



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

December 12, 2018

**Analytical Report for Service Request No: K1810430**

Janet Knox  
Pacific Groundwater Group  
2377 Eastlake Ave., East  
Suite 200  
Seattle, WA 98102

**RE: Head of Swan Island Lagoon / JK1807.01**

Dear Janet,

Enclosed are the results of the sample(s) submitted to our laboratory October 24, 2018  
For your reference, these analyses have been assigned our service request number **K1810430**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

A handwritten signature in black ink, appearing to read "Howard Holmes".

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
**T :** +1 360 577 7222  
**F :** +1 360 636 1068  
**[www.alsglobal.com](http://www.alsglobal.com)**

## Table of Contents

- Acronyms
- Qualifiers
- State Certifications, Accreditations, And Licenses
- Case Narrative
- Chain of Custody
- Total Solids
- Polynuclear Aromatic Hydrocarbons
- Polynuclear Aromatic Hydrocarbons
- Raw Data
  - Total Solids
  - Polynuclear Aromatic Hydrocarbons
  - Polynuclear Aromatic Hydrocarbons

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

## Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

## Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

## Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

## Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso**  
**State Certifications, Accreditations, and Licenses**

Agency	Web Site	Number
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdpb.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdpb.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L16-58-R4
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjlabs.com/">http://www.pjlabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.alsglobal.com](http://www.alsglobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon  
**Sample Matrix:** Soil, Water

**Service Request:** K1810430  
**Date Received:** 10/24/2018

### CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### **Sample Receipt:**

Eleven soil samples and one water sample were received for analysis at ALS Environmental on 10/24/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### **Semivolatiles by GC/MS:**

Method 8270D, Polynuclear Aromatic Hydrocarbons: The results reported for the following compound in sample 612-102418 may contain a slight bias: Acenaphthylene. The chromatogram indicated the presence of non-target background components. The matrix interference may have resulted in a slight high bias in the affected sample. The results were flagged with "X" to indicate the issue.

Method 8270D, Polynuclear Aromatic Hydrocarbons: The results reported for the following compound in sample G-9.15-0to18-102418 may contain a slight bias: Acenaphthylene and Dibenzofuran. The chromatogram indicated the presence of non-target background components. The matrix interference may have resulted in a slight high bias in the affected sample. The results were flagged with "X" to indicate the issue.

Method 8270D, Polynuclear Aromatic Hydrocarbons: The recoveries of a few analytes in Matrix Spikes (MS/DMS) KWG1805796-1/2 were outside the control limits listed in the results summary. The limits are default values temporarily in use until sufficient data points are generated to calculate statistical control limits. Based on the method and historic data, the recoveries observed were in the range expected for this procedure. No further corrective action was taken.

Approved by \_\_\_\_\_

A handwritten signature in black ink is placed over a solid horizontal line.

Date 12/12/2018



## Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



# CHAIN OF CUSTODY

1317 South 13th Ave., Kelso, WA 98626 | +1 360 577 7222 | +1 800 695 7222 | +1 360 636 1068 (fax)

SR# K1810430

PAGE 1

OF 2

COC#

PROJECT NAME <i>Head of Swan Island Lagoon</i>	PROJECT NUMBER <i>JK1807.01</i>	PROJECT MANAGER <i>Janet Knox</i>	COMPANY NAME <i>PCG</i>	NUMBER OF CONTAINERS	TESTS REQUESTED																		REMARKS									
ADDRESS <i>2377 East Lake Ave E</i>	CITY/STATE/ZIP <i>Seattle WA 98102</i>	E-MAIL ADDRESS <i>Janet@pcgns.com</i>	PHONE # <i>206 329 0761</i>		Semi-volatile Organics by GC/MS 625 <input type="checkbox"/> 8270L <input type="checkbox"/> SMM PAHs Volatile Organics 624 <input type="checkbox"/> 8260 <input type="checkbox"/> Hydrocarbons (*see below) Gas <input type="checkbox"/> Diesel <input type="checkbox"/> Oil & Grease/TPH 8021 <input type="checkbox"/> BTEX <input type="checkbox"/> 1664 HEM <input type="checkbox"/> PCBs Arcolors <input type="checkbox"/> Pesticides/Herbicides 8081 <input type="checkbox"/> Congeners <input type="checkbox"/> Chlorophenolics <input type="checkbox"/> Tri <input type="checkbox"/> Tetra <input type="checkbox"/> PCP <input type="checkbox"/> Metals, Total or Dissolved (See List below) <input type="checkbox"/> Cyanide <input type="checkbox"/> Hex-Chrom <input type="checkbox"/> (circle) pH Cond., Cl, SO4, PO4, Turb. NO3, BOD, TSS, DOC, NH3-N, COD, TKN, TOC, (circle) NO2+NO3, T-Phos TOX 9020 <input type="checkbox"/> AOX 1650 <input type="checkbox"/> Alkalinity <input type="checkbox"/> CO3 <input type="checkbox"/> Dioxins/Furans 1613 <input type="checkbox"/> 8290 <input type="checkbox"/> HCO3 <input type="checkbox"/> Dissolved Gases RSK 175 <input type="checkbox"/> Methane <input type="checkbox"/> CO2 <input type="checkbox"/> Ethane <input type="checkbox"/> Etheno <input type="checkbox"/>																											
SAMPLE I.D. <i>E-8.99-01028-102418</i>	DATE <i>10/24/18</i>	TIME <i>1040</i>	LAB I.D. <i>S 24</i>	X																			<i>Archive Split 8 extra jar(s) per each sample</i>									
C-8.94-01027-102418	10/24/18	0955	S 4	X																			X									
D-8.90-01027-102418	10/24/18	0910	S 4	X																			X									
D-8.83-01025-102418	10/24/18	0833	S 4	X																			X									
E-9.02-01026-102418	10/24/18	1207	S 2	X																			X *MS+MSD									
B-9.00-01029-102418	10/24/18	1119	S 4	X																			X									
S12 - 01029-102418	10/24/18	1119	S 2	X																			X									
D-9.09-01029-102418	10/24/18	1405	S 4	X																			X									
A-9.03-01026-102418	10/24/18	1320	S 4	X																			X									
B-9.15-01030-102418	10/24/18	1547	S 4	X																			X									
REPORT REQUIREMENTS					INVOICE INFORMATION					TESTS REQUESTED																						
I. Routine Report: Method Blank, Surrogate, as required  II. Report Dup., MS, MSD as required  III. CLP Like Summary (no raw data)  IV. Data Validation Report  V. EDD					P.O. # _____ Bill To: _____					Circle which metals are to be analyzed:  Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg  Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg																						
										*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: (CIRCLE ONE)																						
TURNAROUND REQUIREMENTS					24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 5 day <input type="checkbox"/> Standard (15 working days) <input type="checkbox"/> Provide FAX Results <input type="checkbox"/>					SPECIAL INSTRUCTIONS/COMMENTS:  <i>extra 2e402 for MS and 1e402 for MSD sample ID E-9.02-01026-102418</i>																						
										Container Supply Number  94249																						
										Requested Report Date <input type="checkbox"/> Sample Shipment contains USDA regulated soil samples (check box if applicable)																						

RELINQUISHED BY:  
*Matt Luxon*  
Signature  
Matt Luxon  
Printed Name

Date/Time  
*10/24/18 2000*  
Acme Env  
Firm

RECEIVED BY:  
*J.C. Ben*  
Signature  
J.C. Ben  
Printed Name

Date/Time  
*10-24-18 13:15*  
Firm

RELINQUISHED BY:  
Signature  
Printed Name

Date/Time  
Firm

RECEIVED BY:  
Signature  
Printed Name

Date/Time  
Firm





PC HH

## Cooler Receipt and Preservation Form

Client PGG

Service Request K18 10430

Received: 10/24/18 Opened: 10/24/18 By: D.Iverson Unloaded: 10/25/18 By: CG

1. Samples were received via? **USPS** **Fed Ex** **UPS** **DHL** **PDX** **Courier** **Hand Delivered**
2. Samples were received in: (circle) **Cooler** **Box** **Envelope** **Other** **NA**
3. Were custody seals on coolers? **NA** **Y** **N** If yes, how many and where?
- If present, were custody seals intact? **Y** **N** If present, were they signed and dated? **Y** **N**

Raw Cooler Temp	Corrected, Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
1.4	1.6	2.5	2.7	+0.2	308				

4. Packing material: **Inserts** **Baggies** **Bubble Wrap** **Gel Packs** **Wet Ice** **Dry Ice** **Sleeves**
5. Were custody papers properly filled out (ink, signed, etc.)? **NA** **Y** **N**
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* **NA** **Y** **N**  
If applicable, tissue samples were received: **Frozen** **Partially Thawed** **Thawed**
7. Were all sample labels complete (i.e analysis, preservation, etc.)? **NA** **Y** **N**
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* **NA** **Y** **N**
9. Were appropriate bottles/containers and volumes received for the tests indicated? **NA** **Y** **N**
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below.* **NA** **Y** **N**
11. Were VOA vials received without headspace? *Indicate in the table below.* **NA** **Y** **N**
12. Was C12/Res negative? **NA** **Y** **N**

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head- space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

**Notes, Discrepancies, & Resolutions:** \*Cooler temperature measured on 10/25/18 at 0820 by CG. Temp not measured upon receipt, cooler stored in refrigerator overnight. Samples taken on 10/24; evidence of cooling as there is wet ice in the cooler & was delivered to ALS on the same day as sampling.



## Total Solids

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil  
**Analysis Method:** 160.3 Modified  
**Prep Method:** None

**Service Request:** K1810430  
**Date Collected:** 10/24/18  
**Date Received:** 10/24/18  
**Units:** Percent  
**Basis:** As Received

**Solids, Total**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
E-8.99-0to28-102418	K1810430-001	<b>28.5</b>	-	-	1	11/30/18 11:20	
C-8.94-0to27-102418	K1810430-002	<b>30.2</b>	-	-	1	11/30/18 11:20	
D-8.90-0to27-102418	K1810430-003	<b>34.7</b>	-	-	1	11/30/18 11:20	
D-8.83-0to25-102418	K1810430-004	<b>34.7</b>	-	-	1	11/30/18 11:20	
E-9.02-0to26-102418	K1810430-005	<b>35.0</b>	-	-	1	11/30/18 11:20	
B-9.00-0to29-102418	K1810430-006	<b>27.7</b>	-	-	1	11/30/18 11:20	
512-0to29-102418	K1810430-007	<b>27.3</b>	-	-	1	11/30/18 11:20	
D-9.09-0to29-102418	K1810430-008	<b>32.2</b>	-	-	1	11/30/18 11:20	
A-9.03-0to26-102418	K1810430-009	<b>28.8</b>	-	-	1	11/30/18 11:20	
B-9.15-0to30-102418	K1810430-010	<b>46.5</b>	-	-	1	11/30/18 11:20	
G-9.15-0to18-102418	K1810430-011	<b>74.1</b>	-	-	1	11/30/18 11:20	

**ALS Group USA, Corp.**

dba ALS Environmental

## QA/QC Report

**Client:** Pacific Groundwater Group (PGG)  
**Project** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/18  
**Date Received:** 10/24/18  
**Date Analyzed:** 11/30/18

**Replicate Sample Summary****Inorganic Parameters**

**Sample Name:** E-9.02-0to26-102418  
**Lab Code:** K1810430-005

**Units:** Percent  
**Basis:** As Received

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>MRL</b>	<b>MDL</b>	<b>Sample Result</b>	<b>Duplicate Sample</b>	<b>Average</b>	<b>RPD</b>	<b>RPD Limit</b>
					K1810430-005DUP Result			
Solids, Total	160.3 Modified	-	-	35.0	35.1	35.1	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



