

Technical Memorandum

TO: Steve Teal, Washington State Department of Ecology
CC: Amy Sikora, Washington State Department of Natural Resources
FROM: Katie Gauglitz, LG
DATE: January 13, 2022
RE: **Fourth 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 chlordanes.

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

Fourth quarter 2021 (4Q21) groundwater monitoring was completed on November 18, 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; Figure 2).

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. Analytical Resources, Inc. of Tukwila, Washington analyzed the groundwater samples for organochlorine pesticides using U.S. Environmental Protection Agency Method 8081B low-level.

Groundwater Monitoring Results

Groundwater monitoring results are summarized below:

- HE was detected in SW-10R at a concentration of 0.125 micrograms per liter ($\mu\text{g/L}$), above the cleanup level (CUL; 0.00481 $\mu\text{g/L}$).
- HE was detected in SW-11R at a concentration of 0.0019 $\mu\text{g/L}$, below the CUL. HE was detected in the SW-11R duplicate sample at a concentration of 0.0014 $\mu\text{g/L}$, also below the CUL.
- Trans-chlordane was detected in SW-10R at a concentration of approximately 0.0201 $\mu\text{g/L}$. There is no CUL for trans-chlordane.
- No analytes other than HE and trans-chlordane were detected in either well during 4Q21 groundwater monitoring.

November 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 184.59 and 184.34 feet mean sea level, respectively. This represents an approximate 2-foot increase from the previous monitoring event, completed in August 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 December 23, 2021, and confirmation that the results have been uploaded to the EIM database is pending.

Conclusions and Next Steps

LAI will continue to conduct quarterly monitoring through May 2023. The next monitoring event is scheduled for February 2022.

Use of this Report

This Technical Memorandum has been prepared for the exclusive use of Washington State Department of Natural Resources and Washington State Department of Ecology for specific application to the Webster Nursery site. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing

in the same locality under similar conditions as this project. LAI makes no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following key staff.

LANDAU ASSOCIATES, INC.



Katie Gauglitz, LG
Senior Project Geologist

KMG/SMM/kjg

[Y:\774\006\R\QUARTERLY GW MONITORING REPORTS\2021_11_4Q21\LAI_WEBSTER NURSERY 4Q21 GW MONITORING_TM_11-22-21.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 November 2021 Laboratory Data Packages

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

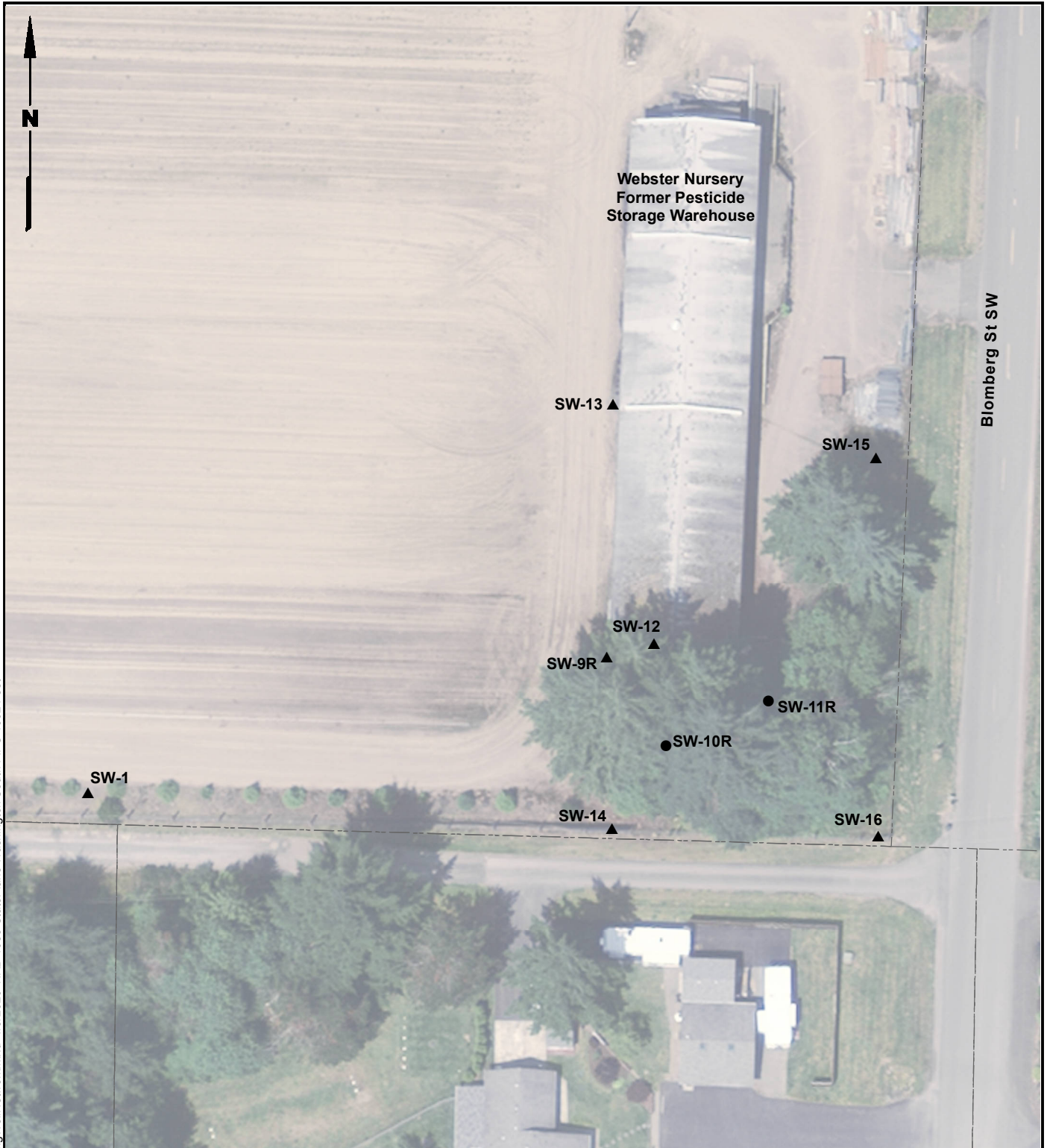
Webster Nursery Site
Tumwater, Washington

