October 4, 2023

Erin McDonnell
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232

Subject: **Willamette Cove Upland Facility**
Response to the Oregon Department of Environmental Quality Comments on the Remedial Design Investigation Evaluation Report
22007576

Dear Erin:

This letter provides the Oregon Department of Environmental Quality (DEQ) with a response to comments received on the *Remedial Design Investigation Evaluation Report (RDI Report, Apex March 22, 2023)*. The comments were provided to the Port of Portland (Port) in a letter from the DEQ dated July 31, 2023. The DEQ comments are repeated (in italics) followed by the Port responses.

General Comments

1. *Nature and Extent of Contamination. As noted in the report, contaminant concentrations at the site do not consistently decrease with depth, nor has the depth of actionable contamination been determined across the site. New ISM data indicate that the conceptual site model for contamination is more complex than initially posited (contaminant confined to shallow soil and generally decreasing with depth). There were also notable detections of contaminants (e.g., PCBs) not originally considered to be common or risk drivers. Please discuss, and the conceptual site model should be updated for remedial design work moving forward.*

Response. This comment mischaracterizes conclusions about COC concentrations versus depth made in Section 4.3 of the report. The report concludes that there is a decreasing concentration with depth for the Central and East Parcels, constituting 78 percent of the total area. Even in the West Parcel, 5 of the 8 COCs exceeding PRGs show a decreasing trend with depth. That said, it is understood that the West Parcel was subject to filling with materials potentially containing COCs. These factors will be included in the conceptual model used during design.

2. *Sampling Results Variability. There is a considerable degree of variability between ISM and replicate sampling results. DEQ believes that this is partially attributable to contaminant heterogeneity in soil, perhaps exacerbated to some degree by the smaller increment (30) size used. The variability is nevertheless concerning. Given the variability observed and to apply a reasonable level of conservativism, DEQ believes that it is appropriate to use the maximum detected ISM concentration (for individual*

contaminants) when considering sample and replicate results for risk screening/remedy design.

Response. In remedial design, the maximum concentration among the replicates will be used. Additionally, in the forthcoming Upland Residual Risk Assessment Update (RRA Update), the maximum concentration among the replicates was selected as the representative concentration for RRA calculations.

3. *Data Uncertainties. As noted in comment 2 above, sampling variability for specific COCs was observed, such as replicates of the mean concentration for PCBs, dioxin/furan TEQ, and mercury. Many areas of data uncertainty will be areas subject to soil removal for these and other COCs; however, specifics regarding areas planned for soil removal areas (lateral and depth) are under development and will be presented in the forthcoming Basis of Design Report. DEQ will defer further analysis at this time and revisit data uncertainty during remedial design to focus efforts on areas that may not be carried forward for soil removal where uncertainty remains. Recommendations to consider will be provided in separate correspondence to address data uncertainty including poor reproducibility of specific COCs and adjustments of data concentrations where the RSD is >35% and <50%.*

Response. Comment noted.

4. *Arsenic. Acknowledging the preliminary remedial goal identified in the Record of Decision, and uncertainly associated with comparing the PRG to ISM sampling results, DEQ is not seeking cleanup within the Uplands below regional background levels for arsenic. This is appropriate based on practical and site-specific considerations, including:*
    - *Arsenic is not a priority COC or risk driver for the site.*
    - *Clean Fill that will be imported onsite (minimum of 1-foot and greater depths in other areas to address residual ecological risk) may naturally contain arsenic concentrations between the PRG (4.4 mg/kg) and the regional background concentration of 8.8 mg/kg. Arsenic concentrations in this range would be considered acceptable.*
    - *DEQ's analysis of contaminant data indicates that arsenic within and above the background range is most often co-located with contamination that would require excavation.*
    - *In the limited instances where arsenic levels are present above background and no remedial action is required for other COCs, a lines of evidence (LOE) approach is recommended.*
    - *Analysis alternatives, such as statistical comparison considering variance, can be performed if needed as a LOE assessment.*
    - *An exceedance ratio of background, including the cumulative exceedance ratio, is not a direct indication of risk.*
    - *Confirmation sampling during/following remedial action presumably will include discrete sampling in combination with ISM.*
    - *This decision is specific to arsenic, most detections of which at the site are attributable to geologic materials from which site soil are derived (natural enrichment). In contrast, elevated concentrations of mercury in site soil are attributable to contaminant releases, and a priority COCs for ecological risk.*

Response. The Port and Metro agree with each bullet point in this comment, however, we believe these bullets apply to other metals as well. We are not requesting changes to other metal PRGs at this time, but we may want to engage DEQ on further discussion on this topic in the future.

5. *Unsampled Berms on East Parcel. Berms adjacent to DU-30, DU-33 and DU-36 are large (about 6 feet tall) and were not sampled. Based on the results from DU-41, which is the berm area adjacent to DU-28, DU-29 and DU-30, these berms should be considered hot spots (similar to DU-41) pending additional data collection. Based on visual observations, perhaps surface soil from the East Parcel was pushed out into these berm areas at some point in time.*

Response. The source of the soil in these berms is not known and may not have any relation to the DU-41 berm. As noted, the berms are located within DU-30, DU-33 and DU-36 so were included in the ISM sampling layout. Human health PRG or ecological dioxin hot spot exceedances were identified in the 0-1 foot samples in these DUs. Unless additional sampling is conducted to demonstrate otherwise, these berms will be removed when the 0-1-foot depth is removed.