## Polynuclear Aromatic Hydrocarbons

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Pacific Groundwater Group (PGG) **Service Request:** K1810430  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Cover Page - Organic Analysis Data Package**  
**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
E-8.99-0to28-102418	K1810430-001	10/24/2018	10/24/2018
C-8.94-0to27-102418	K1810430-002	10/24/2018	10/24/2018
D-8.90-0to27-102418	K1810430-003	10/24/2018	10/24/2018
D-8.83-0to25-102418	K1810430-004	10/24/2018	10/24/2018
E-9.02-0to26-102418	K1810430-005	10/24/2018	10/24/2018
B-9.00-0to29-102418	K1810430-006	10/24/2018	10/24/2018
512-0to29-102418	K1810430-007	10/24/2018	10/24/2018
D-9.09-0to29-102418	K1810430-008	10/24/2018	10/24/2018
A-9.03-0to26-102418	K1810430-009	10/24/2018	10/24/2018
B-9.15-0to30-102418	K1810430-010	10/24/2018	10/24/2018
G-9.15-0to18-102418	K1810430-011	10/24/2018	10/24/2018
E-9.02-0to26-102418MS	KWG1805796-1	10/24/2018	10/24/2018
E-9.02-0to26-102418DMS	KWG1805796-2	10/24/2018	10/24/2018

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	E-8.99-0to28-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-001	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	17	D	8.8	0.78	5	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	8.5	JD	8.8	0.42	5	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	13	D	4.4	0.26	5	11/07/18	11/14/18	KWG1805796	
Acenaphthene	10	D	4.4	0.29	5	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	14	D	4.4	0.20	5	11/07/18	11/14/18	KWG1805796	
Fluorene	23	D	4.4	0.35	5	11/07/18	11/14/18	KWG1805796	
Phenanthrene	120	D	4.4	0.29	5	11/07/18	11/14/18	KWG1805796	
Anthracene	36	D	4.4	0.23	5	11/07/18	11/14/18	KWG1805796	
Fluoranthene	360	D	4.4	0.29	5	11/07/18	11/14/18	KWG1805796	
Pyrene	360	D	4.4	0.29	5	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	110	D	4.4	0.29	5	11/07/18	11/14/18	KWG1805796	
Chrysene	140	D	4.4	0.24	5	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	210	D	4.4	0.50	5	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	72	D	4.4	0.40	5	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	110	D	4.4	0.32	5	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	90	D	4.4	0.57	5	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	20	D	4.4	0.51	5	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	100	D	4.4	0.52	5	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	75	26-102	11/14/18	Acceptable
Fluoranthene-d10	69	23-110	11/14/18	Acceptable
Terphenyl-d14	84	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	C-8.94-0to27-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-002	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	17	D	8.3	0.74	5	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	8.2	JD	8.3	0.39	5	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	13	D	4.2	0.25	5	11/07/18	11/14/18	KWG1805796	
Acenaphthene	8.7	D	4.2	0.27	5	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	9.8	D	4.2	0.19	5	11/07/18	11/14/18	KWG1805796	
Fluorene	16	D	4.2	0.33	5	11/07/18	11/14/18	KWG1805796	
Phenanthrene	87	D	4.2	0.28	5	11/07/18	11/14/18	KWG1805796	
Anthracene	28	D	4.2	0.22	5	11/07/18	11/14/18	KWG1805796	
Fluoranthene	290	D	4.2	0.27	5	11/07/18	11/14/18	KWG1805796	
Pyrene	320	D	4.2	0.27	5	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	110	D	4.2	0.28	5	11/07/18	11/14/18	KWG1805796	
Chrysene	220	D	4.2	0.23	5	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	210	D	4.2	0.48	5	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	66	D	4.2	0.38	5	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	120	D	4.2	0.30	5	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	99	D	4.2	0.53	5	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	22	D	4.2	0.49	5	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	110	D	4.2	0.49	5	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	78	26-102	11/14/18	Acceptable
Fluoranthene-d10	73	23-110	11/14/18	Acceptable
Terphenyl-d14	87	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	D-8.90-0to27-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-003	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	17	D	7.3	0.65	5	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	9.8	D	7.3	0.34	5	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	11	D	3.7	0.21	5	11/07/18	11/14/18	KWG1805796	
Acenaphthene	12	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	9.1	D	3.7	0.16	5	11/07/18	11/14/18	KWG1805796	
Fluorene	15	D	3.7	0.29	5	11/07/18	11/14/18	KWG1805796	
Phenanthrene	120	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Anthracene	25	D	3.7	0.19	5	11/07/18	11/14/18	KWG1805796	
Fluoranthene	310	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Pyrene	340	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	120	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Chrysene	190	D	3.7	0.20	5	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	230	D	3.7	0.42	5	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	86	D	3.7	0.33	5	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	150	D	3.7	0.26	5	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	120	D	3.7	0.47	5	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	25	D	3.7	0.42	5	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	120	D	3.7	0.43	5	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	75	26-102	11/14/18	Acceptable
Fluoranthene-d10	75	23-110	11/14/18	Acceptable
Terphenyl-d14	88	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	D-8.83-0to25-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-004	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	16	D	7.3	0.65	5	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	7.4	D	7.3	0.34	5	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	13	D	3.7	0.21	5	11/07/18	11/14/18	KWG1805796	
Acenaphthene	9.1	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	7.9	D	3.7	0.16	5	11/07/18	11/14/18	KWG1805796	
Fluorene	15	D	3.7	0.29	5	11/07/18	11/14/18	KWG1805796	
Phenanthrene	98	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Anthracene	29	D	3.7	0.19	5	11/07/18	11/14/18	KWG1805796	
Fluoranthene	300	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Pyrene	340	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	120	D	3.7	0.24	5	11/07/18	11/14/18	KWG1805796	
Chrysene	220	D	3.7	0.20	5	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	250	D	3.7	0.42	5	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	87	D	3.7	0.33	5	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	140	D	3.7	0.26	5	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	110	D	3.7	0.47	5	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	26	D	3.7	0.42	5	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	120	D	3.7	0.43	5	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	71	26-102	11/14/18	Acceptable
Fluoranthene-d10	72	23-110	11/14/18	Acceptable
Terphenyl-d14	84	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	E-9.02-0to26-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-005	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	41	D	15	1.3	10	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	20	D	15	0.68	10	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	17	D	7.2	0.42	10	11/07/18	11/14/18	KWG1805796	
Acenaphthene	23	D	7.2	0.46	10	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	12	D	7.2	0.32	10	11/07/18	11/14/18	KWG1805796	
Fluorene	21	D	7.2	0.56	10	11/07/18	11/14/18	KWG1805796	
Phenanthrene	130	D	7.2	0.48	10	11/07/18	11/14/18	KWG1805796	
Anthracene	31	D	7.2	0.38	10	11/07/18	11/14/18	KWG1805796	
Fluoranthene	240	D	7.2	0.46	10	11/07/18	11/14/18	KWG1805796	
Pyrene	310	D	7.2	0.46	10	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	92	D	7.2	0.48	10	11/07/18	11/14/18	KWG1805796	
Chrysene	120	D	7.2	0.39	10	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	170	D	7.2	0.82	10	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	64	D	7.2	0.65	10	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	120	D	7.2	0.52	10	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	96	D	7.2	0.92	10	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	20	D	7.2	0.83	10	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	110	D	7.2	0.85	10	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	77	26-102	11/14/18	Acceptable
Fluoranthene-d10	72	23-110	11/14/18	Acceptable
Terphenyl-d14	87	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

**Sample Name:** B-9.00-0to29-102418      **Units:** ug/Kg  
**Lab Code:** K1810430-006      **Basis:** Dry  
**Extraction Method:** EPA 3541      **Level:** Low  
**Analysis Method:** 8270D SIM

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	11	D	9.1	0.81	5	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	5.6	JD	9.1	0.43	5	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	14	D	4.6	0.27	5	11/07/18	11/14/18	KWG1805796	
Acenaphthene	7.4	D	4.6	0.29	5	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	9.7	D	4.6	0.20	5	11/07/18	11/14/18	KWG1805796	
Fluorene	16	D	4.6	0.36	5	11/07/18	11/14/18	KWG1805796	
Phenanthrene	77	D	4.6	0.30	5	11/07/18	11/14/18	KWG1805796	
Anthracene	26	D	4.6	0.24	5	11/07/18	11/14/18	KWG1805796	
Fluoranthene	290	D	4.6	0.29	5	11/07/18	11/14/18	KWG1805796	
Pyrene	320	D	4.6	0.29	5	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	100	D	4.6	0.30	5	11/07/18	11/14/18	KWG1805796	
Chrysene	140	D	4.6	0.25	5	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	210	D	4.6	0.52	5	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	73	D	4.6	0.41	5	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	110	D	4.6	0.33	5	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	97	D	4.6	0.58	5	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	21	D	4.6	0.53	5	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	110	D	4.6	0.54	5	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	89	26-102	11/14/18	Acceptable
Fluoranthene-d10	92	23-110	11/14/18	Acceptable
Terphenyl-d14	113	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	512-0to29-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-007	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	10	D	9.2	0.82	5	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	5.4	JD	9.2	0.43	5	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	12	D	4.6	0.27	5	11/07/18	11/14/18	KWG1805796	
Acenaphthene	7.1	D	4.6	0.30	5	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	10	D	4.6	0.21	5	11/07/18	11/14/18	KWG1805796	
Fluorene	16	D	4.6	0.36	5	11/07/18	11/14/18	KWG1805796	
Phenanthrene	70	D	4.6	0.31	5	11/07/18	11/14/18	KWG1805796	
Anthracene	25	D	4.6	0.24	5	11/07/18	11/14/18	KWG1805796	
Fluoranthene	270	D	4.6	0.30	5	11/07/18	11/14/18	KWG1805796	
Pyrene	290	D	4.6	0.30	5	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	94	D	4.6	0.31	5	11/07/18	11/14/18	KWG1805796	
Chrysene	170	D	4.6	0.25	5	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	190	D	4.6	0.53	5	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	65	D	4.6	0.42	5	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	100	D	4.6	0.33	5	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	89	D	4.6	0.59	5	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	21	D	4.6	0.54	5	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	100	D	4.6	0.54	5	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	82	26-102	11/14/18	Acceptable
Fluoranthene-d10	78	23-110	11/14/18	Acceptable
Terphenyl-d14	94	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	D-9.09-0to29-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-008	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	18	D	7.8	0.70	5	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	10	D	7.8	0.37	5	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	13	D	3.9	0.23	5	11/07/18	11/14/18	KWG1805796	
Acenaphthene	10	D	3.9	0.25	5	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	9.0	D	3.9	0.18	5	11/07/18	11/14/18	KWG1805796	
Fluorene	13	D	3.9	0.31	5	11/07/18	11/14/18	KWG1805796	
Phenanthrene	92	D	3.9	0.26	5	11/07/18	11/14/18	KWG1805796	
Anthracene	24	D	3.9	0.21	5	11/07/18	11/14/18	KWG1805796	
Fluoranthene	250	D	3.9	0.25	5	11/07/18	11/14/18	KWG1805796	
Pyrene	310	D	3.9	0.25	5	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	98	D	3.9	0.26	5	11/07/18	11/14/18	KWG1805796	
Chrysene	130	D	3.9	0.21	5	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	230	D	3.9	0.45	5	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	77	D	3.9	0.35	5	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	130	D	3.9	0.28	5	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	120	D	3.9	0.50	5	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	25	D	3.9	0.46	5	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	140	D	3.9	0.46	5	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	82	26-102	11/14/18	Acceptable
Fluoranthene-d10	80	23-110	11/14/18	Acceptable
Terphenyl-d14	95	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	A-9.03-0to26-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-009	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	14	JD	18	1.6	10	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	8.1	JD	18	0.82	10	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	33	D	8.7	0.51	10	11/07/18	11/14/18	KWG1805796	
Acenaphthene	15	D	8.7	0.56	10	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	14	D	8.7	0.39	10	11/07/18	11/14/18	KWG1805796	
Fluorene	35	D	8.7	0.68	10	11/07/18	11/14/18	KWG1805796	
Phenanthrene	170	D	8.7	0.58	10	11/07/18	11/14/18	KWG1805796	
Anthracene	63	D	8.7	0.46	10	11/07/18	11/14/18	KWG1805796	
Fluoranthene	1100	D	8.7	0.56	10	11/07/18	11/14/18	KWG1805796	
Pyrene	1000	D	8.7	0.56	10	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	240	D	8.7	0.58	10	11/07/18	11/14/18	KWG1805796	
Chrysene	530	D	8.7	0.47	10	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	530	D	8.7	0.99	10	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	170	D	8.7	0.79	10	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	250	D	8.7	0.63	10	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	220	D	8.7	1.2	10	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	47	D	8.7	1.1	10	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	210	D	8.7	1.1	10	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	79	26-102	11/14/18	Acceptable
Fluoranthene-d10	77	23-110	11/14/18	Acceptable
Terphenyl-d14	98	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	B-9.15-0to30-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-010	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	38	D	11	0.96	10	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	19	D	11	0.51	10	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	18	D	5.4	0.32	10	11/07/18	11/14/18	KWG1805796	
Acenaphthene	27	D	5.4	0.35	10	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	11	D	5.4	0.24	10	11/07/18	11/14/18	KWG1805796	
Fluorene	21	D	5.4	0.42	10	11/07/18	11/14/18	KWG1805796	
Phenanthrene	210	D	5.4	0.36	10	11/07/18	11/14/18	KWG1805796	
Anthracene	41	D	5.4	0.28	10	11/07/18	11/14/18	KWG1805796	
Fluoranthene	370	D	5.4	0.35	10	11/07/18	11/14/18	KWG1805796	
Pyrene	430	D	5.4	0.35	10	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	140	D	5.4	0.36	10	11/07/18	11/14/18	KWG1805796	
Chrysene	210	D	5.4	0.29	10	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	230	D	5.4	0.62	10	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	78	D	5.4	0.49	10	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	170	D	5.4	0.39	10	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	120	D	5.4	0.69	10	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	28	D	5.4	0.63	10	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	130	D	5.4	0.64	10	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	76	26-102	11/14/18	Acceptable
Fluoranthene-d10	73	23-110	11/14/18	Acceptable
Terphenyl-d14	89	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

