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LETTER AND U S NAVY RESPONSE TO U S EPA REGION I AND MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMENTS REGARDING DRAFT REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 7 (OU 7) NSY PORTSMOUTH ME
03/08/2011
TETRA TECH NUS

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March 8, 2011

Project Number 112G00383

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Mail Code OSRR07-3
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Mr. Iver McLeod
Maine Department of Environmental Protection
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Reference: Contract No. N62472-03-D-0057 (CLEAN)
Contract Task Order No. 055

Subject: Responses to Comments on the
Draft Remedial Investigation Report for Operable Unit7 (OU7)
Portsmouth Naval Shipyard (PNS), Kittery, Maine

Dear Mr. Audet/Mr. McLeod:

On behalf of the U.S. Navy, Tetra Tech NUS, Inc. is pleased to provide to the U.S. Environmental Protection Agency Region I (USEPA) and to the Maine Department of Environmental Protection (MEDEP) 2 and 3 copies, respectively, of the responses to USEPA comments dated January 6, 2011, and MEDEP comments dated December 14, 2010 and 1 copy each of the electronic document (on CD).

In accordance with the project schedule, comments are due by **April 7, 2011**.

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

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

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

Sincerely,

Deborah J. Cohen
Project Manager

DJC/clm
Enclosure

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RESPONSES TO MEDEP COMMENTS DATED DECEMBER 14, 2010
DRAFT REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 7
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

1. **Comment:** 1.2, p. 1-2. "Appendix B contains analytical results, including the complete database printout for soil and groundwater…" This is incorrect. Appendix B only contains groundwater results for inorganic analyses. All results must be shown in order for the database to be complete. See Comment 20.

   Response: Appendix B will be updated to include the complete database printout for all media.

2. **Comment:** 1.4, p 1-5 Para. 2: "BGS05 was removed from the background data set and included in the OU7 soil data set." BGS-08 also lies within the site boundaries. Please discuss the rationale for retaining it in the background data set. It appears that it would skew the background comparisons for the site and the "no debris fill" area near former Building 237. The Navy should consider including it in the OU7 soil data set.

   Response: BGS-08 is not within OU7. This facility background sample was collected from a vegetated area west of Newton Street. Estimated coordinates for location of BGS-08 will be corrected so that BGS-08 is within the vegetated area east of Newton Street instead of on Newton Street. The following provides additional information regarding the location of BGS-08.

   The locations for the background samples were approximated from a figure from the RFI Report and entered in the database as estimated locations. The samples were never geo-referenced with actual land features. Based on the approximated coordinates, BGS-08 appears to be in the middle of Newton Street. Based on field logs, BGS-08 was collected from a vegetated area, west of Newton Street. Using the information from the field logs, the location of BGS-08 was geo-referenced with the aerial map. Attachment 1 to these responses to comments is a figure showing the OU7 site boundary and the geo-referenced location of BGS-08. The database coordinates will be updated appropriately.

3. **Comment:** 1.4.1, Onshore Investigations Prior to the RI, p. 1-6. Please provide a brief discussion of the camera survey of the storm drains at OU7 that occurred several years ago and the conclusions drawn from it.

   Response: A discussion of the 2002 storm sewer camera survey will be added to Section 1.4.1. The following text, based on information provided in the March 2003 Site 32 RI QAPP (Revision 0), will be included: "In April 2002, the Navy conducted a storm sewer video camera survey to determine the condition of the storm sewer system that flows through OU7. The survey indicated that a majority of the sewers were in poor condition, with debris, dislocated joints, etc., and that groundwater infiltration was occurring at several locations. The storm sewers have outfalls in the OU7 intertidal area. The outfalls are tidally influenced, and it is likely that the outfalls are points where groundwater from the site is being transported to the Back Channel. Therefore, the Navy considers the storm sewer outfalls as potential groundwater transport pathways in the RI for OU7."

4. **Comment:** 2.2, Shoreline Stabilization, p. 2-2: "The stabilization measure provides for filtering by using multiple layers of increasingly larger material."

   Clarify what the stabilization measure is filtering.

   Response: A revetment structure that is designed to prevent erosion is designed and constructed with several layers of rock and or geotextiles. The purpose of including multiple layers of this material is to create a filter that allows tidal waters and water resulting from wave action to flow in and out of the revetment structure while limiting the amount of fine-grained material migration from behind the revetment structure. To clarify this process the text identified in the comment will be revised to focus

on the desired performance of a revetment structure as follows.

"To ensure the integrity of the revetment structure, the revetment structure was constructed using multiple layers of increasingly larger material that limit the amount of fine-grained material migration through the revetment structure. The migration of the fine-grained material would eventually create voids behind the revetment structure large enough for the revetment structure to sink."

