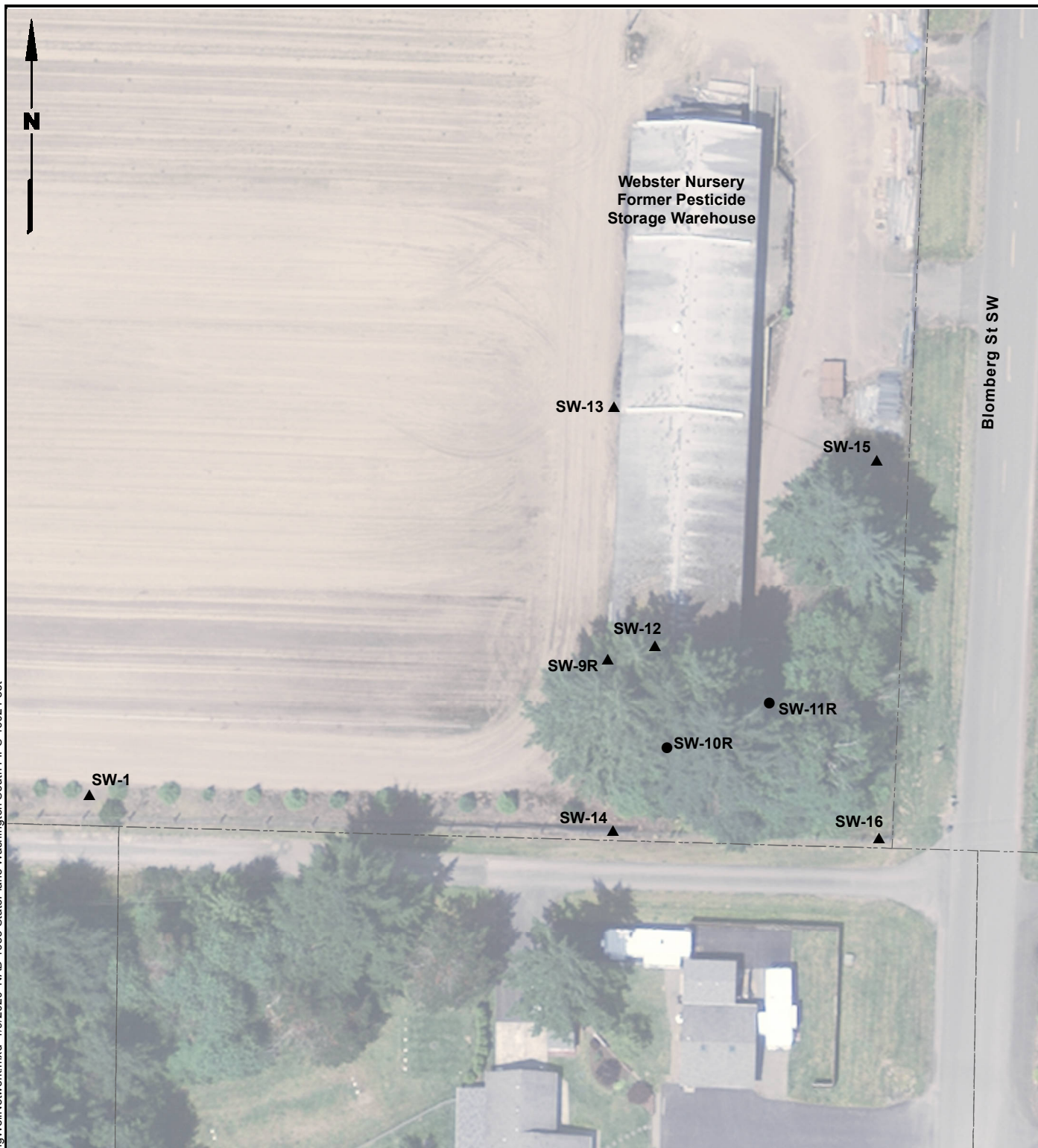
Attachment 1. August 2021 Laboratory Data Package