## Polynuclear Aromatic Hydrocarbons

<b>Sample Name:</b>	G-9.15-0to18-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-011	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	3.2	JD	14	1.8	20	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	2.4	JD	14	0.94	20	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	4.1	JDX	6.8	0.58	20	11/07/18	11/14/18	KWG1805796	
Acenaphthene	5.7	JD	6.8	0.64	20	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	2.6	JDX	6.8	0.44	20	11/07/18	11/14/18	KWG1805796	
Fluorene	6.7	JD	6.8	0.78	20	11/07/18	11/14/18	KWG1805796	
Phenanthrene	47	D	6.8	0.66	20	11/07/18	11/14/18	KWG1805796	
Anthracene	8.6	D	6.8	0.52	20	11/07/18	11/14/18	KWG1805796	
Fluoranthene	58	D	6.8	0.64	20	11/07/18	11/14/18	KWG1805796	
Pyrene	86	D	6.8	0.64	20	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	26	D	6.8	0.66	20	11/07/18	11/14/18	KWG1805796	
Chrysene	34	D	6.8	0.54	20	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	35	D	6.8	1.2	20	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	11	D	6.8	0.90	20	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	29	D	6.8	0.72	20	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	19	D	6.8	1.3	20	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	6.6	JD	6.8	1.2	20	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	28	D	6.8	1.2	20	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	80	26-102	11/14/18	Acceptable
Fluoranthene-d10	73	23-110	11/14/18	Acceptable
Terphenyl-d14	86	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Sediment

**Service Request:** K1810430  
**Date Collected:** NA  
**Date Received:** NA

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	Method Blank	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	KWG1805796-6	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	0.50	0.089	1	11/07/18	11/14/18	KWG1805796	
2-Methylnaphthalene	ND	U	0.50	0.047	1	11/07/18	11/14/18	KWG1805796	
Acenaphthylene	ND	U	0.25	0.029	1	11/07/18	11/14/18	KWG1805796	
Acenaphthene	ND	U	0.25	0.032	1	11/07/18	11/14/18	KWG1805796	
Dibenzofuran	ND	U	0.25	0.022	1	11/07/18	11/14/18	KWG1805796	
Fluorene	ND	U	0.25	0.039	1	11/07/18	11/14/18	KWG1805796	
Phenanthrene	ND	U	0.25	0.033	1	11/07/18	11/14/18	KWG1805796	
Anthracene	ND	U	0.25	0.026	1	11/07/18	11/14/18	KWG1805796	
Fluoranthene	ND	U	0.25	0.032	1	11/07/18	11/14/18	KWG1805796	
Pyrene	ND	U	0.25	0.032	1	11/07/18	11/14/18	KWG1805796	
Benz(a)anthracene	<b>0.035</b>	J	0.25	0.033	1	11/07/18	11/14/18	KWG1805796	
Chrysene	ND	U	0.25	0.027	1	11/07/18	11/14/18	KWG1805796	
Benzo(b)fluoranthene†	ND	U	0.25	0.057	1	11/07/18	11/14/18	KWG1805796	
Benzo(k)fluoranthene	ND	U	0.25	0.045	1	11/07/18	11/14/18	KWG1805796	
Benzo(a)pyrene	ND	U	0.25	0.036	1	11/07/18	11/14/18	KWG1805796	
Indeno(1,2,3-cd)pyrene	ND	U	0.25	0.064	1	11/07/18	11/14/18	KWG1805796	
Dibenz(a,h)anthracene	ND	U	0.25	0.058	1	11/07/18	11/14/18	KWG1805796	
Benzo(g,h,i)perylene	ND	U	0.25	0.059	1	11/07/18	11/14/18	KWG1805796	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	72	26-102	11/14/18	Acceptable
Fluoranthene-d10	67	23-110	11/14/18	Acceptable
Terphenyl-d14	75	27-115	11/14/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430

**Surrogate Recovery Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Extraction Method:** EPA 3541                            **Units:** Percent  
**Analysis Method:** 8270D SIM                            **Level:** Low

<b>Sample Name</b>	<b>Lab Code</b>	<b>Sur1</b>	<b>Sur2</b>	<b>Sur3</b>
E-8.99-0to28-102418	K1810430-001	75 D	69 D	84 D
C-8.94-0to27-102418	K1810430-002	78 D	73 D	87 D
D-8.90-0to27-102418	K1810430-003	75 D	75 D	88 D
D-8.83-0to25-102418	K1810430-004	71 D	72 D	84 D
E-9.02-0to26-102418	K1810430-005	77 D	72 D	87 D
B-9.00-0to29-102418	K1810430-006	89 D	92 D	113 D
512-0to29-102418	K1810430-007	82 D	78 D	94 D
D-9.09-0to29-102418	K1810430-008	82 D	80 D	95 D
A-9.03-0to26-102418	K1810430-009	79 D	77 D	98 D
B-9.15-0to30-102418	K1810430-010	76 D	73 D	89 D
G-9.15-0to18-102418	K1810430-011	80 D	73 D	86 D
Method Blank	KWG1805796-6	72	67	75
E-9.02-0to26-102418MS	KWG1805796-1	74 D	73 D	89 D
E-9.02-0to26-102418DMS	KWG1805796-2	80 D	77 D	91 D
Lab Control Sample	KWG1805796-5	78	79	87

**Surrogate Recovery Control Limits (%)**

Sur1 = Fluorene-d10	26-102
Sur2 = Fluoranthene-d10	23-110
Sur3 = Terphenyl-d14	27-115

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Date Analyzed:** 11/14/2018  
**Time Analyzed:** 06:17

**Internal Standard Area and RT Summary**  
**Polynuclear Aromatic Hydrocarbons**

**File ID:** J:\MS14\DATA\111418\1114F002.D  
**Instrument ID:** MS14  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1806235-2  
**Analysis Lot:** KWG1806235

	Naphthalene-d8		Acenaphthene-d10		Phenanthrene-d10	
	<u>Area</u>	<u>RT</u>	<u>Area</u>	<u>RT</u>	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	58,386	4.75	27,245	6.31	66,920	7.55
<b>Upper Limit ==&gt;</b>	116,772	5.25	54,490	6.81	133,840	8.05
<b>Lower Limit ==&gt;</b>	29,193	4.25	13,623	5.81	33,460	7.05
<b>ICAL Result ==&gt;</b>	60,855	4.80	25,959	6.35	53,916	7.59

*Associated Analyses*

Method Blank	KWG1805796-6	59,123	4.74	31,330	6.31	73,826	7.55
Lab Control Sample	KWG1805796-5	60,453	4.75	29,887	6.31	65,739	7.55
E-8.99-0to28-102418	K1810430-001	53,237	4.74	28,627	6.31	68,745	7.55
C-8.94-0to27-102418	K1810430-002	51,976	4.74	29,108	6.31	65,813	7.55
D-8.90-0to27-102418	K1810430-003	53,010	4.74	30,185	6.31	67,316	7.55
D-8.83-0to25-102418	K1810430-004	53,975	4.75	31,796	6.31	66,432	7.55
B-9.00-0to29-102418	K1810430-006	53,727	4.75	31,129	6.31	67,994	7.55
512-0to29-102418	K1810430-007	54,002	4.74	31,799	6.31	68,800	7.55
D-9.09-0to29-102418	K1810430-008	53,005	4.75	31,761	6.31	67,603	7.55
G-9.15-0to18-102418	K1810430-011	52,974	4.75	32,289	6.31	65,075	7.55
E-9.02-0to26-102418MS	KWG1805796-1	57,068	4.75	34,110	6.31	71,191	7.56
E-9.02-0to26-102418DMS	KWG1805796-2	56,579	4.75	33,461	6.31	71,518	7.56
E-9.02-0to26-102418	K1810430-005	57,873	4.75	34,312	6.31	72,283	7.55
A-9.03-0to26-102418	K1810430-009	58,523	4.75	34,733	6.31	71,985	7.55
B-9.15-0to30-102418	K1810430-010	60,301	4.75	35,072	6.31	73,936	7.55

Results flagged with an asterisk (\*) indicate values outside control criteria.

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Date Analyzed:** 11/14/2018  
**Time Analyzed:** 06:17

**Internal Standard Area and RT Summary**  
**Polynuclear Aromatic Hydrocarbons**

**File ID:** J:\MS14\DATA\111418\1114F002.D  
**Instrument ID:** MS14  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1806235-2  
**Analysis Lot:** KWG1806235

	Chrysene-d12		Perylene-d12	
	<u>Area</u>	<u>RT</u>	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	75,302	10.10	83,299	13.29
<b>Upper Limit ==&gt;</b>	150,604	10.60	166,598	13.79
<b>Lower Limit ==&gt;</b>	37,651	9.60	41,650	12.79
<b>ICAL Result ==&gt;</b>	68,964	10.15	73,742	13.30

**Associated Analyses**

---

Method Blank	KWG1805796-6	83,472	10.10	90,973	13.28
Lab Control Sample	KWG1805796-5	75,453	10.10	83,033	13.29
E-8.99-0to28-102418	K1810430-001	73,642	10.11	79,661	13.32
C-8.94-0to27-102418	K1810430-002	71,367	10.11	77,597	13.33
D-8.90-0to27-102418	K1810430-003	72,757	10.11	78,286	13.34
D-8.83-0to25-102418	K1810430-004	71,829	10.12	77,551	13.35
B-9.00-0to29-102418	K1810430-006	69,568	10.11	76,977	13.33
512-0to29-102418	K1810430-007	70,481	10.11	78,229	13.33
D-9.09-0to29-102418	K1810430-008	73,060	10.12	78,515	13.36
G-9.15-0to18-102418	K1810430-011	65,997	10.11	72,825	13.33
E-9.02-0to26-102418MS	KWG1805796-1	73,537	10.12	80,690	13.34
E-9.02-0to26-102418DMS	KWG1805796-2	75,741	10.12	82,288	13.34
E-9.02-0to26-102418	K1810430-005	76,051	10.12	83,438	13.34
A-9.03-0to26-102418	K1810430-009	73,648	10.11	81,339	13.33
B-9.15-0to30-102418	K1810430-010	76,456	10.11	84,208	13.34

Results flagged with an asterisk (\*) indicate values outside control criteria.