5. **Comment:** 2.3, Data Usability, p. 2-3. "Seep data from 1996 and 1997 is not representative of current conditions because of changes to the shoreline that occurred in 2006. Please indicate the types of changes that occurred - how were the seeps affected? How do current conditions compare to 1996/97 conditions? If this is discussed elsewhere please reference it here.

   Response: The following revision to the text will be made to indicate how conditions have changed and what the current conditions are regarding seeps: "Seep data from 1996 and 1997 are not representative of current conditions because of changes to the shoreline that occurred as part of the 2006 shoreline stabilization. The seeps sampled in 1996 and 1997 (BC-1016, BC-1017, BC-1018, and BC-1020) are no longer present because the area was covered with shoreline controls and outfall pipes located at or near the seeps were exposed. The covered outfall pipes were the main cause for these seeps. Currently minor seeps flowing over sediment can be seen in the low-tide area. The seeps flow over soft sediment, which is difficult to walk on. The mid-to high-tide portion of the shoreline is covered with shoreline controls."

6. **Comment:** 2.3, Data Usability, p. 2-4. "…several soil samples had very high detection limits…"

   Were the data from these samples omitted from the risk assessment and extent of contamination determinations?

   Response: The soil samples with very high detection limits (greater than ten times the screening level) were not omitted from the site dataset and were includes in the risk assessment and extent of contamination determination, as appropriate. The following provides additional information.

   Attachments 2 and 3 of these responses to comments present the detection limit evaluation information for chemicals with detection limits exceeding a screening value for surface and subsurface soil respectively. With the exception of benzo(a)pyrene and dibenzo(a,h)anthracene the samples with elevated detection limits (more than ten times the screening level) were from the 1998 sampling event. The 1998 data were from the SSI; the subsequent RI sampling did not have elevated detection limits for these chemicals. Benzo(a)pyrene and dibenzo(a,h)anthracene had elevated detection limits for samples collected during 1998 and 2003 in both the surface and subsurface soil. Both of these chemicals are carcinogenic PAHs and were evaluated in the nature and extent section as Benzo(a)pyrene Equivalents and selected as COPCs in the risk assessment.

7. **Comment:** 3.2.1 Shoreline Revetment Structure, p. 3-3. The first sentence under Shoreline Revetment Construction indicates that the riprap exists <u>under</u> the filter stone, geotextile and pea-stone ("…riprap underlying filter stone…"). Please correct this.

   Response: The text referenced in the comment will be revised to read as follows.

   "According to as-built details (Appendix A.6), the shoreline revetment is constructed (bottom to top) of pea-stone (used to establish grade), geotextile, and two layers of riprap. The geotextile and lower riprap layer were installed to stabilize the larger exposed riprap layer and to help minimize the migration of fine-grained material from behind the revetment structure to the surface water. The entire revetment structure extends from the low tide elevation to the existing top of slope (variable elevation). The following information is known about the material used to construct the shoreline stabilization revetment."

In addition to making this text change, the material descriptors in the bulleted paragraphs that follow this text will be revised from "filter layer rock" to "lower riprap layer" and "surface layer rock" to "upper riprap layer."

8. **Comment:** 3.2.1 Shoreline Revetment Structure, Surface Layer Rock, p. 3-4, 3rd bullet. Please indicate here, not just in App. A6, that the original large granite blocks on the shoreline were reused as part of the surface layer.

   Response: Text will be added to indicate that the original large granite blocks on the shoreline were reused as part of the surface layer.

9. **Comment:** 3.4.3 Cross-Section Description, D-D', p. 3-9. "Localized pockets of waste material were encountered…" To our knowledge lateral limits of the waste pockets were never determined. Therefore, on Fig. 3-3 draw the waste pockets to indicate that lateral limits are unknown.

   Response: Figure 3-3 will be revised to show the individual waste pockets with approximate boundaries by using dashed lines. The thin intervals of waste only were identified in a small number of borings. Although the lateral extents of individual pockets of waste were not determined, the overall distribution was determined. The borings in which intervals of waste were identified are bounded by borings within 75 to 100 feet that had either no waste or surface fill mixed with waste identified, demonstrating that the waste pockets are localized in nature and do not represent laterally continuous units.

10. **Comment:** 3.5.2, p. 3-13 Para. 2 and Para. 4, and Table 3-1: "*TP-MW-06 was not equipped with a transducer…*"

    The statement should be revised to state that the 2000 data indicated there was no tidal influence rather than tidal lag. It is unusual for this well not to have some tidal influence based on its location in the filled area and its shallow screen in fill with debris, based on the relative response of other wells screened in similar material. Please add the results for MW-06 in October 2008 to the text. Also, the data from 2008 at MW-05 indicate that the Low Tide water elevations are higher than the High Tide elevations, were the readings taken according to the tidal lag in the table? If so, is it possible the lag is incorrect?