G:\Projects\774\006\020\026\FIS\F01 VicinityMap.mxd 5/16/2016 NAD 1983 StatePlane Washington North FIPS 4601 Feet



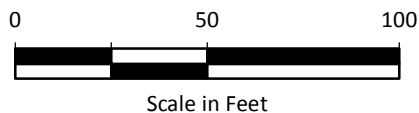
Data Source: Esri 2012

G:\Projects\7741006\040\045\F02MonitoringWellNetwork.mxd 1/9/2020 NAD 1983 StatePlane Washington South FIPS 4602 Feet



#### Legend

- Pesticide Monitoring Well
- ▲ Other Monitoring Well
- Tax Parcels



Scale in Feet

#### Notes

1. SW-9R, SW-10R, and SW-11R are new (replacement) wells.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Sources: Thurston County GIS; WA DNR Survey, 2018.

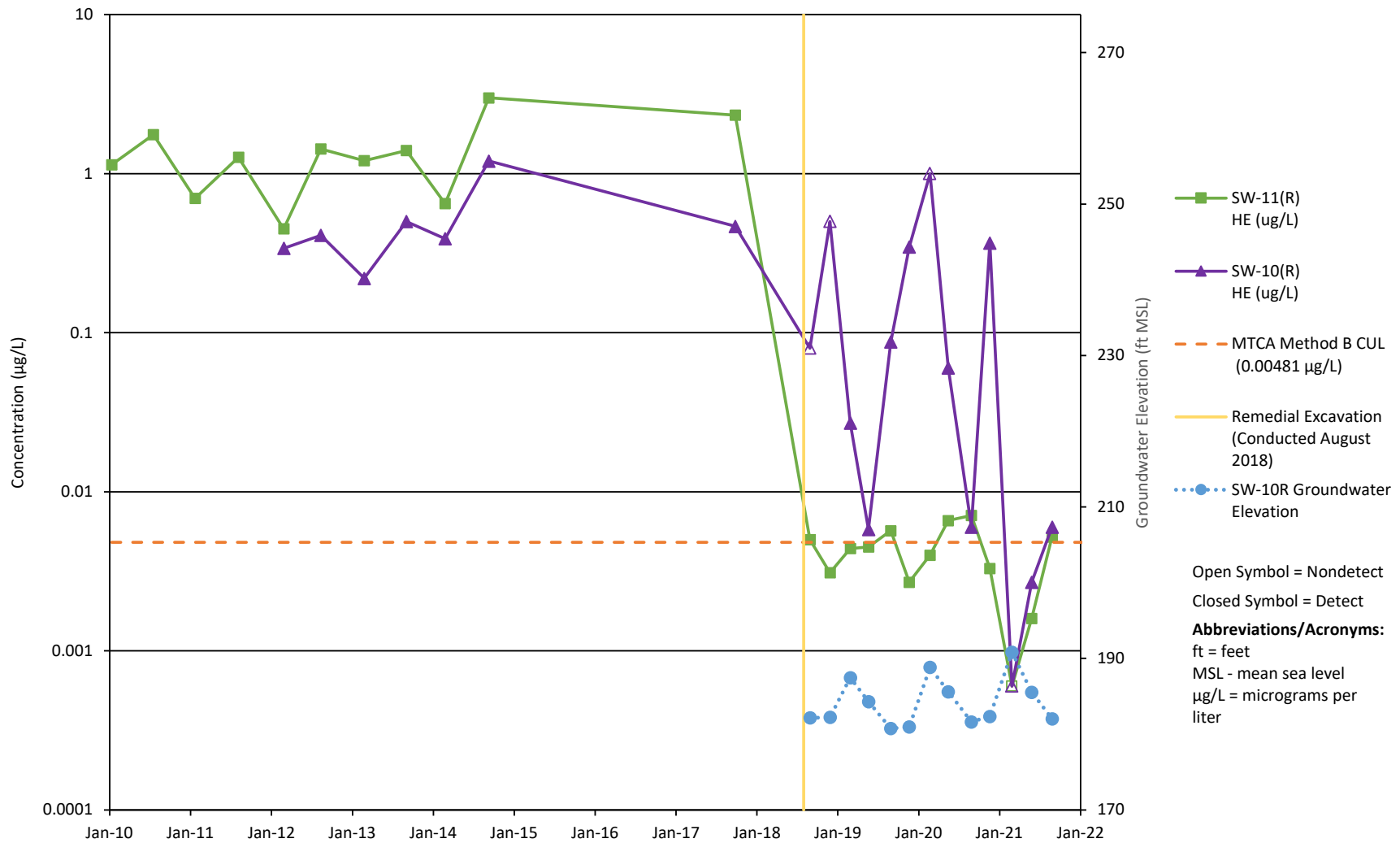


LANDAU  
ASSOCIATES

Webster Nursery Site  
Tumwater, Washington

Monitoring Well Network

Figure  
2



**Table 1**  
**Groundwater Analytical Results**  
**Webster Nursery**  
**Tumwater, Washington**

Analyte	MTCA Method B Cleanup Levels	Sample Location, Sample ID, Laboratory SDG, Sample Date, and Sample Type		
		SW-10R SW-10R-20210825 21H0306 8/25/2021 N	SW-11R SW-11R-20210825 21H0306 8/25/2021 N	SW-11R SW-99-20210825 21H0306 8/25/2021 FD
	Cancerous			
<b>Pesticides (µg/L; SW-846 8081B)</b>				
4,4'-DDD	--	0.0013 U	0.0013 U	0.0013 U
4,4'-DDE	--	0.0013 U	0.0013 U	0.0013 U
4,4'-DDT	--	0.0013 U	0.0013 U	0.0013 U
Aldrin	--	0.0006 U	0.0006 U	0.0006 U
alpha-BHC	--	0.0006 U	0.0006 U	0.0006 U
beta-BHC	--	0.0006 U	0.0006 U	0.0006 U
Chlordane	0.25	0.0050 U	0.0050 U	0.0050 U