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Extracted:** 11/07/2018  
**Date Analyzed:** 11/14/2018

**Matrix Spike/Duplicate Matrix Spike Summary**  
**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	E-9.02-0to26-102418	<b>Units:</b>	ug/Kg
<b>Lab Code:</b>	K1810430-005	<b>Basis:</b>	Dry
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM	<b>Extraction Lot:</b>	KWG1805796

<b>Analyte Name</b>	<b>Sample Result</b>	E-9.02-0to26-102418MS			E-9.02-0to26-102418DMS			<b>%Rec Limits</b>	<b>RPD</b>	<b>RPD Limit</b>			
		KWG1805796-1			KWG1805796-2								
		Matrix Spike			Duplicate Matrix Spike								
Naphthalene	41	109	143	48 *	108	143	47 *	70-130	2	40			
2-Methylnaphthalene	20	106	143	60 *	110	143	63 *	70-130	4	40			
Acenaphthylene	17	102	143	59 *	108	143	63 *	70-130	6	40			
Acenaphthene	23	106	143	58 *	115	143	64 *	70-130	8	40			
Dibenzofuran	12	99.7	143	61 *	107	143	66 *	70-130	7	40			
Fluorene	21	118	143	68 *	128	143	75	70-130	9	40			
Phenanthrene	130	217	143	62 *	234	143	74	70-130	8	40			
Anthracene	31	132	143	70	139	143	75	70-130	5	40			
Fluoranthene	240	319	143	58 *	343	143	75	70-130	7	40			
Pyrene	310	402	143	65 *	423	143	79	70-130	5	40			
Benz(a)anthracene	92	195	143	72	206	143	80	70-130	6	40			
Chrysene	120	235	143	83	247	143	90	70-130	5	40			
Benzo(b)fluoranthene	170	259	143	65 *	284	143	82	70-130	9	40			
Benzo(k)fluoranthene	64	150	143	61 *	160	143	68 *	70-130	6	40			
Benzo(a)pyrene	120	222	143	70	240	143	82	70-130	8	40			
Indeno(1,2,3-cd)pyrene	96	210	143	80	226	143	91	70-130	7	40			
Dibenz(a,h)anthracene	20	108	143	62 *	116	143	67 *	70-130	7	40			
Benzo(g,h,i)perylene	110	190	143	57 *	208	143	69 *	70-130	9	40			

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Sediment

**Service Request:** K1810430  
**Date Extracted:** 11/07/2018  
**Date Analyzed:** 11/14/2018

**Lab Control Spike Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Extraction Method:** EPA 3541  
**Analysis Method:** 8270D SIM

**Units:** ug/Kg  
**Basis:** Dry  
**Level:** Low  
**Extraction Lot:** KWG1805796

Lab Control Sample

KWG1805796-5

**Lab Control Spike**

<b>Analyte Name</b>	<b>Result</b>	<b>Spike</b>	<b>%Rec</b>	<b>%Rec</b> Limits
		<b>Amount</b>		
Naphthalene	63.7	100	64	48-77
2-Methylnaphthalene	67.3	100	67	52-85
Acenaphthylene	68.6	100	69	51-80
Acenaphthene	68.4	100	68	51-82
Dibenzofuran	67.8	100	68	14-125
Fluorene	72.0	100	72	52-83
Phenanthrene	68.9	100	69	48-85
Anthracene	74.2	100	74	56-87
Fluoranthene	68.9	100	69	45-96
Pyrene	73.4	100	73	59-98
Benz(a)anthracene	82.2	100	82	65-97
Chrysene	79.0	100	79	63-100
Benzo(b)fluoranthene	84.4	100	84	63-99
Benzo(k)fluoranthene	81.1	100	81	62-99
Benzo(a)pyrene	85.3	100	85	64-103
Indeno(1,2,3-cd)pyrene	85.9	100	86	61-105
Dibenz(a,h)anthracene	82.2	100	82	56-104
Benzo(g,h,i)perylene	73.4	100	73	56-101

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Sediment

**Service Request:** K1810430  
**Date Extracted:** 11/07/2018  
**Date Analyzed:** 11/14/2018  
**Time Analyzed:** 06:42

**Method Blank Summary**  
**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	Method Blank	<b>Instrument ID:</b>	MS14
<b>Lab Code:</b>	KWG1805796-6	<b>File ID:</b>	J:\MS14\DATA\111418\1114F003.D
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM	<b>Extraction Lot:</b>	KWG1805796

This Method Blank applies to the following analyses:

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>
Lab Control Sample	KWG1805796-5	J:\MS14\DATA\111418\1114F004.D	11/14/18	07:08
E-8.99-0to28-102418	K1810430-001	J:\MS14\DATA\111418\1114F014.D	11/14/18	11:21
C-8.94-0to27-102418	K1810430-002	J:\MS14\DATA\111418\1114F015.D	11/14/18	11:46
D-8.90-0to27-102418	K1810430-003	J:\MS14\DATA\111418\1114F016.D	11/14/18	12:12
D-8.83-0to25-102418	K1810430-004	J:\MS14\DATA\111418\1114F017.D	11/14/18	12:39
B-9.00-0to29-102418	K1810430-006	J:\MS14\DATA\111418\1114F018.D	11/14/18	13:05
512-0to29-102418	K1810430-007	J:\MS14\DATA\111418\1114F019.D	11/14/18	13:31
D-9.09-0to29-102418	K1810430-008	J:\MS14\DATA\111418\1114F020.D	11/14/18	13:57
G-9.15-0to18-102418	K1810430-011	J:\MS14\DATA\111418\1114F021.D	11/14/18	14:25
E-9.02-0to26-102418MS	KWG1805796-1	J:\MS14\DATA\111418\1114F022.D	11/14/18	14:51
E-9.02-0to26-102418DMS	KWG1805796-2	J:\MS14\DATA\111418\1114F023.D	11/14/18	15:17
E-9.02-0to26-102418	K1810430-005	J:\MS14\DATA\111418\1114F024.D	11/14/18	15:43
A-9.03-0to26-102418	K1810430-009	J:\MS14\DATA\111418\1114F025.D	11/14/18	16:09
B-9.15-0to30-102418	K1810430-010	J:\MS14\DATA\111418\1114F026.D	11/14/18	16:35

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Sediment

**Service Request:** K1810430  
**Date Extracted:** 11/07/2018  
**Date Analyzed:** 11/14/2018  
**Time Analyzed:** 07:08

**Lab Control Sample Summary**  
**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	Lab Control Sample	<b>Instrument ID:</b>	MS14
<b>Lab Code:</b>	KWG1805796-5	<b>File ID:</b>	J:\MS14\DATA\111418\1114F004.D
<b>Extraction Method:</b>	EPA 3541	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM	<b>Extraction Lot:</b>	KWG1805796

This Lab Control Sample applies to the following analyses:

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>
Method Blank	KWG1805796-6	J:\MS14\DATA\111418\1114F003.D	11/14/18	06:42
E-8.99-0to28-102418	K1810430-001	J:\MS14\DATA\111418\1114F014.D	11/14/18	11:21
C-8.94-0to27-102418	K1810430-002	J:\MS14\DATA\111418\1114F015.D	11/14/18	11:46
D-8.90-0to27-102418	K1810430-003	J:\MS14\DATA\111418\1114F016.D	11/14/18	12:12
D-8.83-0to25-102418	K1810430-004	J:\MS14\DATA\111418\1114F017.D	11/14/18	12:39
B-9.00-0to29-102418	K1810430-006	J:\MS14\DATA\111418\1114F018.D	11/14/18	13:05
512-0to29-102418	K1810430-007	J:\MS14\DATA\111418\1114F019.D	11/14/18	13:31
D-9.09-0to29-102418	K1810430-008	J:\MS14\DATA\111418\1114F020.D	11/14/18	13:57
G-9.15-0to18-102418	K1810430-011	J:\MS14\DATA\111418\1114F021.D	11/14/18	14:25
E-9.02-0to26-102418MS	KWG1805796-1	J:\MS14\DATA\111418\1114F022.D	11/14/18	14:51
E-9.02-0to26-102418DMS	KWG1805796-2	J:\MS14\DATA\111418\1114F023.D	11/14/18	15:17
E-9.02-0to26-102418	K1810430-005	J:\MS14\DATA\111418\1114F024.D	11/14/18	15:43
A-9.03-0to26-102418	K1810430-009	J:\MS14\DATA\111418\1114F025.D	11/14/18	16:09
B-9.15-0to30-102418	K1810430-010	J:\MS14\DATA\111418\1114F026.D	11/14/18	16:35

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Date Analyzed:** 11/14/2018  
**Time Analyzed:** 05:51

**Tune Summary**  
**Polynuclear Aromatic Hydrocarbons**

**File ID:** J:\MS14\DATA\111418\1114F001.D

**Instrument ID:** MS14

**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1806235

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	46.5	157589	PASS
68	69	0	2	0.0	0	PASS
69	198	0	100	46.9	158868	PASS
70	69	0	2	0.7	1054	PASS
127	198	10	80	51.6	174890	PASS
197	198	0	2	0.0	0	PASS
198	442	30	100	48.5	339050	PASS
199	198	5	9	6.8	22890	PASS
275	198	10	60	35.0	118562	PASS
365	442	1	50	3.4	24040	PASS
441	443	0	100	75.3	101050	PASS
442	442	100	100	100.0	698368	PASS
443	442	15	24	19.2	134280	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1806235-2	J:\MS14\DATA\111418\1114F002.D	11/14/2018	06:17	
Method Blank	KWG1805796-6	J:\MS14\DATA\111418\1114F003.D	11/14/2018	06:42	
Lab Control Sample	KWG1805796-5	J:\MS14\DATA\111418\1114F004.D	11/14/2018	07:08	
E-8.99-0to28-102418	K1810430-001	J:\MS14\DATA\111418\1114F014.D	11/14/2018	11:21	
C-8.94-0to27-102418	K1810430-002	J:\MS14\DATA\111418\1114F015.D	11/14/2018	11:46	
D-8.90-0to27-102418	K1810430-003	J:\MS14\DATA\111418\1114F016.D	11/14/2018	12:12	
D-8.83-0to25-102418	K1810430-004	J:\MS14\DATA\111418\1114F017.D	11/14/2018	12:39	
B-9.00-0to29-102418	K1810430-006	J:\MS14\DATA\111418\1114F018.D	11/14/2018	13:05	
512-0to29-102418	K1810430-007	J:\MS14\DATA\111418\1114F019.D	11/14/2018	13:31	
D-9.09-0to29-102418	K1810430-008	J:\MS14\DATA\111418\1114F020.D	11/14/2018	13:57	
G-9.15-0to18-102418	K1810430-011	J:\MS14\DATA\111418\1114F021.D	11/14/2018	14:25	
E-9.02-0to26-102418MS	KWG1805796-1	J:\MS14\DATA\111418\1114F022.D	11/14/2018	14:51	
E-9.02-0to26-102418DMS	KWG1805796-2	J:\MS14\DATA\111418\1114F023.D	11/14/2018	15:17	
E-9.02-0to26-102418	K1810430-005	J:\MS14\DATA\111418\1114F024.D	11/14/2018	15:43	
A-9.03-0to26-102418	K1810430-009	J:\MS14\DATA\111418\1114F025.D	11/14/2018	16:09	
B-9.15-0to30-102418	K1810430-010	J:\MS14\DATA\111418\1114F026.D	11/14/2018	16:35	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Calibration Date:** 07/11/2018

**Initial Calibration Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration ID:** CAL15779  
**Instrument ID:** MS14

**Column:** MS

Level ID	File ID	Level ID	File ID
A	J:\MS14\DATA\071118\0711F003.D	G	J:\MS14\DATA\071118\0711F009.D
B	J:\MS14\DATA\071118\0711F004.D	H	J:\MS14\DATA\071118\0711F010.D
C	J:\MS14\DATA\071118\0711F005.D	I	J:\MS14\DATA\071118\0711F011.D
D	J:\MS14\DATA\071118\0711F006.D	J	J:\MS14\DATA\071118\0711F012.D
E	J:\MS14\DATA\071118\0711F007.D		
F	J:\MS14\DATA\071118\0711F008.D		