6. *Developing Future Data Needs. In general, DEQ anticipates that based on the recent RDI data, the following will be subject to excavation across the Uplands: a) the top 1-foot of soil across the upland; b) many portions of the site to depths of 1-2 feet below current ground surface (bgs); c) some decision units in the 2-3 ft bgs range. Also select soil berms. Additional contaminant data are expected to be necessary:*
    - *Underlying soil where concentrations are present above human health PRGs and ecological hotspots for metals are present at depth of 3 feet; and*
    - *At three feet below underlying future leave surfaces where not offset with importing clean backfill.*

    Confirmation sampling during/following remedial action activities is an acceptable approach. An alternative is additional pre-removal sampling in areas that may contain deeper contamination and subject to excavation (or capping). The latter may be preferred to minimize potential construction delays from verification sampling for specific COCs with longer turnaround timeframes (e.g., dioxin/furans).

Response. This is consistent with the approach planned for remedial design. Confirmation sampling will be conducted on the proposed leave surface after soil removal. The need for additional remedial action will be evaluated based on the confirmation sampling.

Specific Comments

1. *Extent of Upland Facility, Section 2.2. The riverbank area was excluded from the Upland Record of Decision with the understanding that the in-water remedial action would implement a protective remedy. DEQ continues to coordinate with EPA and responsible parties (Port of Portland and Metro) to ensure sufficient cleanup will be implemented on the riverbank to be protective of both upland and in-water receptors (ecological and human).*

Response. The Port and Metro will continue to coordinate with the in-water team on the remedial actions proposed for the riverbank to ensure cleanup objectives are met.

2. *Cultural Resources, Section 2.1.6. Confirm no archaeological or historical resources were encountered. DEQ expects updated cultural and archeological plans in consultation with Oregon State Historic Preservation Office (SHPO) and appropriate Tribal governments in preparation of future remedial activities.*

Response. No archeological or historical resources were encountered during the remedial design investigation. The inadvertent discovery protocols presented in the RDI Work Plan will be updated as necessary. The Port and Metro would like to request from DEQ any additional guidance or information regarding the consultations.

3. *Boundary Survey Field Confirmation, Section 3.2. At the southeast portion of the site, there is continued uncertainty regarding the extent of Metro property versus BNSF property supporting the railroad bridge. DEQ requests this matter be resolved early in the design process including conducting a professional survey that maps the property boundaries with accuracy and precision. The results of the survey should be presented in the forthcoming Basis of Design Report or earlier.*

Response. The Port and Metro will work to resolve the property boundary along the eastern edge of the Site and incorporate any adjustments into the Basis of Design Report and other remedial design submittals.

4. *ISM Sampling (DU-1 through DU-26, DU-38), Section 3.3.1. Confirm that 130 grams of soil was the target for each increment location, with a total mass of 3,900 grams at each decision unit using 30 increments. Also, discuss how often the mass of the soil was significantly greater than 130 grams (e.g., rarely, moderately, frequently) and the aliquot was homogenized and excess soil was removed. Clarify whether this was before combining the 30 aliquots for the total ISM sample and provide further discussion regarding aliquot weight deviation.*

Response. As described in the Work Plan, the target volume of sample was 0.8 gallons of soil (approximately 3,900 grams based on field method testing). To achieve 3,900 grams of soil, the target mass for each increment was 130 grams (30 x 130 = 3,900). Each increment was weighed in the field using a scale. Although there was some variability in the mass for each increment, if the mass of the collected increment was significantly greater than 130 grams, the mass of the increment was field adjusted by removing sample mass to achieve 130 grams prior to adding the increment to the ISM sample so the mass of the increments was rarely, if ever, 10 percent greater than 130 grams.

5. *Concrete Sab Composite Sampling, Section 3.3.3. Consistent with Section 3.3.1 comment, please provide additional details in the context of composite sampling methodology and when homogenized soil was greater than 800 grams and the weight of the homogenized soil was adjusted to 800 grams by removing excess soil. Clarify if weight was adjusted prior to or after combining the five composite sample aliquots.*

Response. The composite samples beneath the concrete slabs were collected using a 1.75-inch diameter hand auger. The volume of soil removed for each one-foot interval at each increment was approximately 29 cubic inches and consistently weighed approximately 800 grams for a total of 4,000 grams. Upon collection of all five increments for each depth interval, the soil was thoroughly homogenized. A small amount of the homogenized soil was then removed to reduce the volume of the composite sample to fit into the gallon glass sample container.

6. *Deviations from the Work Plan, Section 3.4. Expand discussion on the laboratory processing of the ISM samples and any deviations from the work plan.*

Response. ISM samples were processed by the laboratory in accordance with the Apex Laboratories, LLC Confidential Standard Operating Procedure for Representative Sampling Methodology (RSM) that was provided to DEQ on August 10, 2022 separate from but in support of the Work Plan. In addition, the laboratory ISM processing procedures were consistent with the procedures described in the Work Plan (SAP Section 5.3).

7. *Preliminary Soil Excavation Depths and Volumes, Section 5.1. Note estimated soil volumes identified in the ROD were provided by the Port of Portland and presented in the Feasibility Study. Regarding arsenic, the more recent estimates provided for additional removal driven exclusively by arsenic appears overestimated. Please provide calculations and assumptions.*

Response. The calculations of preliminary soil volumes, including excavation driven by arsenic, are presented in Table 8 of the draft RDI report.

