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U S NAVY RESPONSES TO U S EPA REGION I AND RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT COMMENTS ON DRAFT SOIL FEASIBILITY STUDY FOR DECISION UNITS 2-1 AND 2-2 (DU 2-1 AND 2-2) AT SITE 10 TANK FARM 2 NS NEWPORT RI

04/15/2016

RESOLUTION CONSULTANTS

Navy Responses to Regulatory Agency Comments
EPA Comments, February 29, 2016
RIDEM Comments, February 9, 2016

Draft Soil Feasibility Study for DU 2-1 and 2-2 at Site 10 – Tank Farm 2
Naval Station Newport, Portsmouth, Rhode Island

April 15, 2016

EPA General Comments:

EPA General Comment 1: The Newport background values are specific for soil types so edit the FS to discuss the soil type(s) at DU 2-1 and DU 2-2 and indicate that the calculations used the background values specific to that soil type.

There are problems with the background calculations that need to be addressed and corrected to provide appropriate background values. Review of Appendix A.3 suggests that Navy calculated 95% Upper Prediction Limit values and used those values as background values for DU 2-1. Ninety-five percent (95%) Upper Prediction Limit values cannot be used to establish population background values; they only predict a threshold value below which the population background value would be expected. Ninety-five percent (95%) Upper Prediction Limit values can be used for point by point comparison to individual sample values to determine if each sample likely exceeds the site background. Furthermore, because 95% Upper Prediction Limit values are calculated based on an assumed number of future samples, which in the case of the Navy's calculations is apparently 42 samples (the number of background samples included in the calculation), the greater the number of samples, the greater will be the 95% Upper Prediction Limit value. However, Navy did not collect 42 site samples at DU 2-1 but only 26 samples. Therefore, Navy's calculations predicted inappropriately large background threshold values for DU 2-1. The calculations should be corrected. The appropriate comparison of a site data set to a background data set would involve a two sample hypothesis test to determine if significant differences exist between the site and background data sets. Navy should provide those calculations and comparison. EPA's assessment indicates that the site data set is significantly greater than the background data set for arsenic. Which was the only calculation performed. Finally a more rigorous outlier evaluation is warranted using Singh and Nocerino (1995) as recommended by PRO UCL 5.0 because the greatest arsenic value in the Newport silt loam background data set is a suspected outlier using Rosner's test.

Response: Based on discussion at the RPM meeting on March 16, 2016, EPA is rescinding this comment. Note however that based on comments received on the Draft FS for DU 3-1, 3-2, and 3-3 at Site 11 – Tank Farm 3, the background calculations have been redone so that surface and subsurface soil are looked at separately. The updated Table 10 and 11 from Apppendix A-1, as well as the updated Appendix A-3, are attached. Also attached is the updated Table 2-2 Preliminary Remediation Goals for Soil at DU 2-1 and updated Tables 2-4 and 2-5, which compare the soil data for DU 2-1 to the PRGs. The table in the Executive Summary was updated based on the PRGs as shown in the response to EPA Specific Comment 8.

EPA Specific Comments:

EPA Specific Comment 1: Pg vi, List of Acronyms and Abbreviations Add: "TSCA Toxic Substances Control Act"

Response: The requested acronym was added as requested.

EPA Specific Comment 2: Pg vi, Exec. Summary, par 2 In the third sentence insert ", floodplain," after "wetlands." Change the fourth sentence to: "The DGA concluded that soil associated with only two of the areas within the operable unit posed a potential risk that warrants remedial action under CERCLA."

Response: The requested changes were made as requested.

EPA Specific Comment 3: Pg viii, Exec. Summary, par 4 It is stated that: "DLA Energy continued to use the site as a fuel storage and distribution facility until operations were terminated in 1998. Since that time DESC has been remediating petroleum contamination at the Site, in accordance with RI UST Regulations." Please explain what DESC has done to date to remediate the Site, and what remains to be accomplished with respect to the USTs and contaminated soils. Please introduce "DESC". EPA recommends choosing one name and consistently referring to that name.

Response: The text has been revised as follows: "The site was used by the Navy as a fuel storage area and distribution facility from 1940 until it was leased to the Defense Energy Support Center (DESC) in 1974. DESC continued to use the site as a fuel storage and distribution facility until operations were terminated in 1998. Tank and fuel distribution piping cleaning and decommissioning activities were performed by DESC in 1996/1997 and in 2001. Since that time DESC has been remediating petroleum contamination at the Site, in accordance with state UST Regulations."

References to DLA Energy have been changed to DESC and the acronym was defined as part of the first usage in this paragraph. With regard to additional details, the team will work with EPA and RIDEM to build information together as we evolve the tank farm-wide groundwater assessment and response action. The Navy would prefer to keep this Feasibility Study focused only on DU 2-1 and 2-3 to avoid confusion in the Administrative Record.

EPA Specific Comment 4: Pg viii, Exec. Summary, par 7 - Is there a transformer or other electrical equipment (particularly PCB-contaminated equipment) still inside the building?

Response: The following text has been added at the end of the paragraph: "During an October 2015 site visit, electrical equipment remaining in B219 was observed to have a label stating "This device is certified to contain less than 1 ppm PCBs (Polychlorinated Biphenyls) at the Time of Manufacture.""

EPA Specific Comment 5: Pg ix, Exec. Summary, par 1 - Edit the text and elsewhere where chromium is discussed to clarify that risk is from chromium VI, if present, not from chromium III.

Is there an exceedance of industrial risk standards at DU 2-1 (since there is an RAO for preventing exposure to soils posing and industrial risk)? There are also exceedances of TSCA residential risk-based standards for PCBs (levels equal or greater than 1 mg/kg) and RI soil leachability standards.

Response: The following sentences will be added to the referenced paragraph:

"Chromium is a potential contaminant of concern (COC) because it was conservatively evaluated as hexavalent chromium in the risk assessment because chromium speciation was not available."

"Remedial Action Objectives (RAOs) and preliminary remedial goals (PRGs) were developed based on risk-based concentrations of COCs present in soil at the DUs and applicable regulatory requirements and guidance classified as "to be considered" (TBC)."

EPA Specific Comment 6: Pg ix, Exec. Summary, par 2 - See previous comment about the second bulleted RAO concerning industrial risk from DU 2-1 soil.

Response: The RAO concerning exposure by industrial and restricted recreational users is included because RIDEM Industrial/Commercial Direct Exposure Criteria (DEC) were exceeded in soil within DU 2-1. No change is made to the text based on this comment.

EPA Specific Comment 7: Pg ix, Exec. Summary, par 3 - In the first sentence insert "human health and" after "protection of." Add an additional RAO: "Prevent exposure by potential future residents to soil containing site contaminants that exceed residential use scenario PRGs within DU 2-2. Regarding the leachability RAO, if that is based on the exceedance of the leachability standard for PCBs that would also exceed the industrial direct contact risk standard for PCBs (so an industrial risk RAO would also be needed).

Response: The requested additions have been made, including adding an RAO to address exposure by industrial and restricted recreational users.

EPA Specific Comment 8: Pg x, Exec. Summary - Please correct the table for DU 2-1 for chromium: 17 mg/kg is not the background concentration for chromium VI and no PRG/background value is needed for chromium III. There is no background value available for chromium VI; therefore, include a risk-based value. Add a note to the table to indicate that because no speciation was performed for chromium, all chromium values are assumed to be chromium VI until confirmed otherwise by supplemental sampling.

Correct the PRG for beryllium to 1.5 mg/kg which is the RIDEM residential DEC.

The PRG table for DU 2-2 needs to include a residential TSCA risk-based PRG for PCBs of 1 mg/kg. Also, unless the RAOs are changed (see comment above), include leachability and industrial use PRGs for PCBs of 10 mg/kg (or any other contaminant that exceeds leachability standards, if applicable).

Response: The table of PRGs for DU 2-1 has been updated to provide separate PRGs for surface and subsurface soil that consider the separate background concentrations and to remove consideration of the background concentration for total chromium in the determination

of that PRG. A footnote has been added to the table to address the chromium. Additionally, based on the correction of the RIDEM residential DEC for beryllium, that metal is no longer a COC, since the maximum concentration in soil at DU 2-1 does not exceed the corrected residential DEC.

For DU 2-2, the PRG table has been updated to include residential and industrial use PRGs. See attached updated Table 2-3 presenting the PRGs and Table 2-6, which compares the PRGs to the surface soil data for DU 2-2. Further, see the attached Appendix A-2 Tables 4 and 5, which have been added to the FS.

The PRG tables in the Executive Summary was updated as follows:

Preliminary Remedial Goals for DU 2-1

Parameter	Surface Soil PRG (mg/kg)	Surface Soil Basis	Subsurface Soil PRG (mg/kg)	Subsurface Soil Basis
Human Health - Residential Use Scenario[1]				
Benzo(a)anthracene	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}
Benzo(a)pyrene	0.016	ILCR = 10^{-6}	0.016	ILCR = 10^{-6}
Benzo(b)fluoranthene	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}
Benzo(g,h,i)perylene	0.8	RDEC	0.8	RDEC
Benzo(k)fluoranthene	0.9	RDEC	0.9	RDEC
Chrysene	0.4	RDEC	0.4	RDEC
Dibenz(a,h)anthracene	0.016	ILCR = 10^{-6}	0.016	ILCR = 10^{-6}
Indeno(1,2,3-cd)pyrene	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}
Naphthalene	0.8	Leachability	0.8	Leachability
Arsenic	17	Background	6	Background
Chromium VI [2]	0.31	Background	0.31	Background
Manganese	390	Res DEC	460	Background
Human Health - Industrial Use Scenario				
Benzo(a)pyrene	0.8	I/C DEC	0.8	I/C DEC
Naphthalene	0.8	Leachability	0.8	Leachability
Arsenic	17	Background	7	I/C DEC

Notes:

1. Residential Use Scenario PRGs are reflected for establishing a land use control boundary.

2. Chromium speciation has not been performed at DU 2-1. At this time, chromium is assumed to be hexavalent chromium even though there is no current evidence that it would be this species. Future sampling/analysis is anticipated to show that the chromium detected is primarily trivalent chromium. Upon confirmation of this assumption, chromium would no longer be a COC at DU 2-1.

ILCR=10^{-6} = Incremental Lifetime Cancer Risk of 10^{-6}
RDEC – Residential Direct Exposure Criteria (RIDEM)
I/C DEC – Industrial/Commercial Direct Exposure Criteria (RIDEM)
Leachability – GA Leachability Criteria (RIDEM)
Background – If RIDEM criteria or risk-based PRGs were below background concentrations for the site, the background concentration was selected. The background data set is included in Appendix A.3 of this report and was obtained from the Basewide Background Study Report for Naval Station Newport, Tetra Tech NUS, Inc., July 2008.
mg/kg – Milligrams per kilogram

Preliminary Remedial Goals for DU 2-2

Surface Soil Parameter	PRG (mg/kg)	Basis
Human Health - Residential Use Scenario[1]		
PCBs	1	TSCA [1]
Human Health - Industrial Use Scenario		
PCBs	10	I/C DEC and Leachability
Ecological		
PCBs	3.6	Ecological [2]

Notes:

1. TSCA – Toxic Substances Control Act; Section 761.1(c) of TSCA allows for risk-based cleanup of PCB remediation waste. EPA guidance on Remedial Actions for Superfund Sites with PCB Contamination (OSWER Directive #9355.4-01FS; EPA/540/G-90/007; August 1990) was utilized to develop the risk-based value presented.
2. The Ecological PRG value corresponds to the geometric mean of the NOAEL-and LOAEL-based TRVs for the short-tailed shrew.

I/C DEC – Industrial/Commercial Direct Exposure Criteria (RIDEM)
Leachability – GA Leachability Criteria (RIDEM)
mg/kg – Milligrams per kilogram

EPA Specific Comment 9: Pg xii, Exec. Summary, par 1 - For clarity please edit the third sentence to read: "... Criterion and the Industrial Direct Exposure Criterion (DEC), as well as risk-based standards for residential exposure." Edit the first bullet the same way. Need a second bullet to describe how much addition soil exceed residential standards.

Response: The text discussing PRGs exceedances and estimated areas and volumes for both DU 2-1 and DU 2-2 have been revised as follows:

"DU 2-1

At DU 2-1, soil concentrations were compared to the Industrial and Residential PRGs. PAHs are highest nearest the manway access structure and generally decrease with depth, except for sample location SB1007, potentially indicating that the release was from the surface. PAH concentrations at the two boring locations closest to the manway access structure exceeded one or more Industrial PRG, while benzo(a)pyrene was found at concentrations above the Residential PRG in samples collected over a slightly larger area to the east of the manway access structure. Metal concentrations (arsenic, chromium, and manganese) are very low and not co-located with the PAHs. The following text discusses the impacted area for each land use scenario (industrial and residential).

- Industrial PRGs: For the purpose of evaluating remedial alternatives, an overall impacted area for surface and/or subsurface soils totaling approximately 1,925 square feet or 0.04 acres is estimated, based on the data collected in the 2015 DGA report. Because subsurface soil with exceedances of the RIDEM I/C DEC can be left in place as long as two feet of surface soil are maintained and land use controls are applied, a smaller impacted area requiring an active remedial measure (i.e. soil removal, asphalt cover, etc.) has been estimated as shown on Figure 10 and encompasses soil that exceeds Industrial PRGs in surface soil and soil that exceed the RIDEM GA Leachability Criteria in subsurface soil. The estimated area is 400 square feet and the impacted volume of soil

is estimated to be approximately 60 cubic yards based on an assumed depth of 4 feet bgs. Soil borings in this area had refusals primarily at 4 feet bgs, which was noted to be the top of the tank. The estimated aerial extent of soil that could be addressed by LUCs is the difference between the overall impacted area and the area requiring an active remedial measure, or 1,525 square feet.

- Residential PRGs: For the purpose of evaluating remedial alternatives, an impacted area approximately 1,925 square feet is estimated, based on the data collected in the DGA report. The impacted volume of soil is estimated to be approximately 425 cubic yards based on depths of impact of 4 feet above the tank and a deeper impact of 10 feet over a 630 square foot area in the south/south eastern portion of the area off the tank. This volume encompasses the surface and subsurface soil that exceeds Residential PRGs (including the RIDEM GA Leachability Criterion for naphthalene).

<u>DU 2-2</u>

At DU 2-2, soil concentrations were compared to the Residential, Industrial, and Ecological PRGs. PCBs were detected above the PRGs in surface soils at multiple locations, with the highest concentrations located in the general vicinity of the doorways and electric box for B219. Note that PCB concentrations in two surface soil samples exceed the RIDEM GA Leachability Criterion (which is equivalent to the Industrial PRG). Subsurface soil concentrations of PCBs were very low or not detected and there were no PRG exceedances. The following text discusses the impacted area.

- Industrial and Ecological PRGs: For the purpose of evaluating remedial alternatives, an impacted area totaling approximately 390 square feet is estimated, based on the data collected in the DGA report. This area excludes the footprint of the building, which is approximately 140 square feet. Assuming an impacted depth of 2 feet, the volume of soil that exceeds the Ecological and/or Industrial PRGs is estimated to be approximately 29 cubic yards. This volume also takes into account locations where the PCB concentrations exceed the RIDEM GA Leachability Criterion (which is equivalent to Industrial PRG).

- Residential PRG: For the purpose of evaluating remedial alternatives, an impacted area totaling approximately 830 square feet is estimated, based on the data collected in the DGA report. Assuming an impacted depth of 2 feet, the volume of soil that exceeds the Residential PRG is estimated to be approximately 61 cubic yards. This volume includes soils beneath the building footprint and soil outside the building footprint that also exceed the Industrial and Ecological PRGs."

EPA Specific Comment 10: Pg xii, Exec. Summary, par 2 - Removing all of the contamination to UU/UE within the two DUs would result in there being no exceedances of CERCLA risk-standards for soil within the operable unit. It is therefore unclear why a complete excavation alternative has not been presented. Also, the Navy may consider, for Alternative 2, excavating all PCB-contaminated soil to 1 mg/kg (the unrestricted risk level) rather than the eco-risk PRG so that there are no PCB risks within the OU. The volume of additional soil that would be removed using a 1 mg/kg cleanup standard rather than the 3.6 mg/kg ecological standard would not be expected to be significant.

Response: A complete excavation alternative was presented in Section 3, but was removed from detailed evaluation due to the high costs associated with the alternative and the limited benefit as compared to the cost of remediation, given that residential and other unrestricted use is not a current or reasonably anticipated future use of the tank farm. Under Alternative S-2, excavation to a PCB PRG of 1 mg/kg will not be included, since it is inconsistent with the current and reasonably anticipated future use of the tank farm. No changes were made to the text based on this comment.

EPA Specific Comment 11: Table ES-1 - The RIDEM Industrial DEC for PCBs is exceeded at DU 2-2 so for clarity correct the second line item description to acknowledge that. Residential LUCs also required to DU 2-2 if PCBs left in place equal or greater than 1 mg/kg down to 10 ft bgs.

Response: The second line item has been revised to read: "Soil excavation at DU 2-1 and 2-2 to remove surface and subsurface soil exceeding the Industrial PRGs for DU 2-1 and surface soil exceeding the Industrial and Ecological PRGs for DU 2-2, including RIDEM GA Leachability Criteria for both areas."

The fourth line item has been revised to read: "LUCs applied to DU 2-1 and DU 2-2 preventing residential use."

EPA Specific Comment 12: Table ES-2 - Alternatives S-2 and S-3 are protective and meet ARARs as long as they either include residential LUCs to address PCBs equal or greater than 1 mg/kg down to 10 ft bgs left in place after excavation (in S-2) or outside of the cover (in S-3) in DU 2-2.

Response: For Alternative S-2, the first two sentences in the second column were revised as follows:

"Alternative S-2 removes all soil that exceeds the Industrial PRGs (including RIDEM GA Leachability Criteria) at DU 2-1 and the Industrial and Ecological PRGs (including RIDEM GA Leachability Criteria) at DU 2-2.

Alternative S-2 requires implementation of LUCs to restrict residential use at DU 2-1 and DU 2-2 and require maintenance of the building foundation at DU 2-2, which adds protection to human health."

The second sentence in the fourth column was modified to add "and DU 2-2" prior to "...to restrict residential use..."

EPA Specific Comment 13: Pg 1, §1.0, par 2 - In the third sentence insert ", floodplain," after "wetlands." Change the fourth sentence to: "The DGA concluded that soil associated with only two of the areas within the operable unit posed a potential risk that warrants remedial action under CERCLA."

Response: The requested edits have been made.

EPA Specific Comment 14: Pg 2, §1.1, par 1 - Together with the prior investigations at Tank Farm 2, as documented in the 2006 Site Investigation and Remedial Action Report, the Data

Gaps Assessment satisfies the requirements of a Remedial Investigation for Tank Farm 2. Please edit the text accordingly.

Response: The text was revised as follows: "Together with the prior investigations at Tank Farm 2, as documented in the 2006 Site Investigation and Remedial Action Report (SIRAR), the 2015 DGA report satisfies the requirements for a Remedial Investigation (RI) phase for Tank Farm 2. The 2015 DGA report contains a comprehensive summary of historical activities and investigations at Tank Farm 2, along with the Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA). The DGA report evaluated and presented findings for DU 2-1 (AOC-001) and DU 2-2 (B219)."

EPA Specific Comment 15: Pg 4, §1.3, par 1 - It is stated that: "Since that time, DESC has been remediating petroleum contamination at the Site, in accordance with RI UST Regulations." Please explain what DESC has done to date to remediate the Site, and what remains to be accomplished with respect to the USTs and contaminated soils.

Response: The following text has been added prior to the sentence quoted above: "Tank and fuel distribution piping cleaning and decommissioning activities were performed by DESC in 1996/1997 and in 2001." With regard to additional details, the team will work with EPA and RIDEM to build information together as we evolve the tank farm-wide groundwater assessment and response action. The Navy would prefer to keep this Feasibility Study focused only on DU 2-1 and 2-3 to avoid confusion in the Administrative Record.

EPA Specific Comment 16: Pg 6, §1.3.2, par 1 - Please describe what petroleum remediation has yet to be completed.

Response: See response to EPA Specific Comment 15.

EPA Specific Comment 17: Pg 6, § 1.3.2, par 2 – Does any of the electrical equipment in B219 contain or formerly contain PCBs? Are there any floor drains or cracks in the floor that would allow migration to the underlying soil?

Response: The following sentence has been added to the end of the paragraph: "During an October 2015 site visit, electrical equipment remaining in B219 was observed to have a label stating "This device is certified to contain less than 1 ppm PCBs (Polychlorinated Biphenyls) at the Time of Manufacture." No floor drains were observed."

EPA Specific Comment 18: Pg 9, §1.3.5, par 1 - Edit the fourth sentence to read: "Although not a CERCLA contaminant, the ExTPH/GRO results …."

Response: The requested edit has been made.

EPA Specific Comment 19: Pg 10, §1.3.5, par 3 - In the first bullet, does the dioxin exceed any ARAR or risk-based cleanup standard?

Response: Since ARARs have not been introduced yet, the text does not compare dioxins to ARARs. The text following text has been added to explain the screening criterion used in the DGA: "The PSL is the screening level for total TEQ of 2,3,7,8-TCDD (4.2 pg/g), divided by the

congener's 2005 World Health Organization (WHO) Toxic Equivalency Factor (TEF) for humans and mammals (Van den Berg, et al, 2006)."

EPA Specific Comment 20: Pg 11, §1.3.5, par 1 - When discussing background, has background been determined based on site-specific studies using EPA background guidance standards and have the background levels been approved by EPA and RIDEM?

Response: This paragraph summarizes the background comparison that was conducted as part of the DGA Report, which was approved by EPA and RIDEM. For additional clarity, the text was revised as follows: "As part of the DGA, metals data from the Basewide Background Study Report (Tetra Tech, 2008), was used to perform a "dataset-to-dataset" statistical comparison between the soil data at the Site and the established background concentrations of metals. The background comparison concluded..."

EPA Specific Comment 21: Pg 11, §1.3.5, par 4 - How did 7 samples exceed the industrial RSL and 8 exceed the leachability standard when both are 10 mg/kg?

Response: The commenter appears to be confusing EPA regional screening levels (RSLs) with RIDEM remediation criteria. The industrial RSL used in the DGA is 740 ug/kg and the protection of GW SSL is 480 ug/kg. Refer also to the first paragraph of Section 1.3.5.

EPA Specific Comment 22: Pg 12, §1.3.6, par 2 - When discussing background, has background been determined based on site-specific studies using EPA background guidance standards and have the background levels been approved by EPA and RIDEM?

Response: The discussion of background is based on the analysis conducted in the DGA report, which was approved by EPA and RIDEM. The sentence stating "The majority of metals detected at DU 2-1 are attributable to background and not activities that occurred at DU 2-1" has been deleted and the following text has been added under the "Metals" heading at the top of page 13: "The presence of metals in soil can often be attributed to background concentrations and is not necessarily indicative of contamination. The results of the background analysis conducted in the DGA report revealed that certain metal concentrations at DU 2-1 were consistent with background concentrations, while other metal concentrations may be anthropogenic in nature."

EPA Specific Comment 23: Pg 2, §1.3.6, par 4 - Edit the last sentence to read: "... 2015) or that the downgradient wells do not intercept groundwater from the source areas."

Response: The text was revised as requested.

EPA Specific Comment 24: Pg 13, §1.3.6, par 2 - Does the dioxin exceed any ARAR or risk-based cleanup standard?

Response: This section presents a discussion of fate and transport for different types of constituents detected in soil at DU 2-1 and/or 2-2 and not a comparison of data to ARARs or risk-based cleanup standards. No change is proposed to the text.

EPA Specific Comment 25: Pg 14, §1.3.7, par 3 - Please correct the second sentence to refer to DU 2-1 not DU 2-2.

Response: The typo has been corrected.

EPA Specific Comment 26: Pg 14, §1.3.7, par 5 - The text should refer to chromium VI.

Response: The text has been modified to indicate that chromium was assumed to be hexavalent chromium.

EPA Specific Comment 27: Pg 15, §1.3.7, par 2 - In this section also discuss the residential PCB risk was not assessed as part of the DGA report, but was developed based on EPA risk-based standards.

Response: The human health risk assessment did evaluate risks to hypothetical child and adult residents for both the combination of all areas evaluated in the DGA and specific to DU 2-2. No elevated human health risks were found at DU 2-2, which is where PCBs were detected in soil. Since this section provides a summary of the HHRA conducted as part of the DGA report, no change is proposed to the text.

EPA Specific Comment 28: Pg 16, §1.3.9, par 5 - Does any of the electrical equipment in B219 contain or formerly contain PCBs? Are there any floor drains or cracks in the floor that would allow migration to the underlying soil?

How did 7 samples exceed the industrial RSL and 8 exceed the leachability standard when both are 10 mg/kg?

Response: The following text has been added: "B219 does not appear to have any floor drains that would have been a historical pathway for migration to the underlying soil." Regarding the second part of this comment, see the response to EPA Specific Comment 21.

EPA Specific Comment 29: Pg 17, §1.3.9, par 2 - Replace the first sentence with: "There is a residential human health risk present where contaminated soils exceed 1 mg/kg PCBs and industrial/commercial direct contact standards are exceeded where soils exceed 10 mg/kg PCBs.

Response: The text and is accurate as written and ARARs do not come into play until Section 2.0; however, for consistency with the Tank Farm 1 FS, the following text has been added: "However, based on the development of ARARs later in Section 2.1 and the comparison to chemical-specific ARARs and guidance classified as "to be considered" (TBC) in Section 2.3, PCB levels at DU 2-2 do exceed EPA guidance risk-based PCB standards for unrestricted use."

EPA Specific Comment 30: Pg 18, §2.1, par 4 - In the second sentence change "applicable or relevant and appropriate laws, regulations, and standards promulgated by the federal government" to "any standard, requirement, criteria, or limitation under any Federal environmental law."

Response: The text has been revised as requested.

EPA Specific Comment 31: Pg 19, §2.1.1, par 1 - Change the text to: "2.1.1 Definition of ARARs and TBCs

As defined by the NCP, ARARs are placed into two classifications: applicable requirements and relevant and appropriate requirements."

Response: The text has been revised as requested.

EPA Specific Comment 32: Pg 20, §2.1.3, par 1 - Confirm that the areas are not within either 500 year floodplain or the State buffer zone to regulated wetland resources.

Replace the fourth sentence with: "The federally-threatened Northern Long-Eared Bat has been found overwintering in unused military structures in the area. Therefore, Building 219 in DU 2-2 will be investigated to ensure that it is not used by overwintering bats. If bats are present then the remediation will be carried out in compliance with the Endangered Species Act and species-specific regulatory standards for the Norther Long-Eared Bat." Delete the last sentence, unless neither the ESA, federal floodplain (based on 500-year standard) nor state wetland (based on state buffer zone requirements) ARARs are not cited as a location-specific ARARs.

Response: The potential overwintering of the NLEB in unused military structures is not relevant to the remedial alternatives evaluated in this FS. However, Section 2.1.3 has been revised as follows: "Location-specific ARARs serve to protect individual characteristics, resources, and specific environmental features on a site, such as wetlands, water bodies, floodplains, and sensitive ecosystems. Location-specific ARARs may affect or restrict remediation and site activities. Based on review of RIDEM's online GIS Environmental Resource Map, there are no wetlands, 50-perimeter wetlands, water bodies, floodplains, and sensitive ecosystems in the proximity of the DU 2-1 and DU 2-2 at Tank Farm 2 and the DUs are located more than 200 feet from a shoreline feature and are not located within the jurisdiction of the Coastal Resources Management Council. Although the estimated areas with soil impacts within the DUs appear to be a mix of grassland and shrubland, which is unlikely to be suitable habitat for the federally-threatened Northern Long-eared Bat, this will need to be confirmed during planning for the remedial action. There are no known features of historical significance within the DUs. Table 2-1b provides a summary of the location-specific ARARs."

See response to EPA Specific Comment 80 for the specifics on what is included in the new Table 2-1b.

EPA Specific Comment 33: Pg 21, §2.2, par 2 - Change the fourth sentence to: "As noted in Section 1.3.8, there is an elevated ecological risk to mammals and birds at DU 2-2 due to PCBs (i.e., Aroclor 1260) in surface soil and exceedances of residential risk-based standards, as well ARARs-based exceedance of industrial/commercial and leachability standards."

Response: Section 1.3.8 is a summary of the ecological risk assessment and not a discussion of ARARs or TBCs. No change is proposed to the text.

EPA Specific Comment 34: Pg 21, §2.2, par 3 - The text should identify that the Navy intends to transfer ownership of the property.

Response: The paragraph has been revised as follows: "Future use of the Site is considered in the formulation of RAOs. The Tank Farm 2 site has been identified as excess property by the Navy and is currently undergoing the DoD BRAC process for transfer. Future use plans have not been finalized. Residential and other unrestricted uses are not being considered; however as directed by CERCLA, the FS evaluates remedial action alternatives for the protection of all possible receptors."

EPA Specific Comment 35: Pg 22, §2.2, par 2 - In the first sentence insert "human health and" after "protection of." Add an additional RAO: "Prevent exposure by potential future residents to soil containing site contaminants that exceed residential use scenario PRGs within DU 2-2. Regarding the leachability RAO, if that is based on the exceedance of the leachability standard for PCBs that would also exceed the industrial direct contact risk standard for PCBs (so an industrial risk RAO would also be needed).

Response: The text was revised as follows:

The soil RAOs for the protection of human health and the environment at DU 2-2 are:

- Prevent exposure by potential future residents to soil containing site contaminants that exceed residential use scenario PRGs within DU 2-2.
- Prevent exposure by industrial and restricted recreational users to soil containing site contaminants that exceed industrial use scenario PRGs within DU 2-2.
- Prevent exposure by mammals and birds to surface soil containing COCs that exceed ecological PRGs within DU 2-2.
- Prevent future migration of soil contaminants to groundwater (soil COCs above RIDEM leachability criteria) within DU 2-2.

EPA Specific Comment 36: Pg 23, §2.3, par 3 - Also, discuss using risk-based TSCA standards for developing PRGs for PCBs.

Response: The following section was added to clarify the human health PRGs at DU 2-2:

"Human Health – DU 2-2

Although the DGA did not show unacceptable risk to human health at DU 2-2, the applicability of the RIDEM Remediation Regulations as an ARAR (see Section 2.1) resulted in review of maximum detected chemical concentrations as compared to the ARARs. The residential use PRG for PCBs is based on a lower USEPA residential guidance value of 1 mg/kg, contained in USEPA's Guidance on Remedial Actions for Superfund Sites with PCB Contamination (USEPA, 1990). The industrial use PRG for PCBs is based on the RIDEM I/C DEC and GA Leachability Criteria of 10 mg/kg.

Appendix A.2, Table 5 presents calculations for residual human health risks associated with the hypothetical residential and industrial worker soil exposure scenarios associated with DU 2-2 at Tank Farm 2. The calculation of residual risks uses the exposure factors described above and assumes that soils in this area are remediated to reflect an exposure point concentration equal to the selected PRG.

Table 2-3 presents the PRGs selected for DU 2-2, and basis for selection."

The referenced tables are attached.

EPA Specific Comment 37: Pg 24, §2.3, par 1 - In the text for 2) change "are typically not set" to "under CERCLA cannot be set."

Response: The text was revised as requested.

EPA Specific Comment 38: Pg 24, §2.3, par 3 - In the third sentence change "Per the NCP, USEPA generally does not require cleanup to below background levels" to "CERCLA does not extend cleanup jurisdiction over soils at or less than site-specific background levels."

Add text concerning the TSCA risk-based PRG for residential exposure and ARAR-based PRG for commercial industrial and leachability.

Please check to confirm that the values used for the human health risk assessment and the subsequent revisions made for this FS have not changed with the issuance of the November 2015 RSL tables. Make any necessary changes to reflect the values in the November 2015 RSL tables.

Response: The text was revised as follows: "Per the NCP, CERCLA does not extend cleanup jurisdiction over soils at or less than site-specific background levels. Therefore, PRGs for arsenic in surface and subsurface soil and manganese in subsurface soil are set at background levels."

Regarding TSCA risk-based PRG, see response to EPA Specific Comment 36.

The values used for this FS during development of PRGs have not changed with the issuance of the November 2015 RSL tables. The text and notes in the PRG development section have been updated to refer to the November 2015 RSL tables. Any changes to parameters used in the HHRA were noted in the text and PRG development appendix.

EPA Specific Comment 39: Pg 24, §2.3, foot 2 - Was the process for developing background values described in the footnote consistent with EPA guidance standards and approved by EPA?

Response: Based upon RIDEM Specific Comment 13, the 2nd footnote at the bottom of Page 24 was moved to the body of the text and expanded upon as follows:

"Background concentrations have been established for metals in soils at NAVSTA Newport and Tank Farm 2 using an EPA-approved basewide background study (Tetra Tech, 2008). In the DGA report (Tetra Tech, 2015), it was determined that the Newport Silt Loam background data from the Basewide Background Study Report was appropriate for comparison to site data based upon historical soil maps. Site specific background soil concentrations were calculated for arsenic and manganese in surface and subsurface soil using the Newport Silt Loam background data set identified in the DGA report. A 95% Upper Prediction Limit was calculated using the USEPA ProUCL software (Version 5.0.00). The background data set and ProUCL output are provided in Appendix A.3."

The process described uses data from the EPA-approved Basewide Background Study and is consistent with the process used for all of the other sites at NAVSTA Newport that have RODs that were approved by EPA.

EPA Specific Comment 40: Pg 25, §2.3, par 1 - In the fourth sentence change "Per the NCP, USEPA generally does not require cleanup to below background levels" to "CERCLA does not extend cleanup jurisdiction over soils at or less than site-specific background levels."

Response: The text was revised as follows: "Per the NCP, CERCLA does not extend cleanup jurisdiction over soils at or less than site-specific background levels. Therefore, the PRG for arsenic in surface soil is set at background level."

EPA Specific Comment 41: Pg 25, §2.3, par 3 - Table 11 also needs to include calculations for residual human health risks associated with the hypothetical residential and industrial worker soil exposure scenarios associated with DU 2-2 (from PCBs).

Response: As discussed in EPA Specific Comment 36, a new section was created to discuss human health PRGs at DU 2-2. The following text was added to that section: "Appendix A.2, Table 5 presents calculations for residual human health risks associated with the hypothetical residential and industrial worker soil exposure scenarios associated with DU 2-2 at Tank Farm 2. The calculation of residual risks uses the exposure factors described above and assumes that soils in this area are remediated to reflect an exposure point concentration equal to the selected PRG." The new Appendix A.2 Table is attached.

EPA Specific Comment 42: Pg 25, §2.3, par 4 - Table 2-2 also needs to include the PRGs selected for both DU 2-1 and DU 2-2, and basis for selection, as appropriate for both industrial and residential use scenarios.

Response: Table 2-3 was revised to include residential and industrial use PRGs at DU 2-2 and is attached.

EPA Specific Comment 43: Pg 28, §2.4, par 3 - The DU 2-2 calculations need to include how much volume of contaminated soil will be equal or more than the residential standard of 1 mg/kg PCBs and how much will exceed the ecological risk standard. If the ecological risk is only identified in the first foot of soil and there are exceedances of industrial and leachability standards of 10 mg/kg PCBs below a foot that will be left in place then the volume of that soil needs to be included in the calculations.

Response: The discussion of under Section 2.4 has been revised for both DU 2-1 and DU 2-2 as follows and revised Figures 5, 6, 9, 10, and 11 and Tables 2-4, 2-5, and 2-6 are attached:

"DU 2-1

Tables 2-4 and 2-5 provide a comparison of DU 2-1 surface soil and subsurface soil data to the proposed PRGs.

Figure 5 shows DU 2-1 surface soil sample locations with Residential PRG exceedances for chromium and/or manganese. Figure 6 shows DU 2-1 subsurface soil sample locations with PRG exceedances for chromium, and/or arsenic. Arsenic exceeded the Residential and Industrial PRGs in the majority of subsurface soil samples and the extent is not well-defined laterally. The extent of arsenic PRG exceedances is well defined vertically above the tank (based on refusals at 4 feet bgs, which is expected to be the top of the tank), but not outside of the tank footprint. Chromium exceeded the Residential PRG in all surface and subsurface soil samples. Manganese exceeded the Residential PRG in a few surface soil samples and is not well-defined laterally to the south and east. The extent of metals impacts should be further evaluated through further sampling. Further, chromium speciation should be conducted on

surface and subsurface soil samples during future sampling and if hexavalent chromium is determined not to be present, chromium would be eliminated as a COC.

Figure 7 shows the surface soil sample locations at DU 2-1 with PRG exceedances for PAHs. Figure 8 shows the subsurface soil sample locations at DU 2-1 with PRG exceedances for PAHs. Surface and subsurface soil samples from the two locations closest to the manway access structure for Tank 21 contained several PAHs at concentrations above the Residential and Industrial PRGs (including the RIDEM GA leachability criteria for naphthalene). With the exception of benzo(a)pyrene, these exceedances are well defined to the northeast, east, and southeast, but require additional delineation to the north/northwest and south/southwest. Exceedances of the Residential PRG for benzo(a)pyrene are more widespread, particularly in surface soil, and require additional delineation to the southwest in subsurface soil and to the south, east, and north in surface soil. The extent of PAH impacts should be further evaluated through further sampling.

Figure 10 summarizes all surface and subsurface soil sample locations that have PRG exceedances for PAHs and/or metals and shows an estimated extent of soil impacts for the purpose of evaluating remedial alternatives. Chromium exceedances are not reflected on this figure, because it is expected that further sampling/analysis would show that hexavalent chromium is not present above the PRG.

- Industrial PRGs: For the purpose of evaluating remedial alternatives, an overall impacted area for surface and/or subsurface soils totaling approximately 1,925 square feet or 0.04 acres is estimated, based on the data collected in the 2015 DGA report. Because subsurface soil with exceedances of the RIDEM I/C DEC can be left in place as long as two feet of surface soil are maintained and land use controls are applied, a smaller impacted area requiring an active remedial measure (i.e. soil removal, asphalt cover, etc.) has been estimated as shown on Figure 10 and encompasses soil that exceeds Industrial PRGs in surface soil and soil that exceed the RIDEM GA Leachability Criteria in subsurface soil. The estimated area is 400 square feet and the impacted volume of soil is estimated to be approximately 60 cubic yards based on an assumed depth of 4 feet bgs. Soil borings in this area had refusals primarily at 4 feet bgs, which was noted to be the top of the tank. The estimated aerial extent of soil that could be addressed by LUCs is the difference between the overall impacted area and the area requiring an active remedial measure, or 1,525 square feet.

- Residential PRGs: For the purpose of evaluating remedial alternatives, impacted areas for surface and subsurface soils totaling approximately 1,925 square feet or 0.04 acres are estimated, based on the data collected in the 2015 DGA report. The impacted volume of soil above Residential PRGs is estimated to be approximately 425 cubic yards based on depths of impact of 4 feet above the tank and a deeper impact of 10 feet over a 630 square foot area in the south/south eastern portion of the area off the tank. This volume encompasses the surface and subsurface soil that exceeds Residential PRGs (including the RIDEM GA Leachability Criterion for naphthalene).

<u>DU 2-2</u>

Table 2-6 provides a comparison of DU 2-2 surface soil PCB data to the proposed Residential, Industrial, and Ecological PRGs. Figure 9 shows the surface soil sample locations with PRG

exceedance at DU 2-2. As shown on Figure 9, seven surface soil samples have PCB (Aroclor-1260) concentrations greater than the Residential PRG. The exceedances surround the building, on the north, south and west sides. Of those samples, four surface soil samples on the north, south, and west sides of the building have PCB concentrations greater than the Ecological PRG and two surface soil samples on the north and west sides of the building have PCB concentrations greater than the Industrial PRG (which is equivalent to the GA Leachability Criterion). The PCB concentrations decrease with distance from the building and higher concentrations are present near doorways and the electrical box. The extent of the impacted surface soils exceeding the Ecological and Industrial PRGs are somewhat defined to the south, north, and west; however, further sampling is needed to evaluate the lateral extent of PCB impacts where there are gaps in the delineation. The extent of the impacted surface soils exceeding the Residential PRG is less well defined. Note that soil impacts are defined vertically, since none of the subsurface soil results from the 2 to 4 foot depth exceeded the PRGs. Although three of the surface soil samples that exceeded the PRG were 2005 samples that did not have corresponding subsurface soil samples from the same boring, subsurface soil samples were collected adjacent to these locations as part of the DGA to address that gap and the results did not exceed the PRG. Figure 11 shows estimated extents of PCB impacts for the purpose of evaluating remedial alternatives.

- Industrial and Ecological PRGs: For the purpose of evaluating remedial alternatives, an impacted area totaling approximately 390 square feet is estimated, based on the data collected in the DGA report. This area excludes the footprint of the building, which is approximately 140 square feet. Assuming an impacted depth of 2 feet, the volume of soil that exceeds the Ecological and/or Industrial PRGs is estimated to be approximately 29 cubic yards. This volume also takes into account locations where the PCB concentrations exceed the RIDEM GA Leachability Criterion (which is equivalent to Industrial PRG).

- Residential PRG: For the purpose of evaluating remedial alternatives, an impacted area totaling approximately 830 square feet is estimated, based on the data collected in the DGA report. Assuming an impacted depth of 2 feet, the volume of soil that exceeds the Residential PRG is estimated to be approximately 61 cubic yards. This volume includes soils beneath the building footprint and soil outside the building footprint that also exceed the Industrial and Ecological PRGs."

EPA Specific Comment 44: Pg 31, §3.1.2, par 1 - The Navy may consider removing a PCB contaminated soil in DU 2-2 that exceeds the residential cleanup standard of 1 mg/kg. If not revise the second sentence to add "and DU 2-2" to the end of the sentence. After the fourth sentence insert: "If and when the Building 219 is demolished, the demolition/disposal will meet TSCA protectiveness standards so as not to create a threat of release to the environment."

Response: Alternative S-4 includes excavation to the residential PRG at DU 2-2; however, Alternative S-2 has been revised to include excavation to the industrial and ecological PRGs. The referenced paragraph, along with the subsequent two paragraphs were revised as follows:

"Under this alternative, limited soil excavation and off-site disposal would remove all surface and subsurface soils exceeding the Industrial PRGs for PAHs in DU 2-1 and all surface soils exceeding the Industrial and Ecological PRGs for DU 2-2 (including RIDEM GA Leachability Criteria at both DUs). Additionally, LUCs would be established to address direct exposure to

surface and subsurface soils exceeding Residential PRGs at DU 2-1 and DU 2-2 and subsurface soil exceeding the Industrial PRG for arsenic at DU 3-1. LUCs would also be needed to maintain the building foundation at DU 2-2 under the conservative assumption that PCB contamination may exist beneath the building. If the B219 at DU 2-2 is demolished in the future, the soil beneath the building would be assessed and remediated, if necessary, to meet Industrial and Ecological PRGs. Demolition of this building is not considered part of the remedy. If and when B219 is demolished, the demolition/disposal will meet TSCA protectiveness standards so as not to create a threat of release to the environment. As part of LUCs, a series of documented controls along with site inspections would be conducted to prevent residential use of the property.

Limited Excavation

At DU 2-1, two surface soil and two subsurface soil (2 to 4 feet bgs) samples (TF2-001-SB1007, TF2-001-SB1005) exceed Industrial PRGs for PAHs. Note that subsurface soil exceedances of the Industrial PRG for arsenic would be addressed through LUCs rather than excavation. The RIDEM GA Leachability Criteria served as the basis of the Industrial PRG for naphthalene due to the exceedances at TF2-001-SB1005. Estimated areas and volumes are summarized in Section 2.4.

Four surface soil samples exceed the Ecological PRG for PCBs at DU 2-2 (TF2-B219-1, TF2-B219-3, TF2-B219-4, and TF2-B219-SB1080) and two of those samples (TF2-B219-1 and TF2-B219-4) also exceed the Industrial PRG (which is equivalent to the RIDEM GA Leachability Criterion for PCBs). Estimated areas and volumes are summarized in Section 2.4."

EPA Specific Comment 45: Pg 32, §3.1.2, par 4 - Insert a new second sentence: "Management and disposal standards for PCB-contaminated soil is based on in-situ PCB soil concentrations."

Response: The text was revised as requested.

EPA Specific Comment 46: Pg 32, §3.1.2, par 5 - Backfilling can perhaps be avoided at DU 2-2 if the building and electrical service are no longer active when the remediation is conducted; otherwise, backfill would be required because of buried electrical lines and to provide appropriate access to the building. Is there any likelihood that water would be generated from the excavation work (either groundwater or surface water entering the excavation) that would require removal/treatment. If so, describe how excavation water will be managed/treated/ discharged as part of this alternative.

Response: The last two sentences of the paragraph have been deleted and the previous sentence has been edited to state "...backfilled, graded, and seeded." The cost estimate has been adjusted to include backfill at DU 2-2. Excavation will be stopped if it reaches the water table (see attached updated Appendix C). Removal/treatment of water is not likely. No changes were made to the text.

EPA Specific Comment 47: Pg 32, §3.1.2, par 6 - In the first sentence after "DU 2-1" insert "and DU 2-2." In the fourth sentence change "TSCA" to "Toxic Substances Control Act (TSCA), 15 U.S.C. 2601 et seq."

Response: The text was revised as requested. Also, a new paragraph was added as follows:

"At DU 2-1, LUCs would also be established to ensure that at least two feet of surface soil, which contains arsenic below the Industrial PRG, remains undisturbed in the area within DU 2-1 where subsurface soil exceeds the Industrial PRG. Periodic inspections would also be needed to ensure no change in land use and that the surface soil remains undisturbed in the area where arsenic exceeds the Industrial PRG in the subsurface soil."

EPA Specific Comment 48: Pg 33, §3.1.2, par 1 - In the first sentence change "the LUC Remedial Design (RD) would limit development of the site for residential use" to "the LUC Remedial Design will identify the remedial measures to be taken to restrict residential use." Include standard language describing how enforceable LUCs would be established if the Navy ever transfers the property.

Response: The text was revised as requested to address the first part of the comment. The standard language is included in the detailed description in Section 4.0.

EPA Specific Comment 49: Pg 33, §3.1.3, par 1 - In the first sentence after "DU 2-1" insert "and DU 2-2."

Response: The paragraph was revised as follows:

"Under this alternative, an asphalt cover would be placed over soil that exceeds Industrial PRGs for PAHs at DU 2-1 and Industrial and Ecological PRGs at DU 2-2 (including the RIDEM GA Leachability Criteria at both DUs). LUCs would also be applied to DU 2-1 and DU 2-2 to prevent residential use, at DU 2-1 and DU 2-2 to restrict cover disturbance, at DU 2-1 to prevent direct exposure to subsurface soil exceeding the Industrial PRG for arsenic, and at DU 2-2 to require maintenance of the B219 foundation. The cover will reduce exposure risks by preventing direct contact with the contaminated soil and also minimize leaching of naphthalene and PCBs from soil to groundwater."

EPA Specific Comment 50: Pg 33, §3.1.3, par 3 - In the second sentence remove "(DU 2-1 only)". The cover alternative will also require long-term monitoring to ensure the remedy remains protective.

Response: The text was revised as requested. Long-term inspections and maintenance are described in the subsequent paragraph.

EPA Specific Comment 51: Pg 34, §3.1.3, par 1 - In the fourth sentence after "DU 2-1" insert "and DU 2-2."

Response: The text was revised as requested and the following text was added:

"At DU 2-1, LUCs would also be established to ensure that at least two feet of surface soil (0-2 feet), which contains arsenic below the Industrial PRG, remains undisturbed in the area within DU 2-1 where subsurface soil exceeds the Industrial PRG. Periodic inspections would also be needed to ensure no change in land use and that the surface soil remains undisturbed in the area where arsenic exceeds the Industrial PRG in the subsurface soil.

For this remedial alternative, the LUC RD will identify the remedial measures to be taken to restrict residential use, maintain the integrity of covers at DU 2-1 and 2-2, and ensure subsurface soils exceeding the Industrial PRG for arsenic at DU 3-1 are not disturbed or contacted in the future."

EPA Specific Comment 52: Pg 34, §3.1.3, par 2 - Include standard language describing how enforceable LUCs would be established if the Navy ever transfers the property.

Response: The following text is presented in the Detailed Description in Section 4.2: "LUCs will be developed in accordance with the Principles and Procedures for Specifying, Monitoring, and Enforcement of Land Use Controls and Other Post-ROD Actions (DoD, 2003), per letter dated January 16, 2004, from Alex A. Beehler, Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), and the requirements of the FFA. As long as Navy retains ownership of the property, NAVSTA Newport enforces the LUCs and assures that each LUC is maintained appropriately by tracking it through a centralized tracking system. If the property is transferred from the Navy to another federal owner, upon meeting the requirements for transfers under the site's FFA, Navy would ensure as part of the transfer process that the gaining agency is made aware of the existing controls and would take appropriate action to ensure that such controls remain in place. If the property is ever transferred to non-federal ownership, deed restrictions, meeting state property law standards, would be recorded that would incorporate and land use restrictions. Although the Navy may transfer the procedural LUC responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity. LUCs will be maintained until the concentrations of hazardous substances in the soil are at levels that allow for unrestricted use and exposure."

No changes were made to the text.

EPA Specific Comment 53: Pg 34, §3.1.4, par 1 - After the fourth sentence insert: "If and when the Building 219 is demolished, the demolition/disposal will meet TSCA protectiveness standards so as not to create a threat of release to the environment."

Response: The text was added as requested.

EPA Specific Comment 54: Pg 34, §3.1.4, par 2 - For DU 2-2 need to cite the volume of soil equal or exceeding the residential standard of 1 mg/kg PCB that would need to be excavated and removed.

Response: The text was revised as requested. For DU 2-2, the volume of soil was updated to 61 cubic yards.

EPA Specific Comment 55: Pg 34, §3.1.4, par 3 - Insert a new second sentence: "Management and disposal standards for PCB-contaminated soil is based on in-situ PCB soil concentrations."

Response: The text was added to Section 3.1.4, page 35, paragraph 2.

EPA Specific Comment 56: Pg 35, §3.1.4, par 1 - Please replace "EBP" with "Building 219".

Response: The text was revised as follows: "Chromium is currently identified as a potential COC based on an assumption that the detections in soil are hexavalent chromium; however, if hexavalent chromium is determined not to be present, then chromium would no longer be a COC."

EPA Specific Comment 57: Pg 35, §3.1.4, par 2 - Add at the end of the last sentence: "(except for PCB-contaminated soil which will be characterized for management and disposal in-situ)."

If there is any likelihood that water would be generated from the excavation work (either groundwater or surface water entering the excavation) that would require removal/treatment, describe how excavation water will be managed/treated/discharged as part of this alternative.

Response: The following sentence was added to the referenced paragraph in Section 3.1.4: "Management and disposal standards for PCB-contaminated soil are based on in-situ PCB soil concentrations." Excavation will be stopped if it reaches the water table. Removal/treatment of water is not likely. No changes were made to the text.

EPA Specific Comment 58: Pg 37, §4.1.2, par 2 - Change the first sentence: "The no action alternative does not provide long-term protection of human health or the environment at the DU 2-1 or DU 2-2."

Response: The text was revised as requested.

EPA Specific Comment 59: Pg 38, §4.2.1, par 1 - In the third sentence add "and DU 2-2" at the end of the sentence.

Response: The text was revised as requested. The first three pargraphs of Section 4.2.1 were revised as follows:

"Under this alternative, limited soil excavation and off-site disposal would be performed to remove soils exceeding the Industrial PRGs (including RIDEM GA Leachability Criteria) for PAHs and PCBs at DU 2-1 and DU 2-2, respectively, and exceeding the Ecological PRG at DU 2-2. As discussed in Section 2.0, no remedial actions are required for subsurface soil at DU 2-2 as subsurface soil concentrations in this area do not exceed Ecological PRGs. Additionally, LUCs would be implemented to prevent residential and unrestricted recreational use of the property at DU 2-1 and DU 2-2 and to prevent access to subsurface soil exceeding the Industrial PRG for arsenic at DU 2-1. LUCs would also be required at DU 2-2 to include maintenance of the B219 foundation.

At DU 2-1, two soil boring locations in surface and subsurface (2 to 4 feet bgs) soils (TF2-001-SB1007, TF2-001-SB1005) exceed the Industrial PRGs for PAHs. The RIDEM GA Leachability Criterion served as the basis of the Industrial PRG for naphthalene and was exceeded in the surface and subsurface soil samples at TF2-001-SB1005. Note that subsurface soil exceedances of the Industrial PRG for arsenic would be addressed through LUCs rather than excavation. Estimated areas and volumes are summarized in Section 2.4.

At DU 2-2, four surface soil samples (TF2-B219-1, TF2-B219-3, TF2-B219-4, and TF2-B219-SB1080) exceed the Ecological PRG for PCBs and two of those samples (TF2-B219-1 and TF2-

B219-4) also exceed the Industrial PRG (which is equivalent to the RIDEM GA Leachability Criteria for PCBs). Estimated areas and volumes are summarized in Section 2.4. Details of each component of Alternative S-2 are as follows."

EPA Specific Comment 60: Pg 39, §4.2.1, par 2 - In the second sentence, after "DU 2-1" insert "and DU 2-2."

Response: The text was revised as requested.

EPA Specific Comment 61: Pg 39, §4.2.1, par 5 - Will there be confirmatory testing to ensure all soil above the cleanup number is removed?

Note that for the PCB-contaminated soil in DU 2-2 the waste characterization is to be based on in-situ sampling, as is required under TSCA.

If there is any likelihood that water would be generated from the excavation work (either groundwater or surface water entering the excavation) that would require removal/treatment, describe how excavation water will be managed/treated/discharged as part of this alternative.

Response: As discussed under "Soil Sampling" in Section 4.2.1, sampling would be conducted prior to excavation to fully delineate the extent of soils that exceed PRGs. Confirmation sampling is not expected to be needed. No change has been made to the text.

The following text was added under "Soil Removal and Disposal": "Management and disposal standards for PCB-contaminated soil are based on in-situ PCB soil concentrations."

Excavation will be stopped if it reaches the water table. Removal/treatment of water is not likely. No changes were made to the text.

EPA Specific Comment 62: Pg 40, §4.2.1, par 2 - The LUC subsection needs to be revised to discuss that residential LUCs also need to be established in DU 2-2 for any areas where PCBs will be left in place at equal or exceeding 1 mg/kg.

Response: The text was revised accordingly. The last two sentences of paragraph 3 on Page 40 have been revised to state "The area currently targeted for LUCs at DU 2-1 is presented on Figure 10 and is estimated to be 1,925 square feet in area. The area currently targeted for LUCs at DU 2-2 is presented on Figure 11 and is estimated to be 300 square feet in area plus the building footprint."

Also, a new paragraph was added above paragraph 3 as follows:

"At DU 2-1, LUCs would also be established to ensure that at least two feet of surface soil (0-2 feet), which contains arsenic below the Industrial PRG, remains undisturbed in the area within DU 2-1 where subsurface soil exceeds the Industrial PRG. Periodic inspections would also be needed to ensure no change in land use and that the surface soil remains undisturbed in the area where arsenic exceeds the Industrial PRG in the subsurface soil."

EPA Specific Comment 63: Pg 41, §4.2.2, par 2 - PCB-contaminated soils that exceed the Industrial DEC will also be removed (since the DEC is the same as the leachability criteria).

Supplement the text to state that the alternative would be protective of human health and the environment.

Response: The text was updated to indicate the soil exceeding Industrial PRGs will be removed at DU 2-1 and DU 2-2 and to address other minor changes to the alternative. The following text was added to the "Overall protection of human health and the environment" discussion: "Alternative S-2 is protective of human health and the environment."

EPA Specific Comment 64: Pg 41, §4.2.2, par 3 - Revise LUC description to include a residential LUC at DU 2-2.

Response: The text was revised accordingly.

EPA Specific Comment 65: Pg 42, §4.2.2, par 1 - See previous comments concerning location-specific ARARs for the alternative (see comments for Pg 20, §2.1.3, par 1).

Response: As discussed in EPA Specific Comment 32, location-specific ARARs were added to Appendix B. The text was revised as follows: "Tables B-2a, B-2b, and B-2c in Appendix B present an evaluation of chemical-specific, location-specific, and action-specific ARARs and TBCs associated with Alternative S-2. With proper execution of this alternative, all chemical-specific ARARs and TBCs will be met and location-specific and action-specific ARARs and TBCs would be complied with."

EPA Specific Comment 66: Pg 42, §4.2.2, par 2 - Supplement the text to state that the alternative would provide permanent long-term protectiveness.

Response: The following text was added: "Alternative S-2 would provide permanent long-term protectiveness."

EPA Specific Comment 67: Pg 42, §4.2.2, par 3 - Revise the text to include discussion that residential LUCs will be implemented in DU 2-2. Insert a new third sentence: "If and when the Building 219 is demolished, the demolition/disposal will meet TSCA protectiveness standards so as not to create a threat of release to the environment."

Response: The text was revised as follows: "As part of this alternative, LUCs would include maintenance of the B219 foundation at DU 2-2 to prevent access to soil below the building. If and when the B219 is demolished, the demolition/disposal will meet TSCA protectiveness standards so as not to create a threat of release to the environment. LUCs would also prevent access to subsurface soil at the portion of DU 2-1 with Industrial PRG exceedances. DU 2-1 and DU 2-2 would be suitable for continued use similar to the current use, and LUCs would restrict residential use, under scenarios that could pose unacceptable exposure. Five-year reviews would be conducted to evaluate the continued adequacy of the remedy."

EPA Specific Comment 68: Pg 43, §4.3 - Revise this entire section to address that residential LUCs will be required for areas of DU 2-2 equal or exceeding 1 mg/kg PCBs (see previous comments for Sec. 4.2). Also, the cover will require long-term monitoring, so include a discussion of the monitoring component when relevant throughout the subsections.

Response: The text was revised to include LUCs restricting residential use at DU 2-2 as well as regular site inspections of the cover. The first three paragraphs of Section 4.3.1 were revised as follows:

"This alternative involves placing an asphalt cover over soil that exceeds Industrial PRGs for PAHs (including RIDEM GA Leachability Criteria) at DU 2-1 and Industrial and Ecological PRGs at DU 2-2. Surface and subsurface soil needs to be addressed at DU 2-1 and only surface soil needs to be addressed at DU 2-2. LUCs would also be applied to DU 2-1 and DU 2-2 preventing residential use and restricting cover disturbance. LUCs would also be required at DU 2-1 to prevent access to subsurface soil exceeding the Industrial PRG for arsenic and at DU 2-2 to include maintenance of the B219 foundation. Regular site inspections of the cover would also be performed to verify its integrity in the long-term.

At DU 2-1, two surface soil and two subsurface (2 to 4 feet bgs) samples (TF2-001-SB1007, TF2-001-SB1005) exceed the Industrial PRGs for PAHs. The RIDEM GA Leachability Criteria served as the basis of the Industrial PRG for naphthalene. One soil boring (TF2-001-SB1005) exceeds the RIDEM GA Leachability Criteria for naphthalene. Estimated areas and volumes are summarized in Section 2.4.

At DU 2-2, four soil samples (TF2-B219-1, TF2-B219-3, TF2-B219-4, and TF2-B219-SB1080) exceed the Ecological PRG for PCBs. The Industrial PRG =for PCBs is exceeded for TF2-B219-4 and TF2-B219-1. The RIDEM GA Leachability Criterion and I/C DEC served as the basis of the Industrial PRG for PCBs."

EPA Specific Comment 69: Pg 44, §4.3.1, par 5 - Please supplement the text to address any issues with installing 10 inches of asphalt cover material around the structure at DU 2-1 and around the building at DU 2-2. Clarify, if correct, that this asphalt cover will not interfere with the access to these structures. If necessary include sufficient soil removal to allow placement of the asphalt cover.

The last sentence should apparently refer to geomembranes rather than geotextiles since an impervious cover is necessary. Please review to clarify the intent.

Response: The text was revised as follows: "The asphalt cover system will consist of 4 inches of asphalt pavement overlying at least 6 inches of clean sub-base material to prevent direct contact, erosion, and transport of remaining soil exceeding Industrial PRGs for PAHs at DU 2-1 and Industrial and Ecological PRGs for PCBs at DU 2-2. The cover will be designed to not interfere with access to the structures. This containment system would also minimize the leaching of PAHs and PCBs from soil to groundwater. Alternate covers are possible, such as those using geomembrane materials; however, the asphalt cover system is a common approach and was used here for costing/comparison purposes."

EPA Specific Comment 70: Pg 46, §4.3.2, par 2 - Supplement the text to state that the alternative would be protective of human health and the environment.

Response: The following text was added under "Overall protection of human health and the environment": "Alternative S-3 is protective of human health and the environment."

EPA Specific Comment 71: Pg 47, §4.3.2, par 1 - See previous comments concerning location-specific ARARs for the alternative (see comments for Pg 20, §2.1.3, par 1). Regarding action-specific standards, the asphalt (or alternative design) cover would need to be designed, constructed and maintained to meet RI Remediation Regulation leachability control standards.

Response: The text was revised as follows: "Tables B-3a, B-3b, and B-3c in Appendix B present an evaluation of chemical-specific, location-specific and action-specific ARARs and TBCs associated with Alternative S-3. With proper execution of this alternative, all chemical-specific ARARs and TBCs will be met and location-specific and action-specific ARARs and TBCs would be complied with." The RIDEM Remediation Regulations do not include leachability control standards for covers. Relevant portions of the RI Soild Waste Regulations are included as action-specific ARARs.

EPA Specific Comment 72: Pg 47, §4.3.2, par 2 - Supplement the text to state that the alternative would provide permanent long-term protectiveness.

Response: The following text was added to Section 4.3.2: "Alternative S-3 would provide permanent long-term protectiveness."

EPA Specific Comment 73: Pg 49, §5.0 - Revise this entire section to address that residential LUCs will be required for areas of DU 2-2 equal or exceeding 1 mg/kg PCBs (see previous comments for Sec. 4.2). Also, when relevant, a discussion of the monitoring component for the cover alternative should be included throughout the subsections.

Response: The entire FS Report was revised to include residential LUCs at DU 2-2 as well as regular cover inspections under Alternative S-3.

EPA Specific Comment 74: Pg 50, §5.1.1, par 2 - In the fourth sentence, change "ECH" to "B219".

Response: The text was revised as requested.

EPA Specific Comment 75: Pg 51, §5.1.2 - See previous comments concerning location-specific ARARs for the alternative (see comments for Pg 20, §2.1.3, par 1).

Response: The text was revised to include location-specific ARARs.

EPA Specific Comment 76: Pg 51, §5.1.3 - Please edit the first sentence to read: "... long-term effectiveness because much of the more highly-contaminated soil would be removed from the site and placed in an appropriately-regulated land fill."

Response: The text was revised as requested.

EPA Specific Comment 77: Pg 52, §5.1.5, par 1 - Supplement the text by adding: "Alternative S-2 would create more short-term risk than S-3 because of active handling of the contaminated soil which would create more dust and contact exposure."

This discussion could be expanded to discuss traffic generated by both S-2 and S-3 and the slight risk to the community from transporting contaminated soil over public roads.

Response: The following text was added to Section 5.1.5: "Alternative S-2 would create more short-term risk than S-3 because of active handling of the contaminated soil which would create more dust and contact exposure."

EPA Specific Comment 78: Pg 53, §5.1.6, par 6 - Edit the text to indicate that S-1 would not be administratively implementable because it does not reduce risk at the site and does not satisfy the ARARs.

Response: The following sentence was added to Section 5.1.6: "Alternative S-1 would not be administratively feasible since it does not reduce risk at the site and does not satisfy the ARARs."

EPA Specific Comment 79: Table 2-1a - For the EPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination, Action to be Taken text after "humans" add "and ecological receptors."

Add the following Federal TBCs:

Recommendations of the Technical Review Workgroup for Lead for an approach to Assessing Risks Associated with Adult Exposure to Lead In Soil	*EPA-540-R-03-001 (January 2003)*	*To be Considered*	*EPA guidance for evaluating risks posed by lead in soil.*	*Used to calculate potential risks caused by exposure to lead in soil.*
Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds.	*EPA/600/R-10/005*	*To be Considered*	*EPA guidance for evaluating risks posed by dioxin.*	*Used to calculate potential risks caused by exposure to dioxin in soil.*
Cite any other guidance used to develop the PCB eco-risk PRG.				

Response: The EPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination was added as follows:

EPA Guidance on Remedial Actions for Superfund Sites	*EPA/540/G-90/007 (August 1990)*	*To Be Considered*	*This guidance provided preliminary remediation goals (PRGs) for PCBs for various media.*	*Used in the development of the PRG for soil at DU 2-2 to be protective of unrestricted use by humans and ecological*

with PCB Contamination				*receptors.*

The two items above for lead and dioxins are not relevant to this FS because those analytes were not risk drivers and PRGs were not developed for them. The following guidance has been added:

Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments	*EPA/540/R-97/006*	*To Be Considered*	*EPA guidance for conducting ecological risk assessments*	*Used to calculate potential wildlife risks and PRGs*
Final Guidelines for Ecological Risk Assessment	*EPA/630/R095/002F*	*To Be Considered*	*EPA guidance for conducting ecological risk assessments*	*Used to calculate potential wildlife risks and PRGs*
Guidance for Developing Ecological Soil Screening Levels	*OSWER Directive 9285.7-55*	*To Be Considered*	*EPA guidance for generating ecological soil screening levels*	*Used to calculate potential wildlife risks and PRGs*
Toxicological Benchmarks for Wildlife: 1996 Revision	*ES/ER/TM-86/R3*	*To Be Considered*	*Oak Ridge National Laboratory guidance on toxicity values for wildlife*	*Used to calculate potential wildlife risks and PRGs*
Wildlife Exposure Factors Handbook. Vols. I and II	*EPA/600-R/R-93/187a*	*To Be Considered*	*EPA guidance on identifying exposure parameters for wildlife*	*Used to calculate potential wildlife risks and PRGs*
Development and Validation of Bioaccumulation Models for Earthworms	*ES/ER/TM-220*	*To Be Considered*	*Oak Ridge National Laboratory guidance on uptake of contaminants from soil to earthworms*	*Used to calculate potential wildlife risks and PRGs*

EPA Specific Comment 80: Table 2-1b - If overwintering bat habitat is present in Building 219 [or will be assessed during remedial design] add the following federal location-specific ARAR:

Federal Endangered Species Act of 1973 (ESA); Endangered and Threatened Wildlife and Plants, Special Rules: Northern Long-Eared Bat	*16 U.S.C. 1531 et seq.; 33 C.F.R. Part 320 & 50 C.F.R § 17.40(o)*	*Applicable*	*The purpose of the ESA is to "conserve the ecosystems upon with threatened and endangered species depend" and to conserve and recover listed species. Federal agencies must consult*	*[Overwintering bats have been observed in Building 219] or [As part of pre-design investigations, Building 219 will be assessed to determine if it is*

			with the U.S. Fish and Wildlife Service to ensure that the actions they authorize, fund, or carry out will not jeopardize listed species. The Northern Long-Eared Bat is listed as federally threatened. The Northern Long-Eared Bat has been documented overwintering in former military structures in the area.	*potential bat overwintering habitat. If federally protected bats are located, the U.S. Fish and Wildlife Service will be consulted with during the planning process so that investigations and remedial actions do not adversely impact bat populations or habitats that may be present.*

Response: There was no Table 2-1b in the Draft FS; however, it has been added and Table 2-1 has been renamed as Table 2-1a. The potential overwintering of the NLEB in unused military structures is not relevant to the remedial alternatives evaluated in this FS. Although the estimated areas with soil impacts within the DUs appear to be a mix of grassland and shrub land, which is not suitable habitat for the federally threatened Northern Long-eared Bat, this will need to be confirmed during planning for the remedial action. The table was revised as follows:

Requirement	*Citation*	*Status*	*Requirement Synopsis*	*Action to Be Taken to Attain Requirement*
Federal				
Federal Endangered Species Act of 1973 (ESA); Endangered and Threatened Wildlife and Plants, Special Rules: Northern Long-Eared Bat	*16 U.S.C. 1531 et seq.; 50 C.F.R § 17.40(o)*	*Applicable*	*The purpose of the ESA is to "conserve the ecosystems upon with threatened and endangered species depend" and to conserve and recover listed species. Federal agencies must consult with the U.S. Fish and Wildlife Service to ensure that the actions they authorize, fund, or carry out will not jeopardize listed species. The Northern Long-Eared Bat (NLEB) is listed as federally threatened. The NLEB range includes Coastal New England towns, such as Portsmouth, RI.*	*This requirement may be applicable if clearing of trees of 3 inch diameter at breast height or larger is needed during the remedial action and the work is to be conducted within the April 15th - September 30th time-of-year restriction, under the assumed presence of the NLEB in the area of the site. The U.S. Fish and Wildlife Service will be consulted with, if required, during the planning process so that investigations and remedial actions do not adversely impact bat populations or habitat.*

EPA Specific Comment 81: Table 2-2 - Please correct the table for chromium: 17 mg/kg is not the background concentration for chromium VI and no PRG/background value is needed for chromium III. There is no background value available for chromium VI; therefore, include a risk

based value. Add a note to the table to indicate that because no speciation was performed for chromium, all chromium values are assumed to be chromium VI until confirmed otherwise by supplemental sampling.

Response: The chromium PRG for the residential use scenario was revised to 0.31 mg/kg and the following note was added: "2. Chromium speciation has not been performed for this site. At this time, chromium has been assumed to be hexavalent chromium even though there is no current evidence that it would be this species." See the updated Table 2-2 attached.

EPA Specific Comment 82: Table 2-4 - Correct the name identifier for petroleum from "nonpetroleum" to "extractable TPH" or "TPH-Diesel Range".

Response: Tables 2-4 and 2-5 were revised to "Extractable TPH".

EPA Specific Comment 83: Table 2-5 - The residential PRG for total chromium of 17 mg/kg is not appropriate because this is not a risk driver. Instead list the risk-based value for chromium VI.

Correct the name identifier for petroleum from "nonpetroleum" to "extractable TPH" or "TPH-Diesel Range".

Response: Tables 2-4 and 2-5 were revised accordingly.

EPA Specific Comment 84: Table 2-6, p. 2 - Change "Treatment: Off-Site" to "Source Control"; only one of the process options involves treatment.

Response: Table 2-7 was revised as requested.

EPA Specific Comment 85: Table 3-1 - For Alternative S-3 add long-term monitoring of the cover.

Response: The following text was added to Tables 3-1 and 3-4: "Regular site inspections of the cover would also be performed to verify the continued maintenance of LUCs until the cleanup levels have been achieved." Further edits were made to Table 3-1 through 3-5 based on other comments. The revised Table 3-1 is attached.

EPA Specific Comment 86: Table 4-3 - For "Magnitude of Residual Risk" state that industrial and ecological risk would be reduced to acceptable levels through contamination removal and residential risk would be managed by restricting access.

Response: The following text was added to "Magnitude of Residual Risk": "Under this alternative, risks to industrial users and ecological receptors would be reduced to acceptable levels through contamination removal. Risks to residential users would be reduced by restricting access." Table 4-3 was also updated based on other comments and is attached.

EPA Specific Comment 87: Table 4-4 - For "Ability to Monitor Effectiveness" also state that supplemental sampling would identify the extent of contamination to insure the initial effectiveness of the cap and LUCs. Mention groundwater monitoring to address leachability concerns as was done for Tank Farm 3 FS.

Response: The "Ability to Monitor Effectiveness" text was revised to be consistent with the Tank Farm 3 FS which does not include groundwater monitoring. Specifically, the text was revised as follows: "Additional sampling would be performed to identify the extent of contamination to ensure the initial effectiveness of the excavation and LUCs. Inspections and five-year reviews will also be conducted to monitor effectiveness." Table 4-4 was also modified based on other comments and is attached.

EPA Specific Comment 88: Figure 4 - The sample locations need to be reviewed and corrected because the 2005 samples were collected adjacent to the building doors. SB1088 was a subsurface sample only taken at approximately the same location as B291-1. SB1089 was a subsurface sample only taken at approximately the same location as B219-4. Refer to the field notes in Appendix B of the Tank Farm 2 DGA report.

Response: Figure 4 was revised accordingly and is attached..

EPA Specific Comment 89: Figures – DU 2-1 - Change total chromium in these figures to chromium VI and change the PRG to a risk-based number. There is no residential PRG required for chromium III. Add a note stating that chromium is assumed to be chromium VI until additional sampling proves otherwise.

Response: The figures were revised to reflect updated PRGs. On Figures 5 and 6, a note was added stating "Chromium is a potential COC based on an assumption that detections are hexavalent chromium." Total chromium was not changed to hexavalent chromium, because the data is for total chromium. On Figure 10, chromium results are not shown and the following note has been added: "PRG exceedances for chromium are not reflected on this figure. Hexavalent chromium has been identified as a potential COC, based on an assumption that the detected chromium is hexavalent chromium. There is no evidence that hexavalent chromium is actually present and further sampling/analysis would be expected to show that most of the chromium detected is trivalent chromium."

EPA Specific Comment 90: Figure 9 - Review and correct the sample locations per Figure 4 comment.

Response: Figure 9 was revised accordingly and is attached.

<u>Appendix A.1 - Human Health PRG Development</u>

EPA Specific Comment 91: Table 11 - Based on the PRGs selected the residual residential risk at DU 2-1 is calculated to be 8 x 10-5 based on a residential remediation scenario which is at the extreme upper end of EPA's target risk range and therefore is not an appropriate remedial goal according to the National Contingency Plan. However, the residual risk will be substantially less if the PRG for chromium is risk-based (i.e., chromium VI). Please refer to the subsequent comments on this table.

Correct Notes 1, 4, and 6 to refer to November 2011 for RIDEM regs.

Add a Note indicating that chromium is assumed to be chromium VI until sampling proves otherwise. Therefore, delete the background values for chromium because there are none for chromium VI. Replace the PRG with the risk-based value for chromium VI and adjust the estimated ILCR and HQ.

Response: As discussed in EPA Specific Comment 8, the chromium PRG was updated based on the assumption that chromium is hexavalent. The residual risk calculation was also updated based on the revised PRGs. Appendix A was revised as requested and Table 11 is attached.

EPA Specific Comment 92: Table 12 - Correct the residential DEC for beryllium to 1.5 mg/kg.

Provide the table notes referred to in the table.

Correct the note for RIDEM regulations to refer to November 2011, not 2004.

Identify chromium in this table as chromium VI.

Response: Based on the correction of the RIDEM residential DEC for beryllium, that metal is no longer a COC, since the maximum concentration in soil at DU 2-1 does not exceed the corrected residential DEC.

Table 12 was revised as requested and is attached.

Appendix B

EPA Specific Comment 93: Table B-1a - Add the following Federal TBCs:

Recommendations of the Technical Review Workgroup for Lead for an approach to Assessing Risks Associated with Adult Exposure to Lead In Soil	*EPA-540-R-03-001 (January 2003)*	*To be Considered*	*EPA guidance for evaluating risks posed by lead in soil.*	*This alternative would not prevent exposure to lead in soil at DU 2-1 which contributes to a calculated risk, developed using this guidance.*
Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds.	*EPA/600/R-10/005*	*To be Considered*	*EPA guidance for evaluating risks posed by dioxin.*	*This alternative would not prevent exposure to dioxin in soil at DU 2-1 which contributes to a calculated risk, developed using this guidance.*
Cite any other guidance used to develop the PCB eco-risk PRG.				

Response: The two items above for lead and dioxins are not relevant to this FS because those analytes were not risk drivers and PRGs were not developed for them. However, the following TBCs have been added:

EPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination	*EPA/540/G-90/007 (August 1990)*	*To Be Considered*	*This guidance provided preliminary remediation goals (PRGs) for PCBs for various media.*	*This alternative would not prevent exposure to PCB contamination in soil at DU 3-2 and DU 3-3 which exceeds the guidance value developed by EPA for PCBs in soil.*
Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments	*EPA/540/R-97/006*	*To Be Considered*	*EPA guidance for conducting ecological risk assessments*	*Used to calculate potential wildlife risks and PRGs. This alternative would not prevent exposure to PCBs in soil at DU 2-2, which contribute to a calculated risk, developed using this guidance.*
Final Guidelines for Ecological Risk Assessment	*EPA/630/R095/002F*	*To Be Considered*	*EPA guidance for conducting ecological risk assessments*	*Used to calculate potential wildlife risks and PRGs. This alternative would not prevent exposure to PCBs in soil at DU 2-2, which contribute to a calculated risk, developed using this guidance.*
Guidance for Developing Ecological Soil Screening Levels	*OSWER Directive 9285.7-55*	*To Be Considered*	*EPA guidance for generating ecological soil screening levels*	*Used to calculate potential wildlife risks and PRGs. This alternative would not prevent exposure to PCBs in soil at DU 2-2, which contribute to a calculated risk, developed using this guidance.*
Toxicological Benchmarks for Wildlife: 1996 Revision	*ES/ER/TM-86/R3*	*To Be Considered*	*Oak Ridge National Laboratory guidance on toxicity values for wildlife*	*Used to calculate potential wildlife risks and PRGs. This alternative would not prevent exposure to PCBs in soil at DU 2-2, which contribute to a calculated risk, developed using this guidance.*
Wildlife Exposure Factors Handbook. Vols. I and II	*EPA/600-R/R-93/187a*	*To Be Considered*	*EPA guidance on identifying exposure parameters for wildlife*	*Used to calculate potential wildlife risks and PRGs. This alternative would not prevent exposure to PCBs in soil at DU 2-2, which contribute to a calculated risk, developed using this guidance.*
Development and Validation of	*ES/ER/TM-220*	*To Be Considered*	*Oak Ridge National Laboratory guidance on uptake of contaminants*	*Used to calculate potential wildlife risks and PRGs. This alternative would not*

Bioaccumulation Models for Earthworms			*from soil to earthworms*	*prevent exposure to PCBs in soil at DU 2-2, which contribute to a calculated risk, developed using this guidance.*

EPA Specific Comment 94: Table B-2a - For the EPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination, Action to be Taken text change to: "Used in the development of the PRG for surface soil at DU 2-2 to be protective of unrestricted use by humans and ecological receptors. The action to be taken under this alternative will mitigate risk to receptors through excavation of soils in DU 2-2 that exceed the ecological PRG and instituting land use controls to restrict residential use at DU 2-2 for areas exceeding the residential PRG and establish requirements that any demolition of Building 219 will not cause any release of PCB-contaminated media."

Add the following Federal TBCs:

Recommendations of the Technical Review Workgroup for Lead for an approach to Assessing Risks Associated with Adult Exposure to Lead In Soil	*EPA-540-R-03-001 (January 2003)*	*To be Considered*	*EPA Guidance for evaluating risks posed by lead in soil.*	*Used to compute the potential risks caused by exposure to lead in site soil. The action to be taken under this alternative will mitigate risk to receptors through excavation of soil that exceeds the PRGs for industrial use at DU 2-1 and land use controls to restrict residential use at DU 2-1.*
Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds.	*EPA/600/R-10/005*	*To be Considered*	*EPA guidance for evaluating risks posed by dioxin.*	*Used in the development of the dioxin PRG for soil to be protective of unrestricted use by humans. The action to be taken under this alternative will mitigate risk to receptors through land use controls to restrict residential use at DU 2-1.*
Cite any other guidance used to develop the PCB eco-risk PRG.				

Response: The EPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination has been added with the suggested Action to be Taken. The two items above for lead and dioxins are not relevant to this FS because those analytes were not risk drivers and PRGs were not developed for them. The following additional TBCs have been added:

Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments	*EPA/540/R-97/006*	*To Be Considered*	*EPA guidance for conducting ecological risk assessments*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through excavation of soil that exceeds the ecological PRG at DU 2-2.*
Final Guidelines	*EPA/630/R095/002F*	*To Be*	*EPA guidance for*	*Used to calculate potential*

for Ecological Risk Assessment		*Considered*	*conducting ecological risk assessments*	*wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through excavation of soil that exceeds the ecological PRG at DU 2-2.*
Guidance for Developing Ecological Soil Screening Levels	*OSWER Directive 9285.7-55*	*To Be Considered*	*EPA guidance for generating ecological soil screening levels*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through excavation of soil that exceeds the ecological PRG at DU 2-2.*
Toxicological Benchmarks for Wildlife: 1996 Revision	*ES/ER/TM-86/R3*	*To Be Considered*	*Oak Ridge National Laboratory guidance on toxicity values for wildlife*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through excavation of soil that exceeds the ecological PRG at DU 2-2.*
Wildlife Exposure Factors Handbook. Vols. I and II	*EPA/600-R/R-93/187a*	*To Be Considered*	*EPA guidance on identifying exposure parameters for wildlife*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through excavation of soil that exceeds the ecological PRG at DU 2-2.*
Development and Validation of Bioaccumulation Models for Earthworms	*ES/ER/TM-220*	*To Be Considered*	*Oak Ridge National Laboratory guidance on uptake of contaminants from soil to earthworms*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through excavation of soil that exceeds the ecological PRG at DU 2-2.*

EPA Specific Comment 95: Table B-2b - If overwintering bat habitat is present in Building 219 [or will be assessed during remedial design] add the following federal location-specific ARAR:

Federal Endangered Species Act of 1973 (ESA); Endangered and Threatened Wildlife and Plants, Special Rules: Northern Long-Eared Bat	*16 U.S.C. 1531 et seq.; 33 C.F.R. Part 320 & 50 C.F.R § 17.40(o)*	*Applicable*	*The purpose of the ESA is to "conserve the ecosystems upon with threatened and endangered species depend" and to conserve and recover listed species. Federal agencies must consult with the U.S. Fish and Wildlife Service to ensure that the actions they authorize, fund, or carry out will not jeopardize listed species. The Northern Long-Eared Bat is listed as federally threatened. The Northern Long-Eared Bat has been documented overwintering in former military structures in the area.*	*[Overwintering bats have been observed in Building 219] or [As part of pre-design investigations, Building 219 will be assessed to determine if it is potential bat overwintering habitat. If federally protected bats are located, the U.S. Fish and Wildlife Service will be consulted with during the planning process so that investigations and remedial actions do not adversely impact bat populations or habitats that may be present.*

Response: Table B-2b Action-Specific ARARs and TBCs from the Draft FS has been renamed as Table B-2c and a new Table B-2b Location-Specific ARARs and TBCs has been added. The potential overwintering of the NLEB in unused military structures is not relevant to the remedial alternatives evaluated in this FS. Although the estimated areas with soil impacts within the DUs appear to be a mix of grassland and shrub land, which is not suitable habitat for the federally threatened Northern Long-eared Bat, this will need to be confirmed during planning for the remedial action. The following has been added to the new Table B-2b:

Requirement	*Citation*	*Status*	*Requirement Synopsis*	*Action to Be Taken to Attain Requirement*
Federal				
Federal Endangered Species Act of 1973 (ESA); Endangered and Threatened Wildlife and Plants, Special Rules: Northern Long-Eared Bat	*16 U.S.C. 1531 et seq.; 50 C.F.R § 17.40(o)*	*Applicable*	*The purpose of the ESA is to "conserve the ecosystems upon with threatened and endangered species depend" and to conserve and recover listed species. Federal agencies must consult with the U.S. Fish and Wildlife Service to ensure that the actions they authorize, fund, or carry out will not jeopardize listed species. The Northern Long-Eared Bat (NLEB) is listed as*	*This requirement may be applicable if clearing of trees of 3 inch diameter at breast height or larger is needed during the remedial action and the work is to be conducted within the April 15th - September 30th time-of-year restriction, under the assumed presence of the NLEB in the area of the site. The U.S. Fish and Wildlife Service will be consulted with, if required, during the planning process so that investigations and remedial*

			federally threatened. The NLEB range includes Coastal New England towns, such as Portsmouth, RI.	*actions do not adversely impact bat populations or habitat.*

EPA Specific Comment 96: Table B-2c - Pg 1 – If any water will be generated from the excavation work federal and State ARARs should be added to address any treatment that will be required prior to discharge of the treated water back into the ground, to a POTW, or into surface waters.

For the Action to be Taken text for the TSCA citation add a new third sentence: "LUCs will prevent residential development in areas where PCB contaminated soil exceeds residential levels, will prevent exposure to inaccessible soil under Building 219 and will establish requirements that any demolition of Building 219 will not cause any release of PCB-contaminated media."

Note that if the Navy decides to remove all PCBs to 1 mg/kg then the Section of the TSCA regulations to be cited would to 40 CFR 761.61(a) which does not require EPA to make a separate TSCA determination.

Response: As discussed in the response to EPA Specific Comment 61, water is not expected to be generated from excavation work. No changes were made to the table.

The text was revised as follows: "All soil exceeding identified Industrial and Ecological PRGs for PCBs at DU 3-3 will be excavated and disposed of off-site. The excavation, transportation, and management of PCB contaminated media will be performed in a manner to comply with TSCA, including air monitoring during remedial activities. Land use controls will prevent residential development in areas where PCB contaminated soil exceeds residential levels, will prevent exposure to inaccessible soil under Building 219, and will establish requirements that any demolition of Building 219 will not cause any release of PCB-contaminated media. The ROD will include a finding by the Director, Office of Site Remediation and Restoration, USEPA Region 1, that the remedy's soil PCB cleanup levels, along with the excavation and management of the contaminated media will not pose an unreasonable risk to human health or the environment."

Regarding the last part of the comment, it appears that 40 CFR 761.61(a) would apply to a "Self-implementing on-site cleanup" where a risk assessment is not performed (no PRGs are developed) and the responsible party plans to perform a PCB soil removal action. The OSWER Directive cited appears to be more appropriate to define why a value of 1 mg/kg is used rather than a lower risk-based value calculated using site-specific exposure parameters. Use of this directive/guidance value would then result in the need for written approval under 40 CFR 761.61(c). As such, no changes were made based on this part of the comment.

EPA Specific Comment 97: Table B-3a - For the EPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination, Action to be Taken text change to: "Used in the development of the PRG for surface soil at DU 2-2 to be protective of unrestricted use by humans and ecological receptors. The action to be taken under this alternative will mitigate risk to receptors through installation of an asphalt cover over soils in DU 2-2 that exceed the ecological PRG and instituting land use controls to restrict residential use at DU 2-2 for areas

exceeding the residential PRG and establish requirements that any demolition of Building 219 will not cause any release of PCB-contaminated media.”.”

Add the following Federal TBCs: Recommendations of the Technical Review Workgroup for Lead for an approach to Assessing Risks Associated with Adult Exposure to Lead In Soil	*EPA-540-R-03-001 (January 2003)*	*To be Considered*	*EPA Guidance for evaluating risks posed by lead in soil.*	*Used to compute the potential risks caused by exposure to lead in site soil. The action to be taken under this alternative will mitigate risk to receptors through installation of an asphalt cover over soil that exceeds the PRGs for industrial use at DU 2-1 and land use controls to restrict residential use at DU 2-1.*
Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds.	*EPA/600/R-10/005*	*To be Considered*	*EPA guidance for evaluating risks posed by dioxin.*	*Used in the development of the dioxin PRG for soil to be protective of unrestricted use by humans. The action to be taken under this alternative will mitigate risk to receptors through land use controls to restrict residential use at DU 2-1.*
Cite any other guidance used to develop the PCB eco-risk PRG.				

Response: The EPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination has been added with the suggested Action to be Taken. The two items above for lead and dioxins are not relevant to this FS because those analytes were not risk drivers and PRGs were not developed for them. The following additional TBCs have been added:

EPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination	*EPA/540/G-90/007 (August 1990)*	*To Be Considered*	*This guidance provided preliminary remediation goals (PRGs) for PCBs for various media.*	*Used in the development of the PRG for surface soil at DU 2-2 to be protective of unrestricted use by humans and ecological receptors. The action to be taken under this alternative will*

				mitigate risk to receptors through installation of an asphalt cover over soils in DU 2-2 that exceed the ecological PRG and instituting land use controls to restrict residential use at DU 2-2 for areas exceeding the residential PRG and establish requirements that any demolition of Building 219 will not cause any release of PCB-contaminated media.
Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments	*EPA/540/R-97/006*	*To Be Considered*	*EPA guidance for conducting ecological risk assessments*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through installation of an asphalt cover over soil that exceeds the ecological PRG at DU 2-2.*
Final Guidelines for Ecological Risk Assessment	*EPA/630/R095/002F*	*To Be Considered*	*EPA guidance for conducting ecological risk assessments*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through installation of an asphalt cover over soil that exceeds the ecological PRG at DU 2-2.*
Guidance for Developing Ecological Soil Screening Levels	*OSWER Directive 9285.7-55*	*To Be Considered*	*EPA guidance for generating ecological soil screening levels*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through installation of an asphalt cover over soil that exceeds the ecological PRG at DU 2-2.*
Toxicological Benchmarks for Wildlife: 1996 Revision	*ES/ER/TM-86/R3*	*To Be Considered*	*Oak Ridge National Laboratory guidance on toxicity values for wildlife*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through installation of an asphalt cover over soil that exceeds the ecological PRG at DU 2-2.*
Wildlife Exposure Factors Handbook. Vols.	*EPA/600-R/R-93/187a*	*To Be Considered*	*EPA guidance on identifying exposure parameters for wildlife*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under*

I and II				*this alternative will mitigate risk to receptors through installation of an asphalt cover over soil that exceeds the ecological PRG at DU 2-2.*
Development and Validation of Bioaccumulation Models for Earthworms	*ES/ER/TM-220*	*To Be Considered*	*Oak Ridge National Laboratory guidance on uptake of contaminants from soil to earthworms*	*Used to calculate potential wildlife risks and PRGs. The action to be taken under this alternative will mitigate risk to receptors through installation of an asphalt cover over soil that exceeds the ecological PRG at DU 2-2.*

EPA Specific Comment 98: Table B-3b - If overwintering bat habitat is present in Building 219 [or will be assessed during remedial design] add the following federal location-specific ARAR:

Federal Endangered Species Act of 1973 (ESA); Endangered and Threatened Wildlife and Plants, Special Rules: Northern Long-Eared Bat	*16 U.S.C. 1531 et seq.; 33 C.F.R. Part 320 & 50 C.F.R § 17.40(o)*	*Applicable*	*The purpose of the ESA is to "conserve the ecosystems upon with threatened and endangered species depend" and to conserve and recover listed species. Federal agencies must consult with the U.S. Fish and Wildlife Service to ensure that the actions they authorize, fund, or carry out will not jeopardize listed species. The Northern Long-Eared Bat is listed as federally threatened. The Northern Long-Eared Bat has been documented overwintering in former military structures in the area.*	*[Overwintering bats have been observed in Building 219] or [As part of pre-design investigations, Building 219 will be assessed to determine if it is potential bat overwintering habitat. If federally protected bats are located, the U.S. Fish and Wildlife Service will be consulted with during the planning process so that investigations and remedial actions do not adversely impact bat populations or habitats that may be present.*

Response: Table B-3b Action-Specific ARARs and TBCs from the Draft FS has been renamed as Table B-3c and a new Table B-3b Location-Specific ARARs and TBCs has been added. The potential overwintering of the NLEB in unused military structures is not relevant to the remedial alternatives evaluated in this FS. Although the estimated areas with soil impacts within the DUs appear to be a mix of grassland and shrub land, which is not suitable habitat for the federally threatened Northern Long-eared Bat, this will need to be confirmed during planning for the remedial action. The following has been added to the new Table B-3b:

Requirement	*Citation*	*Status*	*Requirement Synopsis*	*Action to Be Taken to Attain Requirement*
Federal				
Federal Endangered Species Act of 1973 (ESA); Endangered and Threatened Wildlife and Plants, Special Rules: Northern Long-Eared Bat	*16 U.S.C. 1531 et seq.; 50 C.F.R § 17.40(o)*	*Applicable*	*The purpose of the ESA is to "conserve the ecosystems upon with threatened and endangered species depend" and to conserve and recover listed species. Federal agencies must consult with the U.S. Fish and Wildlife Service to ensure that the actions they authorize, fund, or carry out will not jeopardize listed species. The Northern Long-Eared Bat (NLEB) is listed as federally threatened. The NLEB range includes Coastal New England towns, such as Portsmouth, RI.*	*This requirement may be applicable if clearing of trees of 3 inch diameter at breast height or larger is needed during the remedial action and the work is to be conducted within the April 15th - September 30th time-of-year restriction, under the assumed presence of the NLEB in the area of the site. The U.S. Fish and Wildlife Service will be consulted with, if required, during the planning process so that investigations and remedial actions do not adversely impact bat populations or habitat.*

Appendix C – Cost Estimates

EPA Specific Comment 99: Planning Cost Estimate Worksheet:

Alternative S-2: Revise the description of the alternative to be consistent with all comments provided above.

The number of analyses for each parameter does not match the quantities assumed in the backup worksheet. Please review and correct as appropriate.

The areas and volumes used in the calculations do not match the areas and volumes identified in the text (see page 39). Please review and correct as appropriate.

Alternative S-3: Revise the description of the alternative to be consistent with all comments provided above.

The number of analyses for each parameter does not match the quantities assumed in the backup worksheet. Please review and correct as appropriate.

The areas and volumes used in the calculations do not match the areas and volumes identified in the text (see page 39). Please review and correct as appropriate.

Response: Appendix C was updated based on the comments received and is attached.

The Backup Worksheet shows sample quantities without QA/QC samples. The cost estimate includes QA/QC samples. Some adjustments were made to the sampling and analysis assumptions based on the changes to PRGs. The areas and volumes were updated, where needed, based on the revised quantities.

RIDEM General Comments:

RIDEM General Comment 1. Figures in this FS refer to tanks as "Former"; however, according to the DGA, this Site is occupied by 11 2.5-million gallon capacity underground storage tanks that have not been permanently decommissioned or achieved official closure by RIDEM. Figures in Section 1.0 and 2.0 of the DGA refer to "Tanks", not "Former Tanks". Please revise the FS figures to be consistent with the DGA figures.

Response: The figures were all revised to refer to "Tanks".

RIDEM General Comment 2. Please note that a table of action-specific ARARs was not provided in this FS. Please provide this table in the response to comments, which should be similar to the ARARs listed in the RODs for Tank Farms 4 (DU 4-1) and 5 (DU 5-1).

Response: Action-specific ARARs are alternative specific. Tables B-2c and B-3c present the Action-Specific ARARs and TBC. No changes were made to the text.

RIDEM Specific Comments:

RIDEM Specific Comment 1. p. vii, Executive Summary, 2nd paragraph, 1st sentence – Please change "former transformer B219" to "B219" and "release" to "releases". This comment also applies to Section 1.0, Project Background.

Response: All references to "former transformer B219" were revised to "B219" and "release" was modified to "releases" in the referenced sentence.

RIDEM Specific Comment 2. p. vii, Executive Summary, 2nd paragraph, 4th sentence – Please change "that warrants remedial action" to ", and recommended that an FS be conducted for these areas", to be consistent with the DGA. This comment also applies to Section 1.0, Project Background.

Response: The text was revised as follows: "The DGA concluded that soil associated with only two of the areas posed a potential risk, and recommended that an FS be conducted for these areas, under CERCLA."

RIDEM Specific Comment 3. p. vii, Executive Summary, 2nd paragraph, 5th sentence – Please insert "PAHs, chromium and arsenic in" before "soil at DU 2-1". This comment also applies to Section 1.0, Project Background.

Response: The text was revised as follows: "Specifically, the DGA concluded that there is an unacceptable human health risk to hypothetical child and adult residents from exposure to polycyclic aromatic hydrocarbons (PAHs), chromium, and arsenic in soil at DU 2-1."

RIDEM Specific Comment 4. p. vii, Executive Summary, 2nd paragraph, 6th sentence – Please insert "surface" before "soil at DU 2-2". This comment also applies to Section 1.0, Project Background.

Response: The text was revised as requested.

RIDEM Specific Comment 5. p. vii, Executive Summary, 2nd paragraph, last sentence – Please remove the comma after "Although" at the beginning of the sentence. This comment also applies to Section 1.0, Project Background.

Response: The text was revised as requested.

RIDEM Specific Comment 6. p. vii, Executive Summary, 3rd paragraph – Please define the acronyms "USEPA", and "RIDEM" as this is the first time they are used in the FS. Additionally, there is no mention of perfluorocarbons in the DGA. Please reference communications and/or discussions with regulators regarding this additional work. This comment also applies to Section 1.0, Project Background.

Response: The text was revised to define "USEPA" and "RIDEM" the first time they were used in the Executive Summary and main text of the FS Report. In addition, the fourth sentence of the paragraph was revised as follows in order to provide additional background on the planned work related to PFCs: "In addition, the Navy is preparing a tank farm wide groundwater plan for Tank Farm 2, which is scheduled as a draft to EPA and RIDEM later in 2016. As part of this process, the Navy has identified petroleum-related AOCs associated with the former tanks and infrastructure at Tank Farm 2, as well as the potential for perfluorocarbons (PFCs) from former foam firefighting training equipment and/or operations."

RIDEM Specific Comment 7. p. viii, Executive Summary, Site Description, 1st paragraph, 4th and 5th sentences. – Please change "Defense Logics Agency (DLA)" to Defense Energy Support Center (DESC)" to be consistent with DGA, and the rest of the FS.

Response: The text was revised as requested.

RIDEM Specific Comment 8. p. viii, Executive Summary, Site Description, 1st paragraph, last sentence. – In list of acronyms, "RI" is defined as "Remedial Investigation". It may make the report clearer to not also use "RI" when referring to the State of Rhode Island, but rather to spell it out (or change RI to RIDEM when applicable). This comment also applies to Section 1.3, Tank Farm 2 Background Information.

Response: All references to "RI UST Regulations" were changed to "state UST Regulations".

RIDEM Specific Comment 9. p. x, Executive Summary, PRG Table for DU 2-1 – Please note that the RIDEM DEC for beryllium is 1.5 mg/kg. See comment #26 below.

Response: Based on the correction of the RIDEM residential DEC for beryllium, that metal is no longer a COC, since the maximum concentration in soil at DU 2-1 does not exceed the corrected residential DEC. As such, beryllium was removed from the PRG table.

RIDEM Specific Comment 10. p. xi, Executive Summary, DU 2-1, 1st paragraph, 4th sentence – Delete "indicating they may be background", since the data do not necessarily support this statement.

Response: The text was revised as requested.

RIDEM Specific Comment 11. p. 1, Section 1.0, Project Background, 2nd paragraph, 2nd sentence – The DGA doesn't quite conclude that groundwater is not impacted at Tank Farm 2, but rather that there are low residual levels of contaminants and that Navy is deferring additional assessment of groundwater until a later time.

Response: The DGA Report stated: "Based upon a review of historical site data including groundwater and soil sampling results, groundwater was not considered a media that has been impacted by potential releases to the environment." As such, no changes were made to the text.

RIDEM Specific Comment 12. p. 1, Section 1.0, Project Background, 3rd paragraph, 5th sentence – Please remove the extra comma after "tank closure".

Response: The edit has been made as requested.

RIDEM Specific Comment 13. p. 14, Section 1.3.7, Summary of Human Health Risk Assessment, 3rd paragraph, 2nd sentence – The COPCs described for DU 2-2 appear to be a subset of the COPCs for DU 2-1. Please change "DU 2-2" to "DU 2-1" and expand the COPC list to include PAHs, metals, PCBs, and TCDD, referencing the criteria for selection of COPCs provided in the DGA. Add a sentence indicating the PCBs were the only COPCs identified for DU 2-2.

Response: The paragraph has been revised as follows:

"As part of the data evaluation, chemicals of potential concern (COPCs) were selected by comparing the maximum detection in a sampled medium to risk-based concentrations (RBCs). If the maximum detection was greater than the lower RBC, the analytical parameter was retained as a COPC. In accordance with Navy policy (Tetra Tech, 2015) chemicals present at background concentrations were not retained as COPCs in this HHRA. COPCs that were retained in surface soil or all soil at DU 2-1 included PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene), dioxins/furans (2,3,7,8-TCDD equivalents), and metals (aluminum, antimony, arsenic, chromium, cobalt, iron, manganese, and thallium). PCBs (Aroclor 1260) were retained as a COPC for surface soil at DU 2-2."

RIDEM Specific Comment 14. p. 18, Section 2.0, Development of Remediation Criteria and Screening of Technologies, 1st paragraph, 1st sentence – Please change "identified as DU 2-1" to "identified at DU 2-1".

Response: The typo has been corrected as requested.

RIDEM Specific Comment 15. p. 23, Section 2.3, Development of Preliminary Remediation Goals, 2nd paragraph, 1st sentence – Please change "corresponds" to "correspond". Also, please note that the EPA RSLs were reissued in November 2015. Please confirm that toxicity values and volatilization factors for the contaminants of concern have not changed. Lastly, please provide a discussion either in this section or in Appendix A.3, of how site-specific background values were calculated.

Response: The typo has been corrected as requested.

As noted in the response to EPA Specific Comment 38, the values used for this FS during development of PRGs have not changed with the issuance of the November 2015 RSL tables. References to the June 2015 update in the 2nd paragraph have been revised to refer to the November 2015 update.

The 2nd footnote at the bottom of Page 24 was moved to the body of the text and expanded upon as follows:

"Background concentrations have been established for metals in soils at NAVSTA Newport and Tank Farm 2 using an EPA-approved basewide background study (Tetra Tech, 2008). In the DGA report (Tetra Tech, 2015), it was determined that the Newport Silt Loam background data from the Basewide Background Study Report was appropriate for comparison to site data based upon historical soil maps. Site specific background soil concentrations were calculated for arsenic and manganese in surface and subsurface soil using the Newport Silt Loam background data set identified in the DGA report. A 95% Upper Prediction Limit was calculated using the USEPA ProUCL software (Version 5.0.00). The background data set and ProUCL output are provided in Appendix A.3."

RIDEM Specific Comment 16. p. 33, Section 3.1.2, Alternative S-2 – Limited Soil Excavation with Land Use Controls, 1st paragraph, 2nd sentence – Please change the reference from "the ROD" to "the future ROD."

Response: The text was revised as requested.

RIDEM Specific Comment 17. p. 33, Section 3.1.3, Alternative S-3 - Containment with Land Use Controls, 3rd paragraph, last sentence – The square foot areas in this sentence ("440 square feet" at DU 2-1 and "460 square feet" at DU 2-2), differ from those described on pages xi and xii in the Executive Summary and in Section 2.4 (pages 27-28) which state 400 square feet for DU 2-1 and 390 square feet for DU 2-2. Please confirm the areas and update the text as needed.

Response: Based on the updated PRGs, the area and volume has been revised throughout the report and inconsistencies have been corrected. The sentence referenced in this comment has been revised to state 400 square feet for DU 2-1 and 390 feet feet for DU 2-2.

RIDEM Specific Comment 18. p. 34, Section 3.1.3, Alternative S-3 – Containment with Land Use Controls, 2nd paragraph, 1st sentence. – Please change the reference from the "the ROD" to "the future ROD."

Response: The text was revised as requested.

RIDEM Specific Comment 19. p. 34, Section 3.1.4, Alternative S-4 – Excavation to Residential PRGs with Off-Site Disposal, 1st paragraph, 2rd sentence – Please change "be assessed" to "been assessed".

Response: The text was revised as requested.

RIDEM Specific Comment 20. p. 34, Section 3.1.4, Alternative S-4 – Excavation to Residential PRGs with Off-Site Disposal, Excavation, 1st paragraph, 1st sentence – The volume

of soil to be removed from DU 2-2 ("34 cubic yards") differs from the volume described in the Executive Summary (page xii) and Section 2.4 (page 28), which state 29 cubic yards for DU 2-2. Please confirm the volume and update the text as needed.

Response: Based on the updated PRGs, the area and volume has been revised throughout the report and inconsistencies have been corrected. The sentence referenced in this comment has been revised to state 425 cubic yards for DU 2-1 and 61 cubic yards for DU 2-2.

RIDEM Specific Comment 21. p. 35, Section 3.1.4, Alternative S-4 – Excavation to Residential PRGs with Off-Site Disposal, 3rd paragraph, 2nd sentence – Because an asphalt cover is a direct contact and infiltration control and not a storm water control, please replace "storm water runoff controls (such as an asphalt cover materials)" with "an asphalt cover."

Response: The text was revised as follows: "Once the excavation is complete, an asphalt cover will not need to be implemented because the residual contaminant concentrations would not exceed the RIDEM GA Leachability Criteria."

RIDEM Specific Comment 22. p. 39, Section 4.2.1, Alternative S-2 – Limited Soil excavation with Land Use Controls, Soil Removal table – The volumes of soil to be removed from DU 2-1 (65 cubic yards) and DU 2-2 (34 cubic yards) provided in this table differ from the volumes described in the Executive Summary (p. xii), and Section 2.4 (p. 28) which state 60 cubic yards for DU 2-1 and 29 cubic yards for DU 2-2. The cost table in Appendix C appears to be based on 90 cy (for both DU 2-1 and 2-2). Please confirm the volumes and update the text as needed.

Response: Based on the updated PRGs, the area and volume has been revised throughout the report and inconsistencies have been corrected. The table referenced in this comment has been revised as follows:

Exposure Area	Area of Proposed Soil Removal (sq. feet)	Volume of Proposed Soil Removal (cubic yards)
DU 2-1	400	60
DU 2-2	390	29

RIDEM Specific Comment 23. pp. 44-45, Section 4.3.1, Alternative S-3 – Containment with Land Use Controls, tables – Refer to Comments #17 & #20.

Response: Based on the updated PRGs, the area and volume has been revised throughout the report and inconsistencies have been corrected. The tables in this section have been revised as follows:

Exposure Area	Area of Proposed Asphalt Cover (sq. feet)
DU 2-1	400
DU 2-2	390

Exposure Area	Area of Proposed LUCs (sq. feet)
DU 2-1	1,925
DU 2-2	300 plus building footprint

RIDEM Specific Comment 24. Table 2-7, Technology & Process Option Screening for Soil – According to Table 2-7, the remedial technology "Excavation & On-Site Disposal" was screened out, so this should be shaded. Also, the screening text seems to have been cut off. Please move thermal desorption from "Treatment: on-site" to "Treatment: in situ."

Response: Table 2-7 was revised so "Excavation & On-Site Disposal" was screened out. Additionally, the table was revised so all text was visible. "Thermal Desorption" was not moved to "Treatment: In-Situ" because there is already an equivalent process option, referred to a "Thermally Enhanced Soil Vapor Extraction".

RIDEM Specific Comment 25. Appendix A.1, Table 10 – The PRG selection criteria is unclear from the table itself; please add a footnote explaining the process.

Response: The following note was added to Table 10: "For the contaminants listed above, selected PRGs were identified as the lower of the risk-based goals or ARAR (if available). If site-specific background values are available and applicable, the greater of the two values was selected as the PRG."

RIDEM Specific Comment 26. Appendix A.1, Tables 11 and 12 – Please note the RIDEM DEC for beryllium is 1.5 mg/kg for both residential and industrial scenarios. The values provided in these tables are incorrect. Because the maximum detected concentration of beryllium in soil at DU 2-1 of 0.47 mg/kg does not exceed the DEC, it does not require a PRG to be calculated.

Response: Based on the correction of the RIDEM residential DEC for beryllium, that metal is no longer a COC, since the maximum concentration in soil at DU 2-1 does not exceed the corrected residential DEC.

RIDEM Specific Comment 27. Appendix A.3 – This appendix provides analytical results and ProUCL outputs for site-specific background sample results, but does not provide any explanation of how background concentrations were derived or what output concentrations were used. Please provide a discussion of how site-specific background values were calculated.

Response: The appendix has not been modified, but additional text has been added to Section 2.3 Development of Preliminary Remediation Goals. See response to RIDEM Specific Comment 15 for the added text.

Attachments

Table 2-2
Preliminary Remediation Goals (PRGs) for Soil at Decision Unit 2-1

Analyte	Selected Surface Soil PRG (mg/kg)	Basis[1]	Selected Subsurface Soil PRG (mg/kg)	Basis[1]
Residential Use Scenario				
Benzo(a)anthracene	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}
Benzo(a)pyrene	0.016	ILCR = 10^{-6}	0.016	ILCR = 10^{-6}
Benzo(b)fluoranthene	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}
Benzo(g,h,i)perylene	0.8	RDEC	0.8	RDEC
Benzo(k)fluoranthene	0.9	RDEC	0.9	RDEC
Chrysene	0.4	RDEC	0.4	RDEC
Dibenz(a,h)anthracene	0.016	ILCR = 10^{-6}	0.016	ILCR = 10^{-6}
Indeno(1,2,3-cd)pyrene	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}
Naphthalene	0.8	Leachability	0.8	Leachability
Arsenic	17	Background	6	Background
Chromium[2]	0.31	ILCR = 10^{-6}	0.31	ILCR = 10^{-6}
Manganese	390	RDEC	460	Background
Industrial/Restricted Recreational Use Scenario				
Benzo(a)pyrene	0.8	I/C DEC	0.8	I/C DEC
Naphthalene	0.8	Leachability	0.8	Leachability
Arsenic	17	Background	7	I/C DEC

Notes

1. See Appendix A for PRG development and basis:
2. Chromium speciation has not been performed for this site. At this time, chromium has been assumed to be hexavalent chromium even though there is no current evidence that it would be this species.

ILCR = 10^{-6} - Incremental Lifetime Cancer Risk of 10-6 developed based on risk results from the human health risk assessment.

RDEC and I/C DEC - RIDEM Remediation Regulations, DEM-DSR-01-93, November 2011, Table 1 (Residential and Industrial/Commercial Direct Exposure Criteria [DEC])

Leachability - RIDEM Remediation Regulations, DEM-DSR-01-93, November 2011, Table 2 (GA Leachability Criteria)

Background - If RIDEM criteria or risk-based PRGs were below background concentrations for the site, the background concentration was selected. The background data set is included in Appendix A.3 of this report and was obtained from the Basewide Background Study Report for Naval Station Newport, Tetra Tech NUS, Inc., July 2008.

Table 2-3
Preliminary Remediation Goals (PRGs) for Soil at Decision Unit 2-2

Analyte	Selected PRG (mg/kg)	Basis[1]
Residential Use Scenario		
PCBs	1.0	EPA Residential Guidance Value
Industrial/Restricted Recreational Use Scenario		
PCBs	10	I/C DEC, Leachability
Ecological Scenario		
PCBs	3.6	Ecological

Notes

1. See Appendix A for PRG development and basis:
Note that the selected PRG represents the lower of the ecological-based PRG for the short-tailed shrew and American robin and the applicable RIDEM Remediation Regulation criteria. The ecological-based PRG corresponds to the geometric mean of the NOAEL- and LOAEL-based TRVs for the short-tailed shrew.

TABLE 2-4
ANALYTICAL RESULTS - SURFACE SOIL AT DECISION UNIT 2-1

SAMPLE ID			TF2-001-SS1000-0001	TF2-001-SS1001-0001	TF2-001-SS1002-0001	TF2-001-SS1003-0001-D	TF2-001-SS1003-0001	TF2-001-SS1004-0001	TF2-001-SS1005-0001	TF2-001-SS1006-0001	TF2-001-SS1007-0001	TF2-001-SS1008-0001	TF2-001-SS1009-0001	TF2-001-SS1010-0001
SAMPLE DATE			11/27/2013	11/25/2013	11/25/2013	11/25/2013	11/25/2013	11/25/2013	11/27/2013	11/27/2013	11/25/2013	11/25/2013	11/25/2013	11/27/2013
LOCATION ID		Industrial Worker /	TF2-001-SB1000	TF2-001-SB1001	TF2-001-SB1002	TF2-001-SB1003	TF2-001-SB1003	TF2-001-SB1004	TF2-001-SB1005	TF2-001-SB1006	TF2-001-SB1007	TF2-001-SB1008	TF2-001-SB1009	TF2-001-SB1010
DEPTH INTERVAL	Residential PRG	Restricted Recreational	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
SA CODE		PRG	NORMAL	NORMAL	NORMAL	DUPLICATE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
METALS (mg/kg)	**(mg/kg)**	**(mg/kg)**												
ALUMINUM			12200	12600	14200	14000	14600	12700	14000	14600	14000	14600	11900	13400
ANTIMONY			0.18 J	0.13 J	0.08 J	0.08 J	0.09 J	0.08 J	0.17 J	0.12 J	0.2 J	0.08 J	0.26 J	0.08 J
ARSENIC	17	17	4.1	5.1	6.1	6.4	7.1	5.4	7.7	6.8	5.8	6.6	4.9	6.4
BARIUM			17.1	15.4	14.6	12.4	14.2	15.8	18.5	17.7	22.8	17.7	12.6	15.5
BERYLLIUM			0.26	0.3	0.3	0.35	0.34	0.3	0.34	0.33	0.34	0.36	0.27	0.32
CADMIUM			0.08 J	0.08	0.1	0.07 J	0.08	0.11	0.11	0.12	0.14	0.12	0.07 J	0.09
CALCIUM			794	843	833	502	666 J	604	2630	728	1090	923	1090	758
CHROMIUM, TOTAL	0.31		**15.1**	**16.5**	**17.5**	**17.3**	**18**	**14.9**	**16.6**	**16.7**	**16**	**17**	**15.8**	**17.3**
COBALT			10.9	14.4	16.6	11	12	10.4	10.4	11.6	9.6	13.1	15.6	12.6
COPPER			14.2	17	17.3	18.1	18.5	16.2	18.5	17.1	15	18	17.6	20.4
IRON			23800	25600	27800	24700	27000	22600	24100	24800	22900	27200	27700	26800
LEAD			18.3 J	11.4	12.2	14	16.4	12.1 J	18.6 J	14.1 J	26.7 J	12.6 J	12.3 J	13.6
MAGNESIUM			3740	3920	4560	4100	4190	3750	4220	4230	3450	4450	4170	4280
MANGANESE	390		311	**458**	**394**	277	332	294	267	314	270	356	**459**	336
MERCURY			< 0.02 U	< 0.016 U	< 0.02 U	0.09 J	0.21 J	0.17	0.07	0.04	0.11	0.07	< 0.016 U	0.05
NICKEL			21.5	26.2	26.6	23.2	23.2	21.1	20.7	21.8	18.6	24.4	28.4	24.7
POTASSIUM			405	302 J	390	357 J	390 J	379	453	501	463	498	336	360
SELENIUM			< 0.26 U	0.2 J	0.21 J	0.11 J	0.29 J	< 0.29 U	< 0.25 U	< 0.26 U	< 0.24 U	< 0.26 U	< 0.23 U	0.31 J
SILVER			0.04 J	0.03 J	0.04 J	0.05 J	0.07 J	0.05 J	0.04 J	0.56	0.05 J	0.04 J	0.03 J	0.04 J
SODIUM			51.2 J	47.6 J	60.9 J	59.3 J	53.1 J	39.7 J	48.8 J	44.2 J	47.5 J	46.6 J	42.8 J	< 39.4 U
THALLIUM			0.05 J	0.04 J	0.04 J	0.04 J	0.05 J	0.05 J	0.06 J	0.06 J	0.08 J	0.05 J	0.03 J	0.04 J
VANADIUM			20.9	17.9	20.6	18.4	21.1	17.4	17.8	19	19.9	19.2	20	20
ZINC			52.1	56.6	61.5	52.7	52.6	46.8	53	49.9	53.9	56	64.4	57.7
PCDD/F (ng/kg)														
1,2,3,4,6,7,8,9-OCTACHLORODIBENZO-P-DIOXIN			2900	4500	4700 J	7300	6400	4900	4400	5300	6000	6600	4000	5000
1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN			11	< 0.92 U	1.6 J	< 1.6 U	1.6 J	2.5 J	3.8 J	1.8 J	4.8 J	< 1.3 U	5.6	3.8 J
1,2,3,4,6,7,8-HEPTACHLORODIBENZO-P-DIOXIN			54	29	30	36	36	34	36	31	50	33	46	39
1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN			< 0.1 U	< 0.031 U	< 0.049 U	0.29 J	< 0.053 U	0.14 J	< 0.065 U	< 0.045 U	< 0.044 U	0.15 J	0.31 J	< 0.053 U
1,2,3,4,7,8-HEXACHLORODIBENZOFURAN			0.96 J	0.29 J	0.51 J	0.62 J	0.76 J	0.53 J	0.67 J	0.6 J	1 J	< 0.36 U	0.88 J	0.68 J
1,2,3,4,7,8-HEXACHLORODIBENZO-P-DIOXIN			0.78 J	0.19 J	0.22 J	0.3 J	0.29 J	0.3 J	0.27 J	0.22 J	0.48 J	0.29 J	0.44 J	0.34 J
1,2,3,6,7,8-HEXACHLORODIBENZOFURAN			0.8 J	0.19 J	0.48 J	0.51 J	0.46 J	0.41 J	0.61 J	0.42 J	0.73 J	0.52 J	0.65 J	0.57 J
1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN			1.7 J	0.22 J	0.4 J	0.42 J	0.54 J	0.57 J	0.86 J	0.39 J	1.1 J	0.54 J	1.2 J	0.82 J
1,2,3,7,8,9-HEXACHLORODIBENZOFURAN			< 0.05 U	< 0.031 U	< 0.034 U	< 0.035 U	< 0.039 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.034 U	< 0.027 U	< 0.026 U	< 0.031 U
1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN			1.6 J	0.31 J	0.31 J	0.44 J	0.44 J	0.52 J	0.92 J	0.45 J	1.1 J	0.55 J	1.1 J	0.77 J
1,2,3,7,8-PENTACHLORODIBENZOFURAN			0.2 J	< 0.04 U	< 0.04 U	0.24 J	< 0.045 U	0.13 J	0.28 J	< 0.042 U	0.26 J	< 0.077 U	0.2 J	0.15 J
1,2,3,7,8-PENTACHLORODIBENZO-P-DIOXIN			0.19 J	< 0.062 U	< 0.07 U	0.093 J	< 0.092 U	< 0.063 U	0.26 J	< 0.073 U	0.2 J	0.11 J	< 0.056 U	0.18 J
2,3,4,6,7,8-HEXACHLORODIBENZOFURAN			1.2 J	0.096 J	0.19 J	0.57 J	0.33 J	0.22 J	0.53 J	0.32 J	0.73 J	0.4 J	0.61 J	0.52 J
2,3,4,7,8-PENTACHLORODIBENZOFURAN			0.32 J	0.13 J	0.12 J	0.23 J	0.29 J	0.18 J	0.32 J	0.19 J	0.43 J	0.15 J	0.21 J	0.26 J
2,3,7,8-TETRACHLORODIBENZOFURAN			< 0.63 U	< 0.26 U	< 0.36 U	< 0.25 U	0.36 J	< 0.3 U	0.33 J	< 0.14 U	< 0.77 U	< 0.29 U	< 0.24 U	0.19 J
2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN			< 0.037 U	< 0.044 U	< 0.043 U	< 0.038 U	< 0.042 U	< 0.033 U	< 0.041 U	< 0.042 U	< 0.044 U	< 0.032 U	< 0.031 U	< 0.035 U
HEPTACHLORODIBENZOFURAN			31	1.6 J	3.3 J	3 J	2.9 J	4.7 J	7.4	3 J	9.7	2.5 J	11	7.2
HEPTACHLORODIBENZO-P-DIOXINS			100	51	54	66	66	64	71	55	100	60	81	73
HEXACHLORODIBENZOFURAN			15 J	2.3 J	3.8 J	5.4 J	5.9 J	5 J	6.6 J	4.1 J	9.5	4.5 J	8.4	6.2 J
HEXACHLORODIBENZO-P-DIOXIN			14	3.2 J	4 J	4.9 J	5.6 J	6 J	8.2 J	4.2 J	11 J	5.3 J	9.4 J	8.4 J
OCTACHLORODIBENZOFURAN			31	2.1 J	2.4 J	2.7 J	2.2 J	3.5 J	6 J	4 J	6.6 J	2 J	9.4 J	6 J
PENTACHLORODIBENZOFURAN			7.7 J	1.6 J	2.7 J	4.4 J	3.8 J	3.1 J	6.4 J	3 J	7.6 J	2.9 J	4.1 J	3.8 J
PENTACHLORODIBENZO-P-DIOXIN			2.1 J	0.6 J	1.1 J	0.91 J	1.3 J	1.3 J	2.1 J	1.2 J	3 J	1.1 J	1.6 J	1.5 J
TCDF, TOTAL			3.5 J	1.1 J	1 J	2.5 J	3 J	1.5 J	3.9 J	1.6 J	4.2 J	1.9 J	1.2 J	1.9 J
TETRACHLORODIBENZO-P-DIOXIN			0.42 J	< 0.054 U	0.35 J	0.64 J	0.46 J	0.36 J	0.74 J	0.36 J	1.1 J	0.86 J	0.4 J	0.62 J
TEQ			2.525	1.809	1.974	3.009	2.711	2.150	2.503	2.216	3.201	2.697	2.279	2.581
MISCELLANEOUS PARAMETERS														
TOTAL SOLIDS (PCT)			85	90	90	89	89	87	90	84	83	88	89	88
SVOCs (ug/kg)	**(ug/kg)**	**(ug/kg)**												
2-METHYLNAPHTHALENE			< 12 UJ	< 11 U	< 11 U	< 11 U	< 11 U	< 11 UJ	< 440 U	< 12 U	13 J	< 11 U	< 11 U	< 11 U
ACENAPHTHENE			2.2 J	< 11 U	< 11 U	7.8 J	< 11 U	< 11 U	1000	6.8 J	170	< 11 U	2.6 J	< 11 U
ACENAPHTHYLENE			< 12 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	26	< 12 U	12 J	< 11 U	< 11 U	< 11 U
ANTHRACENE			4.4 J	< 11 U	2.8 J	15 J	< 11 U	2.6 J	2200	14 J	340	< 11 U	4.2 J	2.7 J
BENZO[A]ANTHRACENE	160		31	5.2 J	15 J	50 J	24 J	15 J	**4500**	45	**1200**	< 11 U	24	19 J
BENZO[A]PYRENE	16	800	**31**	4.2 J	12 J	**37 J**	**20 J**	13 J	**3700**	**35**	**880**	8.4 J	**23 J**	16 J
BENZO[B]FLUORANTHENE	160		50	6.5 J	18 J	50 J	28 J	25	**5800**	53	**1500**	16 J	37	32
BENZO[G,H,I]PERYLENE	800		16 J	2.7 J	7 J	22 J	10 J	4.3 J	**1800**	16 J	410	< 11 UJ	9 J	8.9 J
BENZO[K]FLUORANTHENE	900		22 J	< 11 UJ	12 J	32	19 J	7.4 J	**1700**	23 J	370	5.2 J	17 J	11 J
CHRYSENE	400		39	6.4 J	16 J	43 J	22 J	14 J	**4900**	45	**1100**	7.9 J	28	19 J
DIBENZO[A,H]ANTHRACENE	16		7.6 J	< 11 UJ	3.5 J	7.6 J	3.7 J	3.9 J	**590 J**	7.4 J	**130**	< 1.9 U	4.8 J	4.6 J
FLUORANTHENE			70	8.4 J	35	130 J	28 J	34	12000 J	97	2700 J	18 J	55	40
FLUORENE			< 12 U	< 11 U	< 11 U	6.6 J	< 11 U	< 11 U	1300	7.6 J	180	< 11 U	< 11 U	< 11 U
INDENO[1,2,3-CD]PYRENE	160		32 J	3.2 J	7.5 J	26	13 J	13 J	**2800 J**	31 J	**700 J**	7.9 J	21 J	17 J
NAPHTHALENE	800	800	< 12 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	**1800**	< 12 U	66	< 11 U	< 11 U	< 11 U
PHENANTHRENE			32	3.1 J	17 J	86 J	3.9 J	18 J	11000	82	2000	9.9 J	33	21 J
PYRENE			63	6.9 J	22 J	80	20 J	26	11000 J	100	3200 J	15 J	62	44
TPH (mg/kg)														
EXTRACTABLE TPH C8-C44						23	18 J							
TPH-GASOLINE RANGE C6-C12						< 2.5 U	< 2 U							

Notes:
1. Bold and Blue shading = exceeded Residential PRG.
2. Bold and Orange shading = exceeded Residential and Industrial Worker/ Restricted Recreational PRGs

PRG = Preliminary Remediation Goal
U = not detected above report detection limits
J = estimate value

TABLE 2-5
ANALYTICAL RESULTS - SUBSURFACE SOIL AT DECISION UNIT 2-1

SAMPLE ID			TF2-001-SB1000-0204	TF2-001-SB1000-0810	TF2-001-SB1001-0204	TF2-001-SB1001-0810	TF2-001-SB1002-0204	TF2-001-SB1002-0405	TF2-001-SB1003-0204	TF2-001-SB1004-0204-D	TF2-001-SB1004-0204	TF2-001-SB1005-0204-D	TF2-001-SB1005-0204	TF2-001-SB1006-0204	TF2-001-SB1007-0204	TF2-001-SB1008-0204	TF2-001-SB1009-0204	TF2-001-SB1009-0810	TF2-001-SB1010-0204
SAMPLE DATE			11/27/2013	11/27/2013	11/25/2013	11/25/2013	11/25/2013	11/25/2013	11/25/2013	11/25/2013	11/25/2013	11/27/2013	11/27/2013	11/27/2013	11/25/2013	11/25/2013	11/25/2013	11/25/2013	11/27/2013
LOCATION ID		Industrial Worker /	TF2-001-SB1000	TF2-001-SB1000	TF2-001-SB1001	TF2-001-SB1001	TF2-001-SB1002	TF2-001-SB1002	TF2-001-SB1003	TF2-001-SB1004	TF2-001-SB1004	TF2-001-SB1005	TF2-001-SB1005	TF2-001-SB1006	TF2-001-SB1007	TF2-001-SB1008	TF2-001-SB1009	TF2-001-SB1009	TF2-001-SB1010
DEPTH INTERVAL		Restricted Recreational	2 - 4 ft	8 - 10 ft	2 - 4 ft	8 - 10 ft	2 - 4 ft	4 - 5 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	8 - 10 ft	2 - 4 ft
SA CODE	Residential PRG	PRG	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUPLICATE	NORMAL	DUPLICATE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
METALS (mg/kg)	**(mg/kg)**	**(mg/kg)**																	
ALUMINUM			16600	15300	14900	20500	15200	12200	11600	13900	13800	11400	9880	13000	13000	14700	16400	21000	16000
ANTIMONY			0.06 J	0.06 J	0.07	< 0.03 U	0.09	0.11	0.07 J	0.09 J	0.09 J	0.1 J	0.08 J	0.08 J	0.15 J	0.1 J	0.05 J	0.03 J	0.07 J
ARSENIC	6	7	**8.4**	**7.3**	**11.3**	**6.2**	**11.9**	**12.5**	**7.7**	**8.8**	**8**	5.6	5	**8.4**	**7.1**	**14.3**	**7.4**	5.6	**6.9 J**
BARIUM			15.2	12.6	16.2	7.2	19.8	19.2	17.9	23.7	25	19.6	20.3	17.1	18.5	27.2	16.1	7.7	16
BERYLLIUM			0.37	0.42	0.36	0.28	0.36	0.39	0.36	0.43	0.43	0.35	0.38	0.37	0.35	0.47	0.36	0.32	0.36
CADMIUM			0.08	0.08	0.13	0.06 J	0.07 J	0.28	0.1 J	0.08 J	0.06 J	0.11	0.11	0.13	0.13	0.15	0.11	0.09	0.09
CALCIUM			874	719	825	1550	720	1210	1030	830	608	1230	1250	1000	1610	1060	752	1660	874
CHROMIUM, TOTAL	0.31		**19.6**	**19.2**	**18.3**	**26.5**	**17.9**	**14.9**	**14.4**	**15.4**	**15.2**	**13.3**	**12.9**	**15.8**	**15.4**	**16.2**	**19**	**25.4**	**18.3**
COBALT			30.3	8.9	14.9	20.3	8.7	7.4	6.2	7.3	7.3	7.6	5.2	7.9	11.3	6.5	18	23.1	13.1
COPPER			19.1	16.9	19	20.6	15	12.1	11.4	13.3	15.6	12	10.2	13.5	13.6	13.5	17.6	20.6	14.8
IRON			29800	28200	28100	42500	23000	17000	18500	20700	23700	17900	16200	20000	21000	17900	29000	45100	31200
LEAD			14.5 J	13.6 J	14.8	11.4	13.5	15.4	12.8	13.1 J	12.4 J	13.1 J	13 J	14.5 J	13.4 J	19.3 J	16.1 J	11.2 J	13.5
MAGNESIUM			5040	4440	4270	7010	3760	2380	2930	3400	3710	3080	2860	3300	3540	2660	4920	6720	4900
MANGANESE	460		383	228	374	385	225	227	168	205	188	229	179	212	276	163	409	458	344
MERCURY			0.04	0.06	0.06 J	< 0.015 UJ	0.06 J	0.1 J	0.04 J	0.05	0.05	0.05	0.04	0.06	0.06	0.11	0.04	< 0.015 U	0.07
NICKEL			25.5	20.8	26.1	34.7	16	12.5	13.5	15.3	17.3	13.9	11.4	15.4	18	13.2	25.2	34	23
POTASSIUM			407	380	362	221	461	526	581	603	608	664	655	557	484	607	428	222	330 J
SELENIUM			< 0.22 U	< 0.21 U	0.33 J	0.17 J	0.37 J	0.36 J	0.31 J	< 0.26 U	< 0.19 U	< 0.22 U	< 0.21 U	< 0.23 U	< 0.23 U	0.37 J	< 0.23 U	< 0.25 U	< 0.22 U
SILVER			0.04 J	0.04 J	0.03 J	0.02 J	0.04 J	0.04 J	0.04 J	0.03 J	0.02 J	0.04 J	0.04 J	0.04 J	0.06 J	0.05 J	0.05 J	0.02 J	0.03 J
SODIUM			37.7 J	31.3 J	43.6 J	42.6 J	56.4 J	56.9 J	58 J	49.3 J	43 J	49 J	48.1 J	52 J	43.4 J	53.2 J	34.4 J	20.6 J	26.5 J
THALLIUM			0.05 J	0.06 J	0.05 J	0.02 J	0.08 J	0.1	0.07 J	0.08 J	0.06 J	0.07	0.08	0.08	0.09	0.12	0.05 J	0.02 J	0.05 J
VANADIUM			18.8	19.2	16.7	20.3	20.5	19.7	17.7	19.4	17.2	16	15.4	19.3	17.5	21.5	19.2	29.2	20.5
ZINC			53.1	47.4	55	73.6	43.4	41.6	34.7	40.9	44.2	38.3	33.6	40.3	45.4	38.8	54.2	85	58.8
PCDD/F (ng/kg)																			
1,2,3,4,6,7,8,9-OCTACHLORODIBENZO-P-DIOXIN			3900	5200	4600		5900 J		4500	7500	6000	3500	4400	5000	14000	5000	7400		4900
1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN			< 0.86 U	< 1.1 U	< 0.95 U		< 0.51 U		< 0.44 U	< 0.49 U	< 0.71 U	2.6 J	< 0.89 U	1.3 J	< 1.1 U	< 0.69 U	< 0.51 U		1.5 J
1,2,3,4,6,7,8-HEPTACHLORODIBENZO-P-DIOXIN			19	25	25		30		29	35	33	24	31	41	150	35	33		28
1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN			< 0.035 U	< 0.087 U	0.078 J		< 0.039 U		< 0.03 U	< 0.022 U	< 0.032 U	< 0.056 U	< 0.04 U	< 0.15 U	< 0.026 U	0.082 J	0.075 J		< 0.04 U
1,2,3,4,7,8-HEXACHLORODIBENZOFURAN			0.65 J	0.39 J	< 0.28 U		< 0.18 U		< 0.13 U	< 0.19 U	< 0.27 U	0.91 J	0.23 J	< 0.13 U	< 0.32 U	< 0.34 U	< 0.28 U		0.31 J
1,2,3,4,7,8-HEXACHLORODIBENZO-P-DIOXIN			0.15 J	< 0.11 U	0.13 J		0.27 J		0.2 J	< 0.061 U	0.22 J	0.23 J	< 0.099 U	< 0.33 U	0.45 J	0.44 J	0.18 J		0.19 J
1,2,3,6,7,8-HEXACHLORODIBENZOFURAN			< 0.023 U	0.22 J	0.51 J		0.29 J		0.42 J	0.64 J	0.49 J	0.41 J	0.26 J	0.48 J	0.2 J	0.3 J	0.42 J		0.48 J
1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN			0.15 J	< 0.079 U	0.21 J		0.25 J		0.31 J	0.28 J	0.26 J	0.28 J	0.31 J	< 0.23 U	0.78 J	0.54 J	0.22 J		0.38 J
1,2,3,7,8,9-HEXACHLORODIBENZOFURAN			< 0.03 U	< 0.067 U	< 0.031 U		< 0.038 U		< 0.027 U	< 0.021 U	< 0.03 U	< 0.04 U	< 0.031 U	< 0.12 U	0.12 J	< 0.023 U	0.14 J		< 0.032 U
1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN			0.23 J	0.17 J	0.26 J		0.32 J		0.33 J	0.37 J	0.32 J	0.42 J	0.59 J	< 0.24 U	0.88 J	0.74 J	0.26 J		0.41 J
1,2,3,7,8-PENTACHLORODIBENZOFURAN			< 0.045 U	< 0.07 U	< 0.04 U		< 0.041 U		< 0.07 U	0.058 J	< 0.035 U	0.18 J	< 0.035 U	< 0.16 U	0.08 J	0.15 J	0.07 J		0.15 J
1,2,3,7,8-PENTACHLORODIBENZO-P-DIOXIN			< 0.07 U	< 0.13 U	< 0.069 U		< 0.092 U		< 0.075 U	0.12 J	< 0.075 U	< 0.082 U	0.11 J	< 0.24 U	< 0.05 U	0.16 J	< 0.051 U		< 0.063 U
2,3,4,6,7,8-HEXACHLORODIBENZOFURAN			< 0.15 U	< 0.06 U	0.13 J		< 0.034 U		0.071 J	0.13 J	< 0.027 U	0.15 J	0.14 J	< 0.11 U	0.15 J	0.21 J	0.2 J		0.17 J
2,3,4,7,8-PENTACHLORODIBENZOFURAN			< 0.033 U	< 0.073 U	< 0.042 U		0.077 J		0.089 J	< 0.033 U	< 0.037 U	0.15 J	0.13 J	< 0.17 U	0.097 J	< 0.034 U	0.1 J		0.11 J
2,3,7,8-TETRACHLORODIBENZOFURAN			< 0.22 U	< 0.52 U	< 0.34 U		< 0.38 U		< 0.33 U	< 0.26 U	< 0.28 U	< 0.099 U	< 0.055 U	< 0.61 U	< 0.29 U	< 0.34 U	< 0.2 U		< 0.068 U
2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN			< 0.035 U	< 0.086 U	< 0.042 U		< 0.05 U		< 0.043 U	< 0.04 U	< 0.041 U	< 0.05 U	< 0.042 U	< 0.16 U	< 0.038 U	< 0.039 U	< 0.029 U		< 0.038 U
HEPTACHLORODIBENZOFURAN			1.6 J	1.7 J	1.2 J		< 0.51 U		< 0.65 U	< 0.73 U	< 0.86 U	3.7 J	1.6 J	1.3 J	1.9 J	< 0.98 U	< 1 U		2.9 J
HEPTACHLORODIBENZO-P-DIOXINS			34	44	44		61		65	66	63	51	63	88	270	86	57		50
HEXACHLORODIBENZOFURAN			1.7 J	0.86 J	2.3 J		0.67 J		1.2 J	< 1.3 U	1 J	2.8 J	1.8 J	1.1 J	< 1.9 U	< 1.5 U	< 2.2 U		3.1 J
HEXACHLORODIBENZO-P-DIOXIN			2.1 J	1.3 J	3 J		4.7 J		6.9 J	5.5 J	5.2 J	6.5 J	7.3	8.8 J	22 J	9.5	2.5 J		4.2 J
OCTACHLORODIBENZOFURAN			2.9 J	3.5 J	1.4 J		1.3 J		< 0.96 U	< 0.96 U	2.1 J	4.6 J	< 1.3 U	3.1 J	2.1 J	< 1 U	< 1.1 U		2.4 J
PENTACHLORODIBENZOFURAN			1.1 J	0.27 J	1.8 J		0.37 J		1.1 J	0.7 J	0.41 J	1.7 J	1.6 J	0.34 J	1.4 J	1.8 J	1.7 J		1.9 J
PENTACHLORODIBENZO-P-DIOXIN			0.39 J	0.72 J	1.3 J		0.98 J		1.7 J	2.3 J	2.1 J	0.68 J	1.7 J	1.4 J	2.7 J	1.8 J	1.4 J		1.5 J
TCDF, TOTAL			0.54 J	0.25 J	0.88 J		2.1 J		2.3 J	2.3 J	2.2 J	1.5 J	1.6 J	1.8 J	1.6 J	4.1 J	1 J		1.4 J
TETRACHLORODIBENZO-P-DIOXIN			0.09 J	< 0.086 U	0.29 J		0.96 J		1.7 J	1.2 J	1.3 J	0.4 J	0.87 J	0.95 J	1.2 J	0.69 J	0.46 J		0.59 J
TEQ			1.47887	1.88905	1.7552	NA	2.20649	NA	1.7998	2.86374	2.25963	1.932	1.608	1.972	5.990	2.283	2.725	NA	1.997
MISCELLANEOUS PARAMETERS																			
TOTAL SOLIDS			90	87	89	92	88	86	87	88	88	86	85	87	88	87	90	92	90
SVOCs (ug/kg)	**(ug/kg)**	**(ug/kg)**																	
2-METHYLNAPHTHALENE			< 11 U	< 12 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 UJ	< 10 UJ	280 J	190	< 11 U	76	< 11 UJ	< 10 U	< 11 UJ	< 11 U
ACENAPHTHENE			< 11 U	< 12 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	< 10 U	890 J	240 J	< 11 U	230	< 11 U	< 10 U	< 11 U	6.9 J
ACENAPHTHYLENE			< 11 U	< 12 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	< 10 U	88 J	29 J	< 11 U	22 J	< 11 U	< 10 U	< 11 U	< 11 U
ANTHRACENE			< 11 U	< 12 U	< 11 U	< 11 U	< 11 U	< 11 U	2.3 J	2 J	4 J	1800 J	740 J	5.6 J	910	2.7 J	< 10 U	< 11 U	19 J
BENZO[A]ANTHRACENE	160		< 11 U	3.6 J	5.5 J	< 11 U	3.6 J	5.5 J	16 J	17 J	22	**4100 J**	**1500 J**	34	**2000**	< 12 U	< 10 U	< 11 U	59 J
BENZO[A]PYRENE	16	800	< 11 U	< 12 U	4.2 J	< 11 UJ	< 11 UJ	5.2 J	13 J	14 J	16 J	**3100 J**	**1200 J**	**29**	**1700**	9.6 J	< 10 UJ	< 11 UJ	**71 J**
BENZO[B]FLUORANTHENE	160		3.1 J	5.8 J	6.5 J	< 11 U	5.1 J	7.5 J	16 J	26	30	**4800 J**	**1800 J**	53	**2600**	18 J	4.8 J	< 11 U	100 J
BENZO[G,H,I]PERYLENE	800		< 11 U	< 12 U	< 2.2 UJ	< 11 UJ	2.3 J	3.6 J	8 J	5.2 J	3.6 J	**1500 J**	540 J	14 J	**860**	< 11 UJ	< 10 UJ	< 11 UJ	49 J
BENZO[K]FLUORANTHENE	900		< 11 U	< 12 U	< 11 UJ	< 11 U	4.3 J	5.6 J	12 J	8.6 J	10 J	**1500 J**	560 J	15 J	770	5.7 J	< 10 U	< 11 U	40 J
CHRYSENE	400		< 11 U	< 12 U	6.2 J	2.7 J	6.1 J	8.4 J	16 J	18 J	24	**3800 J**	**1400 J**	37	**2000**	9.4 J	< 10 U	< 11 U	56 J
DIBENZ[A,H]ANTHRACENE	16		< 11 U	< 12 U	< 11 UJ	< 11 UJ	< 11 UJ	< 11 UJ	2.5 J	4.2 J	5.2 J	**490 J**	**160 J**	6.1 J	**220**	2.5 J	< 10 U	< 11 U	15 J
FLUORANTHENE			< 11 U	5 J	9.4 J	< 11 U	8 J	10 J	32	32	45	10000 J	3800 J	64	5000 J	22 J	< 10 U	< 11 U	140 J
FLUORENE			< 11 U	< 12 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	< 10 U	1700 J	530 J	< 11 U	410 J	< 11 U	< 10 U	< 11 U	7.8 J
INDENO[1,2,3-CD]PYRENE	160		< 11 U	2.8 J	3 J	< 11 U	2.5 J	4.1 J	8.7 J	13 J	16 J	**2400 J**	**860 J**	26 J	**1300 J**	9 J	2.1 J	< 11 U	76 J
NAPHTHALENE	800	800	< 11 U	< 12 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	< 11 U	< 10 U	**1200 J**	370 J	< 11 U	150	< 11 U	< 10 U	< 11 U	6 J
PHENANTHRENE			< 11 U	2.4 J	4.6 J	< 11 U	2.7 J	4.6 J	11 J	13 J	23	11000 J	3500 J	35	3700	15 J	2.7 J	< 11 U	120 J
PYRENE			< 11 U	< 12 U	8 J	< 11 U	5.3 J	8.2 J	21 J	24	32	10000 J	3600 J	67	4800 J	13 J	< 10 U	< 11 U	160 J
TPH (mg/kg)																			
EXTRACTABLE TPH C8-C44				13 J										29			< 11 U		
TPH-GASOLINE RANGE C6-C12				< 2.4 U										< 2.3 U			< 2.4 U		

Notes:
1. Bold and Blue shading = exceeded Residential PRG.
2. Bold and Orange shading = exceeded Residential and Industrial Worker/ Restricted Recreational PRGs
PRG = Preliminary Remediation Goal
U = not detected above report detection limits
J = estimate value

TABLE 2-6
ANALYTICAL RESULTS - SURFACE SOIL AT DECISION UNIT 2-2

SAMPLE ID				TF2-B219-SS1080-0001	TF2-B219-SS1081-0001	TF2-B219-SS1082-0001	TF2-B219-SS1083-0001	TF2-B219-SS1084-0001	TF2-B219-SS1085-0001
SAMPLE DATE				11/12/2013	11/12/2013	11/12/2013	11/12/2013	11/12/2013	11/12/2013
LOCATION ID				TF2-B219-SB1080	TF2-B219-SB1081	TF2-B219-SB1082	TF2-B219-SB1083	TF2-B219-SB1084	TF2-B219-SB1085
DEPTH INTERVAL	Residential PRG	Ecological PRG	Ecological PRG	0 -1	0 -1	0 -1	0 -1	0 -1	0 -1
SACODE	(ug/kg)	(ug/kg)	(ug/kg)	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
POLYCHLORINATED BIPHENYLS (PCBs) (ug/kg)									
AROCLOR-1016	1000	3600	10000	< 96 U	< 9.2 U	< 9 U	< 9 U	< 8.9 U	< 9 U
AROCLOR-1221	1000	3600	10000	< 96 U	< 9.2 U	< 9 U	< 9 U	< 8.9 U	< 9 U
AROCLOR-1232	1000	3600	10000	< 110 U	< 11 U	< 11 U	< 10 U	< 10 U	< 10 U
AROCLOR-1242	1000	3600	10000	< 96 U	< 9.2 U	< 9 U	< 9 U	< 8.9 U	< 9 U
AROCLOR-1248	1000	3600	10000	< 96 U	< 9.2 U	< 9 U	< 9 U	< 8.9 U	< 9 U
AROCLOR-1254	1000	3600	10000	< 96 U	< 9.2 U	< 9 U	< 9 U	< 8.9 U	< 9 U
AROCLOR-1260	1000	3600	10000	**4400**	**2400**	360	24	42	**1300**
AROCLOR-1262	1000	3600	10000	< 96 U	< 9.2 U	< 9 U	< 9 U	< 8.9 U	< 9 U
AROCLOR-1268	1000	3600	10000	< 96 U	< 9.2 U	< 9 U	< 9 U	< 8.9 U	< 9 U
Total PCBs	1000	3600	10000	**4400**	**2400**	360	24	42	**1300**
MISCELLANEOUS PARAMETERS									
TOTAL SOLIDS (UNITS OF PCT)				88	91	94	94	96	94

Notes:
U = not detected above report detection limits
J = estimate value
ND = non-detect
NM = not measured
Bold Text and Blue shading indicates Residential PRG exceeded.
Bold Text and Green shading indicates Residential and Ecological PRG exceeded.
Bold Text and Orange shading indicates Residential, Ecological, and Industrial PRG exceeded.

TABLE 2-6
ANALYTICAL RESULTS - SURFACE SOIL AT DECISION UNIT 2-2

SAMPLE ID	Residential PRG (ug/kg)	Ecological PRG (ug/kg)	TF2-B219-SS1086-0001	TF2-B219-SS1087-0001	TF2-B219-1	TF2-B219-2	TF2-B219-3	TF2-B219-4
SAMPLE DATE			11/12/2013	11/12/2013	6/2/2005	6/2/2005	6/2/2005	6/2/2005
LOCATION ID			TF2-B219-SB1086	TF2-B219-SB1087	TF2-B219-1	TF2-B219-2	TF2-B219-3	TF2-B219-4
DEPTH INTERVAL			0 -1	0 -1	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
SACODE			NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
POLYCHLORINATED BIPHENYLS (PCBs) (ug/kg)								
AROCLOR-1016	1000	3600	< 9.6 U	< 8.9 U	ND	ND	ND	ND
AROCLOR-1221	1000	3600	< 9.6 U	< 8.9 U	ND	ND	ND	ND
AROCLOR-1232	1000	3600	< 11 U	< 10 U	ND	ND	ND	ND
AROCLOR-1242	1000	3600	< 9.6 U	< 8.9 U	ND	ND	ND	ND
AROCLOR-1248	1000	3600	< 9.6 U	< 8.9 U	ND	ND	ND	ND
AROCLOR-1254	1000	3600	< 9.6 U	< 8.9 U	ND	ND	ND	ND
AROCLOR-1260	1000	3600	**2800 J**	600	**18000**	330	**4100**	**11000**
AROCLOR-1262	1000	3600	< 9.6 U	< 8.9 U	NM	NM	NM	NM
AROCLOR-1268	1000	3600	< 9.6 U	< 8.9 U	NM	NM	NM	NM
Total PCBs	1000	3600	**2800**	600	**18000**	330	**4100**	**11000**
MISCELLANEOUS PARAMETERS								
TOTAL SOLIDS (UNITS OF PCT)			88	94	NM	NM	NM	NM

Notes:
U = not detected above report detection limits
J = estimate value
ND = non-detect
NM = not measured
Bold Text and Blue shading indicates Residential PRG exceeded.
Bold Text and Green shading indicates Residential and Ecological PRG exceeded.
Bold Text and Orange shading indicates Residential, Ecological, and Industrial PF

Table 3-1
Components of Soil Remedial Alternatives

Alternative	Key Components
S-1: No Action	• No remedial action • For comparison only
S-2: Limited Soil Excavation with Land Use Controls	• Future sampling to delineate the extent of soil exceedances at DU 2-1 and 2-2 • Install erosion controls • Soil excavation at DU 2-1 and 2-2 to remove all soil exceeding the Industrial PRGs (including RIDEM GA Leachability Criteria) for PAHs and PCBs at DU 2-1 and DU 2-2, respectively, and the Ecological PRG (DU 2-2 only) • Off-site disposal of excavated soils from both DUs • Backfill, grading, and site restoration • Implement LUCs restricting residential use at DU 2-1 and DU 2-2 and to maintain building foundation at B219 within DU 2-2 and perform associated inspections and reporting • Apply LUCs at DU 2-1 to assure that at least two feet of surface soil (0-2 feet), which contains arsenic below the Industrial PRG, remains undisturbed in the area within DU 2-1 where subsurface soil exceeds the Industrial PRG. • Five-year reviews to evaluate remedy
S-3: Containment with Land Use Controls	• Future sampling to delineate the extent of soil exceedances at DU 2-1 and 2-2 • Site preparation for containment at DU 2-1 and 2-2 • Install asphalt cover systems at DU 2-1 and 2-2 consisting of 4 inches of asphalt pavement overlying at least 6 inches of clean sub-base material to prevent direct contact, erosion, and transport of remaining soil exceeding Industrial PRGs (including RIDEM GA Leachability Criteria) for PAHs and PCBs at DU 2-1 and DU 2-2, respectively, and the Ecological PRG (DU 2-2 only) • Apply LUCs to DU 2-1 and 2-2 that restrict cover disturbance and require maintenance of the asphalt covers as well as perform associated inspections and reporting. Regular site inspections of the cover would also be performed to verify the continued maintenance of LUCs until the cleanup levels have been achieved. • LUCs would also be applied to DU 2-1 and DU 2-2 restricting residential use and to DU 2-2 to maintain the building foundation at B219. • Apply LUCs at DU 2-1 to assure that at least two feet of surface soil (0-2 feet), which contains arsenic below the Industrial PRG, remains undisturbed in the area within DU 2-1 where subsurface soil exceeds the Industrial PRG. • Five-year reviews to evaluate remedy
S-4: Excavation and Off-Site Disposal to Residential PRGs (Screened Out)	• Future sampling to delineate the extent of soil exceedances at DU 2-1 and 2-2 • Install erosion controls • Soil excavation at DU 2-1 and 2-2 to remove all soil exceeding the Residential, Industrial, and Ecological PRGs

Alternative	Key Components
	(including RIDEM GA Leachability Criteria) • Off-site disposal of excavated soils from all DUs • Backfill or re-grading and site restoration • Implement LUCs at DU 2-2 to maintain the B219 foundation. If the foundation is demolished, the underlying soil would be assessed and remediated, if needed, to meet the Industrial and Ecological PRGs

Table 4-3
Detailed Evaluation of S-2: Limited Soil Excavation with Land Use Controls

Evaluation Criteria	Detailed Analysis
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	
Human Health Protection	This alternative removes soil concentrations exceeding the Industrial PRGs at DU 2-1 and DU 2-2 (including RIDEM GA Leachability Criteria); thereby, reducing the risk to industrial workers. LUCs would also be applied to restrict residential use at DU 2-1 and DU 2-2 to prevent unacceptable risk to human receptors for the life of the remedy. At DU 2-1, LUCs would also be established to assure that at least two feet of surface soil (0-2 feet), which contains arsenic below the Industrial PRG, remains undisturbed in the area within DU 2-1 where subsurface soil exceeds the Industrial PRG.
Ecological Protection	Soil exceeding the Ecological PRGs (including RIDEM GA Leachability Criteria) would be removed from DU 2-2; thereby, reducing the risk to ecological receptors. LUCs at DU 2-2 would maintain the foundation at Building 219 under the conservative assumption that PCB contamination may exist beneath the building.
COMPLIANCE WITH ARARs	
Chemical-, Location-, and Action-Specific	Under this alternative, chemical-specific, location-specific, and action-specific ARARs would be met. Therefore this alternative would meet ARARs. Refer to Tables B-2a, B-2b, and B-2c in Appendix B for a list and evaluation of ARARs associated with this alternative.
LONG-TERM EFFECTIVENESS AND PERMANENCE	
Magnitude of Residual Risk	Under this alternative, risks to industrial users and ecological receptors would be reduced to acceptable levels through contamination removal. Risks to residential users would be reduced by restricting access. The type and quantity of contaminants remaining at DU 2-1 and DU 2-2 following implementation of this limited action remedy is slightly less than current conditions. LUCs would be established at DU 2-1 and DU 2-2 to prevent residential use and thus prevent the exposure of such receptors to COCs in soils. LUCs would be established at DU 2-2 to maintain the foundation at Building 219 and LUCs would be established at DU 2-1 to prevent exposure to subsurface soils containing arsenic above the Industrial PRG.
Adequacy and Reliability of Controls	Adequacy of this alternative would be confirmed during the five-year reviews. LUCs are reliable if properly enforced.

Evaluation Criteria	Detailed Analysis
REDUCTION OF TMV THROUGH TREATMENT	
Treatment Process Used and Materials Treated	No treatment would be performed under this alternative.
Amount Destroyed or Treated	No treatment would be performed under this alternative.
Degree of Expected Reductions of TMV through treatment	No treatment would be performed under this alternative.
Degree to which Treatment is Irreversible	No treatment would be performed under this alternative.
Type and Quantity of Residuals Remaining after Treatment	No treatment would be performed under this alternative.
SHORT-TERM EFFECTIVENESS	
Protection of Community during Remedial Actions	Short-term community risks associated with off-site disposal of contaminated soil would be minor.
Protection of Workers during Remedial Actions	Short-term worker risks associated with environmental sampling and excavation would be mitigated through the use of proper PPE and proper health and safety practices.
Environmental Impacts	Short-term, minor impacts to ecological habitat due to excavation and environmental sampling would occur.
Time to Achieve Remedial Action Objectives	RAOs would be achieved once the limited excavation is performed and LUCs are implemented. It is assumed implementation of this alternative will take approximately 1 year.
IMPLEMENTABILITY	
Ability to Construct and Operate	LUCs and excavation are common and easy to implement.
Reliability of the Technology	Excavation and LUCs are known to be reliable.
Ease of undertaking Additional Remedial Actions, if needed	If further action is deemed necessary in the future, this alternative would allow for additional remedial actions to occur.
Ability to Monitor Effectiveness	Confirmatory sampling around the excavation would be conducted to evaluate the effectiveness of the remedy. Five-year reviews will also be conducted to monitor effectiveness.
Ability to Obtain Approvals and Coordinate with Other Agencies	Approval for disposal of contaminated soils would require coordination with other agencies.
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	Multiple facilities would be able to accept the excavated materials for final disposition.
Availability of Necessary Equipment and Specialists	There are many contractors available to provide the equipment and services required by this alternative.
Availability of Technology	This alternative contains commonly-used technologies.

Evaluation Criteria	Detailed Analysis
COSTS	
Capital Costs	$324,574
O&M	$92,461
Five-Year Reviews	$23,307
Total Cost[1]	$440,000

[1] Rounded to the nearest $1,000

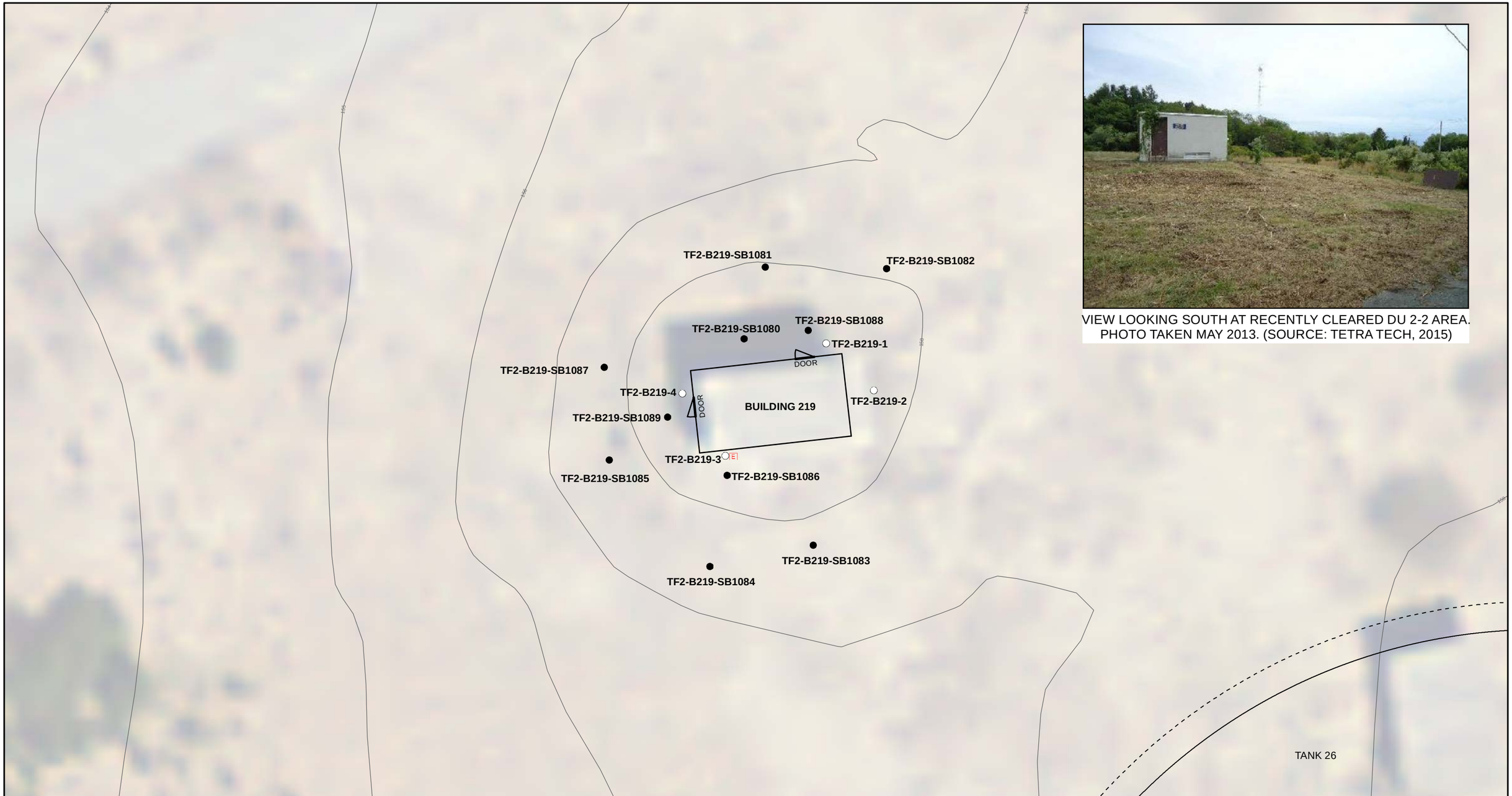
Table 4-4
Detailed Evaluation of S-3: Containment with Land Use Controls

Evaluation Criteria	Detailed Analysis
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT	
Human Health Protection	This alternative prevents direct contact, erosion, and transport of soil exceeding the Industrial PRGs (including RIDEM GA Leachability Criteria) for PAHs and PCBs at DU 2-1 and DU 2-2, respectively. This containment system would also prevent the leaching of PAHs and PCBs from soil to groundwater. LUCs would be implemented at DU 2-1 and DU 2-2 so that the asphalt cover remains intact. LUCs would also be applied to restrict residential use at DU 2-1 and DU 2-2 to prevent unacceptable risk to human receptors for the life of the remedy. At DU 2-1, LUCs would also be established to assure that at least two feet of surface soil, which contains arsenic below the Industrial PRG, remains undisturbed in the area within DU 2-1 where subsurface soil exceeds the Industrial PRG.
Ecological Protection	This alternative prevents direct contact, erosion, and transport of soil exceeding the Ecological PRG (including RIDEM GA Leachability Critieria) at DU 2-2. LUCs would be implemented at DU 2-2 so that the asphalt cover remains intact. LUCs would also be applied to maintain the existing foundation at Building 219.
COMPLIANCE WITH ARARs	
Chemical-, Location-, and Action-Specific	Under this alternative, chemical-specific, location-specific, and action-specific ARARs would be met. Therefore this alternative would meet ARARs. Refer to Tables B-3a, B-3b, and B-3c in Appendix B for a list and evaluation of ARARs associated with this alternative.
LONG-TERM EFFECTIVENESS AND PERMANENCE	
Magnitude of Residual Risk	Under this alternative, risks to industrial users and ecological receptors would be reduced to acceptable levels through installation of a cover system. Risks to residential users would be reduced by restricting access. The type and quantity of contaminants remaining at the site following implementation of this remedy would be the same as current conditions. Exposure to the COCs at DU 2-1 and 2-2 would be prevented by the asphalt cover. LUCs would be implemented to maintain and ensure the integrity of the cover at DU 2-1 and 2-2. LUCs would be established at DU 2-1 to prevent residential use and thus prevent the exposure of such receptors to COCs in soils. LUCs would also be applied at DU 2-1 and 2-2 to restrict

Evaluation Criteria	Detailed Analysis
	disturbance of the cover. LUCs would also be applied to maintain the existing foundation at Building 219 to prevent ecological exposure to potential remaining contaminants.
Adequacy and Reliability of Controls	Adequacy of this alternative will be confirmed during the five-year reviews. LUCs are reliable if properly enforced. Asphalt covers are a common and reliable method of containment.
REDUCTION OF TMV THROUGH TREATMENT	
Treatment Process Used and Materials Treated	No treatment would be performed under this alternative.
Amount Destroyed or Treated	No treatment would be performed under this alternative.
Degree of Expected Reductions of TMV through treatment	No treatment would be performed under this alternative.
Degree to which Treatment is Irreversible	No treatment would be performed under this alternative.
Type and Quantity of Residuals Remaining after Treatment	No treatment would be performed under this alternative.
SHORT-TERM EFFECTIVENESS	
Protection of Community during Remedial Actions	Short-term community risks would be minor.
Protection of Workers during Remedial Actions	Short-term worker risks associated with environmental sampling and cover installation would be mitigated through the use of proper PPE and proper health and safety practices.
Environmental Impacts	Short-term, minor impacts to ecological habitat due to cover installation and environmental sampling would occur.
Time to Achieve Remedial Action Objectives	RAOs would be achieved once the cover installation is complete and LUCs are implemented. It is assumed implementation of this alternative will take approximately 1 year.
IMPLEMENTABILITY	
Ability to Construct and Operate	LUCs and asphalt covers are common technologies. With the proper planning and design, the alternative would be relatively easy to implement.
Reliability of the Technology	Asphalt covers and LUCs are known to be reliable.
Ease of undertaking Additional Remedial Actions, if needed	If further action is deemed necessary in the future, the asphalt cover would have to be removed in order to allow for additional remedial actions.
Ability to Monitor Effectiveness	Additional sampling would be performed to identify the extent of contamination to ensure the initial effectiveness of the excavation and LUCs. Inspections and five-year reviews will also be conducted to monitor effectiveness.
Ability to Obtain Approvals and Coordinate with Other Agencies	Approval of asphalt cover design would require coordination with other agencies.
Availability of Off-Site Treatment,	No off-site treatment, storage, or disposal services would be

Evaluation Criteria	Detailed Analysis
Storage, and Disposal Services and Capacity	needed under this alternative.
Availability of Necessary Equipment and Specialists	There are many contractors available to provide the equipment and services required by this alternative.
Availability of Technology	This alternative contains commonly-used technologies.
COSTS	
Capital Costs	$330,746
O&M	$105,670
Five-Year Reviews	$23,307
Total Cost[1]	$460,000

[1] Rounded to the nearest $1,000



VIEW LOOKING SOUTH AT RECENTLY CLEARED DU 2-2 AREA.
PHOTO TAKEN MAY 2013. (SOURCE: TETRA TECH, 2015)

RESOLUTION CONSULTANTS

Drawn:	JB	04/12/2016
Approved:	MK	04/12/2016
Project #:	60266436	

Legend

- Soil Sample Location (2013)
- Soil Sample Location (2005)
- Electrical Box
- Topographic Contour Line (NAVD 88)

N

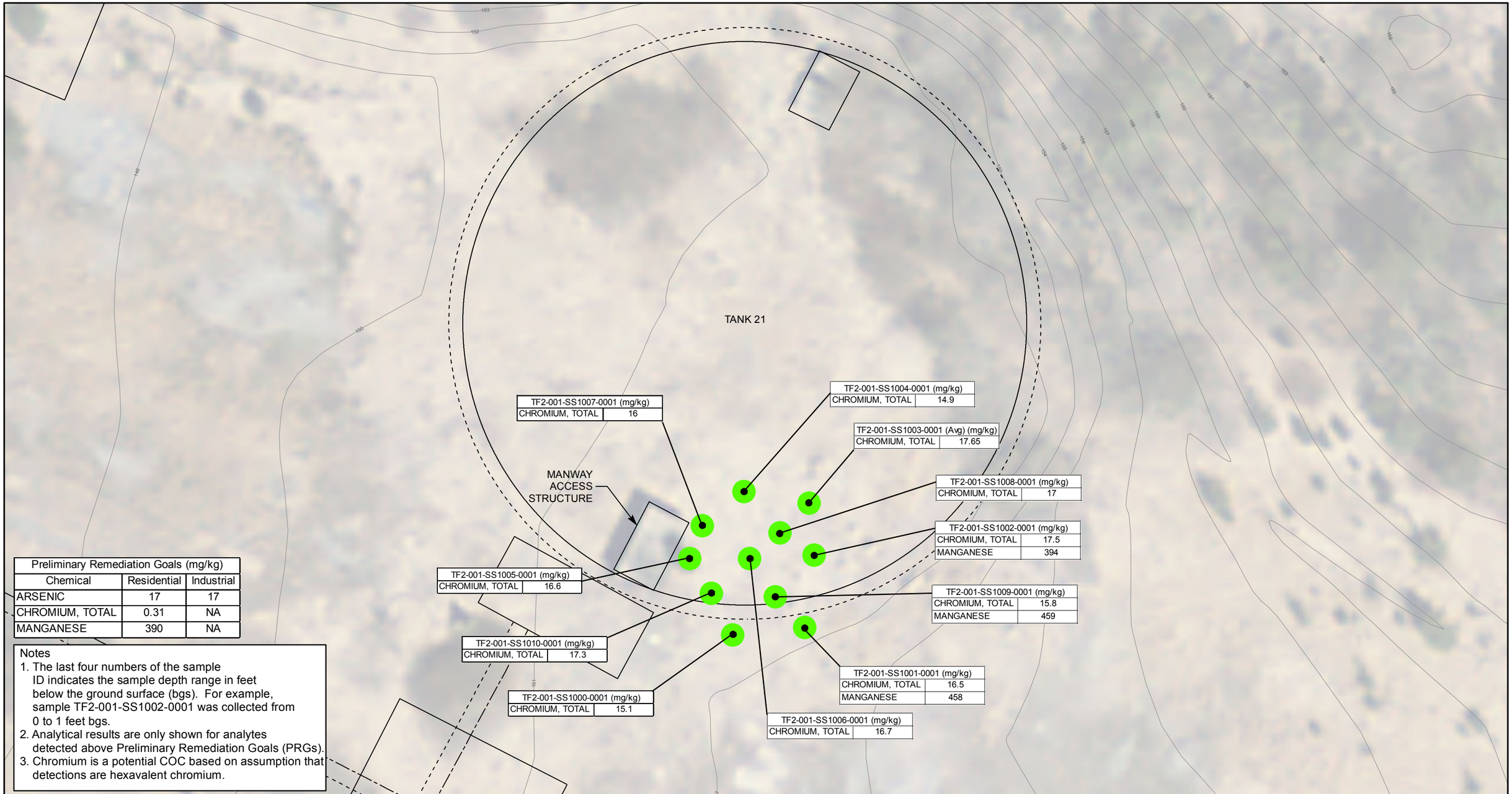
0 5 10

Scale in Feet

FIGURE 4
SOIL SAMPLE LOCATIONS - DECISION UNIT 2-2

SITE 10 - TANK FARM 2
NAVSTA NEWPORT, RHODE ISLAND

Path: P:\Govt\Projects\NavyCLEAN AECOM-EnSafe JV\Newport\GIS\Projects\Tank_Farm_2\FS\MXD\Fig_4_Site_10_TF2_Building219.mxd



Preliminary Remediation Goals (mg/kg)		
Chemical	Residential	Industrial
ARSENIC	17	17
CHROMIUM, TOTAL	0.31	NA
MANGANESE	390	NA

Notes
1. The last four numbers of the sample ID indicates the sample depth range in feet below the ground surface (bgs). For example, sample TF2-001-SS1002-0001 was collected from 0 to 1 feet bgs.
2. Analytical results are only shown for analytes detected above Preliminary Remediation Goals (PRGs).
3. Chromium is a potential COC based on assumption that detections are hexavalent chromium.

RESOLUTION CONSULTANTS

Drawn:	JB	04/12/2016
Approved:	MK	04/12/2016
Project #:	60266436	

Legend
- Soil Sample Location (2013)
- Residential PRG Exceedance
- Topographic Contour Line (NAVD 88)
- Petroleum Distribution
- Ring Drain/BSW Drainage

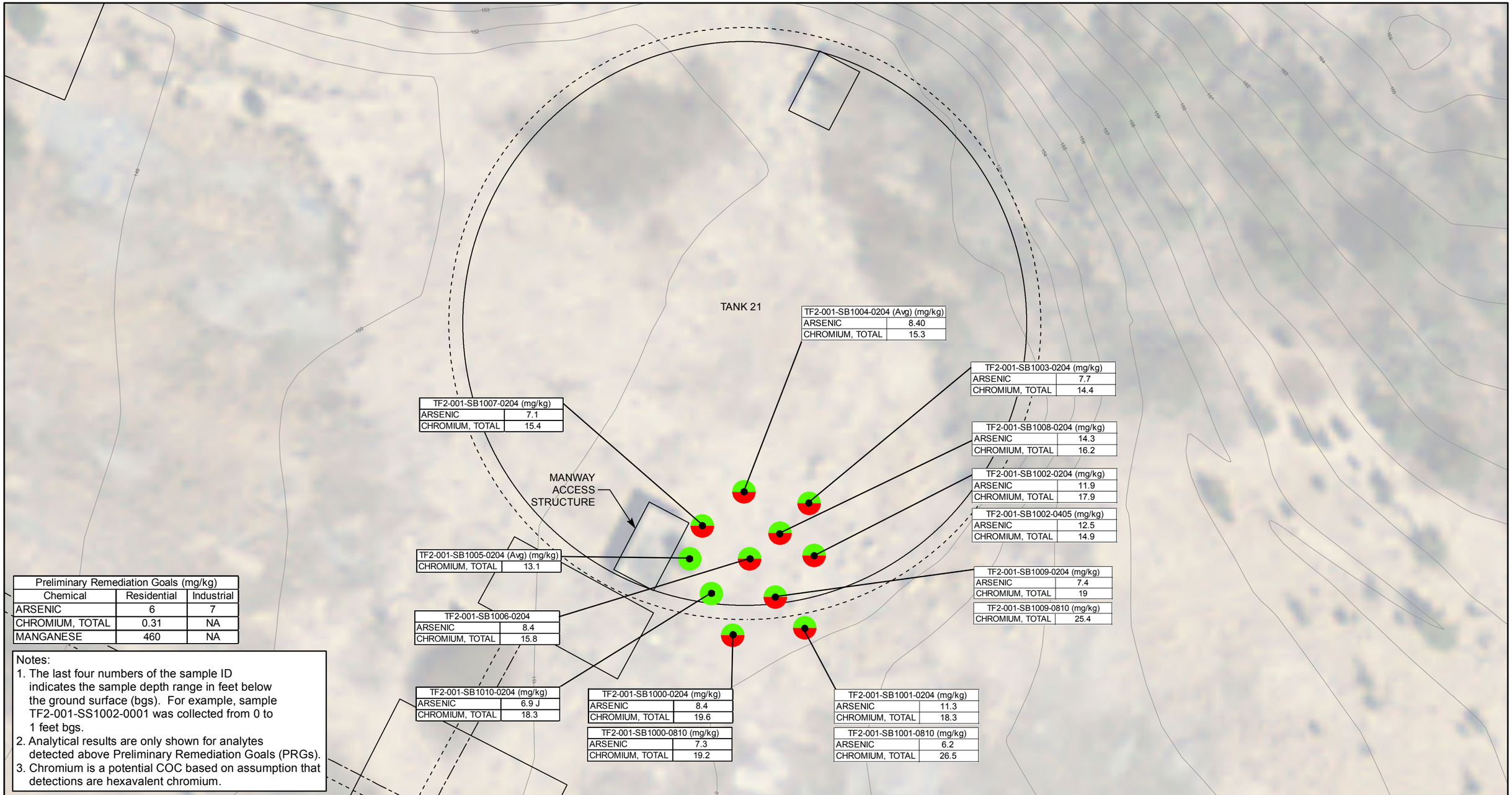
N

0 10 20
Scale in Feet

FIGURE 5
SURFACE SOIL PRG EXCEEDANCES FOR METALS - DECISION UNIT 2-1

SITE 10 - TANK FARM 2
NAVSTA NEWPORT, RHODE ISLAND

Path: P:\Govt\Projects\NavyCLEAN AECOM-EnSafe JV\Newport\GIS\Projects\Tank_Farm_2\FS\MXD\Fig_5_Site_10_TF2_Surface_Soil_PRG_Metals.mxd



Preliminary Remediation Goals (mg/kg)		
Chemical	Residential	Industrial
ARSENIC	6	7
CHROMIUM, TOTAL	0.31	NA
MANGANESE	460	NA

Notes:
1. The last four numbers of the sample ID indicates the sample depth range in feet below the ground surface (bgs). For example, sample TF2-001-SS1002-0001 was collected from 0 to 1 feet bgs.
2. Analytical results are only shown for analytes detected above Preliminary Remediation Goals (PRGs).
3. Chromium is a potential COC based on assumption that detections are hexavalent chromium.

RESOLUTION CONSULTANTS

Drawn:	JB	04/12/2016
Approved:	MK	04/12/2016
Project #:	60266436	

Legend
- Soil Sample Location (2013)
- Industrial PRG Exceedance
- Residential PRG Exceedance
- Topographic Contour Line (NAVD 88)
- Petroleum Distribution
- Ring Drain/BSW Drainage

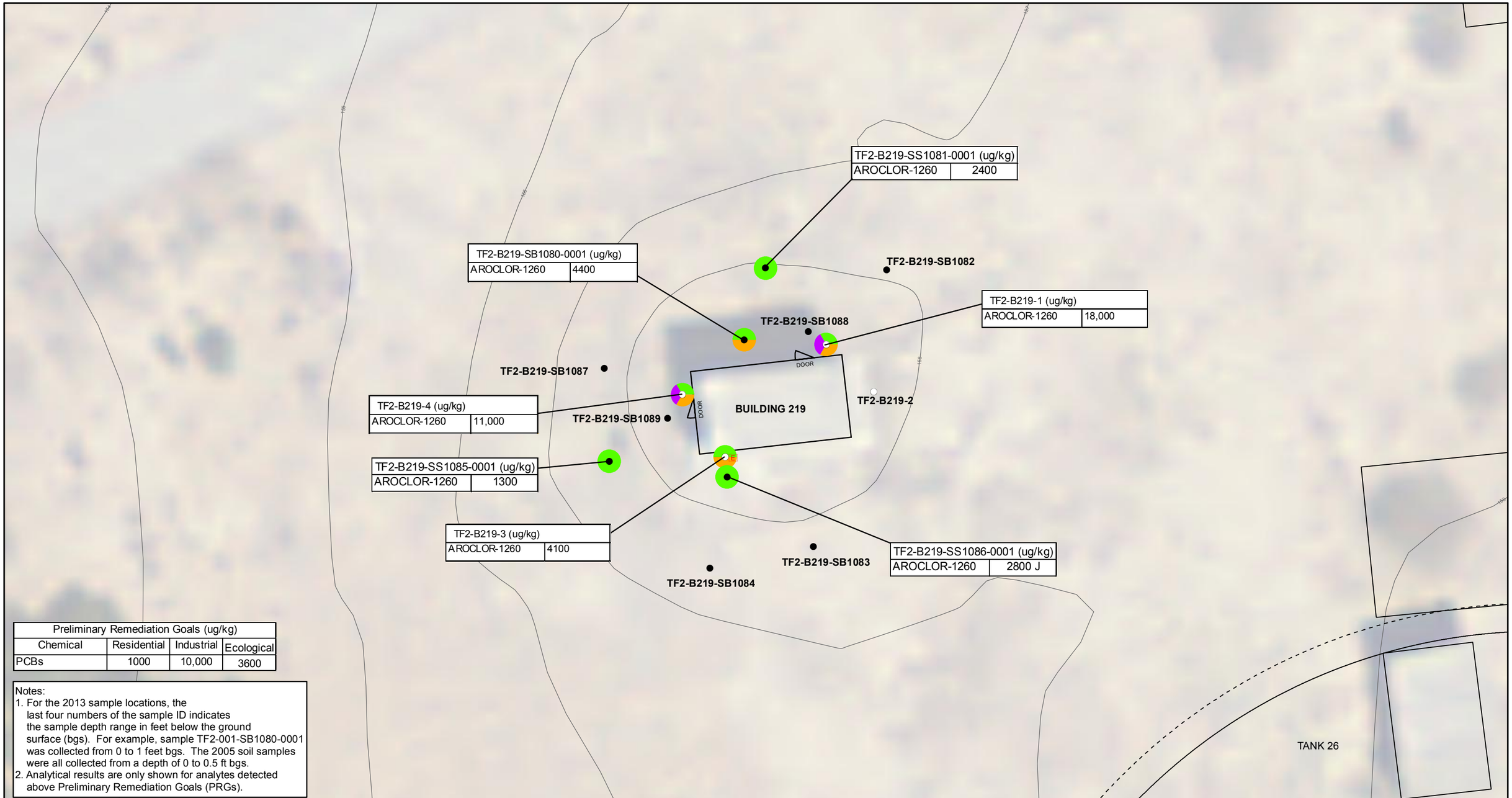
N

0 10 20
Scale in Feet

FIGURE 6
SUBSURFACE SOIL PRG EXCEEDANCES FOR METALS - DECISION UNIT 2-1

SITE 10 - TANK FARM 2
NAVSTA NEWPORT, RHODE ISLAND

Path: P:\Govt\Projects\NavyCLEAN AECOM-EnSafe JV\Newport\GIS\Projects\Tank_Farm_2\FS\MXD\Fig_6_Site_10_TF2_Subsurface_Soil_PRG_Metals.mxd



Preliminary Remediation Goals (ug/kg)			
Chemical	Residential	Industrial	Ecological
PCBs	1000	10,000	3600

Notes:
1. For the 2013 sample locations, the last four numbers of the sample ID indicates the sample depth range in feet below the ground surface (bgs). For example, sample TF2-001-SB1080-0001 was collected from 0 to 1 feet bgs. The 2005 soil samples were all collected from a depth of 0 to 0.5 ft bgs.
2. Analytical results are only shown for analytes detected above Preliminary Remediation Goals (PRGs).

RESOLUTION CONSULTANTS

Drawn:	JB	04/13/2016
Approved:	MK	04/13/2016
Project #:	60266436	

Legend
- Soil Sample Location (2013)
- Soil Sample Location (2005)
- Residential PRG Exceedance
- Ecological PRG Exceedance
- RIDEM GA Leachability Exceedance
- Topographic Contour Line (NAVD 88)
- Electrical Box

N

0 5 10
Scale in Feet

FIGURE 9
SURFACE SOIL
PRG EXCEEDANCES FOR PCBS - DECISION UNIT 2-2

SITE 10 - TANK FARM 2
NAVSTA NEWPORT, RHODE ISLAND

Path: P:\Govt\Projects\NavyCLEAN AECOM-EnSafe JV\Newport\GIS\Projects\Tank_Farm_2\FS\MXD\Fig_9_Building219_Surface_Soil_PRG_PCBs.mxd

Notes:
1. It is assumed that there is no soil above the tank within the footprint of the manway access structure.
2. PRG exceedances for chromium are not reflected on this figure. Hexavalent chromium has been identified as a potential COC, based on an assumption that the detected chromium is hexavalent chromium. There is no evidence that hexavalent chromium is actually present and further sampling/analysis would be expected to show that most of the chromium detected is trivalent chromium.
3. Remedial boundaries subject to change based on planned supplemental sampling. At locations where arsenic concentrations exceeded industrial PRGs in subsurface soil, LUCs will be used to address contamination.

TANK 21

MANWAY ACCESS STRUCTURE

TF2-001-SB1007-0001	
BENZO[A]ANTHRACENE (ug/kg)	1200
BENZO[A]PYRENE (ug/kg)	880
BENZO[B]FLUORANTHENE (ug/kg)	1500
CHRYSENE (ug/kg)	1100
DIBENZ[A,H]ANTHRACENE (ug/kg)	130
INDENO[1,2,3-CD]PYRENE (ug/kg)	700 J

TF2-001-SB1007-0204	
ARSENIC (mg/kg)	7.1
BENZO[A]ANTHRACENE (ug/kg)	2000
BENZO[A]PYRENE (ug/kg)	1700
BENZO[B]FLUORANTHENE (ug/kg)	2600
BENZO[G,H,I]PERYLENE (ug/kg)	860
CHRYSENE (ug/kg)	2000
DIBENZ[A,H]ANTHRACENE (ug/kg)	220
INDENO[1,2,3-CD]PYRENE (ug/kg)	1300 J

TF2-001-SB1004-0204 (Avg)	
ARSENIC (mg/kg)	8.40

TF2-001-SB1008-0204 (mg/kg)	
ARSENIC (mg/kg)	14.3

TF2-001-SS1003-0001 (Avg)	
BENZO[A]PYRENE (ug/kg)	28.5 J

TF2-001-SB1003-0204	
ARSENIC (mg/kg)	7.7

TF2-001-SS1002-0001	
MANGANESE (mg/kg)	394

TF2-001-SB1002-0204	
ARSENIC (mg/kg)	11.9

TF2-001-SB1002-0405	
ARSENIC (mg/kg)	12.5

TF2-001-SS1006-0001	
BENZO[A]PYRENE (ug/kg)	35

TF2-001-SS1006-0204	
BENZO[A]PYRENE (ug/kg)	29
ARSENIC (mg/kg)	8.4

TF2-001-SS1009-0001	
MANGANESE (mg/kg)	459
BENZO[A]PYRENE (ug/kg)	23 J

TF2-001-SB1009-0204 (mg/kg)	
ARSENIC (mg/kg)	7.4

TF2-001-SB1005-0001	
BENZO[A]ANTHRACENE (ug/kg)	4500
BENZO[A]PYRENE (ug/kg)	3700
BENZO[B]FLUORANTHENE (ug/kg)	5800
BENZO[G,H,I]PERYLENE (ug/kg)	1800
BENZO[K]FLUORANTHENE (ug/kg)	1700
CHRYSENE (ug/kg)	4900
DIBENZ[A,H]ANTHRACENE (ug/kg)	590 J
INDENO[1,2,3-CD]PYRENE (ug/kg)	2800 J
NAPHTHALENE (ug/kg)	1800

TF2-001-SB1005-0204 (Avg)	
BENZO[A]ANTHRACENE (ug/kg)	2800 J
BENZO[A]PYRENE (ug/kg)	2150 J
BENZO[B]FLUORANTHENE (ug/kg)	3300 J
BENZO[G,H,I]PERYLENE (ug/kg)	1020 J
BENZO[K]FLUORANTHENE (ug/kg)	1030 J
CHRYSENE (ug/kg)	2600 J
DIBENZ[A,H]ANTHRACENE (ug/kg)	325 J
INDENO[1,2,3-CD]PYRENE (ug/kg)	1630 J
NAPHTHALENE (ug/kg)	785 J

TF2-001-SB1010-0204 (mg/kg)	
ARSENIC (mg/kg)	6.9 J
BENZO[A]PYRENE (ug/kg)	71 J

TF2-001-SS1000-0001	
BENZO[A]PYRENE (ug/kg)	31

TF2-001-SB1000-0204	
ARSENIC (mg/kg)	8.4

TF2-001-SB1000-0810	
ARSENIC (mg/kg)	7.3

TF2-001-SS1001-0001	
MANGANESE	458

TF2-001-SB1001-0204	
ARSENIC (mg/kg)	11.3

TF2-001-SB1001-0810	
ARSENIC (mg/kg)	6.2

RESOLUTION CONSULTANTS

Drawn:	JB	04/13/2016
Approved:	MK	04/13/2016
Project #:	60266436	

Legend

- Soil Sample Location (2013)
- Industrial PRG Exceedance
- RIDEM GA Leachability Exceedance
- Residential PRG Exceedance
- Estimated Extent of LUCs under Alternative S-2 and Alternative S-3
- Estimated Extent of Excavation under Alternative S-2 and Containment under Alternative S-3
- Topographic Contour Line (NAVD 88)
- Petroleum Distribution
- Ring Drain/BSW Drainage

N

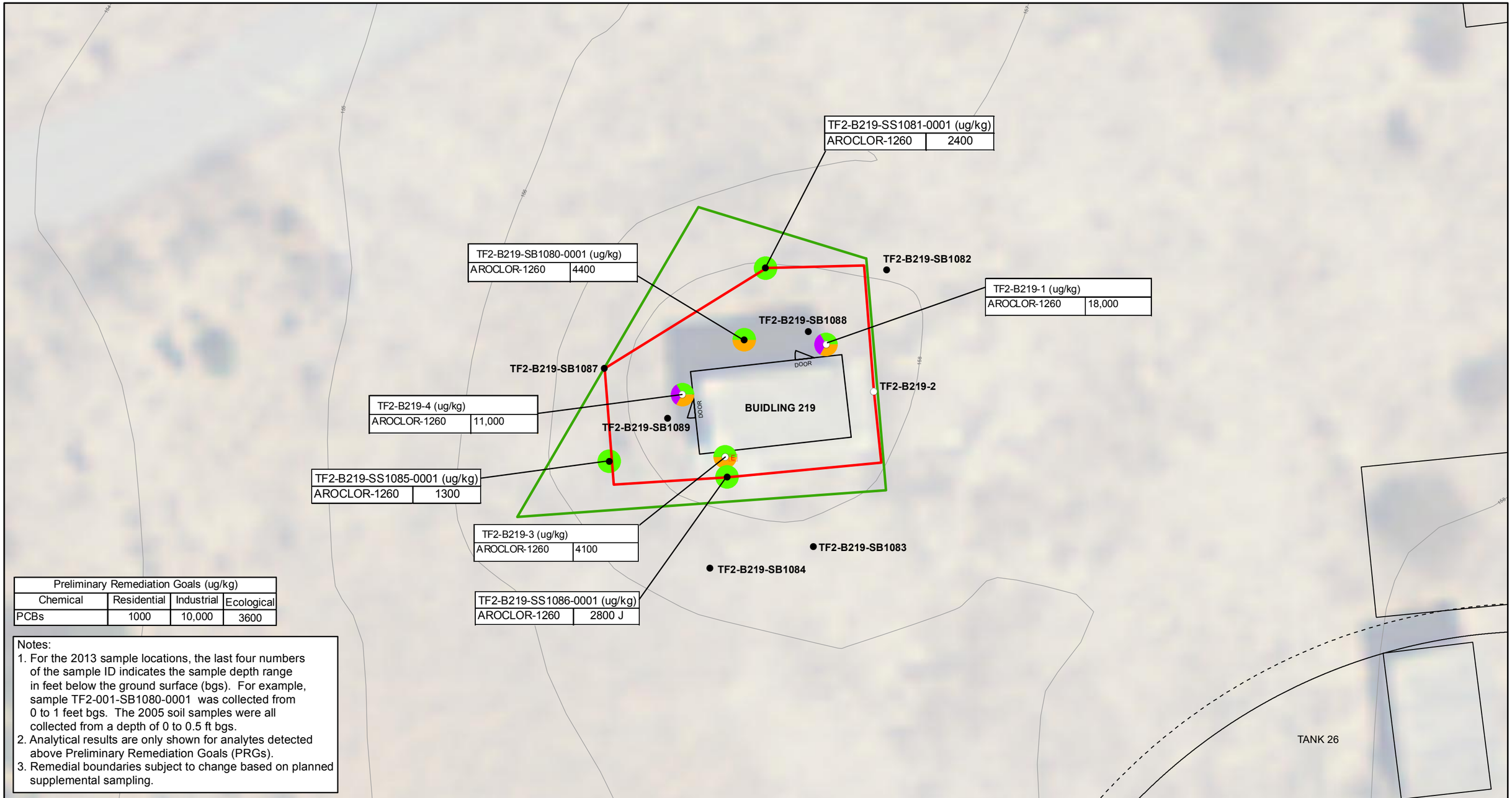
0 10 20

Scale in Feet

FIGURE 10
SUMMARY OF PRG EXCEEDANCES FOR SURFACE AND SUBSURFACE SOILS - DECISION UNIT 2-1

SITE 10 - TANK FARM 2
NAVSTA NEWPORT, RHODE ISLAND

Path: P:\Govt\Projects\NavyCLEAN AECOM-EnSafe JV\Newport\GIS\Projects\Tank_Farm_2\FS\MXD\Fig_10_Site_10_TF2_Summary_PRGS.mxd



Preliminary Remediation Goals (ug/kg)			
Chemical	Residential	Industrial	Ecological
PCBs	1000	10,000	3600

Notes:
1. For the 2013 sample locations, the last four numbers of the sample ID indicates the sample depth range in feet below the ground surface (bgs). For example, sample TF2-001-SB1080-0001 was collected from 0 to 1 feet bgs. The 2005 soil samples were all collected from a depth of 0 to 0.5 ft bgs.
2. Analytical results are only shown for analytes detected above Preliminary Remediation Goals (PRGs).
3. Remedial boundaries subject to change based on planned supplemental sampling.

RESOLUTION CONSULTANTS

Drawn:	JB	04/13/2016
Approved:	MK	04/13/2016
Project #:	60266436	

Legend
- Soil Sample Location (2013)
- Ecological PRG Exceedance
- RIDEM GA Leachability Exceedance
- Estimated Extent of LUCs under Alternative S-2 and Alternative S-3
- Estimated Extent of Excavation under Alternative S-2 and Containment under Alternative S-3
- Electrical Box
- Topographic Contour Line (NAVD 88)

N

0 5 10
Scale in Feet

FIGURE 11
SUMMARY OF PRG EXCEEDANCES
FOR SURFACE SOIL
DECISION UNIT 2-2
SITE 10 - TANK FARM 2
NAVSTA NEWPORT, RHODE ISLAND

Path: P:\Govt\Projects\NavyCLEAN AECOM-EnSafe JV\Newport\GIS\Projects\Tank_Farm_2\FS\MXD\Fig_11_Summary_PRGs.mxd

APPENDIX A.1 – DECISION UNIT 2-1 PRG DEVELOPMENT

TABLE 10. HUMAN HEALTH PRELIMINARY REMEDIATION GOALS (PRGs) FOR SOIL AT DECISION UNIT 2-1
TANK FARM 2, NAVSTA NEWPORT, PORTSMOUTH, RHODE ISLAND

Media/ Scenario	Contaminant	Regulatory Criteria: RIDEM Rem. Regs [1]			Risk-Based PRGs[2]: ILCR				Additional Information: Site-specific Reference Levels[3]		RI Background[4]	Selected Surface Soil PRG[7]	Basis	Selected Subsurface Soil PRG[7]	Basis
		Leachability	I/C DEC	Res. DEC	10^{-6}	10^{-5}	10^{-4}	HQ = 1	Surface Soil	Subsurface Soil					
Decision Unit 2-1 Soil - mg/kg (Hypothetical Residential Scenario)															
	Benzo(a)anthracene	- -	NA	0.9	0.16	1.6	16	NA	- -	- -	- -	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}
	Benzo(a)pyrene	240	NA	0.4	0.016	0.16	1.6	NA	- -	- -	- -	0.016	ILCR = 10^{-6}	0.016	ILCR = 10^{-6}
	Benzo(b)fluoranthene	- -	NA	0.9	0.16	1.6	16	NA	- -	- -	- -	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}
	Benzo(g,h,i)perylene[5]	- -	NA	0.8	NA	NA	NA	NA	- -	- -	- -	0.8	Res. DEC	0.8	Res. DEC
	Benzo(k)fluoranthene[5]	- -	NA	0.9	NA	NA	NA	NA	- -	- -	- -	0.9	Res. DEC	0.9	Res. DEC
	Chrysene[5]	- -	NA	0.4	NA	NA	NA	NA	- -	- -	- -	0.4	Res. DEC	0.4	Res. DEC
	Dibenzo(a,h)anthracene	- -	NA	0.4	0.016	0.16	1.6	NA	- -	- -	- -	0.016	ILCR = 10^{-6}	0.016	ILCR = 10^{-6}
	Indeno(1,2,3-cd)pyrene	- -	NA	0.9	0.16	1.6	16	NA	- -	- -	- -	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}
	Naphthalene[5]	0.8	NA	54	NA	NA	NA	NA	- -	- -	- -	0.8	Leachabilty	0.8	Leachabilty
	Arsenic[6]	- -	NA	7	0.68	6.8	68	NA	17	6	7	17	Background	6	Background
	Chromium	- -	NA	390	0.31	3.1	31	NA	- -	- -	6.53	0.31	ILCR = 10^{-6}	0.31	ILCR = 10^{-6}
	Manganese[5]	- -	NA	390	NA	NA	NA	NA	261	460	- -	390	Res. DEC	460	Background
Decision Unit 2-1 Soil - mg/kg (Industrial Worker/Restricted Recreational Scenario)															
	Benzo(a)pyrene[5]	240	0.8	NA	NA	NA	NA	NA	- -	- -	- -	0.8	I/C DEC	0.8	I/C DEC
	Naphthalene[5]	0.8	10000	NA	NA	NA	NA	NA	- -	- -	- -	0.8	Leachabilty	0.8	Leachabilty
	Arsenic[5,6]	- -	7	NA	NA	NA	NA	NA	17	6	7	17	Background	7	I/C DEC

Notes

ILCR - Incremental Lifetime Cancer Risk

HQ - Hazard Quotient

NA - Not carcinogenic, or a carcinogen was not evaluated for potential non-carcinogenic effects; not applicable

AOC - Area of Concern

1. RIDEM Rem. Regs. - RIDEM Remediation Regulations, DEM-DSR-01-93, November 2011, Table 1 (Residential Direct Exposure Criteria [DEC] and Industrial/Commercial [I/C] DEC) and Table 2 (GA Leachability Criteria); - - = no criterion
2. Risk-based PRGs are developed based on risk results from the human health risk assessment and consider the ingestion, dermal and inhalation routes of exposure, as applicable. Noncancer PRGs are based on child exposure, while cancer PRGs are based on lifetime exposure. The only PRGs included were for those analytes which were concluded to be primary risk drivers; if the cancer or non-cancer effects were not shown to be primary risk drivers, a PRG was not presented (NA).
3. Site-specific background values generated in Appendix A.3. Data was obtained from the Basewide Background Study Report for Naval Station Newport, Tetra Tech NUS, Inc., July 2008.
   - - = not detected
4. Arsenic background based on RIDEM Rem. Regs, November 2011. Other background values - statewide geometric mean provided in Background Levels of Priority Pollutant Metals in Rhode Island Soils, Rhode Island Department of Environmental Management Division of Site Remedation.
5. Analyte included only due to detections in exceedance of RIDEM Regulatory Criteria. As this analyte was not determined to be a risk driver in the Baseline Human Health Risk Assessment, risk-based PRG calculations are not included for this analyte/exposure scenario. Comparison of maximum detected concentrations to regulatory criteria presented in Table 12 of this attachment.
6. While the RIDEM DEC is set at Rhode Island background (7 mg/kg), additional guidance specific to arsenic remediation is provided in the RIDEM Remediation Regulations, DEM-DSR-01-93, November 2011, Section 12.0. Higher concentrations of arsenic are allowable, depending on other site conditions/actions.
7. For the contaminants listed above, selected PRGs were identified as the lower of the risk-based goals or ARAR (if available). If site-specific background values are available and applicable, the greater of the two values was selected as the PRG.

TABLE 11. HUMAN HEALTH PRELIMINARY REMEDIATION GOALS (PRGs) FOR SOIL AT DECISION UNIT 2-1 - RESIDUAL RISK
TANK FARM 2, NAVSTA NEWPORT, PORTSMOUTH, RHODE ISLAND

Media/ Scenario	Contaminant	Regulatory Criteria: RIDEM Rem. Regs [1] Leachability	I/C DEC	Res. DEC	Risk-Based PRGs[2]: ILCR 10^{-6}	10^{-5}	10^{-4}	HQ = 1	Additional Information: Site-specific Reference Levels[3] Surface Soil	Subsurface Soil	RI Background[4]	Selected Surface Soil PRG[7]	Basis	Selected Suburface Soil PRG[7]	Basis	Residual Risk At PRG: Surface Soil Estimated ILCR	Surface Soil Estimated HQ	Subsurface Soil Estimated ILCR	Subsurface Soil Estimated HQ
Decision Unit 2-1 Soil - mg/kg (Hypothetical Residential Scenario)																			
	Benzo(a)anthracene	- -	NA	0.9	0.16	1.6	16	NA	- -	- -	- -	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}	1E-06	NA	1E-06	NA
	Benzo(a)pyrene	240	NA	0.4	0.016	0.16	1.6	NA	- -	- -	- -	0.016	ILCR = 10^{-6}	0.016	ILCR = 10^{-6}	7E-07	NA	7E-07	NA
	Benzo(b)fluoranthene	- -	NA	0.9	0.16	1.6	16	NA	- -	- -	- -	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}	1E-06	NA	1E-06	NA
	Benzo(g,h,i)perylene[5]	- -	NA	0.8	NA	NA	NA	NA	- -	- -	- -	0.8	Res. DEC	0.8	Res. DEC	NA	5E-04	NA	5E-04
	Benzo(k)fluoranthene[5]	- -	NA	0.9	NA	NA	NA	NA	- -	- -	- -	0.9	Res. DEC	0.9	Res. DEC	6E-07	NA	6E-07	NA
	Chrysene[5]	- -	NA	0.4	NA	NA	NA	NA	- -	- -	- -	0.4	Res. DEC	0.4	Res. DEC	3E-08	NA	3E-08	NA
	Dibenzo(a,h)anthracene	- -	NA	0.4	0.016	0.16	1.6	NA	- -	- -	- -	0.016	ILCR = 10^{-6}	0.016	ILCR = 10^{-6}	1E-06	NA	1E-06	NA
	Indeno(1,2,3-cd)pyrene	- -	NA	0.9	0.16	1.6	16	NA	- -	- -	- -	0.16	ILCR = 10^{-6}	0.16	ILCR = 10^{-6}	1E-06	NA	1E-06	NA
	Naphthalene[5]	0.8	NA	54	NA	NA	NA	NA	- -	- -	- -	0.8	Leachabilty	0.8	Leachabilty	NA	NA	NA	NA
	Arsenic[6]	- -	NA	7	0.68	6.8	68	NA	17	6	7	17	Background	6	Background	2E-05	4E-01	7E-06	1E-01
	Chromium	- -	NA	390	0.31	3.1	31	NA	- -	- -	6.53	0.31	ILCR = 10^{-6}	0.31	ILCR = 10^{-6}	1E-06	1E-03	1E-06	1E-03
	Manganese[5]	- -	NA	390	NA	NA	NA	NA	261	460	- -	390	Res. DEC	460	Background	NA	2E-01	NA	3E-01
																3E-05		**1E-05**	
Decision Unit 2-1 Soil - mg/kg (Industrial Worker/Restricted Recreational Scenario)																			
	Benzo(a)pyrene[5]	240	0.8	NA	NA	NA	NA	NA	- -	- -	- -	0.8	I/C DEC	0.8	I/C DEC	3E-06	NA	3E-06	NA
	Naphthalene[5]	0.8	10000	NA	NA	NA	NA	NA	- -	- -	- -	0.8	Leachabilty	0.8	Leachabilty	NA	NA	NA	NA
	Arsenic[5,6]	- -	7	NA	NA	NA	NA	NA	17	6	7	17	Background	7	I/C DEC	6E-06	4E-02	3E-06	2E-02
																9E-06		**5E-06**	

Notes
ILCR - Incremental Lifetime Cancer Risk
HQ - Hazard Quotient
NA - Not carcinogenic, or a carcinogen was not evaluated for potential non-carcinogenic effects; not applicable
AOC - Area of Concern

1. RIDEM Rem. Regs. - RIDEM Remediation Regulations, DEM-DSR-01-93, November 2011, Table 1 (Residential Direct Exposure Criteria [DEC] and Industrial/Commercial [I/C] DEC) and Table 2 (GA Leachability Criteria); - - = no criterion
2. Risk-based PRGs are developed based on risk results from the human health risk assessment and consider the ingestion, dermal and inhalation routes of exposure, as applicable. Noncancer PRGs are based on child exposure, while cancer PRGs are based on lifetime exposure. The only PRGs included were for those analytes which were concluded to be primary risk drivers; if the cancer or non-cancer effects were not shown to be primary risk drivers, a PRG was not presented (NA).
3. Site-specific background values generated in Appendix A.3. Data was obtained from the Basewide Background Study Report for Naval Station Newport, Tetra Tech NUS, Inc., July 2008.
   - - = not detected
4. Arsenic background based on RIDEM Rem. Regs, November 2011. Other background values - statewide geometric mean provided in Background Levels of Priority Pollutant Metals in Rhode Island Soils, Rhode Island Department of Environmental Management Division of Site Remedation.
5. Analyte included only due to detections in exceedance of RIDEM Regulatory Criteria. As this analyte was not determined to be a risk driver in the Baseline Human Health Risk Assessment, risk-based PRG calculations are not included for this analyte/exposure scenario. Comparison of maximum detected concentrations to regulatory criteria presented in Table 12 of this attachment.
6. While the RIDEM DEC is set at Rhode Island background (7 mg/kg), additional guidance specific to arsenic remediation is provided in the RIDEM Remediation Regulations, DEM-DSR-01-93, November 2011, Section 12.0. Higher concentrations of arsenic are allowable, depending on other site conditions/actions.
7. For the contaminants listed above, selected PRGs were identified as the lower of the risk-based goals or ARAR (if available). If site-specific background values are available and applicable, the greater of the two values was selected as the PRG.

APPENDIX A.2 – DECISION UNIT 2-2 PRG DEVELOPMENT

TABLE 4. DEVELOPMENT OF PRELIMINARY REMEDIATION GOALS (PRGs) FOR SOIL AT DECISION UNIT 2-2

Analyte[1]	Maximum Detected Concentration	Units	Regulatory Criteria RIDEM Rem. Regs[2]				Insectivorous Ecological Receptor Exposure Scenario[3]	Selected Residential Use Scenario PRG	Basis	Selected Industrial Use Scenario PRG	Basis	Selected Ecological PRG	Basis
			RDEC	I/C DEC	Leachability - GA	Leachability - GB							
Polychlorinated biphenyls (PCBs)													
PCBs	18	mg/kg	10	10	10	10	3.6	1	EPA Residential Guidance Value [4]	10	I/C DEC, Leachability	3.6	Ecological

Notes

1. Only detected analytes which were considered risk drivers or have regulatory criteria have been presented.

2. RIDEM Rem. Regs. - RIDEM Remediation Regulations, DEM-DSR-01-93, November 2011, Table 1 (Residential and Industrial/Commercial Direct Exposure Criteria [DEC]) and Table 2 (Leachability Criteria); NA = no criterion available

3. The geometric mean of the no observed adverse effects level- (NOAEL) and lowest observed adverse effects level- (LOAEL) based TRVs and an area use factor (AUF) of 10% were used to derive PRGs for the American robin and the short-tailed shrew. The lower of the two values is recommended as the ecological PRG for insectivores.

4. USEPA, 1990.

TABLE 5. DEVELOPMENT OF PRELIMINARY REMEDIATION GOALS (PRGs) FOR SOIL AT DECISION UNIT 2-2 - Residual Risk

Analyte[1]	Maximum Detected Concentration	Units	Regulatory Criteria RIDEM Rem. Regs[2]				Insectivorous Ecological Receptor Exposure Scenario[3]	Selected Residential Use Scenario PRG	Basis	Selected Industrial Use Scenario PRG	Basis	Selected Ecological PRG	Basis
			RDEC	I/C DEC	Leachability - GA	Leachability - GB							
Polychlorinated biphenyls (PCBs)													
PCBs	18	mg/kg	10	10	10	10	3.6	1	EPA Residential Guidance Value [4]	10	I/C DEC, Leachability	3.6	Ecological
							Residual cancer risk:	4E-06		1E-05			
							Residual noncancer hazard:	8E-01		7E-01			

Notes

1. Only detected analytes which were considered risk drivers or have regulatory criteria have been presented.

2. RIDEM Rem. Regs. - RIDEM Remediation Regulations, DEM-DSR-01-93, November 2011, Table 1 (Residential and Industrial/Commercial Direct Exposure Criteria [DEC]) and Table 2 (Leachability Criteria); NA = no criterion available

3. The geometric mean of the no observed adverse effects level- (NOAEL) and lowest observed adverse effects level- (LOAEL) based TRVs and an area use factor (AUF) of 10% were used to derive PRGs for the American robin and the short-tailed shrew. The lower of the two values is recommended as the ecological PRG for insectivores.

4. USEPA, 1990.

APPENDIX A.3 – BACKGROUND CALCULATIONS

Analytical Results
NS Newport
SURFACE (0-1')

	Site	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND
	Location	BWBK-NE01	BWBK-NE02	BWBK-NE03	BWBK-NE04	BWBK-NE05	BWBK-NE06	BWBK-NE07
	Depth	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Date	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00
	Matrix	SO	SO	SO	SO	SO	SO	SO
	Type	N	N	N	N	N	N	N
	Sample	BWBK-SS-NE01-0001	BWBK-SS-NE02-0001	BWBK-SS-NE03-0001	BWBK-SS-NE04-0001	BWBK-SS-NE05-0001	BWBK-SS-NE06-0001	BWBK-SS-NE07-0001
Analyte	**Units**							
Metals								
ARSENIC	mg/kg	**14.5**	**17.1**	**8.6**	**6.7**	**9.4**	**5.6**	**11.7**
MANGANESE	mg/kg	**290**	**222**	**192**	**253**	**208**	**184**	**177**

Analytical Results
NS Newport
SURFACE (0-1')

	Site	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND
	Location	BWBK-NE08	BWBK-NE09	BWBK-NE10	BWBK-NE101	BWBK-NE102	BWBK-NE103	BWBK-NE104
	Depth	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Date	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00
	Matrix	SO	SO	SO	SO	SO	SO	SO
	Type	N	N	N	N	N	N	N
	Sample	BWBK-SS-NE08-0001	BWBK-SS-NE09-0001	BWBK-SS-NE10-0001	BWBK-SS-NE101-0001	BWBK-SS-NE102-0001	BWBK-SS-NE103-0001	BWBK-SS-NE104-0001
Analyte	**Units**							
Metals								
ARSENIC	mg/kg	**6.4**	**8.3**	**8.2**	**3.1**	**2.4**	**2.8**	**2.4**
MANGANESE	mg/kg	**185**	**219**	**193**	**146**	**128**	**104**	**133**

Analytical Results
NS Newport
SURFACE (0-1')

	Site	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	SITE 00002
	Location	BWBK-NE105	BWBK-NE106	BWBK-NE107	BWBK-NE108	BWBK-NE109	BWBK-NE110	BKG-SS03-NEB
	Depth	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1.6 ft
	Date	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	1/1/1900 00:00
	Matrix	SO	SO	SO	SO	SO	SO	SO
	Type	N	N	N	N	N	N	N
	Sample	BWBK-SS-NE105-0001	BWBK-SS-NE106-0001	BWBK-SS-NE107-0001	BWBK-SS-NE108-0001	BWBK-SS-NE109-0001	BWBK-SS-NE110-0001	BKG-SS03-NEB-0016
Analyte	**Units**							
Metals								
ARSENIC	mg/kg	**2.2**	**2.3**	**2.3**	**2.4**	**1.7**	**3**	**6.2**
MANGANESE	mg/kg	**119**	**130**	**164**	**129**	**119**	**85.5**	**204**

Analytical Results
NS Newport
SURFACE (0-1')

	Site	SITE 00002
	Location	BKG-SS09-NEB
	Depth	0 - 1.8 ft
	Date	1/1/1900 00:00
	Matrix	SO
	Type	N
	Sample	BKG-SS09-NEB-0018
Analyte	**Units**	
Metals		
ARSENIC	mg/kg	**10.8**
MANGANESE	mg/kg	**179**

Analytical Results
NS Newport
SUBSURFACE (>1')

	Site	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND
	Location	BWBK-NE01	BWBK-NE02	BWBK-NE03	BWBK-NE04	BWBK-NE05	BWBK-NE06	BWBK-NE07
	Depth	1 - 8 ft	1 - 9 ft	1 - 5 ft	1 - 10 ft	1 - 8 ft	1 - 9 ft	1 - 7 ft
	Date	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00
	Matrix	SO	SO	SO	SO	SO	SO	SO
	Type	N	N	N	N	N	N	N
	Sample	BWBK-SB-NE01-0108	BWBK-SB-NE02-0109	BWBK-SB-NE03-0105	BWBK-SB-NE04-0110	BWBK-SB-NE05-0108	BWBK-SB-NE06-0109	BWBK-SB-NE07-0107
Analyte	**Units**							
Metals								
ARSENIC	mg/kg	**5.2**	**5.8**	**5.5**	**4.6**	**5**	**4.9**	**5.2**
MANGANESE	mg/kg	**359**	**634**	**301**	**344**	**325**	**319**	**300**

Analytical Results
NS Newport
SUBSURFACE (>1')

	Site	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND
	Location	BWBK-NE08	BWBK-NE09	BWBK-NE10	BWBK-NE101	BWBK-NE102	BWBK-NE103	BWBK-NE104
	Depth	1 - 4 ft	1 - 10 ft	1 - 7 ft	1 - 10 ft	1 - 10 ft	1 - 10 ft	1 - 10 ft
	Date	9/13/2006 00:00	9/13/2006 00:00	9/13/2006 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00
	Matrix	SO	SO	SO	SO	SO	SO	SO
	Type	N	N	N	N	N	N	N
	Sample	BWBK-SB-NE08-0104	BWBK-SB-NE09-0110	BWBK-SB-NE10-0107	BWBK-SB-NE101-0110	BWBK-SB-NE102-0110	BWBK-SB-NE103-0110	BWBK-SB-NE104-0110
Analyte	**Units**							
Metals								
ARSENIC	mg/kg	**4.4**	**4.3**	**3.8**	**3.2**	**2.6**	**2.4**	**2.1**
MANGANESE	mg/kg	**255**	**306**	**249**	**243**	**229**	**209**	**176**

Analytical Results
NS Newport
SUBSURFACE (>1')

	Site	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	BACKGROUND	SITE 00002
	Location	BWBK-NE105	BWBK-NE106	BWBK-NE107	BWBK-NE108	BWBK-NE109	BWBK-NE110	BKG-SS03-NEB
	Depth	1 - 10 ft	1 - 10 ft	5 - 10 ft	1 - 10 ft	1 - 10 ft	1 - 10 ft	0 - 1.6 ft
	Date	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	3/27/2007 00:00	1/1/1900 00:00
	Matrix	SO	SO	SO	SO	SO	SO	SO
	Type	N	N	N	N	N	N	N
	Sample	BWBK-SB-NE105-0110	BWBK-SB-NE106-0110	BWBK-SB-NE107-0510	BWBK-SB-NE108-0110	BWBK-SB-NE109-0110	BWBK-SB-NE110-0110	BKG-SS03-NEB-0016
Analyte	**Units**							
Metals								
ARSENIC	mg/kg	**3.7**	**2.6**	**1.9**	**2.2**	**2.2**	**2.6**	**6.2**
MANGANESE	mg/kg	**322**	**247**	**200**	**207**	**214**	**244**	**204**

Analytical Results
NS Newport
SUBSURFACE (>1')

	Site	SITE 00002
	Location	BKG-SS09-NEB
	Depth	0 - 1.8 ft
	Date	1/1/1900 00:00
	Matrix	SO
	Type	N
	Sample	BKG-SS09-NEB-0018
Analyte	**Units**	
Metals		
ARSENIC	mg/kg	**10.8**
MANGANESE	mg/kg	**179**

	A	B	C	D	E	F	G	H	I	J	K	L
1				Background Statistics for Uncensored Full Data Sets								
2		User Selected Options										
3		Date/Time of Computation		4/4/2016 2:15:28 PM								
4		From File		Y:\Projects\NavyCLEAN AECOM-EnSafe JV\Newport\CTO WE16 - TF FS, EECAs\TF2 FS\DF FS Report\Apper								
5		Full Precision		OFF								
6		Confidence Coefficient		95%								
7		Coverage		95%								
8		New or Future K Observations		1								
9		Number of Bootstrap Operations		2000								
10												
11	ARSENIC SURFACE SOIL											
12												
13	General Statistics											
14				Total Number of Observations		22			Number of Distinct Observations			19
15				Minimum		1.7			First Quartile			2.4
16				Second Largest		14.5			Median			5.9
17				Maximum		17.1			Third Quartile			8.525
18				Mean		6.277			SD			4.394
19				Coefficient of Variation		0.7			Skewness			0.963
20				Mean of logged Data		1.597			SD of logged Data			0.719
21												
22				Critical Values for Background Threshold Values (BTVs)								
23				Tolerance Factor K (For UTL)		2.349			d2max (for USL)			2.603
24												
25				Normal GOF Test								
26				Shapiro Wilk Test Statistic		0.873			Shapiro Wilk GOF Test			
27				5% Shapiro Wilk Critical Value		0.911			Data Not Normal at 5% Significance Level			
28				Lilliefors Test Statistic		0.22			Lilliefors GOF Test			
29				5% Lilliefors Critical Value		0.189			Data Not Normal at 5% Significance Level			
30				Data Not Normal at 5% Significance Level								
31												
32				Background Statistics Assuming Normal Distribution								
33				95% UTL with 95% Coverage		16.6			90% Percentile (z)			11.91
34				95% UPL (t)		14.01			95% Percentile (z)			13.5
35				95% USL		17.71			99% Percentile (z)			16.5
36												
37				Gamma GOF Test								
38				A-D Test Statistic		0.849			Anderson-Darling Gamma GOF Test			
39				5% A-D Critical Value		0.755			Data Not Gamma Distributed at 5% Significance Level			
40				K-S Test Statistic		0.216			Kolmogrov-Smirnoff Gamma GOF Test			
41				5% K-S Critical Value		0.188			Data Not Gamma Distributed at 5% Significance Level			
42				Data Not Gamma Distributed at 5% Significance Level								
43												
44				Gamma Statistics								
45				k hat (MLE)		2.239			k star (bias corrected MLE)			1.964
46				Theta hat (MLE)		2.803			Theta star (bias corrected MLE)			3.196
47				nu hat (MLE)		98.54			nu star (bias corrected)			86.43
48				MLE Mean (bias corrected)		6.277			MLE Sd (bias corrected)			4.479
49												
50				Background Statistics Assuming Gamma Distribution								
51				95% Wilson Hilferty (WH) Approx. Gamma UPL		15.47			90% Percentile			12.26
52				95% Hawkins Wixley (HW) Approx. Gamma UPL		15.84			95% Percentile			14.97

	A	B	C	D	E	F	G	H	I	J	K	L
53				95% WH Approx. Gamma UTL with	95% Coverage	20.57					99% Percentile	21
54				95% HW Approx. Gamma UTL with	95% Coverage	21.62						
55					95% WH USL	23.08					95% HW USL	24.54
56												
57						Lognormal GOF Test						
58					Shapiro Wilk Test Statistic	0.91			Shapiro Wilk Lognormal GOF Test			
59					5% Shapiro Wilk Critical Value	0.911			Data Not Lognormal at 5% Significance Level			
60					Lilliefors Test Statistic	0.196			Lilliefors Lognormal GOF Test			
61					5% Lilliefors Critical Value	0.189			Data Not Lognormal at 5% Significance Level			
62						Data Not Lognormal at 5% Significance Level						
63												
64						Background Statistics assuming Lognormal Distribution						
65				95% UTL with	95% Coverage	26.72					90% Percentile (z)	12.41
66					95% UPL (t)	17.49					95% Percentile (z)	16.11
67					95% USL	32.06					99% Percentile (z)	26.29
68												
69						Nonparametric Distribution Free Background Statistics						
70						Data do not follow a Discernible Distribution (0.05)						
71												
72						Nonparametric Upper Limits for Background Threshold Values						
73					Order of Statistic, r	22					95% UTL with 95% Coverage	17.1
74					Approximate f	1.158					Confidence Coefficient (CC) achieved by UTL	0.676
75				95% Percentile Bootstrap UTL with	95% Coverage	17.1					95% BCA Bootstrap UTL with 95% Coverage	17.1
76					95% UPL	16.71					90% Percentile	11.61
77					90% Chebyshev UPL	19.76					95% Percentile	14.36
78					95% Chebyshev UPL	25.86					99% Percentile	16.55
79					95% USL	17.1						
80												
81						Note: The use of USL to estimate a BTV is recommended only when the data set represents a background						
82						data set free of outliers and consists of observations collected from clean unimpacted locations.						
83						The use of USL tends to provide a balance between false positives and false negatives provided the data						
84						represents a background data set and when many onsite observations need to be compared with the BTV.						
85												
86	MANGANESE SURFACE SOIL											
87												
88	General Statistics											
89					Total Number of Observations	22					Number of Distinct Observations	21
90					Minimum	85.5					First Quartile	129.3
91					Second Largest	253					Median	178
92					Maximum	290					Third Quartile	201.3
93					Mean	171.1					SD	50.83
94					Coefficient of Variation	0.297					Skewness	0.431
95					Mean of logged Data	5.099					SD of logged Data	0.305
96												
97						Critical Values for Background Threshold Values (BTVs)						
98					Tolerance Factor K (For UTL)	2.349					d2max (for USL)	2.603
99												
100						Normal GOF Test						
101					Shapiro Wilk Test Statistic	0.968			Shapiro Wilk GOF Test			
102					5% Shapiro Wilk Critical Value	0.911			Data appear Normal at 5% Significance Level			
103					Lilliefors Test Statistic	0.137			Lilliefors GOF Test			
104					5% Lilliefors Critical Value	0.189			Data appear Normal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
105	Data appear Normal at 5% Significance Level											
106												
107	Background Statistics Assuming Normal Distribution											
108					95% UTL with 95% Coverage	290.5				90% Percentile (z)		236.2
109					95% UPL (t)	260.5				95% Percentile (z)		254.7
110					95% USL	303.4				99% Percentile (z)		289.3
111												
112	Gamma GOF Test											
113					A-D Test Statistic	0.298	Anderson-Darling Gamma GOF Test					
114					5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level					
115					K-S Test Statistic	0.13	Kolmogrov-Smirnoff Gamma GOF Test					
116					5% K-S Critical Value	0.185	Detected data appear Gamma Distributed at 5% Significance Level					
117	Detected data appear Gamma Distributed at 5% Significance Level											
118												
119	Gamma Statistics											
120					k hat (MLE)	11.73				k star (bias corrected MLE)		10.16
121					Theta hat (MLE)	14.59				Theta star (bias corrected MLE)		16.84
122					nu hat (MLE)	516				nu star (bias corrected)		447
123					MLE Mean (bias corrected)	171.1				MLE Sd (bias corrected)		53.67
124												
125	Background Statistics Assuming Gamma Distribution											
126				95% Wilson Hilferty (WH) Approx. Gamma UPL		271.1				90% Percentile		242.4
127				95% Hawkins Wixley (HW) Approx. Gamma UPL		273				95% Percentile		267.8
128				95% WH Approx. Gamma UTL with 95% Coverage		314.2				99% Percentile		320
129				95% HW Approx. Gamma UTL with 95% Coverage		318.6						
130					95% WH USL	334.1				95% HW USL		339.9
131												
132	Lognormal GOF Test											
133					Shapiro Wilk Test Statistic	0.975	Shapiro Wilk Lognormal GOF Test					
134					5% Shapiro Wilk Critical Value	0.911	Data appear Lognormal at 5% Significance Level					
135					Lilliefors Test Statistic	0.146	Lilliefors Lognormal GOF Test					
136					5% Lilliefors Critical Value	0.189	Data appear Lognormal at 5% Significance Level					
137	Data appear Lognormal at 5% Significance Level											
138												
139	Background Statistics assuming Lognormal Distribution											
140					95% UTL with 95% Coverage	335.3				90% Percentile (z)		242.2
141					95% UPL (t)	280.2				95% Percentile (z)		270.5
142					95% USL	362.3				99% Percentile (z)		333
143												
144	Nonparametric Distribution Free Background Statistics											
145	Data appear Normal at 5% Significance Level											
146												
147	Nonparametric Upper Limits for Background Threshold Values											
148					Order of Statistic, r	22				95% UTL with 95% Coverage		290
149					Approximate f	1.158				Confidence Coefficient (CC) achieved by UTL		0.676
150				95% Percentile Bootstrap UTL with 95% Coverage		290				95% BCA Bootstrap UTL with 95% Coverage		290
151					95% UPL	284.5				90% Percentile		221.7
152					90% Chebyshev UPL	327				95% Percentile		251.5
153					95% Chebyshev UPL	397.6				99% Percentile		282.2
154					95% USL	290						
155												
156	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											

	A	B	C	D	E	F	G	H	I	J	K	L
157	data set free of outliers and consists of observations collected from clean unimpacted locations.											
158	The use of USL tends to provide a balance between false positives and false negatives provided the data											
159	represents a background data set and when many onsite observations need to be compared with the BTV.											
160												

	A	B	C	D	E	F	G	H	I	J	K	L
1				Background Statistics for Uncensored Full Data Sets								
2		User Selected Options										
3		Date/Time of Computation		4/4/2016 2:18:25 PM								
4		From File		Y:\Projects\NavyCLEAN AECOM-EnSafe JV\Newport\CTO WE16 - TF FS, EECAs\TF2 FS\DF FS Report\Apper								
5		Full Precision		OFF								
6		Confidence Coefficient		95%								
7		Coverage		95%								
8		New or Future K Observations		1								
9		Number of Bootstrap Operations		2000								
10												
11	ARSENIC SUBSURFACE SOIL											
12												
13	General Statistics											
14				Total Number of Observations		20			Number of Distinct Observations			16
15				Minimum		1.9			First Quartile			2.55
16				Second Largest		5.5			Median			3.75
17				Maximum		5.8			Third Quartile			4.925
18				Mean		3.71			SD			1.314
19				Coefficient of Variation		0.354			Skewness			0.0793
20				Mean of logged Data		1.247			SD of logged Data			0.375
21												
22				Critical Values for Background Threshold Values (BTVs)								
23				Tolerance Factor K (For UTL)		2.396			d2max (for USL)			2.557
24												
25				Normal GOF Test								
26				Shapiro Wilk Test Statistic		0.907			Shapiro Wilk GOF Test			
27				5% Shapiro Wilk Critical Value		0.905			Data appear Normal at 5% Significance Level			
28				Lilliefors Test Statistic		0.201			Lilliefors GOF Test			
29				5% Lilliefors Critical Value		0.198			Data Not Normal at 5% Significance Level			
30				Data appear Approximate Normal at 5% Significance Level								
31												
32				Background Statistics Assuming Normal Distribution								
33				95% UTL with 95% Coverage		6.859			90% Percentile (z)			5.394
34				95% UPL (t)		6.039			95% Percentile (z)			5.872
35				95% USL		7.07			99% Percentile (z)			6.767
36												
37				Gamma GOF Test								
38				A-D Test Statistic		0.775			Anderson-Darling Gamma GOF Test			
39				5% A-D Critical Value		0.743			Data Not Gamma Distributed at 5% Significance Level			
40				K-S Test Statistic		0.195			Kolmogrov-Smirnoff Gamma GOF Test			
41				5% K-S Critical Value		0.194			Data Not Gamma Distributed at 5% Significance Level			
42				Data Not Gamma Distributed at 5% Significance Level								
43												
44				Gamma Statistics								
45				k hat (MLE)		7.936			k star (bias corrected MLE)			6.779
46				Theta hat (MLE)		0.468			Theta star (bias corrected MLE)			0.547
47				nu hat (MLE)		317.4			nu star (bias corrected)			271.1
48				MLE Mean (bias corrected)		3.71			MLE Sd (bias corrected)			1.425
49												
50				Background Statistics Assuming Gamma Distribution								
51				95% Wilson Hilferty (WH) Approx. Gamma UPL		6.434			90% Percentile			5.613
52				95% Hawkins Wixley (HW) Approx. Gamma UPL		6.504			95% Percentile			6.322

	A	B	C	D	E	F	G	H	I	J	K	L
53				95% WH Approx. Gamma UTL with	95% Coverage	7.732					99% Percentile	7.799
54				95% HW Approx. Gamma UTL with	95% Coverage	7.899						
55					95% WH USL	8.092					95% HW USL	8.292
56												
57						Lognormal GOF Test						
58					Shapiro Wilk Test Statistic	0.903			Shapiro Wilk Lognormal GOF Test			
59					5% Shapiro Wilk Critical Value	0.905			Data Not Lognormal at 5% Significance Level			
60					Lilliefors Test Statistic	0.181			Lilliefors Lognormal GOF Test			
61					5% Lilliefors Critical Value	0.198			Data appear Lognormal at 5% Significance Level			
62					Data appear Approximate Lognormal at 5% Significance Level							
63												
64					Background Statistics assuming Lognormal Distribution							
65					95% UTL with 95% Coverage	8.545					90% Percentile (z)	5.626
66					95% UPL (t)	6.761					95% Percentile (z)	6.447
67					95% USL	9.075					99% Percentile (z)	8.325
68												
69					Nonparametric Distribution Free Background Statistics							
70					Data appear Approximate Normal at 5% Significance Level							
71												
72					Nonparametric Upper Limits for Background Threshold Values							
73					Order of Statistic, r	20					95% UTL with 95% Coverage	5.8
74					Approximate f	1.053					Confidence Coefficient (CC) achieved by UTL	0.642
75				95% Percentile Bootstrap UTL with	95% Coverage	5.8					95% BCA Bootstrap UTL with 95% Coverage	5.8
76					95% UPL	5.785					90% Percentile	5.23
77					90% Chebyshev UPL	7.75					95% Percentile	5.515
78					95% Chebyshev UPL	9.58					99% Percentile	5.743
79					95% USL	5.8						
80												
81					Note: The use of USL to estimate a BTV is recommended only when the data set represents a background							
82					data set free of outliers and consists of observations collected from clean unimpacted locations.							
83					The use of USL tends to provide a balance between false positives and false negatives provided the data							
84					represents a background data set and when many onsite observations need to be compared with the BTV.							
85												
86	MANGANESE SUBSURFACE SOIL											
87												
88	General Statistics											
89					Total Number of Observations	20					Number of Distinct Observations	20
90					Minimum	176					First Quartile	225.3
91					Second Largest	359					Median	252
92					Maximum	634					Third Quartile	319.8
93					Mean	284.2					SD	97.88
94					Coefficient of Variation	0.344					Skewness	2.503
95					Mean of logged Data	5.607					SD of logged Data	0.284
96												
97					Critical Values for Background Threshold Values (BTVs)							
98					Tolerance Factor K (For UTL)	2.396					d2max (for USL)	2.557
99												
100					Normal GOF Test							
101					Shapiro Wilk Test Statistic	0.753			Shapiro Wilk GOF Test			
102					5% Shapiro Wilk Critical Value	0.905			Data Not Normal at 5% Significance Level			
103					Lilliefors Test Statistic	0.188			Lilliefors GOF Test			
104					5% Lilliefors Critical Value	0.198			Data appear Normal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
105	Data appear Approximate Normal at 5% Significance Level											
106												
107	Background Statistics Assuming Normal Distribution											
108				95% UTL with	95% Coverage	518.7				90% Percentile (z)		409.6
109					95% UPL (t)	457.6				95% Percentile (z)		445.1
110					95% USL	534.4				99% Percentile (z)		511.8
111												
112	Gamma GOF Test											
113					A-D Test Statistic	0.712	Anderson-Darling Gamma GOF Test					
114					5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level					
115					K-S Test Statistic	0.156	Kolmogrov-Smirnoff Gamma GOF Test					
116					5% K-S Critical Value	0.194	Detected data appear Gamma Distributed at 5% Significance Level					
117	Detected data appear Gamma Distributed at 5% Significance Level											
118												
119	Gamma Statistics											
120					k hat (MLE)	11.87				k star (bias corrected MLE)		10.12
121					Theta hat (MLE)	23.93				Theta star (bias corrected MLE)		28.06
122					nu hat (MLE)	474.9				nu star (bias corrected)		405
123					MLE Mean (bias corrected)	284.2				MLE Sd (bias corrected)		89.3
124												
125	Background Statistics Assuming Gamma Distribution											
126			95% Wilson Hilferty (WH) Approx. Gamma UPL			450.2				90% Percentile		402.9
127			95% Hawkins Wixley (HW) Approx. Gamma UPL			449.9				95% Percentile		445.2
128			95% WH Approx. Gamma UTL with		95% Coverage	525.7				99% Percentile		531.9
129			95% HW Approx. Gamma UTL with		95% Coverage	527.9						
130					95% WH USL	546.4				95% HW USL		549.5
131												
132	Lognormal GOF Test											
133					Shapiro Wilk Test Statistic	0.906	Shapiro Wilk Lognormal GOF Test					
134					5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level					
135					Lilliefors Test Statistic	0.141	Lilliefors Lognormal GOF Test					
136					5% Lilliefors Critical Value	0.198	Data appear Lognormal at 5% Significance Level					
137	Data appear Lognormal at 5% Significance Level											
138												
139	Background Statistics assuming Lognormal Distribution											
140				95% UTL with	95% Coverage	537.2				90% Percentile (z)		391.6
141					95% UPL (t)	450				95% Percentile (z)		434.1
142					95% USL	562.2				99% Percentile (z)		526.7
143												
144	Nonparametric Distribution Free Background Statistics											
145	Data appear Approximate Normal at 5% Significance Level											
146												
147	Nonparametric Upper Limits for Background Threshold Values											
148					Order of Statistic, r	20				95% UTL with	95% Coverage	634
149					Approximate f	1.053				Confidence Coefficient (CC) achieved by UTL		0.642
150			95% Percentile Bootstrap UTL with		95% Coverage	634				95% BCA Bootstrap UTL with	95% Coverage	634
151					95% UPL	620.3				90% Percentile		345.5
152					90% Chebyshev UPL	585				95% Percentile		372.8
153					95% Chebyshev UPL	721.3				99% Percentile		581.8
154					95% USL	634						
155												
156	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											

	A	B	C	D	E	F	G	H	I	J	K	L
157	data set free of outliers and consists of observations collected from clean unimpacted locations.											
158	The use of USL tends to provide a balance between false positives and false negatives provided the data											
159	represents a background data set and when many onsite observations need to be compared with the BTV.											
160												

Appendix C

Cost Estimates

Planning Cost Estimate Summary

Alternative: S-1 No Action

Site:	DU 2-1 and 2-2 at Site 10 - Tank Farm 2, NAVSTA Newport	Description:	This alternative consists of no remedial action as a baseline comparison.
Location:	Portsmouth, Rhode Island		
Phase:	FS		
Date:	October 2015		

PERIODIC COSTS

Description	QTY	UNIT	UNIT COST	Total	Notes
No costs are estimated for this No Action alternative.					
SUBTOTAL				$0	
TOTAL PERIODIC ANNUAL COSTS				$0	

PRESENT VALUE ANALYSIS

Cost Type	Total Cost per Year	Discount Factor	Present Value	Notes
Capital Cost	0		$0	
O&M Cost	0		$0	
Periodic Cost	$0		$0	
Total Present Value of Alternative			$0	

Planning Cost Estimate Summary

Alternative: S-2 Limited Soil Excavation with Land Use Controls

Site: DU 2-1 and 2-2 at Site 10 - Tank Farm 2, NAVSTA Newport
Location: Portsmouth, Rhode Island
Phase: FS
Date: October 2015

Description: Under this alternative, limited soil excavation and off-site disposal would be performed at DU 2-1 to remove soils exceding Industrial PRGs for PAHs and at DU 2-2 to remove soils exceeding the Industrial and Ecological PRGs (including RIDEM GA Leachability Criteria at both areas). LUCs would also be implemented at DU 2-1 and 2-2 to prevent residential use and other unrestricted use of the property, at DU 2-1 to prevent direct contact with subsurface soil containing arsenic above the Industrial PRG, and at DU 2-2 to maintain the building foundation and prevent human and ecological exposures.

CAPITAL COSTS

Description		QTY	UNIT	UNIT COST	Total	Notes
Land Use Control Remedial Design (LUC RD)						
Prepare LUC RD (4 iterations)		1	LS	$15,000	$15,000	Estimated
					$15,000	
Delineation Soil Sampling						
HASP		1	LS	$7,000	$7,000	
Work Plan/UFP SAP		1	LS	$30,000	$30,000	
Direct push drill rig and operator		11	day	$2,000	$22,000	Assumes 66 soil borings with average depth to 5 ft and 18 borings with depth to 1 ft.
Labor to record and collect samples		22	person-days	$1,500	$33,000	Assume 12-hr field day
Laboratory analyses:						
	PAHs	50	EA	$120	$6,000	See Backup for sampling and analysis assumptions. Quantities include field duplicates (1 every 10).
	Arsenic	87	EA	$20	$1,740	
	Manganese	26	EA	$20	$520	
	Hexavalent Chromium	8	EA	$65	$520	
	PCBs	22	EA	$60	$1,320	
Travel		22	person-days	$200	$4,400	
Field supplies and equipment		1	EA	$1,500	$1,500	Allowance
Data Validation		30	HR	$100	$3,000	Allowance
Surveying		1	LS	$2,000	$2,000	Sample locations, contours, surface features
Tech Memo (2 iterations)		60	HR	$100	$6,000	Allowance
					$119,000	
Site Preparation and Management						
RA Contractor Work Plan		1	LS	$20,000	$20,000	
HASP		1	LS	$7,000	$7,000	
Equipment mobilization		1	LS	$2,500	$2,500	
Temporary facilities		1	LS	$500	$500	
Erosion control measures		200	LF	$4	$800	
Clearing and grubbing		790	SF	$8	$6,320	
					$37,120	
Excavation						
Excavate soil		90	CY	$15	$1,350	Based on 4 foot depth at DU 2-1 and 2 foot depth at DU 2-2 and areas shown on Figures 10 and 11
Dust control and air monitoring		1	LS	$500	$500	
Clean fill testing		1	EA	$830	$830	Estimate for VOCs, SVOCs, PCBs, pesticides, TPH, metals
Furnish common fill		108	CY	$15	$1,620	Cost to backfill excavation footprint at DU 2-1 and 2-2
Install clean fill		108	CY	$15	$1,620	
Regrade excavation footprint		790	SF	$1	$790	
Seeding		790	SF	$5	$3,950	
					$10,660	
Soil Disposal						
Waste Characterization		1	EA	$830	$830	Estimate for VOCs, SVOCs, PCBs, pesticides, TPH, metals; 1 per 500 CY
T&D non-haz soil		135	Ton	$75	$10,125	
					$10,955	
Post-Construction						
Contractor Completion Report		75	HR	$100	$7,500	
Remedial Action Completion Report		150	HR	$100	$15,000	
(2 iterations)					$22,500	
SUBTOTAL					$215,235	
Contingency	30%				$64,571	Scope (15%)+ Bid(15%)
SUBTOTAL					$279,806	
Project Management	6%				$16,788.33	
Remedial Design	4%				$11,192.22	
Construction Management	6%				$16,788.33	
TOTAL CAPITAL COSTS					$324,574	

Planning Cost Estimate Summary

Alternative: S-2 Limited Soil Excavation with Land Use Controls

O&M COSTS

Description		QTY	UNIT	UNIT COST	Total	Notes
Annual LUC Site inspections (through year 30)		1	each	$3,500	$3,500	Estimated; See attached worksheet 30 yrs of cost incorporated in present value analysis
SUBTOTAL					$3,500	
Contingency	0%				$0	
Project Management	10%				$350	
TOTAL O&M ANNUAL COSTS					$3,850	

PERIODIC COSTS

Description	QTY	UNIT	UNIT COST	Total	Notes
Five Year Review (through year 30)	6	each	$5,000	$30,000	Assume one component of base-wide 5-yr review
SUBTOTAL				$30,000	
TOTAL PERIODIC ANNUAL COSTS				$5,000	

PRESENT VALUE ANALYSIS

Cost Type	Year	Total Cost	Total Cost per Year	Discount Factor at 1.5%	Present Value	Notes
Capital Cost	0	$324,574	$324,574	1	$324,574	Discount rate of 1.5% is based on the
O&M Cost	1 to 30	$115,500	$3,850	24.0158	$92,461	30-Year Real Interest Rate in Appendix C
Periodic Cost	5	$5,000	$5,000	0.9283	$4,642	of the White House Office of Management
	10	$5,000	$5,000	0.8617	$4,309	and Budget (OMB) Circular A-94, Revised
	15	$5,000	$5,000	0.7999	$4,000	December 2014.
	20	$5,000	$5,000	0.7425	$3,713	
	25	$5,000	$5,000	0.6892	$3,446	
	30	$5,000	$5,000	0.6398	$3,199	
Total Present Value of Alternative					$440,342	

Planning Cost Backup Worksheet

Alternative: S-2 Limited Soil Excavation with Land Use Controls

Site: DU 2-1 and 2-2 at Site 10 - Tank Farm 2, NAVSTA Newport
Location: Portsmouth, Rhode Island
Phase: FS
Date: October 2015

Assumptions:

DU 2-1 Soil Sampling (not including QA/QC)
Sampling and analysis to delineate contamination and assess whether hexavalent chromium is present above the PRG or if it should be eliminated as a COC

Hexavalent Chromium: Assume resampling of 3 previous locations at 2 depth intervals each (2-4 feet and 8-10 feet) that had the highest total chromium in excess of the PRG for hexavalent chromium: TF2-001-SB1009-0204 and-0810, TF2-001-SS1001-0204 and 0810, and TF2-001-SB1000-0204 and -0810 (6 samples)
Arsenic: Assume an initial 12 sampling locations with two subsurface samples each (2-4 ft bgs and/or 8-10 ft bgs). Assume and additional 24 subsurface locations, with two depth intervals each, collected and potentially analyzed as step-outs.
PAHs: Assume an initial 11 surface samples and 5 subsurface samples (2-4 ft bgs and/or 8-10 ft bgs) collected and analyzed. Assume an additional 16 surface samples and 9 subsurface samples (2-4 ft bgs and/or 8-10 ft bgs) collected and potentially analyzed as step-outs.
Manganese: Assume an initial 5 surface and 3 subsurface (2-4 ft bgs) samples collected and analyzed. Assume an additional 7 surface and 6 subsurface (2-4 ft bgs) samples collected and potentially analyzed as step-outs.

DU 2-2 Delineation Soil Sampling (not including QA/QC)
Sampling and analysis to delineate overall extent of PCBs
PCBs: Assume 12 initial surface soil samples collected and analyzed and 6 potential step-out surface soil samples collected and analyzed.

Work Statement:
Annual Land Use Control (LUC) Inspections and Reporting

Description	QTY	UNIT	UNIT COST	Total	Notes
Travel	1	LS	$200	$200	
Labor for Inspection	24	HR	$100	$2,400	
Report	8	HR	$100	$800	
Misc	1	LS	$100	$100	
TOTAL COST PER ANNUAL INSPECTION				$3,500	

Source of Cost Data:
Engineering Estimate

Cost Adjustment Factor:

FACTOR:		NOTES:
H&S Productivity (labor & equip)		Level D
Escalation to Base Year		
Area Cost Factor		
Subcontractor Overhead & Prof.		
Prime Contractor Overhead & Prof.		

Planning Cost Estimate Summary

Alternative: S-3 Containment with Land Use Controls

Site: DU 2-1 and 2-2 at Site 10 - Tank Farm 2, NAVSTA Newport
Location: Portsmouth, Rhode Island
Phase: FS
Date: October 2015

Description: Under this alternative, an asphalt cap would be placed over soil in excess of the Industrial PRGs for PAHs at DU 2-1 and in excess of the Industrial and Ecological PRGs for PCBs at DU 2-2 (including RIDEM GA Leachability Criterion at both). LUCs would be applied to DU 2-1 and DU 2-2 that restrict cover disturbance and require maintenance of the impermeable caps as well as perform associated inspections and reporting. LUCs would also be applied to DU 2-1 and 2-2 that prevent residential and unrestricted recreational use, to DU 2-1 to prevent direct exposure to subsurface soil containing arsenic above the Industrial PRG, and to DU 2-2 that require maintanenance of the building foundation.

CAPITAL COSTS

Description		QTY	UNIT	UNIT COST	Total	Notes
Land Use Control Remedial Design (LUC RD)						
Prepare LUC RD (4 iterations)		1	LS	$15,000	$15,000	Estimated
					$15,000	
Delineation Soil Sampling						
HASP		1	LS	$7,000	$7,000	
Work Plan/UFP SAP		1	LS	$30,000	$30,000	
Direct push drill rig and operator		11	day	$2,000	$22,000	Assumes 66 soil borings with average depth to 5 ft and 18 borings with depth to 1 ft.
Labor to record and collect samples		22	person-days	$1,500	$33,000	Assume 12-hr field day
Laboratory analyses:						
	PAHs	50	EA	$120	$6,000	See Backup for sampling and analysis
	Arsenic	87	EA	$20	$1,740	assumptions. Quantities include field
	Manganese	26	EA	$20	$520	duplicates.
	Hexavalent Chromium	8	EA	$65	$520	
	PCBs	22	EA	$450	$9,900	
Travel		22	person-days	$200	$4,400	
Field supplies and equipment		1	EA	$1,500	$1,500	Allowance
Data Validation		30	HR	$100	$3,000	Allowance
Surveying		1	LS	$2,000	$2,000	Sample locations, contours, surface features
Tech Memo (2 iterations)		60	HR	$100	$6,000	Allowance
					$127,580	
Site Preparation and Management						
RA Work Plan		1	LS	$20,000	$20,000	
HASP		1	LS	$7,000	$7,000	
Equipment mobilization		1	LS	$5,000	$5,000	
Temporary facilities		1	LS	$2,500	$2,500	
Erosion control measures		200	LF	$4	$800	
Clearing and grubbing		790	SF	$8	$6,320	
					$41,620	
Construct Asphalt Cover						
Dust control and air monitoring		1	LS	$1,000	$1,000	
Regrade cap area		790	SF	$1	$790	
Clean fill testing		1	EA	$830	$830	Estimate for VOCs, SVOCs, PCBs, pesticides, TPH, metals
Furnish common fill		18	CY	$15	$270	A minimum of 6 inches of clean sub-base material will be
Install clean fill		18	CY	$15	$270	installed prior to installation of asphalt pavement
Install asphalt pavement		10	CY	$375	$3,750	Cost to have asphalt to be poured 4" over 790 SF
Survey to document final cover elevations		1	LS	$2,000	$2,000	
					$8,910	
Post-Construction						
Contractor Completion Report		75	HR	$100	$7,500	
Remedial Action Completion Report		150	HR	$100	$15,000	
(2 iterations)					$22,500	
SUBTOTAL					$215,610	
Contingency	30%				$64,683	Scope (15%)+ Bid(15%)
SUBTOTAL					$280,293	
Project Management	6%				$16,817.58	
Remedial Design	6%				$16,817.58	
Construction Management	6%				$16,817.58	
TOTAL CAPITAL COSTS					$330,746	

Planning Cost Estimate Summary

Alternative: S-3 Containment with Land Use Controls

O&M COSTS

Description		QTY	UNIT	UNIT COST	Total	Notes
Allowance for maintenance		1	each	$500	$500	Allowance for misc. needs
Annual LUC Site inspections (through year 30)		1	each	$3,500	$3,500	Estimated; See attached worksheet
SUBTOTAL					$4,000	
Contingency	0%				$0	
Project Management	10%				$400	
TOTAL O&M ANNUAL COSTS					$4,400	

PERIODIC COSTS

Description	QTY	UNIT	UNIT COST	Total	Notes
Five Year Review (through year 30)	6	each	$5,000	$30,000	Assume one component of base-wide 5-yr review
SUBTOTAL				$30,000	
TOTAL PERIODIC ANNUAL COSTS				$5,000	

PRESENT VALUE ANALYSIS

Cost Type	Year	Total Cost	Total Cost per Year	Discount Factor at 1.5%	Present Value	Notes
Capital Cost	0	$330,746	$330,746	1	$330,746	Discount rate of 1.5% is based on the
O&M Cost	1 to 30	$132,000	$4,400	24.0158	$105,670	30-Year Real Interest Rate in Appendix C
Periodic Cost	5	$5,000	$5,000	0.9283	$4,642	of the White House Office of Management
	10	$5,000	$5,000	0.8617	$4,309	and Budget (OMB) Circular A-94, Revised
	15	$5,000	$5,000	0.7999	$4,000	December 2014.
	20	$5,000	$5,000	0.7425	$3,713	
	25	$5,000	$5,000	0.6892	$3,446	
	30	$5,000	$5,000	0.6398	$3,199	
Total Present Value of Alternative					$459,722	

Planning Cost Backup Worksheet

Alternative: S-3 Containment with Land Use Controls

Site: Newport
Location: Portsmouth, Rhode Island
Phase: FS
Date: October 2015

Assumptions:

DU 2-1 Soil Sampling (not including QA/QC)

Sampling and analysis to delineate contamination and assess whether hexavalent chromium is present above the PRG or if it should be eliminated as a COC

Hexavalent Chromium: Assume resampling of 3 previous locations at 2 depth intervals each (2-4 feet and 8-10 feet) that had the highest total chromium in excess of the PRG for hexavalent chromium: TF2-001-SB1009-0204 and-0810, TF2-001-SS1001-0204 and 0810, and TF2-001-SB1000-0204 and -0810 (6 samples)

Arsenic: Assume an initial 12 sampling locations with two subsurface samples each (2-4 ft bgs and/or 8-10 ft bgs). Assume and additional 24 subsurface locations, with two depth intervals each, collected and potentially analyzed as step-outs.

PAHs: Assume an initial 11 surface samples and 5 subsurface samples (2-4 ft bgs and/or 8-10 ft bgs) collected and analyzed. Assume an additional 16 surface samples and 9 subsurface samples (2-4 ft bgs and/or 8-10 ft bgs) collected and potentially analyzed as step-outs.

Manganese: Assume an initial 5 surface and 3 subsurface (2-4 ft bgs) samples collected and analyzed. Assume an additional 7 surface and 6 subsurface (2-4 ft bgs) samples collected and potentially analyzed as step-outs.

DU 2-2 Delineation Soil Sampling (not including QA/QC)
Sampling and analysis to delineate overall extent of PCBs

PCBs: Assume 12 initial surface soil samples collected and analyzed and 6 potential step-out surface soil samples collected and analyzed.

Work Statement:
Annual Land Use Control (LUC) Inspections and Reporting

Description	QTY	UNIT	UNIT COST	Total	Notes
Travel	1	LS	$200	$200	
Labor for Inspection	24	HR	$100	$2,400	
Report	8	HR	$100	$800	
Misc	1	LS	$100	$100	
TOTAL COST PER ANNUAL INSPECTION				$3,500	

Source of Cost Data:
Engineering Estimate

Cost Adjustment Factor:

FACTOR:		NOTES:
H&S Productivity (labor & equip)		Level D
Escalation to Base Year		
Area Cost Factor		
Subcontractor Overhead & Prof.		
Prime Contractor Overhead & Prof.		