Analyte Name	Level			Level			Level			Level			Level		
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF
Naphthalene	A	2.0	1.42	B	4.0	1.31	C	8.0	1.19	D	20	1.15	E	100	1.13
	F	200	1.11	G	400	1.09	H	1000	1.06	I	1600	1.03	J	2000	1.07
2-Methylnaphthalene	A	2.0	0.789	B	4.0	0.741	C	8.0	0.734	D	20	0.715	E	100	0.718
	F	200	0.692	G	400	0.662	H	1000	0.650	I	1600	0.627	J	2000	0.635
Acenaphthylene	A	2.0	2.52	B	4.0	2.35	C	8.0	2.29	D	20	2.33	E	100	2.37
	F	200	2.41	G	400	2.42	H	1000	2.41	I	1600	2.43	J	2000	2.34
Acenaphthene	A	2.0	1.44	B	4.0	1.38	C	8.0	1.33	D	20	1.38	E	100	1.38
	F	200	1.39	G	400	1.38	H	1000	1.35	I	1600	1.38	J	2000	1.32
Dibenzofuran	A	2.0	2.25	B	4.0	2.12	C	8.0	2.21	D	20	2.09	E	100	2.22
	F	200	2.29	G	400	2.24	H	1000	2.22	I	1600	2.24	J	2000	2.11
Fluorene	A	2.0	1.81	B	4.0	1.68	C	8.0	1.62	D	20	1.64	E	100	1.70
	F	200	1.68	G	400	1.67	H	1000	1.60	I	1600	1.63	J	2000	1.56
Phenanthrene	A	2.0	1.33	B	4.0	1.33	C	8.0	1.25	D	20	1.23	E	100	1.25
	F	200	1.25	G	400	1.22	H	1000	1.23	I	1600	1.22	J	2000	1.16
Anthracene	A	2.0	1.20	B	4.0	1.17	C	8.0	1.17	D	20	1.14	E	100	1.21
	F	200	1.22	G	400	1.22	H	1000	1.22	I	1600	1.21	J	2000	1.17
Fluoranthene	A	2.0	1.50	B	4.0	1.44	C	8.0	1.44	D	20	1.41	E	100	1.54
	F	200	1.60	G	400	1.58	H	1000	1.63	I	1600	1.65	J	2000	1.62
Pyrene	A	2.0	1.49	B	4.0	1.46	C	8.0	1.38	D	20	1.37	E	100	1.34
	F	200	1.29	G	400	1.32	H	1000	1.33	I	1600	1.39	J	2000	1.36
Benz(a)anthracene	A	2.0	1.50	B	4.0	1.32	C	8.0	1.26	D	20	1.19	E	100	1.20
	F	200	1.23	G	400	1.27	H	1000	1.32	I	1600	1.34	J	2000	1.31
Chrysene	A	2.0	1.23	B	4.0	1.21	C	8.0	1.23	D	20	1.20	E	100	1.24
	F	200	1.25	G	400	1.25	H	1000	1.26	I	1600	1.28	J	2000	1.24
Benzo(b)fluoranthene	A	2.0	1.19	B	4.0	1.16	C	8.0	1.15	D	20	1.16	E	100	1.20
	F	200	1.26	G	400	1.30	H	1000	1.34	I	1600	1.32	J	2000	1.27
Benzo(k)fluoranthene	A	2.0	1.16	B	4.0	1.17	C	8.0	1.13	D	20	1.19	E	100	1.23
	F	200	1.26	G	400	1.29	H	1000	1.29	I	1600	1.29	J	2000	1.25

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Calibration Date:** 07/11/2018

**Initial Calibration Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration ID:** CAL15779  
**Instrument ID:** MS14

**Column:** MS

<b>Analyte Name</b>	Level A			Level B			Level C			Level D			Level E		
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF
Benzo(a)pyrene	A	2.0	1.09	B	4.0	1.01	C	8.0	1.03	D	20	1.04	E	100	1.05
	F	200	1.07	G	400	1.11	H	1000	1.15	I	1600	1.16	J	2000	1.12
Indeno(1,2,3-cd)pyrene	A	2.0	1.23	B	4.0	1.10	C	8.0	1.06	D	20	1.06	E	100	1.07
	F	200	1.08	G	400	1.05	H	1000	1.01	I	1600	0.996	J	2000	0.959
Dibenz(a,h)anthracene	A	2.0	1.12	B	4.0	1.10	C	8.0	1.09	D	20	1.17	E	100	1.12
	F	200	1.10	G	400	1.07	H	1000	1.02	I	1600	1.00	J	2000	0.971
Benzo(g,h,i)perylene	A	2.0	1.44	B	4.0	1.37	C	8.0	1.31	D	20	1.34	E	100	1.28
	F	200	1.27	G	400	1.21	H	1000	1.12	I	1600	1.07	J	2000	1.04
Fluorene-d10				B	4.0	1.49	C	8.0	1.33	D	20	1.28	E	100	1.25
	F	200	1.24	G	400	1.25	H	1000	1.21	I	1600	1.24	J	2000	1.20
Fluoranthene-d10	A	2.0	1.18	B	4.0	1.19	C	8.0	1.15	D	20	1.11	E	100	1.20
	F	200	1.26	G	400	1.31	H	1000	1.40	I	1600	1.42	J	2000	1.39
Terphenyl-d14				B	4.0	1.05	C	8.0	0.934	D	20	0.867	E	100	0.832
	F	200	0.823	G	400	0.835	H	1000	0.837	I	1600	0.830	J	2000	0.801

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Calibration Date:** 07/11/2018

**Initial Calibration Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration ID:** CAL15779  
**Instrument ID:** MS14

**Column:** MS

<b>Analyte Name</b>	<b>Compound Type</b>	<b>Calibration Evaluation</b>				<b>RRF Evaluation</b>		
		<b>Fit Type</b>	<b>Eval.</b>	<b>Result</b>	<b>Q</b>	<b>Control Criteria</b>	<b>Average RRF</b>	<b>Q</b>
Naphthalene	MS	AverageRF	% RSD	10.7		≤ 20	1.15	0.70
2-Methylnaphthalene	MS	AverageRF	% RSD	7.5		≤ 20	0.696	0.40
Acenaphthylene	MS	AverageRF	% RSD	2.7		≤ 20	2.39	0.90
Acenaphthene	MS	AverageRF	% RSD	2.3		≤ 20	1.37	0.90
Dibenzofuran	MS	AverageRF	% RSD	3.1		≤ 20	2.20	0.80
Fluorene	MS	AverageRF	% RSD	4.1		≤ 20	1.66	0.90
Phenanthrene	MS	AverageRF	% RSD	4.1		≤ 20	1.25	0.70
Anthracene	MS	AverageRF	% RSD	2.4		≤ 20	1.19	0.70
Fluoranthene	MS	AverageRF	% RSD	5.8		≤ 20	1.54	0.60
Pyrene	MS	AverageRF	% RSD	4.5		≤ 20	1.37	0.60
Benz(a)anthracene	MS	AverageRF	% RSD	6.8		≤ 20	1.29	0.80
Chrysene	MS	AverageRF	% RSD	1.9		≤ 20	1.24	0.70
Benzo(b)fluoranthene	MS	AverageRF	% RSD	5.7		≤ 20	1.24	0.70
Benzo(k)fluoranthene	MS	AverageRF	% RSD	4.7		≤ 20	1.23	0.70
Benzo(a)pyrene	MS	AverageRF	% RSD	4.7		≤ 20	1.08	0.70
Indeno(1,2,3-cd)pyrene	MS	AverageRF	% RSD	6.9		≤ 20	1.06	0.50
Dibenz(a,h)anthracene	MS	AverageRF	% RSD	5.7		≤ 20	1.08	0.40
Benzo(g,h,i)perylene	MS	AverageRF	% RSD	10.7		≤ 20	1.24	0.50
Fluorene-d10	SURR	AverageRF	% RSD	6.9		≤ 20	1.28	0.01
Fluoranthene-d10	SURR	AverageRF	% RSD	9.0		≤ 20	1.26	0.01
Terphenyl-d14	SURR	AverageRF	% RSD	8.9		≤ 20	0.867	0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Calibration Date:** 07/11/2018  
**Date Analyzed:** 07/11/2018

**Second Source Calibration Verification**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15779  
**Units:** ng/ml

**File ID:** J:\MS14\DATA\071118\0711F013.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
Naphthalene	400	370	1.15	1.06	-8	NA	± 30 %	AverageRF
2-Methylnaphthalene	400	390	0.696	0.683	-2	NA	± 30 %	AverageRF
Acenaphthylene	400	390	2.39	2.33	-2	NA	± 30 %	AverageRF
Acenaphthene	400	380	1.37	1.32	-4	NA	± 30 %	AverageRF
Dibenzofuran	400	370	2.20	2.05	-7	NA	± 30 %	AverageRF
Fluorene	400	390	1.66	1.60	-4	NA	± 30 %	AverageRF
Phenanthrene	400	380	1.25	1.19	-4	NA	± 30 %	AverageRF
Anthracene	400	400	1.19	1.18	-1	NA	± 30 %	AverageRF
Fluoranthene	400	410	1.54	1.60	4	NA	± 30 %	AverageRF
Pyrene	400	350	1.37	1.21	-12	NA	± 30 %	AverageRF
Benz(a)anthracene	400	380	1.29	1.22	-6	NA	± 30 %	AverageRF
Chrysene	400	390	1.24	1.20	-3	NA	± 30 %	AverageRF
Benzo(b)fluoranthene	400	410	1.24	1.27	2	NA	± 30 %	AverageRF
Benzo(k)fluoranthene	400	420	1.23	1.28	4	NA	± 30 %	AverageRF
Benzo(a)pyrene	400	400	1.08	1.08	0	NA	± 30 %	AverageRF
Indeno(1,2,3-cd)pyrene	400	370	1.06	0.993	-7	NA	± 30 %	AverageRF
Dibenz(a,h)anthracene	400	380	1.08	1.03	-4	NA	± 30 %	AverageRF
Benzo(g,h,i)perylene	400	370	1.24	1.14	-9	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Date Analyzed:** 11/14/2018

**Continuing Calibration Verification Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/11/2018  
**Calibration ID:** CAL15779  
**Analysis Lot:** KWG1806235  
**Units:** ng/ml

**File ID:** J:\MS14\DATA\111418\1114F002.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Naphthalene	400	350	0.70	1.15	0.996	-14	NA	± 20	AverageRF
2-Methylnaphthalene	400	350	0.40	0.696	0.609	-13	NA	± 20	AverageRF
Acenaphthylene	400	360	0.90	2.39	2.13	-11	NA	± 20	AverageRF
Acenaphthene	400	360	0.90	1.37	1.22	-11	NA	± 20	AverageRF
Dibenzofuran	400	360	0.80	2.20	1.96	-11	NA	± 20	AverageRF
Fluorene	400	390	0.90	1.66	1.63	-2	NA	± 20	AverageRF
Phenanthrene	400	340	0.70	1.25	1.07	-14	NA	± 20	AverageRF
Anthracene	400	360	0.70	1.19	1.07	-11	NA	± 20	AverageRF
Fluoranthene	400	330	0.60	1.54	1.27	-17	NA	± 20	AverageRF
Pyrene	400	350	0.60	1.37	1.19	-13	NA	± 20	AverageRF
Benz(a)anthracene	400	360	0.80	1.29	1.17	-10	NA	± 20	AverageRF
Chrysene	400	350	0.70	1.24	1.10	-11	NA	± 20	AverageRF
Benzo(b)fluoranthene	400	380	0.70	1.24	1.18	-5	NA	± 20	AverageRF
Benzo(k)fluoranthene	400	370	0.70	1.23	1.12	-8	NA	± 20	AverageRF
Benzo(a)pyrene	400	380	0.70	1.08	1.04	-4	NA	± 20	AverageRF
Indeno(1,2,3-cd)pyrene	400	360	0.50	1.06	0.966	-9	NA	± 20	AverageRF
Dibenz(a,h)anthracene	400	360	0.40	1.08	0.969	-10	NA	± 20	AverageRF
Benzo(g,h,i)perylene	400	320	0.50	1.24	1.01	-19	NA	± 20	AverageRF
Fluorene-d10	400	440	0.01	1.28	1.41	10	NA	± 20	AverageRF
Fluoranthene-d10	400	390	0.01	1.26	1.21	-4	NA	± 20	AverageRF
Terphenyl-d14	400	400	0.01	0.867	0.868	0	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430