cis-Chlordane	--	0.0006 U	0.0006 U	0.0006 U
delta-BHC	--	0.0006 U	0.0006 U	0.0006 U
Dieldrin	--	0.0013 U	0.0013 U	0.0013 U
Endosulfan I	--	0.0006 U	0.0006 U	0.0006 U
Endosulfan II	--	0.0013 U	0.0013 U	0.0013 U
Endosulfan Sulfate	--	0.0013 U	0.0013 U	0.0013 U
Endrin	--	0.0013 U	0.0013 U	0.0013 U
Endrin Aldehyde	--	0.0013 U	0.0013 U	0.0013 U
Endrin Ketone	--	0.0013 U	0.0013 U	0.0013 U
gamma-BHC	--	0.0006 U	0.0006 U	0.0006 U
Heptachlor	0.0194	0.0006 U	0.0006 U	0.0006 U
Heptachlor Epoxide	0.00481	<b>0.0060 J</b>	<b>0.0052</b>	<b>0.0055</b>
Methoxychlor	--	0.0063 U	0.0063 U	0.0063 U
Toxaphene	--	0.0625 U	0.0625 U	0.0625 U
trans-Chlordane	--	0.0006 U	0.0006 U	0.0006 U

**Notes:**

-- = cleanup level not applicable

**Bold text** = Indicates detected analyte.

Green Box = Detected concentration is greater than the cleanup level

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte

**Abbreviations and Acronyms:**

FD = field duplicate

ID = identification

µg/L = micrograms per liter

MTCA = Model Toxics Control Act

N = primary sample

SDG = sample delivery group

**Table 2**  
**Groundwater Level Measurements**  
**Webster Nursery**  
**Tumwater, Washington**

Well ID	Top of Casing Elevation (ft)	Depth to Water (ft bgs)	Groundwater Elevation (ft)
SW-10R	193.41	11.37	182.04
SW-11R	192.50	10.76	181.74

**Notes:**

Groundwater elevation data was collected August 25, 2021.