Vicinity Map

Figure
1

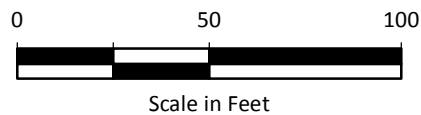


G:\Projects\7741006\0401\045\F02MonitoringWellNetwork.mxd 1/9/2020 NAD 1983 StatePlane Washington South FIPS 4602 Feet



Legend

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



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.

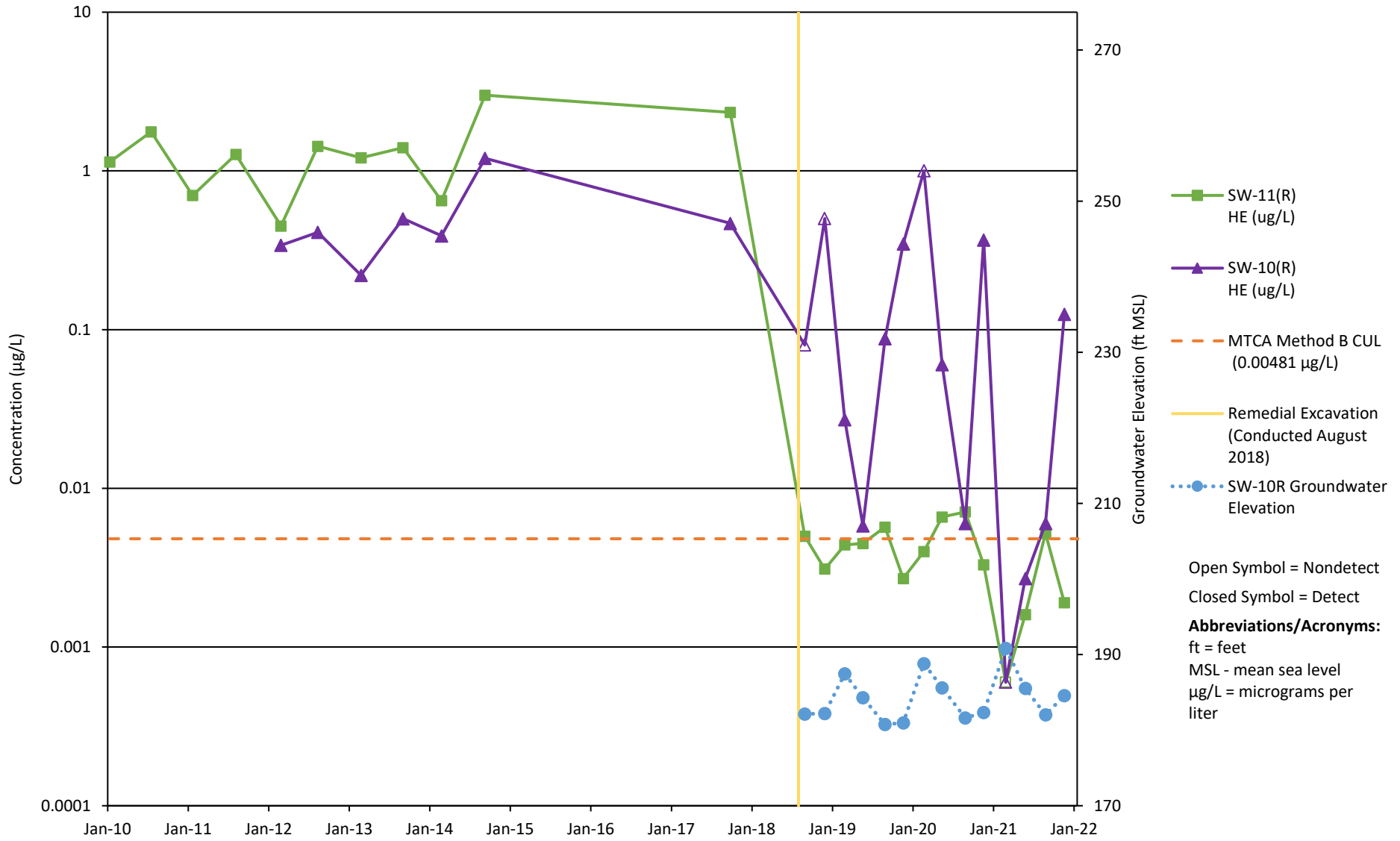


Table 1
Groundwater Analytical Results
Webster Nursery
Tumwater, Washington

Analyte	MTCA Method B Cleanup Levels	Sample Location, Sample ID, Laboratory SDG, Sample Date, and Sample Type		
		SW-10R SW-10R-20211118 21K0326 11/18/2021 N	SW-11R SW-11R-20211118 21K0326 11/18/2021 N	SW-11R SW-99-20211118 21K0326 11/18/2021 FD
Pesticides (µg/L; SW-846 8081B)				
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	--	0.0200 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	0.125	0.0019	0.0014
Methoxychlor	--	0.0063 U	0.0063 U	0.0063 U
Toxaphene	--	0.0625 U	0.0625 U	0.0625 U
trans-Chlordane	--	0.0201 J	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 in the sample.

Abbreviations and Acronyms:

FD = field duplicate

ID = identification

µg/L = micrograms per liter

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	8.82	184.59
SW-11R	192.50	8.16	184.34

Notes:

Groundwater elevation data was measured November 18, 2021.

Abbreviations:

bgs = below ground surface
ft = feet
ID = identification

November 2021 Laboratory Data Package



Analytical Resources, LLC
Analytical Chemists and Consultants

03 December 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)
21K0326

Associated SDG ID(s)
N/A