**Analysis Run Log**  
**Polynuclear Aromatic Hydrocarbons**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1806235

**Instrument ID:** MS14

<b>File ID</b>	<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Analysis Started</b>	<b>Start Time</b>	<b>Q</b>	<b>Date Analysis Finished</b>	<b>Finish Time</b>
1114F001.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1806235-1	11/14/2018	05:51		11/14/2018	06:11
1114F002.D	Continuing Calibration Verification	KWG1806235-2	11/14/2018	06:17		11/14/2018	06:36
1114F003.D	Method Blank	KWG1805796-6	11/14/2018	06:42		11/14/2018	07:01
1114F004.D	Lab Control Sample	KWG1805796-5	11/14/2018	07:08		11/14/2018	07:27
1114F005.D	ZZZZZZ	ZZZZZZ	11/14/2018	07:33		11/14/2018	07:52
1114F006.D	ZZZZZZ	ZZZZZZ	11/14/2018	07:58		11/14/2018	08:17
1114F007.D	ZZZZZZ	ZZZZZZ	11/14/2018	08:23		11/14/2018	08:42
1114F008.D	ZZZZZZ	ZZZZZZ	11/14/2018	08:48		11/14/2018	09:07
1114F009.D	ZZZZZZ	ZZZZZZ	11/14/2018	09:14		11/14/2018	09:33
1114F010.D	ZZZZZZ	ZZZZZZ	11/14/2018	09:40		11/14/2018	09:59
1114F011.D	ZZZZZZ	ZZZZZZ	11/14/2018	10:05		11/14/2018	10:24
1114F012.D	ZZZZZZ	ZZZZZZ	11/14/2018	10:30		11/14/2018	10:49
1114F013.D	ZZZZZZ	ZZZZZZ	11/14/2018	10:56		11/14/2018	11:15
1114F014.D	E-8.99-0to28-102418	K1810430-001	11/14/2018	11:21		11/14/2018	11:40
1114F015.D	C-8.94-0to27-102418	K1810430-002	11/14/2018	11:46		11/14/2018	12:05
1114F016.D	D-8.90-0to27-102418	K1810430-003	11/14/2018	12:12		11/14/2018	12:31
1114F017.D	D-8.83-0to25-102418	K1810430-004	11/14/2018	12:39		11/14/2018	12:58
1114F018.D	B-9.00-0to29-102418	K1810430-006	11/14/2018	13:05		11/14/2018	13:24
1114F019.D	512-0to29-102418	K1810430-007	11/14/2018	13:31		11/14/2018	13:50
1114F020.D	D-9.09-0to29-102418	K1810430-008	11/14/2018	13:57		11/14/2018	14:16
1114F021.D	G-9.15-0to18-102418	K1810430-011	11/14/2018	14:25		11/14/2018	14:44
1114F022.D	E-9.02-0to26-102418MS	KWG1805796-1	11/14/2018	14:51		11/14/2018	15:10
1114F023.D	E-9.02-0to26-102418DMS	KWG1805796-2	11/14/2018	15:17		11/14/2018	15:36
1114F024.D	E-9.02-0to26-102418	K1810430-005	11/14/2018	15:43		11/14/2018	16:02
1114F025.D	A-9.03-0to26-102418	K1810430-009	11/14/2018	16:09		11/14/2018	16:28
1114F026.D	B-9.15-0to30-102418	K1810430-010	11/14/2018	16:35		11/14/2018	16:54
1114F027.D	ZZZZZZ	ZZZZZZ	11/14/2018	17:01		11/14/2018	17:20
1114F028.D	ZZZZZZ	ZZZZZZ	11/14/2018	17:27		11/14/2018	17:46

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Soil

**Service Request:** K1810430  
**Date Extracted:** 11/07/2018

**Extraction Prep Log**  
**Polynuclear Aromatic Hydrocarbons**

**Extraction Method:** EPA 3541  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1805796  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
E-8.99-0to28-102418	K1810430-001	10/24/18	10/24/18	40.037g	2mL	28.5	
C-8.94-0to27-102418	K1810430-002	10/24/18	10/24/18	40.004g	2mL	30.2	
D-8.90-0to27-102418	K1810430-003	10/24/18	10/24/18	40.007g	2mL	34.7	
D-8.83-0to25-102418	K1810430-004	10/24/18	10/24/18	40.011g	2mL	34.7	
E-9.02-0to26-102418	K1810430-005	10/24/18	10/24/18	40.028g	2mL	35.0	
B-9.00-0to29-102418	K1810430-006	10/24/18	10/24/18	40.009g	2mL	27.7	
512-0to29-102418	K1810430-007	10/24/18	10/24/18	40.052g	2mL	27.3	
D-9.09-0to29-102418	K1810430-008	10/24/18	10/24/18	40.011g	2mL	32.2	
A-9.03-0to26-102418	K1810430-009	10/24/18	10/24/18	40.044g	2mL	28.8	
B-9.15-0to30-102418	K1810430-010	10/24/18	10/24/18	40.077g	2mL	46.5	
G-9.15-0to18-102418	K1810430-011	10/24/18	10/24/18	40.080g	2mL	74.1	
Method Blank	KWG1805796-6	NA	NA	40.332g	2mL	NA	
E-9.02-0to26-102418MS	KWG1805796-1	10/24/18	10/24/18	40.057g	2mL	35.0	
E-9.02-0to26-102418DMS	KWG1805796-2	10/24/18	10/24/18	40.011g	2mL	35.0	
Lab Control Sample	KWG1805796-5	NA	NA	20.000g	2mL	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis



## Polynuclear Aromatic Hydrocarbons

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Pacific Groundwater Group (PGG) **Service Request:** K1810430  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Cover Page - Organic Analysis Data Package**  
**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
612-102418	K1810430-012	10/24/2018	10/24/2018

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Water

**Service Request:** K1810430  
**Date Collected:** 10/24/2018  
**Date Received:** 10/24/2018

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	612-102418	<b>Units:</b>	ug/L
<b>Lab Code:</b>	K1810430-012	<b>Basis:</b>	NA
<b>Extraction Method:</b>	EPA 3511	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	<b>0.0077</b>	J	0.020	0.0014	1	10/30/18	11/01/18	KWG1805607	
2-Methylnaphthalene	<b>0.0059</b>	J	0.020	0.0013	1	10/30/18	11/01/18	KWG1805607	
Acenaphthylene	<b>0.0070</b>	JX	0.020	0.0011	1	10/30/18	11/01/18	KWG1805607	
Acenaphthene	<b>0.0024</b>	J	0.020	0.0012	1	10/30/18	11/01/18	KWG1805607	
Dibenzofuran	<b>0.0054</b>	J	0.020	0.00096	1	10/30/18	11/01/18	KWG1805607	
Fluorene	<b>0.0034</b>	J	0.020	0.0011	1	10/30/18	11/01/18	KWG1805607	
Phenanthrene	<b>0.011</b>	J	0.020	0.0011	1	10/30/18	11/01/18	KWG1805607	
Anthracene	ND	U	0.020	0.00082	1	10/30/18	11/01/18	KWG1805607	
Fluoranthene	<b>0.0029</b>	J	0.020	0.00082	1	10/30/18	11/01/18	KWG1805607	
Pyrene	<b>0.0020</b>	J	0.020	0.0010	1	10/30/18	11/01/18	KWG1805607	
Benz(a)anthracene	<b>0.0024</b>	J	0.020	0.00097	1	10/30/18	11/01/18	KWG1805607	
Chrysene	ND	U	0.020	0.00076	1	10/30/18	11/01/18	KWG1805607	
Benzo(b)fluoranthene†	ND	U	0.020	0.00083	1	10/30/18	11/01/18	KWG1805607	
Benzo(k)fluoranthene	ND	U	0.020	0.00094	1	10/30/18	11/01/18	KWG1805607	
Benzo(a)pyrene	ND	U	0.020	0.0011	1	10/30/18	11/01/18	KWG1805607	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.00089	1	10/30/18	11/01/18	KWG1805607	
Dibenz(a,h)anthracene	ND	U	0.020	0.0013	1	10/30/18	11/01/18	KWG1805607	
Benzo(g,h,i)perylene	ND	U	0.020	0.00086	1	10/30/18	11/01/18	KWG1805607	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	80	42-131	11/01/18	Acceptable
Fluoranthene-d10	76	42-133	11/01/18	Acceptable
Terphenyl-d14	72	32-129	11/01/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

## Analytical Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Water

**Service Request:** K1810430  
**Date Collected:** NA  
**Date Received:** NA

**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	Method Blank	<b>Units:</b>	ug/L
<b>Lab Code:</b>	KWG1805607-3	<b>Basis:</b>	NA
<b>Extraction Method:</b>	EPA 3511	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	<b>0.0070</b>	J	0.020	0.0014	1	10/30/18	11/01/18	KWG1805607	
2-Methylnaphthalene	<b>0.0053</b>	J	0.020	0.0013	1	10/30/18	11/01/18	KWG1805607	
Acenaphthylene	ND	U	0.020	0.0011	1	10/30/18	11/01/18	KWG1805607	
Acenaphthene	<b>0.0024</b>	J	0.020	0.0012	1	10/30/18	11/01/18	KWG1805607	
Dibenzofuran	<b>0.0056</b>	J	0.020	0.00096	1	10/30/18	11/01/18	KWG1805607	
Fluorene	<b>0.0040</b>	J	0.020	0.0011	1	10/30/18	11/01/18	KWG1805607	
Phenanthrene	<b>0.011</b>	J	0.020	0.0011	1	10/30/18	11/01/18	KWG1805607	
Anthracene	ND	U	0.020	0.00082	1	10/30/18	11/01/18	KWG1805607	
Fluoranthene	<b>0.0024</b>	J	0.020	0.00082	1	10/30/18	11/01/18	KWG1805607	
Pyrene	<b>0.0021</b>	J	0.020	0.0010	1	10/30/18	11/01/18	KWG1805607	
Benz(a)anthracene	<b>0.0022</b>	J	0.020	0.00097	1	10/30/18	11/01/18	KWG1805607	
Chrysene	ND	U	0.020	0.00076	1	10/30/18	11/01/18	KWG1805607	
Benzo(b)fluoranthene†	ND	U	0.020	0.00083	1	10/30/18	11/01/18	KWG1805607	
Benzo(k)fluoranthene	ND	U	0.020	0.00094	1	10/30/18	11/01/18	KWG1805607	
Benzo(a)pyrene	ND	U	0.020	0.0011	1	10/30/18	11/01/18	KWG1805607	
Indeno(1,2,3-cd)pyrene	ND	U	0.020	0.00089	1	10/30/18	11/01/18	KWG1805607	
Dibenz(a,h)anthracene	ND	U	0.020	0.0013	1	10/30/18	11/01/18	KWG1805607	
Benzo(g,h,i)perylene	ND	U	0.020	0.00086	1	10/30/18	11/01/18	KWG1805607	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	89	42-131	11/01/18	Acceptable
Fluoranthene-d10	83	42-133	11/01/18	Acceptable
Terphenyl-d14	67	32-129	11/01/18	Acceptable

## † Analyte Comments

Benzo(b)fluoranthene This analyte cannot be separated from Benzo(j)fluoranthene.

Comments: \_\_\_\_\_

**Client:** Pacific Groundwater Group (PGG) **Service Request:** K1810430  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Water

**Surrogate Recovery Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Extraction Method:** EPA 3511 **Units:** Percent  
**Analysis Method:** 8270D SIM **Level:** Low

<b>Sample Name</b>	<b>Lab Code</b>	<b>Sur1</b>	<b>Sur2</b>	<b>Sur3</b>
612-102418	K1810430-012	80	76	72
Method Blank	KWG1805607-3	89	83	67
Lab Control Sample	KWG1805607-1	98	96	81
Duplicate Lab Control Sample	KWG1805607-2	87	86	76

**Surrogate Recovery Control Limits (%)**

---

Sur1 = Fluorene-d10	42-131
Sur2 = Fluoranthene-d10	42-133
Sur3 = Terphenyl-d14	32-129

---

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Date Analyzed:** 11/01/2018  
**Time Analyzed:** 10:01

**Internal Standard Area and RT Summary**  
**Polynuclear Aromatic Hydrocarbons**

**File ID:** J:\MS14\DATA\110118\1101F002.D  
**Instrument ID:** MS14  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1805861-2  
**Analysis Lot:** KWG1805861

	Naphthalene-d8		Acenaphthene-d10		Phenanthrene-d10	
	<u>Area</u>	<u>RT</u>	<u>Area</u>	<u>RT</u>	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	61,479	4.79	27,097	6.35	55,256	7.59
<b>Upper Limit ==&gt;</b>	122,958	5.29	54,194	6.85	110,512	8.09
<b>Lower Limit ==&gt;</b>	30,740	4.29	13,549	5.85	27,628	7.09
<b>ICAL Result ==&gt;</b>	60,855	4.80	25,959	6.35	53,916	7.59

*Associated Analyses*

Method Blank	KWG1805607-3	74,394	4.80	34,232	6.35	70,535	7.59
Lab Control Sample	KWG1805607-1	75,504	4.80	32,219	6.35	66,909	7.59
Duplicate Lab Control Sample	KWG1805607-2	72,899	4.80	31,102	6.35	64,163	7.59
612-102418	K1810430-012	72,186	4.80	33,109	6.35	67,185	7.59

Results flagged with an asterisk (\*) indicate values outside control criteria.