**Abbreviations:**

bgs = below ground surface

ft = feet

ID = identification



# **August 2021 Laboratory Data Package**



**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants

20 September 2021

Sierra Mott  
Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma, WA 98402

RE: Webster Nursery

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
21H0306

Associated SDG ID(s)  
N/A

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I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

Kelly Bottem, Client Services Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





## Chain-of-Custody Record

- ☐ North Seattle (206) 631-8660  
☒ Tacoma (253) 926-2493  
☐ Olympia (360) 791-3178

- ☐ Spokane (509) 327-9737  
☐ Portland (503) 542-1080  
☐ \_\_\_\_\_

Date 8/25/21  
Page 1 of 1

Turnaround Time:

### Standard

Accelerated

Project Name Webster Nursery Project No. 774006.040.047  
Project Location/Event Olympia WA / 3Q 21 Sampling  
Sampler's Name SMR  
Project Contact Sierra Mott, Katie Gauglitz  
Send Results To S. Mott, P. Jorgensen, E. Weber

### Testing Parameters

Special Handling Requirements:

Shipment Method:

Stored on ice: Yes / No

Sample I.D.	Date	Time	Matrix	No. of Containers
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Observations/Comments

SW-10R-	20210825	8/25/21	155	Aq	2	+
SW-11R-	20210825	1	825	1	2	+
SW-9q-	20210825	1	827	1	2	+

— Allow water samples to settle, collect aliquot from clear portion ☐

\_\_\_ NWTPH-Dx - Acid wash cleanup ☐

- Silica gel cleanup ☐

\_\_\_ Dissolved metal samples were field filtered

Other \_\_\_\_\_

Relinquished by

Signature

Printed Name Simone Rodriguez

Company Landay Associates

Date 8/25/21 Time 1325

Received by

Signature

Printed Name

Company

Date 08/05/2021 Time 13:25

Relinquished by

Signature

Printed Name

Company

Date \_\_\_\_\_ Time \_\_\_\_\_

Received by

Signature

Printed Name

Company

Date \_\_\_\_\_ Time \_\_\_\_\_

WHITE COPY - Laboratory

YELLOW COPY - Project File

PINK COPY - Client Representative

10/2018



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

**Reported:**  
20-Sep-2021 11:03

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SW-10R-20210825	21H0306-01	Water	25-Aug-2021 09:55	25-Aug-2021 13:25
SW-11R-20210825	21H0306-02	Water	25-Aug-2021 08:25	25-Aug-2021 13:25
SW-99-20210825	21H0306-03	Water	25-Aug-2021 08:27	25-Aug-2021 13:25



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

**Reported:**  
20-Sep-2021 11:03

## Work Order Case Narrative

### **Pesticides - EPA Method SW8081B**

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.



Analytical Resources, Incorporated  
Analytical Chemists and Consultants

# Cooler Receipt Form

ARI Client: London

Project Name: webster Nursery

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Carrier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 21H0306

Tracking No: \_\_\_\_\_ NA

## Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1325

5.4

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 5206

Cooler Accepted by: JB

Date: 08/25/21

Time: 1325

**Complete custody forms and attach all shipping documents**

## Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA

Were the sample(s) split by ARI? NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: DL Date: 08/25/21 Time: 1741 Labels checked by: \_\_\_\_\_

**\*\* Notify Project Manager of discrepancies or concerns \*\***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

**Additional Notes, Discrepancies, & Resolutions:**

By: \_\_\_\_\_

Date: \_\_\_\_\_





Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
20-Sep-2021 11:03

SW-10R-20210825

21H0306-01 (Water)

### Chlorinated Pesticides

Method: EPA 8081B		Sampled: 08/25/2021 09:55
Instrument: ECD6 Analyst: YZ		Analyzed: 09/17/2021 18:45
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJI0001 Prepared: 09/01/2021	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 21H0306-01 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJI0139 Cleaned: 17-Sep-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 21H0306-01 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJI0138 Cleaned: 17-Sep-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL Extract ID: 21H0306-01 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	0.0060	ug/L	P1
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
Surrogate: Decachlorobiphenyl			30-160 %	78.8	%	
Surrogate: Decachlorobiphenyl [2C]			30-160 %	81.7	%	
Surrogate: Tetrachlorometaxylene			30-160 %	71.5	%	
Surrogate: Tetrachlorometaxylene [2C]			30-160 %	57.7	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
20-Sep-2021 11:03