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, LLC

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

<input type="checkbox"/> North Seattle (206) 631-8660	<input type="checkbox"/> Spokane (509) 327-9737	Date <u>11/18/21</u>	Turnaround Time: <u>Standard</u>
<input checked="" type="checkbox"/> Tacoma (253) 926-2493	<input type="checkbox"/> Portland (503) 542-1080	Page <u>1</u> of <u>1</u>	Accelerated _____
<input type="checkbox"/> Olympia (360) 791-3178			

Sample I.D.	Date	Time	Matrix	No. of Containers	Testing Parameters	Observations/Comments
SW-10R-20211118	11/18/21	1134	Aq	2	Residues - original sample (ROSLB)	Special Handling Requirements: _____ Shipment Method: _____ Stored on ice: <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No
SW-11R-20211118	L	1002	L	2		
SW-99-20211118	L	1005	L	2		
						Allow water samples to settle, collect aliquot from clear portion <input type="checkbox"/> NWTPH-Dx - Acid wash cleanup <input type="checkbox"/> - Silica gel cleanup <input type="checkbox"/> Dissolved metal samples were field filtered <input type="checkbox"/>
						Other _____

Relinquished by Signature <u>Cassidy Sawyer</u> Printed Name <u>Cassidy Sawyer</u> Company <u>Landau Associates</u> Date <u>11/18/21</u> Time <u>14:51</u>	Received by Signature <u>Arden Paist</u> Printed Name <u>Arden Paist</u> Company <u>ARI</u> Date <u>11/18/21</u> Time <u>14:51</u>	Relinquished by Signature _____ Printed Name _____ Company _____ Date _____ Time _____	Received by Signature _____ Printed Name _____ Company _____ Date _____ Time _____
---	---	---	---