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Date Analyzed:** 11/01/2018  
**Time Analyzed:** 10:01

**Internal Standard Area and RT Summary**  
**Polynuclear Aromatic Hydrocarbons**

**File ID:** J:\MS14\DATA\110118\1101F002.D  
**Instrument ID:** MS14  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1805861-2  
**Analysis Lot:** KWG1805861

	Chrysene-d12		Perylene-d12	
	<u>Area</u>	<u>RT</u>	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	65,042	10.16	74,641	13.37
<b>Upper Limit ==&gt;</b>	130,084	10.66	149,282	13.87
<b>Lower Limit ==&gt;</b>	32,521	9.66	37,321	12.87
<b>ICAL Result ==&gt;</b>	68,964	10.15	73,742	13.30

*Associated Analyses*

---

Method Blank	KWG1805607-3	70,471	10.16	76,749	13.37
Lab Control Sample	KWG1805607-1	70,688	10.16	77,747	13.37
Duplicate Lab Control Sample	KWG1805607-2	67,948	10.16	75,058	13.37
612-102418	K1810430-012	68,339	10.16	74,415	13.37

Results flagged with an asterisk (\*) indicate values outside control criteria.

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Water

**Service Request:** K1810430  
**Date Extracted:** 10/30/2018  
**Date Analyzed:** 11/01/2018

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Extraction Method:** EPA 3511      **Units:** ug/L  
**Analysis Method:** 8270D SIM      **Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1805607

<b>Analyte Name</b>	Lab Control Sample KWG1805607-1			Duplicate Lab Control Sample KWG1805607-2			<b>%Rec Limits</b>	<b>RPD Limit</b>		
	<b>Lab Control Spike</b>			<b>Duplicate Lab Control Spike</b>						
	<b>Result</b>	<b>Spike Amount</b>	<b>%Rec</b>	<b>Result</b>	<b>Spike Amount</b>	<b>%Rec</b>				
Naphthalene	2.31	2.78	83	2.37	2.78	85	52-115	3	30	
2-Methylnaphthalene	2.27	2.78	82	2.33	2.78	84	48-120	3	30	
Acenaphthylene	2.63	2.78	95	2.67	2.78	96	58-124	2	30	
Acenaphthene	2.53	2.78	91	2.60	2.78	94	63-121	3	30	
Dibenzofuran	2.60	2.78	94	2.68	2.78	96	56-132	3	30	
Fluorene	2.57	2.78	93	2.62	2.78	94	68-121	2	30	
Phenanthrene	2.53	2.78	91	2.58	2.78	93	64-126	2	30	
Anthracene	2.65	2.78	96	2.72	2.78	98	68-127	2	30	
Fluoranthene	2.33	2.78	84	2.40	2.78	86	70-127	3	30	
Pyrene	2.71	2.78	98	2.78	2.78	100	72-127	2	30	
Benz(a)anthracene	2.67	2.78	96	2.75	2.78	99	74-124	3	30	
Chrysene	2.57	2.78	92	2.66	2.78	96	74-132	4	30	
Benzo(b)fluoranthene	2.73	2.78	98	2.81	2.78	101	73-136	3	30	
Benzo(k)fluoranthene	2.57	2.78	93	2.65	2.78	96	74-134	3	30	
Benzo(a)pyrene	2.68	2.78	96	2.76	2.78	99	75-131	3	30	
Indeno(1,2,3-cd)pyrene	2.52	2.78	91	2.59	2.78	93	63-136	3	30	
Dibenz(a,h)anthracene	2.31	2.78	83	2.38	2.78	86	59-135	3	30	
Benzo(g,h,i)perylene	2.41	2.78	87	2.48	2.78	89	63-127	3	30	

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Water

**Service Request:** K1810430  
**Date Extracted:** 10/30/2018  
**Date Analyzed:** 11/01/2018  
**Time Analyzed:** 14:24

**Method Blank Summary**  
**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	Method Blank	<b>Instrument ID:</b>	MS14
<b>Lab Code:</b>	KWG1805607-3	<b>File ID:</b>	J:\MS14\DATA\110118\1101F011.D
<b>Extraction Method:</b>	EPA 3511	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM	<b>Extraction Lot:</b>	KWG1805607

This Method Blank applies to the following analyses:

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>
Lab Control Sample	KWG1805607-1	J:\MS14\DATA\110118\1101F012.D	11/01/18	14:53
Duplicate Lab Control Sample	KWG1805607-2	J:\MS14\DATA\110118\1101F013.D	11/01/18	15:23
612-102418	K1810430-012	J:\MS14\DATA\110118\1101F014.D	11/01/18	15:52

## QA/QC Report

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Water

**Service Request:** K1810430  
**Date Extracted:** 10/30/2018  
**Date Analyzed:** 11/01/2018  
**Time Analyzed:** 14:53

**Lab Control Sample Summary**  
**Polynuclear Aromatic Hydrocarbons**

<b>Sample Name:</b>	Lab Control Sample	<b>Instrument ID:</b>	MS14
<b>Lab Code:</b>	KWG1805607-1	<b>File ID:</b>	J:\MS14\DATA\110118\1101F012.D
<b>Extraction Method:</b>	EPA 3511	<b>Level:</b>	Low
<b>Analysis Method:</b>	8270D SIM	<b>Extraction Lot:</b>	KWG1805607

This Lab Control Sample applies to the following analyses:

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>
Method Blank	KWG1805607-3	J:\MS14\DATA\110118\1101F011.D	11/01/18	14:24
612-102418	K1810430-012	J:\MS14\DATA\110118\1101F014.D	11/01/18	15:52

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Date Analyzed:** 11/01/2018  
**Time Analyzed:** 09:32

**Tune Summary**  
**Polynuclear Aromatic Hydrocarbons**

**File ID:** J:\MS14\DATA\110118\1101F001.D

**Instrument ID:** MS14

**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1805861

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	39.4	88173	PASS
68	69	0	2	0.0	0	PASS
69	198	0	100	41.4	92794	PASS
70	69	0	2	0.7	646	PASS
127	198	10	80	47.2	105666	PASS
197	198	0	2	0.0	0	PASS
198	442	30	100	47.1	223978	PASS
199	198	5	9	6.9	15387	PASS
275	198	10	60	35.5	79600	PASS
365	442	1	50	2.6	12134	PASS
441	443	0	100	74.8	68840	PASS
442	442	100	100	100.0	475328	PASS
443	442	15	24	19.4	92066	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1805861-2	J:\MS14\DATA\110118\1101F002.D	11/01/2018	10:01	
Method Blank	KWG1805607-3	J:\MS14\DATA\110118\1101F011.D	11/01/2018	14:24	
Lab Control Sample	KWG1805607-1	J:\MS14\DATA\110118\1101F012.D	11/01/2018	14:53	
Duplicate Lab Control Sample	KWG1805607-2	J:\MS14\DATA\110118\1101F013.D	11/01/2018	15:23	
612-102418	K1810430-012	J:\MS14\DATA\110118\1101F014.D	11/01/2018	15:52	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Calibration Date:** 07/11/2018

**Initial Calibration Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration ID:** CAL15779  
**Instrument ID:** MS14

**Column:** MS

Level ID	File ID	Level ID	File ID
A	J:\MS14\DATA\071118\0711F003.D	G	J:\MS14\DATA\071118\0711F009.D
B	J:\MS14\DATA\071118\0711F004.D	H	J:\MS14\DATA\071118\0711F010.D
C	J:\MS14\DATA\071118\0711F005.D	I	J:\MS14\DATA\071118\0711F011.D
D	J:\MS14\DATA\071118\0711F006.D	J	J:\MS14\DATA\071118\0711F012.D
E	J:\MS14\DATA\071118\0711F007.D		
F	J:\MS14\DATA\071118\0711F008.D		

Analyte Name	Level			Level			Level			Level			Level		
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF
Naphthalene	A	2.0	1.42	B	4.0	1.31	C	8.0	1.19	D	20	1.15	E	100	1.13
	F	200	1.11	G	400	1.09	H	1000	1.06	I	1600	1.03	J	2000	1.07
2-Methylnaphthalene	A	2.0	0.789	B	4.0	0.741	C	8.0	0.734	D	20	0.715	E	100	0.718
	F	200	0.692	G	400	0.662	H	1000	0.650	I	1600	0.627	J	2000	0.635
Acenaphthylene	A	2.0	2.52	B	4.0	2.35	C	8.0	2.29	D	20	2.33	E	100	2.37
	F	200	2.41	G	400	2.42	H	1000	2.41	I	1600	2.43	J	2000	2.34
Acenaphthene	A	2.0	1.44	B	4.0	1.38	C	8.0	1.33	D	20	1.38	E	100	1.38
	F	200	1.39	G	400	1.38	H	1000	1.35	I	1600	1.38	J	2000	1.32
Dibenzofuran	A	2.0	2.25	B	4.0	2.12	C	8.0	2.21	D	20	2.09	E	100	2.22
	F	200	2.29	G	400	2.24	H	1000	2.22	I	1600	2.24	J	2000	2.11
Fluorene	A	2.0	1.81	B	4.0	1.68	C	8.0	1.62	D	20	1.64	E	100	1.70
	F	200	1.68	G	400	1.67	H	1000	1.60	I	1600	1.63	J	2000	1.56
Phenanthrene	A	2.0	1.33	B	4.0	1.33	C	8.0	1.25	D	20	1.23	E	100	1.25
	F	200	1.25	G	400	1.22	H	1000	1.23	I	1600	1.22	J	2000	1.16
Anthracene	A	2.0	1.20	B	4.0	1.17	C	8.0	1.17	D	20	1.14	E	100	1.21
	F	200	1.22	G	400	1.22	H	1000	1.22	I	1600	1.21	J	2000	1.17
Fluoranthene	A	2.0	1.50	B	4.0	1.44	C	8.0	1.44	D	20	1.41	E	100	1.54
	F	200	1.60	G	400	1.58	H	1000	1.63	I	1600	1.65	J	2000	1.62
Pyrene	A	2.0	1.49	B	4.0	1.46	C	8.0	1.38	D	20	1.37	E	100	1.34
	F	200	1.29	G	400	1.32	H	1000	1.33	I	1600	1.39	J	2000	1.36
Benz(a)anthracene	A	2.0	1.50	B	4.0	1.32	C	8.0	1.26	D	20	1.19	E	100	1.20
	F	200	1.23	G	400	1.27	H	1000	1.32	I	1600	1.34	J	2000	1.31
Chrysene	A	2.0	1.23	B	4.0	1.21	C	8.0	1.23	D	20	1.20	E	100	1.24
	F	200	1.25	G	400	1.25	H	1000	1.26	I	1600	1.28	J	2000	1.24
Benzo(b)fluoranthene	A	2.0	1.19	B	4.0	1.16	C	8.0	1.15	D	20	1.16	E	100	1.20
	F	200	1.26	G	400	1.30	H	1000	1.34	I	1600	1.32	J	2000	1.27
Benzo(k)fluoranthene	A	2.0	1.16	B	4.0	1.17	C	8.0	1.13	D	20	1.19	E	100	1.23
	F	200	1.26	G	400	1.29	H	1000	1.29	I	1600	1.29	J	2000	1.25

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Calibration Date:** 07/11/2018

**Initial Calibration Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration ID:** CAL15779  
**Instrument ID:** MS14