8. *Tables. Composite results for DU-44 under the concrete slab in DU-16 exceeds ecological hot spot levels for dioxins and furans (i.e., dioxin TEQ at 60.7 ng/kg) and mercury, and PRGs for lead, nickel, and zinc. This sample location is missing from cumulative risk tables. Please add this sample to the tables.*

Response. Assume this is for composite sample DU-42 (not DU-44) based on the dioxin TEQ concentration and COC exceedances. Composite sample DU-42 was included in Table 10 for cumulative exceedance ratios (on page 2). We note that the exceedance ratios shown are relative to the PRG. In some cases, the PRG is a background value. In that case (e.g., for mercury) the ratios shown in Table 10 do not reflect risk ratios. Future documents will clarify ratios being shown and risk evaluations will use risk-based values to identify risk ratios.

9. *Laboratory Replicate Samples (Quality Control Duplicates), Appendix F. The workplan called for laboratory duplicates of the processed 3,900 grams of soil in order to assess the variability in laboratory processing. Please present and discuss results the report. [Section 5.3 of the work plan states the "Laboratory quality assurance/quality control (QA/QC) will include a method blank and a batch laboratory control sample (LCS), sample duplicate 1 (DUP1), sample duplicate 2 (DUP2), sample matrix spike (MS). Sample replicates will be formed by subsampling multiple increments of powdered sample."] Section 4.7.4 of Appendix F discusses the laboratory duplicates, but no results or discussion is provided. Please present the laboratory duplicate results in dry weight.*

Response. The laboratory duplicate results are summarized in the attached tables.

Please contact us at (503) 974-0429 if you have any questions.

Sincerely,

Steve Misner, R.G.
Project Manager

Cc: Daniel Hafley, DEQ
Jennifer Peterson, DEQ
Mike Poulsen, DEQ
David Lacey, DEQ
Sarah Greenfield, DEQ
Dwight Leisle, Port of Portland
Alison Clements, Metro
Paul Slyman, Metro

Attachment:

Quality Assurance/Quality Control Laboratory Data Tables

Attachment

Laboratory Quality Assurance/Quality Control Data Tables

Supplimental Table 1a
Soil Results - PAHs and Dibenzofurans - Lab Duplicates
Willamette Cove Upland Facility
Portland, Oregon