**SW-11R-20210825**  
**21H0306-02 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B			Sampled: 08/25/2021 08:25		
Instrument: ECD6 Analyst: YZ			Analyzed: 09/17/2021 19:03		
Sample Preparation:	Preparation Method: EPA 3510C SepF			Extract ID: 21H0306-02 A 01	
	Preparation Batch: BJI0001	Sample Size: 1000 mL			
	Prepared: 09/01/2021	Final Volume: 0.5 mL			
Sample Cleanup:	Cleanup Method: Silica Gel			Extract ID: 21H0306-02 A 01	
	Cleanup Batch: CJI0139	Initial Volume: 0.5 mL			
	Cleaned: 17-Sep-2021	Final Volume: 0.5 mL			
Sample Cleanup:	Cleanup Method: Sulfur			Extract ID: 21H0306-02 A 01	
	Cleanup Batch: CJI0138	Initial Volume: 0.5 uL			
	Cleaned: 17-Sep-2021	Final Volume: 0.5 uL			

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	0.0052	ug/L	
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
Surrogate: Decachlorobiphenyl			30-160 %	75.5	%	
Surrogate: Decachlorobiphenyl [2C]			30-160 %	75.7	%	
Surrogate: Tetrachlorometaxylene			30-160 %	67.2	%	
Surrogate: Tetrachlorometaxylene [2C]			30-160 %	56.4	%	





Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
20-Sep-2021 11:03

SW-99-20210825

21H0306-03 (Water)

### Chlorinated Pesticides

Method: EPA 8081B		Sampled: 08/25/2021 08:27
Instrument: ECD6 Analyst: YZ		Analyzed: 09/17/2021 19:20
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJI0001 Prepared: 09/01/2021	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 21H0306-03 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJI0139 Cleaned: 17-Sep-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 21H0306-03 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJI0138 Cleaned: 17-Sep-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL Extract ID: 21H0306-03 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	0.0055	ug/L	
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
Surrogate: Decachlorobiphenyl			30-160 %	86.0	%	
Surrogate: Decachlorobiphenyl [2C]			30-160 %	86.1	%	
Surrogate: Tetrachlorometaxylene			30-160 %	67.2	%	
Surrogate: Tetrachlorometaxylene [2C]			30-160 %	56.6	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
20-Sep-2021 11:03

### Chlorinated Pesticides - Quality Control

#### Batch BJI0001 - EPA 3510C SepF

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BJI0001-BLK1)</b>		Prepared: 01-Sep-2021 Analyzed: 17-Sep-2021 17:15								
alpha-BHC	ND	0.0006	ug/L							U
beta-BHC	ND	0.0006	ug/L							U
gamma-BHC (Lindane)	ND	0.0006	ug/L							U
delta-BHC	ND	0.0006	ug/L							U
Heptachlor	ND	0.0006	ug/L							U
Aldrin	ND	0.0006	ug/L							U
Heptachlor Epoxide	ND	0.0006	ug/L							U
trans-Chlordane (beta-Chlordane)	ND	0.0006	ug/L							U
cis-Chlordane (alpha-chlordane)	ND	0.0006	ug/L							U
Endosulfan I	ND	0.0006	ug/L							U
4,4'-DDE	ND	0.0013	ug/L							U
Dieldrin	ND	0.0013	ug/L							U
Endrin	ND	0.0013	ug/L							U
Endosulfan II	ND	0.0013	ug/L							U
4,4'-DDD	ND	0.0013	ug/L							U
Endrin Aldehyde	ND	0.0013	ug/L							U
4,4'-DDT	ND	0.0013	ug/L							U
Endosulfan Sulfate	ND	0.0013	ug/L							U
Endrin Ketone	ND	0.0013	ug/L							U
Methoxychlor	ND	0.0063	ug/L							U
Toxaphene	ND	0.0625	ug/L							U
Chlordane (NOS)	ND	0.0050	ug/L							U
Surrogate: Decachlorobiphenyl	0.0153		ug/L	0.0200		76.7	30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0153		ug/L	0.0200		76.3	30-160			
Surrogate: Tetrachlorometaxylene	0.0125		ug/L	0.0200		62.4	30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0108		ug/L	0.0200		54.2	30-160			
<b>LCS (BJI0001-BS1)</b>		Prepared: 01-Sep-2021 Analyzed: 17-Sep-2021 17:33								
alpha-BHC	0.0067	0.0006	ug/L	0.0100		66.5	30-160			
beta-BHC	0.0070	0.0006	ug/L	0.0100		70.1	30-160			
gamma-BHC (Lindane)	0.0068	0.0006	ug/L	0.0100		68.4	30-160			
delta-BHC	0.0068	0.0006	ug/L	0.0100		67.5	30-160			
Heptachlor	0.0071	0.0006	ug/L	0.0100		70.5	30-160			
Aldrin [2C]	0.0072	0.0006	ug/L	0.0100		72.1	30-160			
Heptachlor Epoxide [2C]	0.0071	0.0006	ug/L	0.0100		71.5	30-160			



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Project Manager: Sierra Mott

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### Chlorinated Pesticides - Quality Control

#### Batch BJI0001 - EPA 3510C SepF

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>LCS (BJI0001-BS1)</b> Prepared: 01-Sep-2021 Analyzed: 17-Sep-2021 17:33										
trans-Chlordane (beta-Chlordane) [2C]	0.0067	0.0006	ug/L	0.0100		67.1	30-160			
cis-Chlordane (alpha-chlordane) [2C]	0.0070	0.0006	ug/L	0.0100		69.7	30-160			
Endosulfan I	0.0072	0.0006	ug/L	0.0100		71.8	30-160			
4,4'-DDE	0.0140	0.0013	ug/L	0.0200		69.9	30-160			
Dieldrin	0.0143	0.0013	ug/L	0.0200		71.3	30-160			
Endrin [2C]	0.0141	0.0013	ug/L	0.0200		70.6	30-160			
Endosulfan II [2C]	0.0150	0.0013	ug/L	0.0200		74.8	30-160			
4,4'-DDD [2C]	0.0142	0.0013	ug/L	0.0200		70.9	30-160			
Endrin Aldehyde [2C]	0.0124	0.0013	ug/L	0.0200		61.8	30-160			
4,4'-DDT [2C]	0.0136	0.0013	ug/L	0.0200		67.9	30-160			
Endosulfan Sulfate [2C]	0.0146	0.0013	ug/L	0.0200		72.8	30-160			
Endrin Ketone [2C]	0.0147	0.0013	ug/L	0.0200		73.4	30-160			
Methoxychlor [2C]	0.0716	0.0063	ug/L	0.100		71.6	30-160			
Surrogate: Decachlorobiphenyl	0.0161		ug/L	0.0200		80.5	30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0165		ug/L	0.0200		82.4	30-160			
Surrogate: Tetrachlorometaxylene	0.0125		ug/L	0.0200		62.3	30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0115		ug/L	0.0200		57.7	30-160			
<b>LCS (BJI0001-BS2)</b> Prepared: 01-Sep-2021 Analyzed: 17-Sep-2021 17:51										
Toxaphene	0.788	0.0625	ug/L	1.00		78.8	30-160			
Surrogate: Decachlorobiphenyl	0.0164		ug/L	0.0200		82.2	30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0170		ug/L	0.0200		85.2	30-160			
Surrogate: Tetrachlorometaxylene	0.0134		ug/L	0.0200		67.0	30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0123		ug/L	0.0200		61.3	30-160			
<b>LCS (BJI0001-BS3)</b> Prepared: 01-Sep-2021 Analyzed: 17-Sep-2021 18:09										
Chlordane (NOS)	0.206	0.0050	ug/L	0.400		51.4	0-200			
Surrogate: Decachlorobiphenyl	0.0143		ug/L	0.0200		71.4	30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0142		ug/L	0.0200		70.8	30-160			
Surrogate: Tetrachlorometaxylene	0.0114		ug/L	0.0200		57.1	30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.00957		ug/L	0.0200		47.9	30-160			
<b>LCS Dup (BJI0001-BSD1)</b> Prepared: 01-Sep-2021 Analyzed: 17-Sep-2021 18:27										
alpha-BHC	0.0070	0.0006	ug/L	0.0100		70.3	30-160	5.48	30	



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### Chlorinated Pesticides - Quality Control

#### Batch BJI0001 - EPA 3510C SepF

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>LCS Dup (BJI0001-BSD1)</b>		Prepared: 01-Sep-2021 Analyzed: 17-Sep-2021 18:27								
beta-BHC	0.0075	0.0006	ug/L	0.0100		75.2	30-160	7.13	30	
gamma-BHC (Lindane)	0.0070	0.0006	ug/L	0.0100		69.5	30-160	1.57	30	
delta-BHC	0.0068	0.0006	ug/L	0.0100		67.7	30-160	0.29	30	
Heptachlor	0.0071	0.0006	ug/L	0.0100		71.4	30-160	1.22	30	
Aldrin [2C]	0.0071	0.0006	ug/L	0.0100		70.9	30-160	1.59	30	
Heptachlor Epoxide [2C]	0.0072	0.0006	ug/L	0.0100		71.6	30-160	0.13	30	
trans-Chlordane (beta-Chlordane)	0.0068	0.0006	ug/L	0.0100		68.2	30-160	4.33	30	
cis-Chlordane (alpha-chlordane) [2C]	0.0069	0.0006	ug/L	0.0100		68.9	30-160	1.29	30	
Endosulfan I	0.0074	0.0006	ug/L	0.0100		73.8	30-160	2.74	30	
4,4'-DDE	0.0140	0.0013	ug/L	0.0200		69.9	30-160	0.02	30	
Dieldrin	0.0143	0.0013	ug/L	0.0200		71.6	30-160	0.52	30	
Endrin [2C]	0.0138	0.0013	ug/L	0.0200		69.1	30-160	2.16	30	
Endosulfan II [2C]	0.0149	0.0013	ug/L	0.0200		74.5	30-160	0.42	30	
4,4'-DDD	0.0139	0.0013	ug/L	0.0200		69.7	30-160	0.21	30	
Endrin Aldehyde [2C]	0.0117	0.0013	ug/L	0.0200		58.4	30-160	5.62	30	
4,4'-DDT [2C]	0.0132	0.0013	ug/L	0.0200		66.2	30-160	2.47	30	
Endosulfan Sulfate [2C]	0.0144	0.0013	ug/L	0.0200		72.0	30-160	1.18	30	
Endrin Ketone [2C]	0.0155	0.0013	ug/L	0.0200		77.3	30-160	5.15	30	
Methoxychlor [2C]	0.0710	0.0063	ug/L	0.100		71.0	30-160	0.76	30	
Surrogate: Decachlorobiphenyl	0.0146		ug/L	0.0200		72.8	30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0145		ug/L	0.0200		72.4	30-160			
Surrogate: Tetrachlorometaxylene	0.0124		ug/L	0.0200		62.2	30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0111		ug/L	0.0200		55.6	30-160			



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## Certified Analyses included in this Report

Analyte	Certifications
<b>EPA 8081B in Water</b>	
alpha-BHC	DoD-ELAP,WADOE,NELAP
alpha-BHC [2C]	DoD-ELAP,WADOE,NELAP
beta-BHC	DoD-ELAP,WADOE,NELAP
beta-BHC [2C]	DoD-ELAP,WADOE,NELAP
gamma-BHC (Lindane)	DoD-ELAP,WADOE,NELAP
gamma-BHC (Lindane) [2C]	DoD-ELAP,WADOE,NELAP
delta-BHC	DoD-ELAP,WADOE,NELAP
delta-BHC [2C]	DoD-ELAP,WADOE,NELAP
Heptachlor	DoD-ELAP,WADOE,NELAP
Heptachlor [2C]	DoD-ELAP,WADOE,NELAP
Aldrin	DoD-ELAP,WADOE,NELAP
Aldrin [2C]	DoD-ELAP,WADOE,NELAP
Heptachlor Epoxide	DoD-ELAP,WADOE,NELAP
Heptachlor Epoxide [2C]	DoD-ELAP,WADOE,NELAP
trans-Chlordane (beta-Chlordane)	DoD-ELAP,WADOE,NELAP
trans-Chlordane (beta-Chlordane) [2C]	DoD-ELAP,WADOE,NELAP
cis-Chlordane (alpha-chlordane)	DoD-ELAP,WADOE,NELAP
cis-Chlordane (alpha-chlordane) [2C]	DoD-ELAP,WADOE,NELAP
Endosulfan I	DoD-ELAP,WADOE,NELAP
Endosulfan I [2C]	DoD-ELAP,WADOE,NELAP
4,4'-DDE	DoD-ELAP,WADOE,NELAP
4,4'-DDE [2C]	DoD-ELAP,WADOE,NELAP
Dieldrin	DoD-ELAP,WADOE,NELAP
Dieldrin [2C]	DoD-ELAP,WADOE,NELAP
Endrin	DoD-ELAP,WADOE,NELAP
Endrin [2C]	DoD-ELAP,WADOE,NELAP
Endosulfan II	DoD-ELAP,WADOE,NELAP
Endosulfan II [2C]	DoD-ELAP,WADOE,NELAP
4,4'-DDD	DoD-ELAP,WADOE,NELAP
4,4'-DDD [2C]	DoD-ELAP,WADOE,NELAP
Endrin Aldehyde	DoD-ELAP,WADOE,NELAP
Endrin Aldehyde [2C]	DoD-ELAP,WADOE,NELAP
4,4'-DDT	DoD-ELAP,WADOE,NELAP
4,4'-DDT [2C]	DoD-ELAP,WADOE,NELAP
Endosulfan Sulfate	DoD-ELAP,WADOE,NELAP



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Endosulfan Sulfate [2C]	DoD-ELAP,WADOE,NELAP
Endrin Ketone	DoD-ELAP,WADOE,NELAP
Endrin Ketone [2C]	DoD-ELAP,WADOE,NELAP
Methoxychlor	DoD-ELAP,WADOE,NELAP
Methoxychlor [2C]	DoD-ELAP,WADOE,NELAP
Hexachlorobutadiene	DoD-ELAP,WADOE,NELAP
Hexachlorobutadiene [2C]	DoD-ELAP,WADOE,NELAP
Hexachlorobenzene	DoD-ELAP,WADOE,NELAP
Hexachlorobenzene [2C]	DoD-ELAP,WADOE,NELAP
2,4'-DDE	DoD-ELAP
2,4'-DDE [2C]	DoD-ELAP
2,4'-DDD	DoD-ELAP
2,4'-DDD [2C]	DoD-ELAP
2,4'-DDT	DoD-ELAP
2,4'-DDT [2C]	DoD-ELAP
Oxychlordane	DoD-ELAP
Oxychlordane [2C]	DoD-ELAP
cis-Nonachlor	DoD-ELAP
cis-Nonachlor [2C]	DoD-ELAP
trans-Nonachlor	DoD-ELAP
trans-Nonachlor [2C]	DoD-ELAP
Mirex	DoD-ELAP
Mirex [2C]	DoD-ELAP
Toxaphene	DoD-ELAP
Toxaphene [2C]	DoD-ELAP
Chlordane, technical	DoD-ELAP
Chlordane, technical [2C]	DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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### Notes and Definitions

- \* Flagged value is not within established control limits.
- P1 The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.