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

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

Reported:
03-Dec-2021 17:49

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SW-10R-20211118	21K0326-01	Water	18-Nov-2021 11:34	18-Nov-2021 14:51
SW-11R-20211118	21K0326-02	Water	18-Nov-2021 10:02	18-Nov-2021 14:51
SW-99-20211118	21K0326-03	Water	18-Nov-2021 10:05	18-Nov-2021 14:51



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

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

Reported:
03-Dec-2021 17:49

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 with the exception of ICV1 and CCV1 for cis -Chlordane which failed low on one column. The second column is in control.

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 with the exception of analytes flagged on the associated forms. The BS/BSD were spiked with 3 spikes: INDA, Toxaphene and NOS instead of extracting BS2 and BS3. INDA spike reported values are high due to Toxaphene and NOS interference.



Cooler Receipt Form

ARI Client: Landau Tacoma
 COC No(s): _____ (NA)
 Assigned ARI Job No: 21K0326

Project Name: Webster Nursery
 Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
 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 1601 2.1
 If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO 2565

Cooler Accepted by: AP Date: 11/18/21 Time: 1451

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: AP Date: 11/18/21 Time: 1634 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:
03-Dec-2021 17:49

SW-10R-20211118
21K0326-01 (Water)

Chlorinated Pesticides

Method: EPA 8081B Sampled: 11/18/2021 11:34
Instrument: ECD6 Analyst: YZ Analyzed: 12/01/2021 14:34

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0513 Prepared: 11/24/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0326-01 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0314 Cleaned: 30-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0326-01 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0313 Cleaned: 30-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0326-01 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	0.116	ug/L	E
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	0.0201	ug/L	
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0200	ND	ug/L	Y1, 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
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	97.6	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	100	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	82.6	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	72.4	%	



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

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

Reported:
03-Dec-2021 17:49

SW-10R-20211118
21K0326-01RE1 (Water)

Chlorinated Pesticides

Method: EPA 8081B Sampled: 11/18/2021 11:34
Instrument: ECD6 Analyst: YZ Analyzed: 12/01/2021 15:28

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0513 Prepared: 11/24/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0326-01RE1 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0314 Cleaned: 30-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0326-01RE1 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0313 Cleaned: 30-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0326-01RE1 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	10	0.0063	ND	ug/L	U
beta-BHC	319-85-7	10	0.0063	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	10	0.0063	ND	ug/L	U
delta-BHC	319-86-8	10	0.0063	ND	ug/L	U
Heptachlor	76-44-8	10	0.0063	ND	ug/L	U
Aldrin	309-00-2	10	0.0063	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	10	0.0063	0.125	ug/L	D
trans-Chlordane (beta-Chlordane)	5103-74-2	10	0.0063	0.0181	ug/L	D
cis-Chlordane (alpha-chlordane)	5103-71-9	10	0.100	ND	ug/L	Y1, U
Endosulfan I	959-98-8	10	0.0063	ND	ug/L	U
4,4'-DDE	72-55-9	10	0.0125	ND	ug/L	U
Dieldrin	60-57-1	10	0.0125	ND	ug/L	U
Endrin	72-20-8	10	0.0125	ND	ug/L	U
Endosulfan II	33213-65-9	10	0.0125	ND	ug/L	U
4,4'-DDD	72-54-8	10	0.0125	ND	ug/L	U
Endrin Aldehyde	7421-93-4	10	0.0125	ND	ug/L	U
4,4'-DDT	50-29-3	10	0.0125	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	10	0.0125	ND	ug/L	U
Endrin Ketone	53494-70-5	10	0.0125	ND	ug/L	U
Methoxychlor	72-43-5	10	0.0625	ND	ug/L	U
Toxaphene	8001-35-2	10	0.625	ND	ug/L	U
Chlordane (NOS)	57-74-9	10	0.0500	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	115	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	90.7	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	75.9	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	67.8	%	



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

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

Reported:
03-Dec-2021 17:49

SW-11R-20211118
21K0326-02 (Water)

Chlorinated Pesticides

Method: EPA 8081B Sampled: 11/18/2021 10:02
Instrument: ECD6 Analyst: YZ Analyzed: 12/01/2021 14:52

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0513 Prepared: 11/24/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0326-02 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0314 Cleaned: 30-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0326-02 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0313 Cleaned: 30-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0326-02 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	0.0019	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
<i>Surrogate: Decachlorobiphenyl</i>				30-160 %	96.3 %	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				30-160 %	98.0 %	
<i>Surrogate: Tetrachlorometaxylene</i>				30-160 %	67.0 %	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				30-160 %	76.2 %	



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

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

Reported:
03-Dec-2021 17:49

SW-99-20211118
21K0326-03 (Water)

Chlorinated Pesticides

Method: EPA 8081B Sampled: 11/18/2021 10:05
Instrument: ECD6 Analyst: YZ Analyzed: 12/01/2021 15:10

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJK0513 Prepared: 11/24/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21K0326-03 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJK0314 Cleaned: 30-Nov-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21K0326-03 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJK0313 Cleaned: 30-Nov-2021	Initial Volume: 0.5 uL Final Volume: 0.5 uL	Extract ID: 21K0326-03 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	0.0014	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
<i>Surrogate: Decachlorobiphenyl</i>				30-160 %	95.1	%
<i>Surrogate: Decachlorobiphenyl [2C]</i>				30-160 %	101	%
<i>Surrogate: Tetrachlorometaxylene</i>				30-160 %	65.3	%
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				30-160 %	75.1	%



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

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

Reported:
03-Dec-2021 17:49

Analysis by: Analytical Resources, LLC

Chlorinated Pesticides - Quality Control

Batch BJK0513 - 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
Blank (BJK0513-BLK1)										
Prepared: 24-Nov-2021 Analyzed: 01-Dec-2021 13:40										
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
<i>Surrogate: Decachlorobiphenyl</i>	0.0175		ug/L	0.0200		87.7	30-160			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	0.0177		ug/L	0.0200		88.3	30-160			
<i>Surrogate: Tetrachlorometaxylene</i>	0.0136		ug/L	0.0200		68.2	30-160			
<i>Surrogate: Tetrachlorometaxylene [2C]</i>	0.0162		ug/L	0.0200		81.0	30-160			

LCS (BJK0513-BS1)										
Prepared: 24-Nov-2021 Analyzed: 01-Dec-2021 13:58										
alpha-BHC [2C]	0.0071	0.0006	ug/L	0.0100		70.7	30-160			
beta-BHC	0.0074	0.0006	ug/L	0.0100		73.8	30-160			
gamma-BHC (Lindane) [2C]	0.0072	0.0006	ug/L	0.0100		71.7	30-160			
delta-BHC [2C]	0.0068	0.0006	ug/L	0.0100		67.9	30-160			
Heptachlor [2C]	0.0175	0.0006	ug/L	0.0100		175	30-160			*
Aldrin	0.0072	0.0006	ug/L	0.0100		71.6	30-160			
Heptachlor Epoxide	0.0107	0.0006	ug/L	0.0100		107	30-160			



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

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

Reported:
03-Dec-2021 17:49

Analysis by: Analytical Resources, LLC

Chlorinated Pesticides - Quality Control

Batch BJK0513 - 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
LCS (BJK0513-BS1)		Prepared: 24-Nov-2021 Analyzed: 01-Dec-2021 13:58								
trans-Chlordane (beta-Chlordane)	0.0329	0.0006	ug/L	0.0100		329	30-160			*
cis-Chlordane (alpha-chlordane) [2C]	0.0279	0.0006	ug/L	0.0100		279	30-160			*
Endosulfan I	0.0123	0.0006	ug/L	0.0100		123	30-160			
4,4'-DDE [2C]	0.0179	0.0013	ug/L	0.0200		89.3	30-160			
Dieldrin	0.0174	0.0013	ug/L	0.0200		87.0	30-160			
Endrin [2C]	0.0285	0.0013	ug/L	0.0200		143	30-160			P1
Endosulfan II	0.0388	0.0013	ug/L	0.0200		194	30-160			*
4,4'-DDD [2C]	0.0306	0.0013	ug/L	0.0200		153	30-160			P1
Endrin Aldehyde [2C]	0.0359	0.0013	ug/L	0.0200		179	30-160			*
4,4'-DDT	0.0334	0.0013	ug/L	0.0200		167	30-160			*, P1
Endosulfan Sulfate	0.0295	0.0013	ug/L	0.0200		148	30-160			
Endrin Ketone	0.0208	0.0013	ug/L	0.0200		104	30-160			
Methoxychlor	0.117	0.0063	ug/L	0.100		117	30-160			
<i>Surrogate: Decachlorobiphenyl</i>	0.0197		ug/L	0.0200		98.7	30-160			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	0.0186		ug/L	0.0200		92.8	30-160			
<i>Surrogate: Tetrachlorometaxylene</i>	0.0107		ug/L	0.0200		53.3	30-160			
<i>Surrogate: Tetrachlorometaxylene [2C]</i>	0.0140		ug/L	0.0200		69.8	30-160			
LCS Dup (BJK0513-BSD1)		Prepared: 24-Nov-2021 Analyzed: 01-Dec-2021 14:16								
alpha-BHC [2C]	0.0078	0.0006	ug/L	0.0100		77.9	30-160	9.74	30	
beta-BHC	0.0079	0.0006	ug/L	0.0100		78.7	30-160	6.36	30	
gamma-BHC (Lindane) [2C]	0.0079	0.0006	ug/L	0.0100		79.1	30-160	9.82	30	
delta-BHC [2C]	0.0074	0.0006	ug/L	0.0100		73.8	30-160	8.29	30	
Heptachlor [2C]	0.0199	0.0006	ug/L	0.0100		199	30-160	12.80	30	*
Aldrin [2C]	0.0077	0.0006	ug/L	0.0100		76.6	30-160	9.59	30	
Heptachlor Epoxide	0.0118	0.0006	ug/L	0.0100		118	30-160	9.93	30	
trans-Chlordane (beta-Chlordane)	0.0377	0.0006	ug/L	0.0100		377	30-160	13.60	30	*
cis-Chlordane (alpha-chlordane) [2C]	0.0306	0.0006	ug/L	0.0100		306	30-160	9.16	30	*
Endosulfan I	0.0114	0.0006	ug/L	0.0100		114	30-160	7.97	30	
4,4'-DDE [2C]	0.0199	0.0013	ug/L	0.0200		99.3	30-160	10.60	30	
Dieldrin [2C]	0.0208	0.0013	ug/L	0.0200		104	30-160	18.50	30	
Endrin [2C]	0.0322	0.0013	ug/L	0.0200		161	30-160	11.90	30	*
Endosulfan II	0.0466	0.0013	ug/L	0.0200		233	30-160	18.20	30	*
4,4'-DDD [2C]	0.0341	0.0013	ug/L	0.0200		171	30-160	11.00	30	*
Endrin Aldehyde [2C]	0.0460	0.0013	ug/L	0.0200		230	30-160	24.60	30	*, P1



Landau Associates, Inc. - Tacoma 2107 South C Street Tacoma WA, 98402	Project: Webster Nursery Project Number: Webster Nursery Project Manager: Sierra Mott	Reported: 03-Dec-2021 17:49
---	---	---------------------------------------

Analysis by: Analytical Resources, LLC

Chlorinated Pesticides - Quality Control

Batch BJK0513 - 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
LCS Dup (BJK0513-BSD1)				Prepared: 24-Nov-2021 Analyzed: 01-Dec-2021 14:16						
4,4'-DDT	0.0369	0.0013	ug/L	0.0200		185	30-160	9.94	30	*, P1
Endosulfan Sulfate	0.0312	0.0013	ug/L	0.0200		156	30-160	5.58	30	
Endrin Ketone	0.0224	0.0013	ug/L	0.0200		112	30-160	7.50	30	
Methoxychlor [2C]	0.138	0.0063	ug/L	0.100		138	30-160	27.60	30	P1
<i>Surrogate: Decachlorobiphenyl</i>	0.0206		ug/L	0.0200		103	30-160			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	0.0204		ug/L	0.0200		102	30-160			
<i>Surrogate: Tetrachlorometaxylene</i>	0.0132		ug/L	0.0200		66.2	30-160			
<i>Surrogate: Tetrachlorometaxylene [2C]</i>	0.0159		ug/L	0.0200		79.6	30-160			



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

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

Reported:
03-Dec-2021 17:49

Certified Analyses included in this Report

Analyte	Certifications
EPA 8081B in Water	
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



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

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

Reported:
03-Dec-2021 17:49

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
Oxychlorane	DoD-ELAP
Oxychlorane [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



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

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

Reported:
03-Dec-2021 17:49

Notes and Definitions

- * Flagged value is not within established control limits.
- D The reported value is from a dilution
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- 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).
- Y1 Raised reporting limit due to interference
- 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.