Lab Duplicate Sample ID	Associated DU's	PAHs and Dibenzofuran by EPA Method 8270E-SIM																		
		Concentrations in µg/kg																		
		Acenaphthene	Acenaphthylene	Anthracene	Benz(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(g,h,i) perylene	Chrysene	Dibenz(a,h) anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd) pyrene	1-Methyl naphthalene	2-Methyl naphthalene	Naphthalene	Phenanthrene	Pyrene	Dibenzofuran
22G0960-DUP1	DU-1	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	<1.54	**2.51**	<1.54	<1.54
22G0986-DUP1	DU-1	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94
22H0273-DUP1	DU-2, DU-5, DU-6, DU-7	<4.86	<4.86	<4.86	<4.86	<4.86	<4.86	<4.86	<4.86	<4.86	<4.86	**6.35**	<4.86	<4.86	<4.86	<4.86	**5.83**	**6.46**	**5.19**	<4.86
22H0493-DUP1	DU-3	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38
22H0587-DUP1	DU-4, DU-8, DU-9, DU-11	**7.01**	<4.80	**10.8**	**51.9**	**74.9**	**104**	**34.6**	**58.6**	**72.2**	**11.9**	**103**	<4.80	**69.1**	**6.08**	**14.4**	**12.8**	**54.4**	**103**	**5.92**
22H0587-DUP2	DU-4, DU-8, DU-9, DU-11	**6.09**	**5.05**	**13.3**	**60.3**	**87.6**	**119**	**40.1**	**66.6**	**83.3**	**14.0**	**117**	<4.74	**78.3**	**6.38**	**14.7**	**13.6**	**59.2**	**119**	**5.17**
22H0587-DUP3	DU-4, DU-8, DU-9, DU-11	**6.81**	**5.25**	**12.6**	**63.9**	**96.7**	**134**	**44.7**	**70.6**	**89.1**	**15.7**	**124**	<4.72	**85.9**	**6.19**	**15.3**	**12.7**	**62.8**	**125**	**5.38**
22H0086-DUP1	DU-5	<336	<336	<336	**820**	**1090**	**1350**	**508**	**748**	**968**	<336	**1190**	<336	**896**	<336	<336	<336	**482**	**1330**	<336
22H0135-DUP1	DU-5	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58	<1.58
22H0977-DUP1	DU-5, DU-14	<1910	<585	<840	<382	<127	<127	<127	<127	<407	<127	**553**	**4540**	<127	**13200**	**14000**	**1390**	**9310**	**1570**	**2350**
22H0798-DUP1	DU-10	<1.34	**3.14**	**6.59**	**28.8**	**44.3**	**58.1**	**18.1**	**52.1**	**45.9**	**5.59**	**84.3**	<1.34	**51.4**	<1.34	<1.34	**1.75**	**31.1**	**111**	<1.34
22H0838-DUP1	DU-10, DU-12	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49	<1.49
22H0653-DUP1	DU-11	**36.6**	**285**	**190**	**896**	**1490**	**1360**	**431**	**1040**	**1300**	**206**	**1520**	**101**	**1050**	**145**	**345**	**514**	**1010**	**2450**	**42.7**
22H0694-DUP1	DU-11	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0	<63.0
22I0197-DUP1	DU-13	**8.63**	**47.2**	**44.5**	**201**	**287**	**325**	**96.2**	**247**	**312**	**38.4**	**325**	**12.1**	**235**	**26.1**	**57.7**	**94.4**	**179**	**445**	**8.49**
22I0197-DUP2	DU-13	**8.81**	**49.8**	**45.2**	**201**	**288**	**329**	**92.9**	**246**	**312**	**38.9**	**322**	**12.7**	**232**	**26.4**	**59.5**	**96.5**	**180**	**445**	**8.80**
22I0197-DUP3	DU-13	**9.82**	**56.3**	**53.3**	**230**	**330**	**376**	**109**	**280**	**361**	**45.2**	**380**	**13.8**	**267**	**30.0**	**67.7**	**109**	**210**	**520**	**9.90**
22I0252-DUP1	DU-13	**6.93**	**83.2**	**62.5**	**869**	**875**	**1180**	**387**	**669**	**1070**	**151**	**1480**	**10.9**	**733**	**27.8**	**62.7**	**93.3**	**218**	**1400**	**9.07**
22H1039-DUP1	DU-15	<1.31	**3.68**	**5.48**	**40.0**	**63.1**	**70.7**	**24.6**	**59.2**	**60.3**	**6.16**	**108**	<1.31	**60.5**	<1.31	<1.31	**2.07**	**38.9**	**139**	<1.31
22I0778-DUP1	DU-16	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48
22K0575-DUP1	DU-16, DU-26, DU-31	**430**	**731**	**2530**	**4540**	**6450**	**7720**	**2440**	**7790**	**6330**	**743**	**11800**	**329**	**7160**	**189**	**423**	**1640**	**7630**	**15000**	<164
22I0280-DUP1	DU-17	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	<6.98	**11.6**	<6.98	<6.98	<6.98
22J0495-DUP1	DU-18, DU-27	<5.08	**20.3**	**24.8**	**72.7**	**123**	**193**	**52.5**	**162**	**127**	**18.7**	**117**	<5.08	**144**	**6.49**	**10.5**	**21.3**	**62.2**	**139**	<5.08
22J0716-DUP1	DU-18	**0.814**	<109	<109	<109	<109	<109	<109	<109	<109	<109	<109	<109	<109	<109	**414**	**571**	<456	<217	**274**
22I0558-DUP1	DU-19	**5.42**	**40.1**	**35.7**	**144**	**245**	**305**	**106**	**226**	**208**	**37.9**	**261**	**9.19**	**222**	**11.9**	**15.9**	**36.0**	**166**	**287**	**10.8**