**Column:** MS

<b>Analyte Name</b>	Level A			Level B			Level C			Level D			Level E		
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF
Benzo(a)pyrene	A	2.0	1.09	B	4.0	1.01	C	8.0	1.03	D	20	1.04	E	100	1.05
	F	200	1.07	G	400	1.11	H	1000	1.15	I	1600	1.16	J	2000	1.12
Indeno(1,2,3-cd)pyrene	A	2.0	1.23	B	4.0	1.10	C	8.0	1.06	D	20	1.06	E	100	1.07
	F	200	1.08	G	400	1.05	H	1000	1.01	I	1600	0.996	J	2000	0.959
Dibenz(a,h)anthracene	A	2.0	1.12	B	4.0	1.10	C	8.0	1.09	D	20	1.17	E	100	1.12
	F	200	1.10	G	400	1.07	H	1000	1.02	I	1600	1.00	J	2000	0.971
Benzo(g,h,i)perylene	A	2.0	1.44	B	4.0	1.37	C	8.0	1.31	D	20	1.34	E	100	1.28
	F	200	1.27	G	400	1.21	H	1000	1.12	I	1600	1.07	J	2000	1.04
Fluorene-d10				B	4.0	1.49	C	8.0	1.33	D	20	1.28	E	100	1.25
	F	200	1.24	G	400	1.25	H	1000	1.21	I	1600	1.24	J	2000	1.20
Fluoranthene-d10	A	2.0	1.18	B	4.0	1.19	C	8.0	1.15	D	20	1.11	E	100	1.20
	F	200	1.26	G	400	1.31	H	1000	1.40	I	1600	1.42	J	2000	1.39
Terphenyl-d14				B	4.0	1.05	C	8.0	0.934	D	20	0.867	E	100	0.832
	F	200	0.823	G	400	0.835	H	1000	0.837	I	1600	0.830	J	2000	0.801

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Calibration Date:** 07/11/2018

**Initial Calibration Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration ID:** CAL15779  
**Instrument ID:** MS14

**Column:** MS

<b>Analyte Name</b>	<b>Compound Type</b>	<b>Calibration Evaluation</b>				<b>RRF Evaluation</b>		
		<b>Fit Type</b>	<b>Eval.</b>	<b>Result</b>	<b>Q</b>	<b>Control Criteria</b>	<b>Average RRF</b>	<b>Q</b>
Naphthalene	MS	AverageRF	% RSD	10.7		≤ 20	1.15	0.70
2-Methylnaphthalene	MS	AverageRF	% RSD	7.5		≤ 20	0.696	0.40
Acenaphthylene	MS	AverageRF	% RSD	2.7		≤ 20	2.39	0.90
Acenaphthene	MS	AverageRF	% RSD	2.3		≤ 20	1.37	0.90
Dibenzofuran	MS	AverageRF	% RSD	3.1		≤ 20	2.20	0.80
Fluorene	MS	AverageRF	% RSD	4.1		≤ 20	1.66	0.90
Phenanthrene	MS	AverageRF	% RSD	4.1		≤ 20	1.25	0.70
Anthracene	MS	AverageRF	% RSD	2.4		≤ 20	1.19	0.70
Fluoranthene	MS	AverageRF	% RSD	5.8		≤ 20	1.54	0.60
Pyrene	MS	AverageRF	% RSD	4.5		≤ 20	1.37	0.60
Benz(a)anthracene	MS	AverageRF	% RSD	6.8		≤ 20	1.29	0.80
Chrysene	MS	AverageRF	% RSD	1.9		≤ 20	1.24	0.70
Benzo(b)fluoranthene	MS	AverageRF	% RSD	5.7		≤ 20	1.24	0.70
Benzo(k)fluoranthene	MS	AverageRF	% RSD	4.7		≤ 20	1.23	0.70
Benzo(a)pyrene	MS	AverageRF	% RSD	4.7		≤ 20	1.08	0.70
Indeno(1,2,3-cd)pyrene	MS	AverageRF	% RSD	6.9		≤ 20	1.06	0.50
Dibenz(a,h)anthracene	MS	AverageRF	% RSD	5.7		≤ 20	1.08	0.40
Benzo(g,h,i)perylene	MS	AverageRF	% RSD	10.7		≤ 20	1.24	0.50
Fluorene-d10	SURR	AverageRF	% RSD	6.9		≤ 20	1.28	0.01
Fluoranthene-d10	SURR	AverageRF	% RSD	9.0		≤ 20	1.26	0.01
Terphenyl-d14	SURR	AverageRF	% RSD	8.9		≤ 20	0.867	0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Calibration Date:** 07/11/2018  
**Date Analyzed:** 07/11/2018

**Second Source Calibration Verification**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15779  
**Units:** ng/ml

**File ID:** J:\MS14\DATA\071118\0711F013.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
Naphthalene	400	370	1.15	1.06	-8	NA	± 30 %	AverageRF
2-Methylnaphthalene	400	390	0.696	0.683	-2	NA	± 30 %	AverageRF
Acenaphthylene	400	390	2.39	2.33	-2	NA	± 30 %	AverageRF
Acenaphthene	400	380	1.37	1.32	-4	NA	± 30 %	AverageRF
Dibenzofuran	400	370	2.20	2.05	-7	NA	± 30 %	AverageRF
Fluorene	400	390	1.66	1.60	-4	NA	± 30 %	AverageRF
Phenanthrene	400	380	1.25	1.19	-4	NA	± 30 %	AverageRF
Anthracene	400	400	1.19	1.18	-1	NA	± 30 %	AverageRF
Fluoranthene	400	410	1.54	1.60	4	NA	± 30 %	AverageRF
Pyrene	400	350	1.37	1.21	-12	NA	± 30 %	AverageRF
Benz(a)anthracene	400	380	1.29	1.22	-6	NA	± 30 %	AverageRF
Chrysene	400	390	1.24	1.20	-3	NA	± 30 %	AverageRF
Benzo(b)fluoranthene	400	410	1.24	1.27	2	NA	± 30 %	AverageRF
Benzo(k)fluoranthene	400	420	1.23	1.28	4	NA	± 30 %	AverageRF
Benzo(a)pyrene	400	400	1.08	1.08	0	NA	± 30 %	AverageRF
Indeno(1,2,3-cd)pyrene	400	370	1.06	0.993	-7	NA	± 30 %	AverageRF
Dibenz(a,h)anthracene	400	380	1.08	1.03	-4	NA	± 30 %	AverageRF
Benzo(g,h,i)perylene	400	370	1.24	1.14	-9	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430  
**Date Analyzed:** 11/01/2018

**Continuing Calibration Verification Summary**  
**Polynuclear Aromatic Hydrocarbons**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/11/2018  
**Calibration ID:** CAL15779  
**Analysis Lot:** KWG1805861  
**Units:** ng/ml

**File ID:** J:\MS14\DATA\110118\1101F002.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Naphthalene	400	410	0.70	1.15	1.17	2	NA	± 20	AverageRF
2-Methylnaphthalene	400	410	0.40	0.696	0.712	2	NA	± 20	AverageRF
Acenaphthylene	400	450	0.90	2.39	2.67	12	NA	± 20	AverageRF
Acenaphthene	400	430	0.90	1.37	1.49	9	NA	± 20	AverageRF
Dibenzofuran	400	450	0.80	2.20	2.48	13	NA	± 20	AverageRF
Fluorene	400	430	0.90	1.66	1.80	8	NA	± 20	AverageRF
Phenanthrene	400	420	0.70	1.25	1.32	6	NA	± 20	AverageRF
Anthracene	400	390	0.70	1.19	1.17	-2	NA	± 20	AverageRF
Fluoranthene	400	410	0.60	1.54	1.58	2	NA	± 20	AverageRF
Pyrene	400	410	0.60	1.37	1.42	4	NA	± 20	AverageRF
Benz(a)anthracene	400	440	0.80	1.29	1.43	10	NA	± 20	AverageRF
Chrysene	400	430	0.70	1.24	1.34	8	NA	± 20	AverageRF
Benzo(b)fluoranthene	400	440	0.70	1.24	1.36	10	NA	± 20	AverageRF
Benzo(k)fluoranthene	400	430	0.70	1.23	1.31	6	NA	± 20	AverageRF
Benzo(a)pyrene	400	460	0.70	1.08	1.24	14	NA	± 20	AverageRF
Indeno(1,2,3-cd)pyrene	400	450	0.50	1.06	1.21	14	NA	± 20	AverageRF
Dibenz(a,h)anthracene	400	420	0.40	1.08	1.12	4	NA	± 20	AverageRF
Benzo(g,h,i)perylene	400	430	0.50	1.24	1.35	9	NA	± 20	AverageRF
Fluorene-d10	400	390	0.01	1.28	1.25	-2	NA	± 20	AverageRF
Fluoranthene-d10	400	380	0.01	1.26	1.21	-4	NA	± 20	AverageRF
Terphenyl-d14	400	400	0.01	0.867	0.858	-1	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01

**Service Request:** K1810430

**Analysis Run Log**  
**Polynuclear Aromatic Hydrocarbons**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1805861

**Instrument ID:** MS14

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
1101F001.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1805861-1	11/1/2018	09:32		11/1/2018	09:52
1101F002.D	Continuing Calibration Verification	KWG1805861-2	11/1/2018	10:01		11/1/2018	10:20
1101F003.D	ZZZZZZ	ZZZZZZ	11/1/2018	10:30		11/1/2018	10:49
1101F004.D	ZZZZZZ	ZZZZZZ	11/1/2018	10:59		11/1/2018	11:18
1101F005.D	ZZZZZZ	ZZZZZZ	11/1/2018	11:28		11/1/2018	11:47
1101F006.D	ZZZZZZ	ZZZZZZ	11/1/2018	11:58		11/1/2018	12:17
1101F007.D	ZZZZZZ	ZZZZZZ	11/1/2018	12:27		11/1/2018	12:46
1101F008.D	ZZZZZZ	ZZZZZZ	11/1/2018	12:56		11/1/2018	13:15
1101F009.D	ZZZZZZ	ZZZZZZ	11/1/2018	13:25		11/1/2018	13:44
1101F010.D	ZZZZZZ	ZZZZZZ	11/1/2018	13:55		11/1/2018	14:14
1101F011.D	Method Blank	KWG1805607-3	11/1/2018	14:24		11/1/2018	14:43
1101F012.D	Lab Control Sample	KWG1805607-1	11/1/2018	14:53		11/1/2018	15:12
1101F013.D	Duplicate Lab Control Sample	KWG1805607-2	11/1/2018	15:23		11/1/2018	15:42
1101F014.D	612-102418	K1810430-012	11/1/2018	15:52		11/1/2018	16:11
1101F015.D	ZZZZZZ	ZZZZZZ	11/1/2018	16:22		11/1/2018	16:41
1101F016.D	ZZZZZZ	ZZZZZZ	11/1/2018	16:51		11/1/2018	17:10
1101F017.D	ZZZZZZ	ZZZZZZ	11/1/2018	17:20		11/1/2018	17:39
1101F018.D	ZZZZZZ	ZZZZZZ	11/1/2018	17:50		11/1/2018	18:09
1101F019.D	ZZZZZZ	ZZZZZZ	11/1/2018	18:19		11/1/2018	18:38
1101F020.D	ZZZZZZ	ZZZZZZ	11/1/2018	18:49		11/1/2018	19:08
1101F021.D	Continuing Calibration Verification	KWG1805861-3	11/1/2018	19:18		11/1/2018	19:37

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

## QA/QC Results

**Client:** Pacific Groundwater Group (PGG)  
**Project:** Head of Swan Island Lagoon/JK1807.01  
**Sample Matrix:** Water

**Service Request:** K1810430  
**Date Extracted:** 10/30/2018

**Extraction Prep Log**  
**Polynuclear Aromatic Hydrocarbons**

**Extraction Method:** EPA 3511  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1805607  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
612-102418	K1810430-012	10/24/18	10/24/18	450mL	2ml	NA	
Method Blank	KWG1805607-3	NA	NA	450mL	2ml	NA	
Lab Control Sample	KWG1805607-1	NA	NA	450mL	2ml	NA	
Duplicate Lab Control Sample	KWG1805607-2	NA	NA	450mL	2ml	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis