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LETTER AND THE U S NAVY RESPONSES TO COMMENTS ON THE DRAFT SAMPLING
AND ANALYSIS PLAN FOR OPERABLE UNIT 8 (OU 8) REMEDIAL INVESTIGATION NSY
PORTSMOUTH ME
09/18/2014
TETRA TECH



TETRA TECH

PITT-09-14-048

September 18, 2014

Project Number 112G03270

Mr. Matthew Audet
USEPA, Region 1
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Mail Code OSRR07-3
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Mr. Iver McLeod
Maine Department of Environmental Protection
State House Station 17
Augusta, Maine 04333-0017

Reference: Contract No. N62470-08-D-1001 (CLEAN)
Contract Task Order No. WE32

Subject: Responses to Comments on the Draft Sampling and Analysis Plan for
Operable Unit 8 Remedial Investigation
Portsmouth Naval Shipyard (PNS), Kittery, Maine

Dear Mr. Audet/Mr. McLeod:

On behalf of the U.S. Navy, Tetra Tech is pleased to provide to U.S. Environmental Protection Agency Region I (USEPA) and Maine Department of Environmental Protection (MEDEP) 1 and 2 copies, respectively, of the subject responses to MEDEP comments dated June 11, 2014. An electronic copy is also being submitted via e-mail. USEPA e-mail dated June 24, 2014 indicated no comments on the draft document. In accordance with the project schedule, comments are due by **October 20, 2014**.

If you have any comments or questions, or if additional information is required, please contact Ms. Linda Cole at 757.341.2011.

For the Community Restoration Advisory Board (RAB) members; if you have any comments or questions on these issues, they can be provided to the Navy at a RAB meeting, by calling the Public Affairs office at 207.438.1140 or by writing to:

Portsmouth Naval Shipyard
Public Affairs Office
Attn: Danna Eddy
Portsmouth, NH 03804-5000

Sincerely,

Deborah J. Cohen, PE
Project Manager

DJC/clm
Enclosure



TETRA TECH

Mr. Matthew Audet
Environmental Protection Agency
Mr. Iver McLeod
Maine Department of Environmental Protection
September 18, 2014 – Page 2

Without Enclosure

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Ms. Mary Marshall (e-mail)
Mr. Peter Britz (e-mail)
NH Fish & Game (D. Grout) (e-mail)
ME Dept. of Marine Resources (D. Nault) (e-mail)
Dr. Roger Wells (e-mail)
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Mr. Jack McKenna
Ms. Lisa Joy (e-mail)
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Mr. Tim Evans, Tetra Tech
Ms. Megan Boerio, Tetra Tech
Ms. Jennifer Obrin, Katahdin (e-mail)
Mr. Doug Bogen /TAG recipient (e-mail)
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**RESPONSES TO MEDEP COMMENTS DATED JUNE 11, 2014
DRAFT SAMPLING AND ANALYSIS PLAN FOR OPERABLE UNIT 8 REMEDIAL
INVESTIGATION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE**

1. **Comment:** Although the general boundary of the site is described by the quay wall, it is evident from the data at MW/SB05 and potentially from the disposal data from the recent utility work at Building 174 that the fill placed west of the quay wall is also impacted. It is unclear whether impacts are from Shipyard activity after the filling occurred or from the fill itself. If access can be established additional borings are warranted to characterize soils west of the quay wall. Disposal data from the utility excavation needs to be added to the SAP as an appendix and evaluated to determine if it is consistent with the CSM and the likely COCs. If this data indicate that there are data gaps in the CSM then adjustments need to be made to the SAP.

Response: No text revision is proposed. Based on site history, the location of the quay walls, and data available for OU8, MW/SB05 is not considered within the boundary of OU8 and characterization of soil west of the quay wall is not planned as part of the investigation for OU8.

Data from MW/SB05 and from the recent construction project at Building 174 do not indicate that fill placed west of the quay wall has been impacted by OU8. With the exception of mercury in the surface soil at SB05, chemical concentrations are low. Mercury in the surface soil at SB05 was elevated; however, mercury concentrations were low in the soil samples within OU8. The site history for OU8 also does not indicate that mercury was associated with operations at OU8.

Based on further discussion with the IR Program Manager, PWD-Maine Environmental Division, regarding the construction project, soil samples had non-hazardous (TCLP) results west of the quay wall where SB05 is located. Soil samples with TCLP exceedances were collected east of the quay (inside of OU8) and only lead had TCLP exceedances. Because of the TCLP exceedances, disposal of excavated soil from within OU8 was sent to a hazardous waste disposal facility and no further characterization of soil was conducted as part of the project. To support potential offsite disposal at a non-hazardous facility, pre-excavation characterization of soil west of the quay wall (referred to as Zone 2 soil) was conducted. The Navy collected composite soil samples from 12 test pits in the excavation area west of the quay wall and analyzed the samples for the required disposal characterization analytes, including VOCs, SVOCs, pesticides, herbicides, PCBs, RCRA metals, and cyanide. Four of the test pits were in the vicinity of MW/SB05. Concentrations of organics and inorganics were low or non-detected. The data showed low concentrations of mercury.

The physical boundary of the site is known. Because it isn't possible to separate CERLCA activities from the fill material within the OU8 boundaries, the Navy will need to accept the physical boundaries as the limit. But because fill material outside of the site boundaries is not related to CERLCA activities at OU8, the Navy does not need to determine chemical concentrations in fill material outside the OU8 boundary. However, the Navy recognizes that if data from the RI indicate that there are elevated mercury concentrations within OU8, then further discussion will be needed to determine the appropriate action to address site-related mercury.

2. **Comment:** Executive Summary, 1st and 2nd sentence. These sentences give the impression that the RI has already been started. Please change the words completing/complete to

performing/perform.

Response: The text of the first two sentences will be revised to read as follows.

“This Operable Unit (OU) 8 Remedial Investigation (RI) Sampling and Analysis Plan (SAP) provides the basis and methods for conducting an RI for OU8 at Portsmouth Naval Shipyard (PNS), Kittery, Maine. Information necessary to complete the RI Report and Feasibility Study for OU8 will be collected during this investigation.”

- Comment:** 10.3, History of Environmental Investigations: The former fuel tanks in the area near Building 92 are identified as potential sources in Section 10.4.3. TPH was detected in soil and groundwater and was identified in the SI as needing additional data collection. In addition to the PAHs please add MADEP EPH method for evaluation of the TPH previously detected at the site.

Response: No TPH (DRO or GRO) data will be collected for OU8 as part of the RI. PAHs are sufficient to evaluate potential risks for the RI and therefore DRO data are not necessary. There is no indication that VOCs are contaminants associated with OU8 (based on site history and SSI data) and GRO data showed low concentrations or non-detects in soil and groundwater; therefore, neither VOC nor GRO data are necessary for the RI.

The tanks mentioned in Section 10.4.3 are not located at OU8; these were located upgradient of the site. The former fuel oil tanks were present at Building 92, east (upgradient) of the former timber basin eastern quay wall and were located where the building has since been expanded. To eliminate the confusion, the Navy will remove the tanks from the CSM as being a potential source, as they are not sources at OU8.

- Comment:** 10.3, p. 20, 3rd para. Change “... concentrations exceeding industrial risk-based screening...” to “concentrations exceeding USEPA industrial risk-based screening...” since Tables 1 does not indicate that the Navy made any comparison to Maine Remedial Action Guidelines for Soil (RAGS).

Response: The clarification will be made as noted, to read as follows.

“...concentrations exceeding USEPA industrial risk-based screening...”

- Comment:** 10.4.4, p. 23. The previous data collection suggests some tidal influence on groundwater at the site, but it does not necessarily mean there is an influx of river water to the site each tidal cycle. The groundwater data do not indicate that in-situ the soils are not leaching significant concentrations of contaminants under current conditions. However, the TCLP data from the utility project may show that management of any future excavated soil will be needed for disposal.

Response: No text revision is proposed. The Navy agrees that there may not be an influx of river water throughout the site during high tidal periods, except along the edges of the site. As discussed in Worksheet 11, as part of the RI, tidal information will be collected as part of characterization of groundwater conditions. The Navy agrees that if soil is to be excavated as part of a future remedial action, the soil would be tested and handled appropriately.

- Comment:** 10.4.4, p. 24, 2nd para. The impacts to the offshore are also contingent on conditions such as buildings and asphalt remaining in place. The concentrations won't increase but the mobility could increase if soil were exposed, excavated, etc. Text should be added to note that factor.

Response: No text revision is proposed. The unsaturated zone at OU8 has been exposed previously, as the asphalt has not always been present. Also, the fill material at OU8 is already in contact with groundwater. Therefore, migration is not expected to be of concern. Impacts to the offshore area were investigated as part of the OU4 investigation, and no impacts to the offshore attributable to OU8 were identified.

7. **Comment:** Section 11.2, Project Action Limits and Section 11.4, Decision Rule #3: Maine DEP considers acceptable risk to meet an Incremental Lifetime Cancer Risk (ILCR) of 10⁻⁵ for carcinogens for purposes of human health risk assessment, please revise as needed.

Response: No text revision is proposed. As the Navy has discussed with MEDEP previous (for example see the Navy's response to MEDEP Comment No. 37 on the draft OU7 RI Report, provided in Appendix E.1 of the final OU7 RI Report, Tetra Tech, July 2011), the Navy makes risks decisions based on the USEPA risk range and not State of Maine risk guidelines because Maine's risk assessment guidelines are not promulgated. However, as part of the risk assessment, the Navy will discuss exceedances of the Maine guideline for informational purposes.

8. **Comment:** Section 11.3, Study Area Boundaries and Figure 8: As noted above, soil data indicate that the boundary of contamination to the west is not defined. It is unclear if Site 3 is the source of elevated concentrations. Additional data are needed to quantify concentrations in the fill, if access is possible, unless data are available for the geotechnical borings around Building 174. At a minimum the area needs to be qualitatively discussed since it borders the currently identified site boundary.

Response: No text revision is proposed. There is a known physical boundary for the site soil, and the mercury exceedance that was detected outside of the boundary is not from site-related activities based on the available site information. No additional sampling outside of the site boundary is proposed, as it is not within the scope of the project to quantify potential contamination in fill outside of OU8.

9. **Comment:** Section 11.4, Groundwater EPCs: Approval of the groundwater EPCs will be determined when the Navy risk assessor proposes criteria.

Response: No text revision is proposed. The risk assessment will provide the selection of EPCs and the risk assessment will be included in the RI Report that will be distributed to the regulators for review and comment.

10. **Comment:** Section 11.4, Decision Rule #1: MEDEP does not typically allow compounds to be screened out of a risk assessment based on background concentrations. At a minimum, the implication of leaving out such compounds must be discussed in the uncertainty section of the risk assessment. For comparisons of risk-based values to background MEDEP suggests that the 95% UCL statistics would be an appropriate background value to consider. If another value is used please provide rationale.

Response: No text revision is proposed. For qualitative evaluation of data, the Navy will use the 95% UCL for the facility background data set as a representative concentration to provide an understanding of nature and extent of contamination. For risk assessment, the selection of chemicals of potential concern (COPCs) and uncertainty based on screening out of background will be conducted consistent with risk assessments for other PNS sites (e.g., OU7 RI Report), where risks from chemicals that are screened out as COPCs based on background (based on a dataset to dataset comparison) are evaluated in the uncertainty section.

11. **Comment:** Worksheet #13: Please provide the boring logs referenced from construction at Building 92 and Building 174 as an electronic appendix to the SAP.

Response: Electronic copies of the boring logs referenced from the construction projects will be included on the CD provided in the SAP.

12. **Comment:** Worksheet #15: Several PAHs do not have brackish/saline PSLs available. What screening levels will be used for these compounds in the likely scenario that the water is brackish/saline?

Response: The updated Worksheet 15 is attached and it reflects updates to the screening levels based on updates to USEPA RSLs in May 2014 and recalculation of facility-specific screening levels.

The facility-specific screening levels for construction worker exposure will be used as the PSLs for brackish/saline water. The Navy re-calculated the screening levels to account for both dermal and incidental ingestion exposure pathways consistent with the lead screening level calculation. The methodology is based on Risk Assessment for Superfund, Volume I, Human Health Evaluation Manual Part A, (Interim Final RAGS Part A, USEPA, December 1989, 2010 updates) and Risk Assessment for Superfund, Volume I, Human Health Evaluation Manual Part E, Supplemental Guidance for Dermal Risk Assessment (RAGS Part E, USEPA, July 2004). With the inclusion of incidental ingestion in the screening level calculation, all of the PAHs now have brackish/saline PSLs. The methodology and worksheets showing the calculation of construction worker groundwater screening levels will be provided in Appendix A of the SAP. In addition, Tables 1, 2, and 3 in Appendix A will be updated to include the May 2014 USEPA RSLs and the updated facility-specific screening levels for groundwater.

13. **Comment:** Worksheet #15 and Worksheet #17:

- Please add EPH to the groundwater and soil collection and add the MEDEP reference limits to Worksheet 15. Rather than sample all soil locations for EPH a subset of samples are warranted for locations where there is field evidence of petroleum impacts in the soil. As a minimum locations adjacent SB-02, SB-05, or SB-06 may warrant sampling, based on earlier data.
- Groundwater, hydraulic conductivity – The general approach is acceptable, although there appear to be some errors in the text. (MW005 is west of the site, and MW-03 is in the east central portion of the site) Based on the proximity or inclusion of MW-02 and MW-05 in the backfill material from the recent construction at the site, only one of these wells is warranted for the study, to see if the newer fill has a hydraulic conductivity distinct from the historic fill in the area. MW-06 should also be considered, based on its location near the last timber basin area filled, and to provide spatial coverage from other wells prepared.

Response: The Navy will evaluate PAHs as part of the RI, but will not add EPH to the analysis proposed, as discussed in the Navy's response to MEDEP Comment No. 3.

Regarding hydraulic conductivity testing, the Navy agrees with the suggested revisions. The text will be revised as follows: "...include WTB-MW02 or WTB-MW07 (depending on the lithology encountered during drilling of WTB-MW07) in the northern portion of the site, WTB-MW02/MW03 in the east-central portion of the site, and WTB-MW05/MW06 south of the site."

14. **Comment:** Worksheet 18 and Figure 8: Soil samples also are needed from SB-07, to support the groundwater data, and to provide additional soil characterization west of the quay wall.

Please add to the table and revise as needed. A subset of EPH samples is also needed as an addition to the table. If trailers or other items have been moved following completion of the work at Building 174 then the three “middle” borings to the south and roughly in line with WTB-MW-04 should be shifted west to the other side of the rail or crank lines for greater spatial coverage of the site.

Response: As part of the SSI, soil samples were collected from WTB-SB07. The new proposed monitoring well WTB-MW07 is located outside of the site boundary and soil sample will not be collected at this location. Because of the various utilities, it may be difficult to install a boring east of WTB-MW07; however, the Navy will move the proposed boring location shown south of WTB-SB07 to the east of WTB-MW07/west of WTB-MW02. Locations of the proposed borings are approximate, and will be shifted as needed and as allowed by the current site configuration. A utility clearance will be conducted before field work and significant modifications to proposed boring locations will be provided to the regulators as part of regular project discussions (e.g., weekly RPM calls).

15. **Comment:** Appendix A: The table associated with the sensitivity analysis indicated that a more desirable 10% alpha error can be achieved with only a small increase in the number of samples, 23 vs 18. The previous page notes that MARSSIM recommends that the number of samples be increased by 20% to account for uncertainty and potential missing/unusable samples, but in this case no increase was included. Based on these factors adding soils data from MW/SB-07 and perhaps adding an additional boring west of the quay wall is consistent with the approach taken to evaluate the number of samples needed. These locations would also provide adequate data collection if some of the proposed sample point(s) prove to be inaccessible.

Response: No additional borings are planned at this time. Soil samples will be collected within the boundary of OU8 for the RI; no soil samples are planned to the west of the western quay wall. As discussed in the Navy’s response to MEDEP Comment No. 14, soil samples have been collected at WTB-SB07 and none are planned for the new monitoring well location (WTB-MW07), which is located outside of the OU8 boundary. Sample locations may need to be shifted based on site conditions as discussed above.

For the calculation of number of samples, this is an estimate based on the input assumptions to get the minimum number of samples in a general ballpark to meet the project goals. The Navy recognizes that different alpha and beta errors can be selected to identify the number of samples. Site conditions, existing data, and accessibility are also factors that should be considered in developing the sampling plan. For OU8, the sampling plan is based on 18 new boring locations and 5 existing boring locations within OU8. The new boring locations were identified to provide spatial coverage of the site with consideration of the presence of underground utilities and other structures that could impeded or prevent collection of soil samples. Based on the planned soil sampling from new borings and the existing soil samples, the anticipated OU8 data set will consist of 21 surface soil samples and 51 subsurface soil samples. Therefore, the Navy believes that the planned sampling will exceed the minimum number of samples identified in the calculation.

SAP WORKSHEET #15: REFERENCE LIMITS AND EVALUATION TABLES

[\(UFP-QAPP Manual Section 2.8.1\)](#)

Matrix: Soil

Analytical Group: TAL Metals **SW-846 Method 6010 limits with the exception of arsenic, cobalt, thallium (SW-846 Method 6020 limits presented), and mercury by SW-846 Method 7471B**

Analyte	CAS No.	PSLs (mg/kg) ¹	PSL Reference ¹	Project QL Goal (mg/kg)	Laboratory Specific Limits ²		
					LOQ(mg/kg)	LOD (mg/kg)	DL (mg/kg)
Aluminum	7429-90-5	7700 N	USEPA RSL	2600	30	10	0.71
Antimony	7440-36-0	3.1 N	USEPA RSL	1.0	0.8	0.5	0.07
Arsenic	7440-38-2	0.67 C	USEPA RSL	0.22	0.5	0.4	0.15
Barium	7440-39-3	1500 N	USEPA RSL	500	0.5	0.3	0.03
Beryllium	7440-41-7	16 N	USEPA RSL	5.3	0.5	0.05	0.007
Cadmium	7440-43-9	7 N	USEPA RSL	2.3	1.0	0.3	0.008
Calcium	7440-70-2	NA	USEPA RSL	NA	10	8.0	1.78
Chromium	7440-47-3	12000 N	USEPA RSL	4000	1.5	0.4	0.03
Cobalt	7440-48-4	2.3 N	USEPA RSL	0.77	0.1	0.03	0.0054
Copper	7440-50-8	310 N	USEPA RSL	100	2.5	1.0	0.16
Iron	7439-89-6	5500 N	USEPA RSL	1800	10	8.0	1.4
Lead	7439-92-1	400	USEPA RSL	130	0.5	0.4	0.09
Magnesium	7439-95-4	NA	USEPA RSL	NA	10	8.0	0.68
Manganese	7439-96-5	180 N	USEPA RSL	60	0.5	0.4	0.16
Mercury	7439-97-6	0.94 N (elemental)	USEPA RSL	0.31	0.033	0.017	0.0052

Matrix: Soil

Analytical Group: TAL Metals SW-846 Method 6010 limits with the exception of arsenic, cobalt, thallium (SW-846 Method 6020 limits presented), and mercury by SW-846 Method 7471B

Analyte	CAS No.	PSLs (mg/kg) ¹	PSL Reference ¹	Project QL Goal (mg/kg)	Laboratory Specific Limits ²		
					LOQ(mg/kg)	LOD (mg/kg)	DL (mg/kg)
Nickel	7440-02-0	150 N	USEPA RSL	50	4	0.4	0.044
Potassium	7440-09-7	NA	USEPA RSL	NA	100	50	2.9
Selenium	7782-49-2	39 N	USEPA RSL	13	1.0	0.7	0.17
Silver	7440-22-4	39 N	USEPA RSL	13	1.5	0.4	0.03
Sodium	7440-23-5	NA	USEPA RSL	NA	100	50	1.48
Thallium³	7440-28-0	0.078 N	USEPA RSL	0.026	0.1	0.04	0.0094
Vanadium	7440-62-2	39 N	USEPA RSL	13	2.5	0.4	0.04
Zinc	7440-66-6	2300 N	USEPA RSL	770	2.5	1.0	0.17

Notes:

- 1 The PSLs are for use as part of COPC screening in the risk assessment. Chemicals with concentrations that exceed PSLs and facility background levels (based on a statistical comparison of the site data set to the facility background data set) will be selected as COPCs. The PSLs are the USEPA residential Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, RSL Table, May 2014. The values shown are based on a target hazard quotient of 0.1 for non-carcinogens (N) and an ILCR of 1×10^{-6} for carcinogens (C). PSLs are NA for chemicals that do not have screening levels.
- 2 Laboratory-specific DLs, LODs, and LOQs are limits that the selected laboratory can achieve when performing a specific analytical method. If the LOQ exceeds the PSL, bold text is used for the entire row of data.
- 3 Thallium toxicity criterion is only suitable for screening and is not used for quantifying risks.

Matrix: Soil

Analytical Group: PAHs
 Selected Ion Monitoring (SIM) **SW-846 Method 8270D SIM**
 Analysis

Analyte	CAS No.	PSL (µg/kg)	PSL Reference ¹	Project QL Goal (µg/kg)	Laboratory Specific Limits ²		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
Acenaphthene	83-32-9	350000 N	USEPA RSL	120000	20	10	1.5
Acenaphthylene	208-96-8	350000 N (based on acenaphthene)	USEPA RSL	120000	20	10	1.2
Anthracene	120-12-7	1700000 N	USEPA RSL	570000	20	10	1.2
Benzo(a)anthracene	56-55-3	150 C	USEPA RSL	50	20	10	1.9
Benzo(a)pyrene	50-32-8	15 C	USEPA RSL	5	20	10	3.3
Benzo(b)fluoranthene	205-99-2	150 C	USEPA RSL	50	20	10	2.4
Benzo(g,h,i)perylene	191-24-2	170000 N (based on pyrene)	USEPA RSL	57000	20	10	2.0
Benzo(k)fluoranthene	207-08-9	1500 C	USEPA RSL	500	20	10	3.1
Chrysene	218-01-9	15000 C	USEPA RSL	5000	20	10	1.7
Dibenzo(a,h)anthracene	189-64-0	15 C	USEPA RSL	5	20	10	1.8
Fluoranthene	206-44-0	230000 N	USEPA RSL	77000	20	10	1.8
Fluorene	86-73-7	230000 N	USEPA RSL	77000	20	10	3.2
Indeno(1,2,3-CD)pyrene	193-39-5	150 C	USEPA RSL	50	20	10	1.9
Naphthalene	91-20-3	3800 C	USEPA RSL	1300	20	10	2.6

Matrix: Soil

Analytical Group: PAHs
Selected Ion Monitoring (SIM) SW-846 Method 8270D SIM
Analysis

Analyte	CAS No.	PSL (µg/kg)	PSL Reference ¹	Project QL Goal (µg/kg)	Laboratory Specific Limits ²		
					LOQ (µg/kg)	LOD (µg/kg)	DL (µg/kg)
Phenanthrene	85-01-8	170000 N (based on pyrene)	USEPA RSL	57000	20	10	1.8
Pyrene	129-00-0	170000 N	USEPA RSL	57000	20	10	2.1

Notes:

- 1 The PSLs are for use as part of COPC screening in the risk assessment. Chemicals with concentrations that exceed the PSLs and facility background levels (based on a statistical comparison of the site data set to the facility background data set) will be selected as COPCs. The PSLs are the USEPA residential RSLs for Chemical Contaminants at Superfund Sites, RSL Table, May 2014. The values shown are based on a target hazard quotient of 0.1 for non-carcinogens (N) and an ILCR of 1×10^{-6} for carcinogens (C).
- 2 Laboratory-specific DLs, LODs, and LOQs are limits that the selected laboratory can achieve when performing a specific analytical method. If the LOQ exceeds the PSL, bold text is used for the entire row of data.

Matrix: Groundwater

Analytical Group: TAL
Metals (Total and
Dissolved)

SW-846 Method 6010 limits with the exception of antimony, arsenic, beryllium, cadmium, cobalt, selenium, silver, thallium and vanadium (SW-846 Method 6020 limits presented). Mercury by SW-846 Method 7470A.

Analyte	CAS No.	PSL Freshwater (µg/L) ¹	PSL Brackish or Saline Water (µg/L) ¹	PSL Reference Freshwater/ Brackish or Saline Water ¹	Project QL Goal (µg/L)	Laboratory Specific Limits ²		
						LOQ (µg/L)	LOD (µg/L)	DL (µg/L)
Aluminum	7429-90-5	2000 N	1150000 N	USEPA RSL/ PNS CW SL	670	300	100	14.8
Antimony	7440-36-0	0.78 N	138 N	USEPA RSL/ PNS CW SL	0.26	1.0	0.5	0.054
Arsenic	7440-38-2	0.052 C	345 N	USEPA RSL/ PNS CW SL	0.017	5.0	4.0	2.25
Barium	7440-39-3	380 N	35700 N	USEPA RSL/ PNS CW SL	130	5.0	3.0	0.23
Beryllium	7440-41-7	2.5 N	97.2 N	PNS CW SL	0.83	1.0	0.2	0.034
Cadmium	7440-43-9	0.92 N	65.4 N	USEPA RSL/ PNS CW SL	0.31	1.0	0.2	0.03
Calcium	7440-70-2	NA	NA	USEPA RSL/ PNS CW SL	NA	100	80	11.2
Chromium	7440-47-3	2200 N	27100 N	USEPA RSL/ PNS CW SL	730	10	4.0	0.36
Cobalt	7440-48-4	0.6 N	4570 N	USEPA RSL/ PNS CW SL	0.20	1.0	0.3	0.06
Copper	7440-50-8	80 N	46000 N	USEPA RSL/ PNS CW SL	27	25	10	0.63
Iron	7439-89-6	1400 N	804000 N	USEPA RSL/ PNS CW SL	470	100	80	5.42
Lead	7439-92-1	15	1340	USEPA RSL/ PNS CW SL	5	5.0	4.0	1.07
Magnesium	7439-95-4	NA	NA	USEPA RSL/ PNS CW SL	NA	100	80	7.8

Matrix: Groundwater

Analytical Group: TAL
Metals (Total and Dissolved)

SW-846 Method 6010 limits with the exception of antimony, arsenic, beryllium, cadmium, cobalt, selenium, silver, thallium and vanadium (SW-846 Method 6020 limits presented). Mercury by SW-846 Method 7470A.

Analyte	CAS No.	PSL Freshwater (µg/L) ¹	PSL Brackish or Saline Water (µg/L) ¹	PSL Reference Freshwater/ Brackish or Saline Water ¹	Project QL Goal (µg/L)	Laboratory Specific Limits ²		
						LOQ (µg/L)	LOD (µg/L)	DL (µg/L)
Manganese	7439-96-5	43 N	2550 N	USEPA RSL/ PNS CW SL	14	5.0	4.0	1.06
Mercury	7439-97-6	0.57 (mercuric chloride)	357 (mercuric chloride)	USEPA RSL/ PNS CW SL	0.19	0.2	0.1	0.013
Nickel	7440-02-0	39 N	8710 N	USEPA RSL/ PNS CW SL	13	10	4.0	0.28
Potassium	7440-09-7	NA	NA	USEPA RSL/ PNS CW SL	NA	1000	500	41
Selenium	7782-49-2	10 N	5750 N	USEPA RSL/ PNS CW SL	3.3	5.0	3.0	0.19
Silver	7440-22-4	9.4 N	853 N	PNS CW SL	3.1	1.0	0.4	0.05
Sodium	7440-23-5	NA	NA	USEPA RSL/ PNS CW SL	NA	1000	500	23.7
Thallium³	7440-28-0	0.020 N	46.0 N	USEPA RSL/ PNS CW SL	0.0067	1.0	0.4	0.06
Vanadium	7440-62-2	8.6 N	703 N	USEPA RSL/ PNS CW SL	2.9	5.0	4.0	0.51
Zinc	7440-66-6	600 N	412000 N	USEPA RSL/ PNS CW SL	200	20	10	0.73

Notes:

- 1 If the majority of groundwater at the site is fresh water, the PSLs for fresh water will be used as part of COPC selection. Otherwise, the PSLs for brackish or saline water will be used as part of COPC selection. The PSLs for fresh water are the USEPA Tap water RSLs for Chemical Contaminants at Superfund Sites, RSL Table, May 2014. The PSLs for brackish or saline water are PNS-specific screening levels for construction worker contact (dermal) with groundwater (PNS CW SL) that were calculated using the methodology provided in Appendix A.4. The values shown are based on a target hazard quotient of 0.1 for non-carcinogens (N) and an ILCR of 1×10^{-6} for carcinogens (C). PSLs are NA for chemicals that do not have screening levels.

- 2 Laboratory-specific DLs, LODs, and LOQs are limits that the selected laboratory can achieve when performing a specific analytical method. If the LOQ exceeds the PSL, bold text is used for the entire row of data. If the LOQ and LOD exceed the PSL, bold text and shading are used for the entire row of data.
- 3 Thallium toxicity criterion is only suitable for screening and is not used for quantifying risks.

Matrix: Groundwater

Analytical Group: PAHs
(Sim Analysis) **SW-846 Method 8270D SIM**

Analyte	CAS No.	PSL Freshwater (µg/L) ¹	PSL Brackish or Saline Water (µg/L) ¹	PSL Reference Freshwater/ Brackish or Saline Water ¹	Project QL Goal (µg/L)	Laboratory Specific Limits ²		
						LOQ (µg/L)	LOD (µg/L)	DL (µg/L)
Acenaphthene	83-32-9	53 N	3760 N	USEPA RSL/ PNS CW SL	18	0.2	0.1	0.064
Acenaphthylene	208-96-8	53 N (based on acenaphthene)	1080 N	USEPA RSL/ PNS CW SL	18	0.2	0.1	0.054
Anthracene	120-12-7	180 N	10100 N	USEPA RSL/ PNS CW SL	60	0.2	0.1	0.044
Benzo(a)anthracene	56-55-3	0.034 C	1870 C	USEPA RSL/ PNS CW SL	0.011	0.2	0.1	0.046
Benzo(a)pyrene	50-32-8	0.0034 C	187 C	USEPA RSL/ PNS CW SL	0.0011	0.2	0.1	0.066
Benzo(b)fluoranthene	205-99-2	0.034 C	1870 C	USEPA RSL/ PNS CW SL	0.011	0.2	0.1	0.089
Benzo(g,h,i)perylene	191-24-2	12 N (based on pyrene)	21.0 N	USEPA RSL/ PNS CW SL	4.0	0.2	0.1	0.065
Benzo(k)fluoranthene	207-08-9	0.34 C	18700 C	USEPA RSL/ PNS CW SL	0.11	0.2	0.1	0.049
Chrysene	218-01-9	3.4 C	187000 C	USEPA RSL/ PNS CW SL	1.1	0.2	0.1	0.036
Dibenzo(a,h)anthracene	189-64-0	0.0034 C	187 C	USEPA RSL/ PNS CW SL	0.0011	0.2	0.1	0.070
Fluoranthene	206-44-0	80 N	779000 N	USEPA RSL/ PNS CW SL	27	0.2	0.1	0.073
Fluorene	86-73-7	29 N	5650 N	USEPA RSL/ PNS CW SL	9.7	0.2	0.1	0.061
Indeno(1,2,3-CD)pyrene	193-39-5	0.034 C	1870 C	USEPA RSL/ PNS CW SL	0.011	0.2	0.1	0.052

Matrix: Groundwater

Analytical Group: PAHs **SW-846 Method 8270D SIM**
 (Sim Analysis)

Analyte	CAS No.	PSL Freshwater (µg/L) ¹	PSL Brackish or Saline Water (µg/L) ¹	PSL Reference Freshwater/ Brackish or Saline Water ¹	Project QL Goal (µg/L)	Laboratory Specific Limits ²		
						LOQ (µg/L)	LOD (µg/L)	DL (µg/L)
Naphthalene	91-20-3	0.17 C	23600 N	USEPA RSL/ PNS CW SL	0.057	0.2	0.1	0.064
Phenanthrene	85-01-8	12 N (based on pyrene)	58400 N	USEPA RSL/ PNS CW SL	4.0	0.2	0.1	0.051
Pyrene	129-00-0	12 N	1850 N	USEPA RSL/ PNS CW SL	4.0	0.2	0.1	0.059

Notes:

- 1 If the majority of groundwater at the site is fresh water, the PSLs for fresh water will be used as part of COPC selection. Otherwise, the PSLs for brackish or saline water will be used as part of COPC selection. The PSLs for fresh water are the USEPA Tap water RSLs for Chemical Contaminants at Superfund Sites, RSL Table, May 2014. The PSLs for brackish or saline water are PNS-specific screening levels for construction worker contact (ingestion and dermal) with groundwater (PNS CW SL) that were calculated using the methodology provided in Appendix A.4. The values shown are based on a target hazard quotient of 0.1 for non-carcinogens (N) and an ILCR of 1×10^{-6} for carcinogens (C). PSLs are NA for chemicals that do not have screening levels.
- 2 Laboratory-specific DLs, LODs, and LOQs are limits that the selected laboratory can achieve when performing a specific analytical method. If the LOQ exceeds the PSL, bold text is used for the entire row of data. If the LOQ and LOD exceed the PSL, bold text and shading are used for the entire row of data.