22J1186-DUP1	DU-20	<5.04	**15.4**	**10.7**	**52.7**	**105**	**172**	**57.9**	**88.2**	**116**	**20.6**	**87.6**	**5.15**	**86.7**	**5.24**	**9.47**	**14.2**	**40.2**	**142**	<5.04
22I0607-DUP2	DU-21	<58.8	<58.8	<58.8	**60.8**	<58.8	<58.8	<58.8	<58.8	<58.8	<58.8	**64.7**	<58.8	<58.8	<58.8	<58.8	<58.8	<58.8	**59.8**	<58.8
22J0877-DUP1	DU-22, DU-35	<105	<105	<52.7	<52.7	<52.7	<52.7	<52.7	<52.7	<52.7	<52.7	<52.7	**137**	<52.7	**8190**	**16300**	**13400**	**241**	**62.4**	<52.7
22J0980-DUP1	DU-22	<26.5	<26.5	<53.0	<26.5	<53.0	<26.5	<26.5	<26.5	<26.5	<26.5	<26.5	<26.5	<26.5	<26.5	<26.5	<26.5	**87.9**	**54.9**	<26.5
22J1128-DUP1	DU-22	<4.94	<4.94	<4.94	**15.4**	**14.2**	**24.7**	**11.7**	**15.7**	**27.6**	<4.94	**20.7**	<4.94	**16.3**	<4.94	**5.95**	**10.8**	**19.0**	**22.2**	<4.94
22J0792-DUP1	DU-23, DU-35	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	<60.9	**74.4**	<60.9	<60.9	<60.9
22J0005-DUP1	DU-24	<123	<61.5	<61.5	<61.5	<61.5	<61.5	<61.5	<61.5	<61.5	<61.5	<61.5	**76.6**	<61.5	**8430**	**17300**	**17500**	**124**	<61.5	<61.5
22J0218-DUP1	DU-25, DU-32	<4.67	**16.9**	**12.3**	**57.7**	**81.2**	**131**	**42.8**	**71.9**	**88.3**	**10.9**	**120**	<4.67	**76.7**	<4.67	**7.16**	**17.3**	**63.8**	**113**	**6.23**
22K0589-DUP1	DU-26	**560000**	<29000	**260000**	**118000**	**104000**	**96700**	**30900**	**71600**	**166000**	**6260**	**578000**	**279000**	**68900**	**447000**	**584000**	**303000**	**1540000**	**690000**	**44200**
22K0816-DUP1	DU-26, DU-38	<5.46	<5.46	<5.46	**7.64**	**8.26**	**10.4**	<5.46	**12.4**	**7.33**	<5.46	**9.23**	<5.46	**10.1**	<5.46	<5.46	<5.46	<5.46	**11.6**	<5.46
22L0386-DUP1	DU-42, DU-44	<5.03	<5.03	**5.78**	**30.2**	**38.2**	**44.2**	**16.9**	**40.2**	**36.6**	**5.07**	**50.7**	<5.03	**36.7**	**5.62**	**6.82**	**7.97**	**38.3**	**55.0**	<5.03
22J0610-DUP1	DU-27	**40.6**	**28.9**	**88.5**	**218**	**261**	**306**	**111**	**203**	**311**	**27.3**	**628**	**36**	**189**	**9.93**	**16.9**	**26.3**	**289**	**748**	**22**
22I0942-DUP1	DU-28, DU-30	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41
22I0989-DUP1	DU-29	<4.96	**13.3**	**13.2**	**60.4**	**98.3**	**128**	**43.0**	**92.0**	**99.8**	**12.4**	**128**	<4.96	**91.3**	**13.3**	**17.9**	**22.8**	**72.1**	**135**	**8.61**
22I1043-DUP1	DU-33	<4.94	**12.4**	**15.0**	**56.2**	**65.8**	**105**	**29.9**	**64.8**	**86.7**	**8.40**	**110**	<4.94	**57.0**	**13.2**	**21.1**	**38.4**	**70.9**	**107**	**12.0**
22J0367-DUP1	DU-34	**5.91**	**57.7**	**37.9**	**125**	**164**	**259**	**81.8**	**128**	**175**	**23.7**	**283**	**15.9**	**135**	**7.81**	**16.1**	**38.5**	**193**	**248**	**17.1**
22K0468-DUP1	DU-36	<5.04	**5.32**	**7.50**	**40.2**	**49.1**	**80.0**	**26.7**	**68.1**	**70.8**	**9.05**	**80.1**	<5.04	**56.2**	<5.04	**7.92**	**17.2**	**43.4**	**82.1**	<5.04
22K0955-DUP1	DU-38	<13.8	<13.8	<13.8	<13.8	<13.8	<13.8	<13.8	<13.8	<13.8	<13.8	<13.8	<27.7	<13.8	**59.0**	**112**	**17.0**	**26.8**	<13.8	<13.8
22K0996-DUP1	DU-38, DU-40	<28.9	<28.9	<28.9	**35.1**	<57.8	<57.8	<28.9	**48.4**	**70.8**	<28.9	**156**	**48.9**	**38.0**	<28.9	<28.9	<28.9	**156**	**128**	<28.9
22L0048-DUP1	DU-37	<54.1	<54.1	<54.1	**71.6**	**65.6**	**79.1**	<54.1	**61.9**	**75.9**	<54.1	**94.8**	<54.1	**63.7**	<54.1	<54.1	<54.1	<54.1	**107**	<54.1
22L0109-DUP1	DU-39	**6.07**	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	**18.4**	**32.8**	**49.0**	**6.35**	<4.88	<4.88
22L0001-DUP1	DU-43	<5.00	<5.00	<5.00	**6.15**	**5.06**	**6.09**	<5.00	**12.2**	**5.53**	<5.00	**7.49**	<5.00	**7.54**	<5.00	<5.00	<5.00	<5.00	**7.84**	<5.00
22K0099-DUP1	DU-41	**7.90**	**25.4**	**45.5**	**115**	**140**	**199**	**73.9**	**138**	**178**	**18.0**	**281**	**5.50**	**140**	**18.5**	**24.1**	**23.8**	**98.2**	**309**	**12.1**
22K0293-DUP1	DU-41	**23.2**	<25.4	**54.3**	**139**	**182**	**261**	**88.8**	**189**	**226**	**26.9**	**324**	**18.2**	**172**	**81.1**	**91.7**	**70.7**	**272**	**358**	**36.7**
22K0293-DUP3	DU-41	**26.6**	<25.4	**52.3**	**123**	**167**	**244**	**80.3**	**176**	**217**	**22.2**	**304**	**19.9**	**163**	**73.2**	**84.0**	**63.6**	**254**	**335**	**34.4**
22K0371-DUP1	DU-41	**5.48**	**10.6**	**18.7**	**63.3**	**84.1**	**126**	**44.5**	**93.4**	**107**	**12.0**	**133**	**<5.03**	**90.1**	**22.4**	**27.8**	**27.5**	**89.4**	**145**	**9.55**

Notes:
PAHs = Polycyclic aromatic hydrocarbons.
µg/kg = Micrograms per kilogram (parts per billion).
Bolded values exceed the Detection Limit

Supplimental Table 1b
Soil Results - Metals- Laboratory Duplicates
Willamette Cove Upland Facility
Portland, Oregon

Lab Duplicate Sample ID	Associated DUs	Metals by EPA Method 6020B								
		Concentrations in µg/kg								
		Antimony	Arsenic	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc
22G1023-DUP1	DU-1	**0.696**	**5.49**	**37.5**	**60.9**	**326**	**0.0904**	**28.6**	<0.556	**142**
22G0986-DUP1	DU-1	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94
22H0517-DUP1	DU-2	**1.93**	**2.71**	**11.6**	**13.4**	**8.11**	**0.269**	**13.0**	<0.292	**46.4**
22H0622-DUP1	DU-3, DU-4, DU-8	<0.567	**4.30**	**21.1**	**31.7**	**36.4**	**0.141**	**18.8**	<0.567	**142**
22H0622-DUP2	DU-3, DU-4, DU-8	<0.541	**4.06**	**19.8**	**31.4**	**37.6**	**0.137**	**18.5**	<0.541	**141**
22H0622-DUP3	DU-3, DU-4, DU-8	<0.536	**4.24**	**20.3**	**31.7**	**38.2**	**0.135**	**19.1**	<0.536	**143**
22H0299-DUP1	DU-5	**1.05**	**8.94**	**51.7**	**367**	**48.8**	**0.103**	**44.3**	**0.344**	**185**
22H0299-DUP2	DU-5	**0.967**	**9.00**	**50.3**	**358**	**54.8**	**0.105**	**32.4**	**0.318**	**187**
22H0964-DUP1	DU-5	--	--	--	--	--	<0.0463	--	--	--
22H0226-DUP1	DU-6, DU-7	<0.697	**1.46**	**25.7**	**19.2**	**9.75**	<0.0558	**9.84**	<0.697	**37.7**
22H0854-DUP1	DU-10	<0.506	**4.47**	**14.0**	**34.0**	**89.6**	**1.12**	**30.1**	<0.506	**106**
22H0763-DUP1	DU-11	<0.509	**4.29**	**22.4**	**35.3**	**50.5**	**0.676**	**31.4**	<0.509	**108**
22H0907-DUP1	DU-12	<0.602	**4.53**	**25.7**	**85.6**	**0.619**	**27.3**	<0.602	**55.1**	**185**
22I0154-DUP1	DU-13	**0.612**	**5.66**	**13.5**	**94.6**	**232**	**1.16**	**19.9**	<0.499	**199**
22I0154-DUP2	DU-13	**2.50**	**6.20**	**14.6**	**97.1**	**242**	**1.23**	**21.7**	<0.558	**207**
22I0154-DUP3	DU-13	**0.741**	**6.03**	**14.8**	**91.3**	**234**	**1.15**	**21.5**	<0.551	**197**
22I0346-DUP1	DU-13	<0.489	**4.51**	**12.5**	**51.8**	**90.4**	**0.797**	**17.6**	<0.489	**104**
22H1013-DUP1	DU-14	<0.523	**1.40**	**15.6**	**42.4**	**7.37**	**0.106**	**11.7**	<0.523	**127**
22H1066-DUP1	DU-15	<0.525	**3.58**	**13.2**	**59.6**	**1.30**	**19.5**	<0.525	**116**	--
22H1066-DUP2	DU-15	--	--	--	--	**69.5**	--	--	--	--
22I0041-DUP1	DU-15	**3.61**	--	--	--	--	--	--	--	--
22I0795-DUP1	DU-16, DU-21	**2.45**	**9.94**	**14.5**	**120**	**285**	**0.759**	**19.2**	<0.532	**235**
22K0657-DUP1	DU-16	**2.61**	**7.49**	**14.0**	**74.6**	**154**	**1.72**	**19.5**	**0.505**	**145**
22I0412-DUP1	DU-17	**0.894**	**6.92**	**22.7**	**30.5**	**63.1**	**0.0842**	**22.1**	<0.489	**120**
22J0397-DUP1	DU-18	<0.515	**2.98**	**14.9**	**28.3**	**27.7**	<0.0412	**17.5**	<0.515	**80.0**
22J0449-DUP1	DU-18	<0.502	**4.19**	**18.0**	**13.1**	**31.6**	<0.0401	**13.2**	<0.502	**74.9**
22J0617-DUP1	DU-18	**5.55**	**19.8**	**31.7**	**33.3**	**0.0469**	**19**	<0.513	**109**	**0.814**
22I0548-DUP1	DU-19	<0.622	**4.06**	**19.0**	**18.1**	**8.11**	<0.0498	**13.8**	<0.622	**39.5**
22J1084-DUP1	DU-20, DU-22	**1.23**	**4.38**	**16.4**	**30.7**	**46.8**	**0.222**	**19.8**	<0.535	**122**
22J1018-DUP1	DU-22	<0.498	**64.7**	**21.4**	**26.6**	**425**	**0.0535**	**13.9**	<0.498	**151**
22J0977-DUP1	DU-23	**1.81**	**6.11**	**20.8**	**151**	**273**	**1.03**	**22.6**	<0.491	**180**
22I1012-DUP1	DU-24	<0.499	**3.87**	**15.9**	**39.2**	**49.9**	**0.279**	**18.9**	<0.499	**115**
22J0271-DUP1	DU-25, DU-34	<0.725	**7.37**	**21.1**	**27.4**	**13.9**	<0.0580	**23.3**	<0.725	**74.3**
22K0713-DUP1	DU-26	<0.509	**6.00**	**13.4**	**14.2**	**10.2**	<0.0407	**20.8**	<0.509	**24.3**
22K0765-DUP1	DU-26, DU-38	<0.612	**2.95**	**10.2**	**16.5**	**58.9**	<0.0489	**10.4**	**0.848**	**1530**
22L0300-DUP1	DU-42	<0.508	**4.08**	**16.2**	**30.9**	**52.4**	**0.242**	**21.4**	<0.508	**122**
22J0687-DUP1	DU-27	<0.500	**3.77**	**11.9**	**30.8**	**55.4**	**0.296**	**16.6**	<0.500	**94.4**
22I0918-DUP1	DU-29	**1.17**	**6.86**	**12.2**	**115**	**97.7**	**0.0577**	**17.6**	<0.531	**159**
22K0495-DUP1	DU-31	**1.74**	**6.46**	**15.1**	**36.7**	**46.8**	**0.0472**	**17.3**	<0.490	**124**
22J0055-DUP1	DU-32	<0.552	**4.16**	**14.3**	**17.4**	**164**	<0.0442	**10.1**	<0.552	**151**
22I0975-DUP1	DU-33	<0.749	**3.14**	**7.34**	**16.0**	**11.3**	<0.0600	**7.48**	<0.749	**76.6**
22J0856-DUP1	DU-35	<0541	**4.03**	**13.9**	**49.1**	**24.7**	<0.0433	**16.7**	<0.541	**163**
22K0434-DUP1	DU-36	**5.24**	**4.99**	**21.3**	**60.4**	**79.1**	**0.0466**	**24.2**	<0.508	**269**
22K0912-DUP1	DU-38, DU-40	<0.522	**0.803**	**4.35**	**29.7**	**1.51**	<0.0418	**13.3**	<0.522	**17.1**
22L0005-DUP1	DU-37	<0.522	**3.78**	**18.4**	**25.9**	**36.4**	<0.0418	**19.3**	**0.587**	**76.4**
22L0069-DUP1	DU-39	<0.537	**2.69**	**14.2**	**23.1**	**6.31**	<0.0430	**15.8**	<0.537	**64.6**
22K0945-DUP1	DU-43	**1.00**	**1.51**	**11.0**	**66.5**	**55.7**	<0.0441	**6.42**	<0.551	**250**
22L0375-DUP1	DU-44	**0.551**	**3.16**	**13.8**	**17.7**	**11.7**	<0.0393	**17.0**	<0.491	**83.8**
22K0154-DUP1	DU-41	**2.45**	**10.6**	**23.3**	**62.8**	**130**	**0.101**	**21.1**	<0.522	**148**
22K0154-DUP2	DU-41	**2.37**	**10.7**	**21.0**	**62.2**	**130**	**0.108**	**18.8**	<0.525	**154**
22K0263-DUP1	DU-41	**1.30**	**19.4**	**19.4**	**42.1**	**108**	**0.0586**	**19.1**	<0.516	**155**

Notes:
µg/kg = Micrograms per kilogram (parts per billion).
Bolded values exceed the Detection Limit

Supplimental Table 1c
Soil Results - PCBs- Laboratory Duplicates
Willamette Cove Upland Facility
Portland, Oregon

Lab Duplicate Sample ID	Associated DUs	PCBs by EPA Method 8082A								
		Concentrations in µg/kg								
		Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268
22H0076-DUP1	DU-1	<4.95	<4.95	<4.95	<4.95	<4.95	**377**	<4.95	<4.95	<4.95
22H0492-DUP1	DU-2	<5.08	<5.08	<5.08	<5.08	<5.08	<5.08	**173**	<5.08	<5.08
22H0550-DUP1	DU-3, DU-4, DU-8	<5.08	<5.08	<5.08	<5.08	<5.08	**27.9**	**47.4**	<5.08	<5.08
22H0550-DUP2	DU-3, DU-4, DU-8	<5.03	<5.03	<5.03	<5.03	<5.03	**29.3**	**50.7**	<5.03	<5.03
22H0550-DUP3	DU-3, DU-4, DU-8	<5.08	<5.08	<5.08	<5.08	<5.08	**34.6**	**51.8**	<5.08	<5.08
22H0233-DUP1	DU-5	<4.67	<4.67	<4.67	<4.67	<4.67	**24.3**	**24.6**	<4.67	<4.67
22H0976-DUP1	DU-5, DU-12, DU-14	<5.02	<5.02	<5.02	<5.02	<5.02	<5.02	<5.02	<5.02	<5.02
22H0334-DUP1	DU-6, DU-7	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38	<5.38
22H0647-DUP1	DU-9	<5.10	<5.10	<5.10	<5.10	<5.10	<5.10	<5.10	<5.10	<5.10
22H0711-DUP1	DU-9	<5.16	<5.16	<5.16	<5.16	<5.16	**12.1**	**31.8**	<5.16	<5.16
22H0727-DUP1	DU-9	**0.571**	**4.77**	**28.3**	**35.8**	**25.7**	**0.266**	**24.5**	<0.525	**140**
22H0886-DUP2	DU-10	<4.83	<4.83	<4.83	<4.83	<4.83	<4.83	<4.83	**8.86**	**7.90**
22H0741-DUP1	DU-11	<4.90	<4.90	<4.90	<4.90	<4.90	**10.7**	**10.9**	<4.90	<4.90
22H0931-DUP1	DU-12	<5.43	<5.43	<5.43	<5.43	<5.43	<5.43	<5.43	<5.43	<5.43
22I0090-DUP3	DU-13	<5.39	<5.39	<5.39	**15.7**	<5.39	**5.72**	<5.39	<5.39	--
22I0250-DUP1	DU-13	<5.02	<5.02	<5.02	<5.02	<5.02	**21.7**	**9.24**	<5.02	<5.02
22I0250-DUP2	DU-13	<5.05	<5.05	<5.05	<5.05	<5.05	**23.3**	**9.64**	<5.05	<5.05
22I0250-DUP3	DU-13	<5.08	<5.08	<5.08	<5.08	<5.08	**26.6**	**11.1**	<5.08	<5.08
22I0287-DUP1	DU-13	<4.97	<4.97	<4.97	<4.97	<4.97	**5.80**	<4.97	<4.97	<4.97
22I0333-DUP1	DU-13, DU-17	<4.68	<4.68	<4.68	<4.68	<4.68	**11.2**	<4.68	--	--
22H1040-DUP1	DU-14	<5.05	<5.05	<5.05	<5.05	<5.05	**7.19**	<5.05	<5.05	<5.05
22H1089-DUP2	DU-15	<34.7	<34.7	<34.7	**3630**	<34.7	**1080**	<34.7	<34.7	<34.7
22I0829-DUP1	DU-16, DU-21	<4.75	<4.75	<4.75	<4.75	<4.75	**18.3**	**18.7**	<4.75	<4.75
22K0708-DUP1	DU-16	<5.01	<5.01	<5.01	<5.01	<5.01	<5.01	<5.01	<5.01	<5.01
22I0451-DUP2	DU-17	<1.98	<1.98	<1.98	<1.98	<1.98	**12.8**	**16.6**	--	--
22J0642-DUP1	DU-18	<5.08	<5.08	<5.08	<5.08	<5.08	<10.2	**10.1**	<5.08	<5.08
22J0761-DUP1	DU-18, DU-27	<1.92	<1.92	<1.92	<1.92	<1.92	**12.7**	**4.80**	<1.92	<1.92
22J0848-DUP1	DU-18, DU-35	<4.96	<4.96	<4.96	<4.96	<4.96	<4.96	**8.55**	<4.96	<4.96
22I0557-DUP1	DU-19	<4.97	<4.97	<4.97	<4.97	<4.97	**128**	<23.1	<4.97	<4.97
22I0557-DUP2	DU-19	--	--	--	--	--	--	--	<4.97	<4.97
22J1131-DUP1	DU-20, DU-22	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88	<4.88
22J1029-DUP1	DU-22	<4.92	<4.92	<4.92	<4.92	<4.92	**6.12**	<4.92	<4.92	<4.92
22J0976-DUP1	DU-23	<4.84	<4.84	<4.84	<4.84	<4.84	**20.9**	**17.1**	<4.84	<4.84
22J0046-DUP1	DU-24, DU-29, DU-33	<5.50	<5.50	<5.50	<5.50	<5.50	<5.50	<5.50	<5.50	<5.50
22J0396-DUP1	DU-25	<4.93	<4.93	<4.93	<4.93	<4.93	**23.2**	**11.6**	<4.93	<4.93
22J0459-DUP1	DU-25, DU-34	<5.10	<5.10	<5.10	<5.10	<5.10	**9.76**	<5.10	<5.10	<5.10
22K0780-DUP1	DU-26	<4.83	<4.83	<4.83	<4.83	<4.83	<4.83	**108**	<4.83	**40.8**
22K0954-DUP1	DU-26, DU-38	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**15.9**	<5.00	<5.00
22L0437-DUP1	DU-42, DU-44	<4.99	<4.99	<4.99	<4.99	<4.99	<4.99	<4.99	<4.99	<4.99
22I0927-DUP1	DU-28, DU-30	<5.06	<5.06	<5.06	<5.06	<5.06	**79.1**	<5.06	<5.06	<5.06
22I1029-DUP1	DU-29, DU-33	<5.52	<1.99	<14.7	<8.18	<1.99	**15.4**	**8.78**	<1.99	<1.99
22K0563-DUP1	DU-31, DU-36	<4.89	<4.89	<4.89	<4.89	<4.89	<4.89	<4.89	<4.89	<4.89
22J0201-DUP1	DU-32	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95
22J0079-DUP1	DU-33	<5.32	<5.32	<5.32	<5.32	<5.32	**6.13**	**6.73**	<5.32	<5.32
22J0552-DUP1	DU-34	<5.03	<5.03	<5.03	<5.03	<5.03	**20.0**	<5.03	<5.03	<5.03
22K0456-DUP1	DU-36	<5.09	<5.09	<5.09	<5.09	<5.09	**8.68**	<5.09	<5.09	<5.09
22K0907-DUP1	DU-38	<5.02	<5.02	<5.02	<5.02	<5.02	**11.7**	**9.97**	<5.02	<5.02
22L0002-DUP1	DU-38	<5.05	<5.05	<5.05	<5.05	<5.05	**7.27**	<5.05	<5.05	<5.05
22L0049-DUP1	DU-37, DU-40, DU-43	<4.90	<4.90	<4.90	<4.90	<4.90	<4.90	<4.90	<4.90	<4.90
22L0223-DUP1	DU-37, DU-39	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00

Please see notes at end of table.

Supplimental Table 1c
Soil Results - PCBs- Laboratory Duplicates
Willamette Cove Upland Facility
Portland, Oregon

Lab Duplicate Sample ID	Associated DUs	PCBs by EPA Method 8082A								
		Concentrations in µg/kg								
		Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268
22K0225-DUP1	DU-41	<4.82	<4.82	<4.82	<4.82	<4.82	**81.1**	<4.82	<4.82	<4.82
22K0280-DUP1	DU-41	<4.91	<4.91	<4.91	<4.91	<4.91	**53.9**	**18.1**	<4.91	<4.91
22K0280-DUP2	DU-41	<4.95	<4.95	<4.95	<4.95	<4.95	**60.1**	**17.0**	<4.95	<4.95
22K0372-DUP1	DU-41	<5.01	<5.01	<5.01	<5.01	<5.01	**9.36**	**7.91**	<5.01	<5.01

Notes:
µg/kg = Micrograms per kilogram (parts per billion).
Bolded values exceed the Detection Limit
PCBs = Poly-Chlorinated Biphenols