    Response: Regarding TP-MW06, the text will be clarified. The third sentence in Section 3.5.2, paragraph 2 will be revised to read: "TP-MW06 was not equipped with a transducer, because the SSI Report (TtNUS, May 2000) indicated TP-MW06 showed less than a ~~0.2~~ 0.02 feet difference between water levels measured at high tide and low tide, indicating that there was no significant tidal ~~lag~~ influence at this well."

    The discussion of the results for TP-MW06 from the October 2008 evaluation will be discussed in the text by adding the following in Section 3.5.2 before the first paragraph on page 3-14: "The water level response observed in TP-MW06 had a change of at least 0.4 foot during the water level measurement period on October 23, 2008. The tidal lag was estimated to be 1 hour 10 minutes for this location."

    Regarding TP-MW05 and Table 3-1, the groundwater elevations presented in Table 3-1 were not measured according to the tidal lag. They were measured coincident with the peak tide (either high or low) within a period of ½ hour before and 1 to 2 ½ hours after of the predicted tide, within the longest estimated tidal lag. The measurements were taken to represent a snapshot of the groundwater flow field. The tidal lag for TP-MW05 is considered correct. Although the well is located adjacent to the shoreline, the well is screened in material with higher fines, and the water levels appear to be damped. The maximum water level change between low and high tide during the 2003 tidal study was approximately 0.2 foot; the difference in head in TP-MW05 between high and low tidal cycles during the 2008 synoptic rounds was less than 0.5 foot. The difference between low and high tide levels may relate to the low tidal influence (reflected in the minimal difference in water levels

between high and low tide) and the measurements occurring at the tide response. This would result in a lower elevation at high tide (i.e., water levels in the well still rising from the previous low tide period) and vice versa for the low tide.

11. **Comment:** 3.5.2, p. 3-13 Para. 3 and Table 3-1. "Tidal effects were observed in the wells equipped with transducers except TP-MW-01 and TP-MW-09…"

    Please clarify the magnitude of decreasing water levels and that no tidal effect was observed in these wells. Based on its location, high hydraulic conductivity and boring log MW-09 would be likely to have tidal effects, however the void reported in the logs must affect this location.

    Response: The following sentence will be added after the first sentence of Section 3.5.2, paragraph 3, for clarification: "No tidal influence was observed in wells TP-MW01 and TP-MW09." In addition the following text as requested will be added to the end of the same paragraph: "The decreasing water levels (less than 0.1 foot decrease observed) in wells TP-MW01 and TP-MW09 was likely related to background trend conditions. Both of these wells are relatively far from stormwater drainage network that could influence them. TP-MW01 (an upgradient well) is distant from the shoreline and within the boundary of the original Seavey Island, reducing potential tidal influence."

12. **Comment:** 3.5.2, p.3-15 Para. 4, Appendix A.4 and Table 3-1. The recovery plots for these two wells are certainly atypical and indicate very fast response times. The data for MW-09 may actually represent the conductivity of the sandpack in the void at that well, and at MW-10 the well may be hydraulically connected to the drainage system across Goodrich Avenue. Please discuss this possibility and how it might affect interpretation of site hydrogeology.

    Response: The Navy agrees with the potential for measuring the permeability of the sand pack in TP-MW09 but also believes this may be true for TP-MW10 rather than being hydraulically connected drainage system across Goodrich Avenue. Due to the enlargement of the borehole of TP-MW10 during drilling, similar conditions relating to measurement of the sand pack permeability likely exist for TP-MW10 as for TP-MW09. The elevation of the drainage system across Goodrich Avenue in the area of TP-MW10 is higher in elevation (by more than 5 feet) than the saturated zone at TP-MW10. Therefore, it is not believed that the drainage system significantly influences well TP-MW10. The following sentence will be added after the last sentence of paragraph 4 to provide additional interpretation: "Additionally, the borehole of TP-MW10 was enlarged during drilling due to the fill material, and void spaces may have developed which were filled with sand during well installation. Therefore, the higher hydraulic conductivities measured in TP-MW09 and TP-MW10 may reflect the permeability of the sand in the void space rather than the formation permeability."

13. **Comment:** 4.0, Nature and Extent, p. 4-1, 1st para. Please indicate that outfall samples were also collected.

    Response: In Section 2.1, intertidal surface water was defined as (outfalls and nearby surface water). For clarity, the second sentence in the first paragraph of Section 4.0 will be revised to read as follows: "Soil and groundwater were investigated for the onshore area of OU7; surface water (outfalls and nearby surface water), seeps, and sediment were investigated in the intertidal portion of the offshore area."

14. **Comment:** 4.1.1, p. 4-1, Table 4-2 & Table 4-3. "Maximum facility background concentrations…are presented." The Site 32 QAPP (Table 1-3) used the "representative" PNS Facility Background values for comparisons of site data to screening criteria. Please revise Table 4-2 and Table 4-3 to these levels rather than the maximum concentrations that are listed.

    Response: For discussion of the nature and extent of contamination in the RI Report, the maximum facility background concentrations were presented to give a general understanding of nature and extent of contamination and help focus on chemicals more likely to be associated with a potential OU7 source. For additional information the representative PNS Facility Background values (95%

UCLs) and range of detected concentrations will be added to Tables 4-2 and 4-3. This additional information does not change the evaluation in the Nature and Extent Section. In addition, the HHRA (Section 6.0) background evaluation is based on a data set to dataset comparison and there is no impact to risk evaluation.

15. **Comment:** 4.1.1, p.4-2. Please indicate the source for the EPA residential soil screening levels.

    Response: The reference for the USEPA RSL table will be added as follows, USEPA Regional Screening Level Table Residential Soil (November 2010).

16. **Comment:** 4.1.1, p. 4-2. "Two PCBs (Aroclor 1248 and Aroclor 1254) were detected at concentrations above background and risk based screening levels in surface and subsurface soils, with Aroclor 1260 only detected at concentrations exceeding facility background and risk based screening levels in subsurface soil."

    Several of the nondetected Aroclors had detection limits higher than USEPA Nov. 2010 Regional Screening Levels (http://www.epa.gov/region9/superfund/prg/). The Navy compares detection limits to screening levels in App. D.4 and shows that there were exceedances of detection limits 1.0% to 3.1% of the time. Does the Navy discuss the uncertainty that these relatively few exceedances add to the human health risk assessment?

    Response: For surface soil 67 samples were analyzed for Aroclors. In surface soil the number of samples that exceeded the screening levels for Aroclors ranged from one to seven. These detection limits were all less than five times the screening levels. For subsurface soil Aroclors were analyzed for in 96 samples. The number of detection limits exceeding the screening level for Aroclors in subsurface soil ranged from one to three and were all less than five times the screening level. Based on the low number of samples that exceeded the screening criteria little uncertainty is anticipated for these few elevated detection limits.

17. **Comment:** 4.1.1, p. 4-2 last paragraph and Table 4-2 and Table 4-3. The discussion of background needs to be removed from the text related to PCBs. The text should note that all Facility Background samples were non-detect for PCBs (see Tables). In addition there is no geologic source or intended use in soils for PCBs.

    Response: The text will be clarified to remove discussion of background related to PCBs.

18. **Comment:** 4.1.1, p. 4-4. The paragraph discussing normal probability plots indicates that there are 27 soil and 23 subsurface soil locations corresponding to data points above an inflection point as shown in App. B.2. Please indicate what locations these are as this information cannot be determined from the probability plots.

    Response: Additional information will be provided in Appendix B for clarity. The sample locations are plotted on the normal probability plots at the end Appendix B.2. Attachments 4 and 5 to these responses to comments provide new Tables B-1 and B-2 that list for each chemical the locations that are greater than background in surface soil and subsurface soil. These tables will be added to Appendix B.2 in the draft final document. The text in Section 4.1.1 will be revised to, "The normal probability plots are presented in Appendix B.2 along with tables summarizing which locations are above an inflection point for each chemical and therefore most likely represent concentrations above background."

19. **Comment:** 4.1.1, pp. 4-3 & 4-4 and App. B.2. "Based on these plots, detected concentrations exceeding risk-based screening levels correspond to areas filled after 1910, …"

    Please include TP-SB115 in this discussion, and correct the text later in the paragraph on page 4-4 to reflect the detection at that location and the Arochlor 1254 screening level. Also, discuss the relative significance of the surface soil PCB detection in the area where no industrial activity took place.

Response: PCBs detected in TP-SB115 slightly exceeded the screening level and does not indicate significant site impact. For clarity, the text will be revised to read as follows: "Based on these plots detected concentrations exceeding risk-based screening levels correspond to areas filled after 1910, with the exception of TP-SB115, TP-SB120, TP-SB15, and TP-SB39. Aroclor-1254 was detected at 280 µg/kg at location TP-SB115 which slightly exceeds the risk-based screening level of 110 µg/kg. Aroclor-1254 was used in capacitor and transformers as well as hydraulic fuels. Trains have diesel/electric engines and transformers which may leak and drip PCBs onto the track. Therefore the slight exceedances of the risk-based screening level in the area with no known industrial use may be related to the railroad."

20. **Comment:** 4.1.2, p. 4-4, para 1.

    a) Figure 4-1 does not show MW-07 and MW-03, please revise as needed.
    b) The analytical database for groundwater presented in App. B.1 is incomplete. The Navy must present results for all analyses even if all the results were non-detect. The detection limits provided with these data are critical to understanding whether or not compounds are definitively below screening levels.
    c) "A copy of the analytical database for groundwater is presented in Appendix B.1 and summarized in Table A.1 of Appendix A.5 presents the OU7 sampling list." Some words are missing. Please correct.
    d) Please provide a reference for the ecological screening levels that are used to derive groundwater screening levels.

    Response:

    a) Figure 4-1 will be revised to show all OU7 monitoring well locations.
    b) Appendix B.1 will be updated to display the full analytical database printout as indicated in the Navy's response to MEDEP Comment No. 1.
    c) The text will be revised to the following, "A copy of the analytical database for groundwater is presented in Appendix B.1 and Table A.1 of Appendix A.5 presents the OU7 sampling list".
    d) The ecological screening references as follow will be added as appropriate

    Buchman, M. F., 1999. NOAA Screening Quick Reference Tables, NOAA HAZMAT Report 99-1, Seattle, WA, Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration.http://response.restoration.noaa.gov/cpr/sediment/squirt/squirt.html

    Suter, G.W. II. and C.L. Tsao. 1996. Toxicological Benchmarks for Screening Potential Constituents of Concern for Effects on Aquatic Biota:1996 Revision. Environmental Sciences Division, Oak Ridge National Laboratory. ES/ER/TM-96/R2.

    USEPA (United States Environmental Protection Agency), January 1996. ECO Update, Ecotox Thresholds. United States Environmental Protection Agency. Office of Solid Waste and Emergency Response. Intermittent Bulletin, Volume 3, Number 2. EPA540/F-95/038.

    USEPA, May 1996. Quality Criteria for Water - 1986. Office of Water, Regulations and Standards. EPA 440/5-86-001.

    USEPA (U.S. Environmental Protection Agency), 2009. National Recommended Water Quality Criteria: 2009. Office of Water.

21. **Comment:** 4.1.2, p. 4-4, para 2. "VOCs, pesticides, and PCBs were not detected in any of the groundwater samples." All results for toxaphene were nondetect, however even after a dilution factor of 100 detection limits exceeded the ecological screening level of 0.0002 ug/L by factors ranging from 43 – 300. Therefore, toxaphene may present a risk to biota and should not be dismissed. Please discuss this issue within the report. This comment also applies to toxaphene in surface water.

Response: Toxaphene was primarily used in the southern United States to control insect pests on cotton and other crops (ATSDR, September 2010). See Attachment 6 to these responses to comments for additional information on toxaphene. Toxaphene was not detected in any of the soil samples collected at OU7 with detection limits ranging from 25 ug/kg to 3500 ug/kg or in the groundwater or surface water. In addition, no pesticides were identified as chemicals associated with OU7 sources. Therefore, pesticides as a chemical class are not associated with OU7. Based on this, there is no reason to suspect that toxaphene would be present at OU7 or would present a risk to biota from exposure to OU7 media.

22. **Comment:** 4.2.1, p. 4-5. "Inorganics were the only chemicals detected in OU7 surface water." See previous comment regarding toxaphene.

    Response: Please see the Navy's response to MEDEP Comment No. 21.

23. **Comment:** Section 4.2.1, p. 4-5, Para. 2: "Zinc was not detected in the filtered samples from OF-61, OF-63, and TPSW-03 but not at TP-SW02." Should the first part of this sentence read "Zinc was detected…"?

    Response: The first part of the sentence will be changed to "Zinc was detected in the filtered samples from OF-61, OF-63, and TP-SW03."

24. **Comment:** Table 4-2 – Footnote 4. "RBCs for noncarcinogenic compounds are divided by 10 to correspond to a HI of 0.1."

    The RSL for lead has not been divided by 10 for an HI=0.1. Please change 400 mg/kg to 40 mg/kg or clarify why it should remain 400 mg/kg.

    Also, the RSL for metallic vanadium is incorrect. Please update to the Nov. 2010 RSL, 5.5 mg/kg. Therefore, the value presented in the table should be 0.55 mg/kg to correspond to a HI of 0.1.

    Response: The table will be revised to remove "n" notation for lead because USEPA has no consensus on a cancer slope factor (CSF) or a reference dose (RfD) for inorganic lead therefore it is not possible to calculate a classic carcinogenic or noncarcingenic screening level for lead. USEPA evaluates lead exposure using lead-blood modeling. On Table 4-2 the lead RSL is not divided by 10 because the lead RSL was not developed using the typical noncarcinogenic screening level methodology (i.e. blood-lead modeling was used to obtain the lead RSL rather than the use of a RfD).

    The RSL for vanadium and compounds is more representative of the form of vanadium that is likely to be present at the site than metallic vanadium; therefore, the vanadium and compounds value was used rather than the metallic vanadium value. Table 4-2 will be updated using the November 2010 RSLs. The RSL for vanadium and compounds is 390 mg/kg (N) therefore the RSL on Table 4-2 will be updated to 39.0 mg/kg to represent an HI of 0.1. All RSLs will be updated to the November 2010 version of the RSL table for the Draft Final RI Report.

25. **Comment:** Tables 4-5 & 4-6. Please indicate the sources of the ecological screening levels. Some appear to be from National Recommended Water Quality Criteria, some from NOAA SQRT tables, and some from elsewhere.

    Also, please carefully check units of ecological screening levels. Some of the values that appear to be from NOAA SQRT tables, e.g. acenaphthene, are in ug/L while the concentrations for organics found in water are in ng/L.

    Response: For the sources of the ecological screening levels please see the Navy's response to MEDEP Comment No. 20. These sources will be added to Tables 4-5 and 4-6. All units will be reported in ug/L for consistency.

26. **Comment:** Table 4-6. Indicate that shaded chemicals were selected as COPCs.

    Response: Table 4-6 is not a COPC selection table. A footnote will be added to Table 4-6 to indicate that shaded cells indicate that the maximum concentration exceeded the identified screening criteria. Section 4.0 discusses the nature and extent of contamination, selection of COPCs is discussed in Section 6.2.2 with the COPC selection tables presented in Appendix D.

27. **Comment:** 5.2.1, p. 5-6, Para. 2. "One seep was observed east of OU7." Please identify the seep on one of the figures or provide additional detail on its location.

    Response: The text will be revised to read, "One seep was observed east of the shoreline controls (see Figure 1-4 for the location of the shoreline controls)."

28. **Comment:** 5.3.4 Modeling Input Parameters and Appendix C: Why was Arochlor-1254 included in the COPC list and not the other PCB arochlors with higher concentrations in soil at the site?

    Response: All three Aroclors detected at the site (Aroclor-1248, -1254 and -1260) were included and retained during the preliminary COPC screening as shown on Table C.5. However, consistent with the modeling COPC process, in the subsequent step, Aroclor-1248 and Aroclor-1260 were eliminated from further modeling/screening because their cumulative ranking was low. This indicates that these two PCBs are relatively inconsequential with respect to total mass and therefore, potential migration from on to off-shore is negligible at the site from a modeling perspective (e.g. other risks may still be valid based on their detection). The cumulative ranking table will be added to Appendix C.1.

29. **Comment:** 5.3.6 final paragraph: Since the calculated leached value was not carried through the model for most compounds, how does the modeling demonstrate how conservative it is to use the lowest applicable K_d?

    Response: The screening/model is conservative from the perspective that the lower of the calculated leached concentration or the observed groundwater concentration was actually used. This approach allowed lower concentrations of groundwater than actually observed to be screened/modeled. With regard to using the lowest applicable Kd, this was evaluated as part of the uncertainty analysis, with negligible differences in end results. A full range of Kd values were evaluated, as well as assumptions in foc and sediment-soil partitioning assumptions.

30. **Comment:** Table 5-1. Please indicate the sources of the surface water criteria.

    Response: The source of the surface water criteria are noted on Table 5-1 next to the criteria in the Surface Water Criteria Reference column with the references footnoted at the bottom of the table.

31. **Comment:** 6.0, p. 6-1, 3rd paragraph, Table1 (Appendix D) and Figure 6-1. The Conceptual Site Model (CSM) needs to include consideration of the vapor intrusion pathway due to the presence of volatile compounds in soil in some areas of the site. Though the volatile compounds in soil (including some of the more volatile semi-volatile compounds such as naphthalene and 2-methylnaphthalene) may not have been selected as COPCs for direct contact exposure pathways, these compounds could present a risk to occupants of current and/or future buildings at the site. It should be noted that there are some detections of semi-volatile compounds that may also contribute to the vapor intrusion pathway. Please address.

    Response: No further evaluation of vapor intrusion is necessary primarily because site data indicate that a subsurface soil source of sufficiently volatile and toxic chemicals does not exist at OU7. Vapor intrusion requires a source, an inhabited building, and a pathway. A soil source of compounds sufficiently volatile and toxic to pose a vapor intrusion threat is not present at OU7 based on a review of the site data. The majority of soil data concentrations for those compounds sufficiently volatile and toxic to warrant a vapor intrusion concern were reported as not detected. Where such compounds were detected, the concentrations were low and did not show a source. For example, naphthalene

was detected in soil at concentrations ranging from 5 to 2,300 ug/kg. Two detected naphthalene concentrations of 2,300 ug/kg and 1,400 ug/kg at locations TP-SB39 (2 to 5 feet) and TP-SB02 (9 to 11 feet), respectively, were greater than the rest of the naphthalene soil concentration data (all other naphthalene soil concentrations were 750 ug/kg or less). These locations are not near one another, it does not indicate that a naphthalene subsurface soil sources exists.

The HHRA CSM will be updated to include a note that the vapor intrusion pathway for OU7 is not a concern because volatile compounds are not a concern for OU7.

32. **Comment:** 6.2.2, p. 6-9, Former Location of Building 237 Decision Unit. Please provide additional justification for evaluating this exposure point as a separate decision unit. As written, there is no information provided to judge whether this approach is conservative or results in data gaps for this separate decision unit (e.g., insufficient soil or groundwater data).

    Response: Justification for calculating risks on just the clean fill area around the former location of Building 237 was discussed in the Nature and Extent Section 4.1.1. The samples in this area did not contain debris material and the concentrations of total PCBs, lead, and total carcinogenic PAHs did not exceed risk-based screening levels. A statistical comparison of the samples in the clean fill area in the former vicinity of OU7 to the rest of the OU7 data determined that mean concentrations for this area were less than mean concentrations found at the rest of OU7. Additionally, eight samples associated with this area are enough samples to calculate a 95 percent Upper Confidence Limit. The following text will be added as the second sentence of the last paragraph of page 6-9, "As discussed in Section 4.1.1, the area in the former location of Building 237 did not contain debris material and the chemical concentrations in this area were found to be statistically different from the chemical concentrations in the remaining portion of OU7."

33. **Comment:** 6.2.2.1, p. 6-10, Para. 3 & 4. The first sentence in the text needs to be corrected, as there were no detections for PCBs in the Background samples. The conclusion for surface soils near Building 237 also needs to be revised for Arochlor-1254.

    Response: The first sentenced will be revised to the following: "Maximum concentrations of dioxins/furans evaluated as TEQ, and several metals also exceeded USEPA residential RSLs but did not exceed facility background concentrations (see Appendix B.2)".

    The discussion for surface soils near Building 237 will be revised to include Aroclor-1254 along with the corresponding COPC and risk tables in Appendix D.2. The third and fourth sentence of the fourth paragraph will be updated as follows: "Although the maximum concentrations of several contaminants exceeded USEPA residential RSL, with the exception of Aroclor-1254, all of these contaminant concentrations were determined to be within background concentrations. The only contaminant in surface soil from the former location of Building 237 selected as a COPC was Aroclor-1254.

34. **Comment:** 6.2.2, p. 6-10 *ff.* COPC selection for soil and groundwater. As stated in the 2009 MEDEP *Guidance for Human Health Risk Assessment for Hazardous Waste Sites*, "…neither USEPA nor DEP/MeCDC permits the exclusion of inorganic or organic compounds from the human health risk assessment based on comparison to background levels. Compounds that may exist at background concentrations should be quantitatively evaluated in the risk assessment." The decision to forego action for compounds that are present at levels consistent with background is a risk management decision and should occur as part of the feasibility study, not as part of the risk assessment. Though it is recognized that there is some further discussion of the eliminated compounds in the Uncertainty Analysis, the risk assessment lacks a clear presentation of cumulative site risk, including those compounds that the Navy has speculated are present as a result of background conditions. Please include this analysis.

    Response: Navy Background Policy requires that baseline risk assessments should not be conducted on chemicals that are present at levels less than corresponding background

concentrations. Potential risks from chemicals within facility background were calculated using a risk-ratio technique and are provided in Appendix D.7.3.

35. **Comment:** 6.6.1, p. 6-31, Contaminants Eliminated Due to Background, and App. B.2. The evaluation relies on non-detect reporting limits to assess data distributions and in comparison to actual detections at site locations. The associated data plots often describe the distribution of reporting limits (or in some cases reporting limits with a few detections) as if they were actual data. Conclusions regarding background conditions need to be heavily qualified when only a few detections are assessed. Elimination of COPCs by comparing detected concentrations to reporting limits is not appropriate. Compounds which were not detected in background include the PCB Arochlors, dieldrin, and thallium.

    Response: The background evaluation for chemicals not detected in background samples or with few detections was conducted as part of the graphical portion of the background evaluation, and no formal statistical tests were conducted. For surface soil, the evaluation of site samples to background samples that were either non-detect or had few detection was conducted for antimony, Aroclor-1248, Aroclor-1254, dibenzo(a,h)anthracene, and thallium. Antimony and Aroclor-1248 were the only chemicals removed as chemicals of potential concern from the risk assessment based on this comparison. Aroclor-1254 was also detected in less than 5 percent of site samples and therefore regardless of the background evaluation would not be included in risk assessment. The maximum detected site antimony concentration (12.4 mg/kg) was slightly greater than the background antimony concentration (9.4 mg/kg). For subsurface soil, the evaluation of site samples to background samples that were either non-detect or had few detections was conducted for thallium, dieldrin, dibenzo(a,h)anthracene, Aroclor-1260, Aroclor-1248, and antimony. None of the subsurface soil chemicals were removed as chemicals of potential concern from the risk assessment based on the evaluation. Dieldrin and Aroclor-1248 were not evaluated in the risk assessment due to low frequencies of detections. Dieldrin was detected in 1 of 60 samples and Aroclor-1248 was detected in 1 of 80 samples. Conclusions regarding background conditions when there are only a few detected concentrations (less than 10 percent) will be removed from the statistical background analysis in Appendix B.2. However, the discussion of these chemicals in relation to background levels will be included in the nature and extent section (Section 4.0) to provide perspective on the magnitude of site concentration.

36. **Comment:** 6.6.3, p. 6-43, 1st paragraph. Please provide additional details concerning the testing performed to justify the evaluation of total chromium as 100% chromium (III) in the risk assessment. This paragraph implies that a portion of the total chromium is present as chromium (VI) and the assumption that all chromium is chromium (III) may not be appropriate. Please address.

    Response: The SSI provided data to support the determination that hexavalent chromium is not a concern for the site and that chromium III is an appropriate surrogate to use to evaluate total chromium concentrations at the site. The following provides additional clarification and text revisions. The Site 32 RI QAPP stated: "Based on evaluation of the SSI data for soil and groundwater at Site 32, additional analysis for VOCs, hexavalent chromium, cyanide, and DRO/GRO are not required for the Site 32 RI. VOCs, hexavalent chromium, and cyanide concentrations were less than risk screening levels; therefore, these parameters are not a concern for evaluation of human health risk or offshore impact." Therefore, based on the QAPP, trivalent chromium was used as a surrogate for total chromium in the risk assessment. The second sentence of the paragraph will be updated as follows: "Criteria for trivalent chromium were used as a surrogate for total chromium in the risk assessment based on the conclusions in the RI QAPP that hexavalent chromium was not associated with OU7 (because hexavalent chromium concentrations in SSI samples were less than the screening level)."

37. **Comment:** 6.7.3, p. 6-50. Risk drivers should be identified for any receptor with cancer risks greater than 1×10^{-5}, not 1×10^{-4}. Please correct.

Response: Summaries of risks based on USEPA risk ranges and State of Maine risk guideline are described in Sections 6.7.1 and 6.7.2. Tables 6.1 and 6.2 show chemicals that exceed the various risk levels for each receptor. As shown in these tables, the risk drivers based on State of Maine risk guidelines would not change.

Risks drivers are identified in the text based on USEPA risk range and not State of Maine risk guidelines because Maine's risk assessment guidelines are not promulgated.

38. **Comment:** 7.1.1, Para. 2, p. 7-1. "Therefore, the filled area before 1910 can be defined as a separate population from the rest of OU7."

    Please revise the statement to restrict the conclusion to the area filled prior to 1910 in the immediate vicinity of Building 237. Adding a shaded area to one of the figures would help clarify what portion of the site is being considered.

    Response: The text will be revised to clarify that the filled area before 1910 in the immediate vicinity of Building 237 is defined as a separate population. Figure 1-3 shows the area in the vicinity of Former Building 237 and the 1910 shoreline.

39. **Comment:** 7.1.3, p. 7-4. "Offshore concerns for ecological receptors are being addressed as part of OU4." Please indicate here that OU7 is no longer acting as a source of contaminants that may pose unacceptable risk to the offshore area.

    Response: The following sentence will be added to the last paragraph of Section 7.1.3. "OU7 is no longer acting as a source of contaminants that may pose unacceptable risk to the offshore area."

40. **Comment:** References. TtNUS, August 2000 – change November 1996 to November 1997.

    Response: November 1996 will be changed to November 1997.

41. **Comment:** The plots in Appendix B.2 are inconclusive for the various Arochlors(and possibly other compounds), as they compare detection limit values to actual detections. Such comparisons are inappropriate. See Comment 35.

    Response: The plots for the compounds with low frequency of detection (less than 10 percent) will be removed from Appendix B.2. Please see the Navy's response to MEDEP Comment No. 35.

42. **Comment:** App. B.2.

    a. Please place the outlier analysis plots after page B.2.7, not after B.2.9 which discusses the site data-background data comparisons.
    b. Place the site-background comparison plots after p. B.2.9.
    c. Label the site-background comparison plots so the difference between, e.g. the first surface soil plot for aluminum is distinguished from the second surface soil plot for aluminum. Presumably one set of plots is for the area around the former Building 237 area but this is not clear at all.
    d. Place Tables 1-7 at the end of App. B.2, after all the plots.

    Response: The following changes will be made as requested.
    a) The outlier analysis plots will be placed after B.2.7.
    b) The site-background comparison plots will be placed after B.2.9.
    c) The site-background comparison plots will be relabeled so the first presents the comparison between site and background and the second presents the comparison between the area with no debris in the vicinity of former Building 237 and background.
    d) Tables 1 through 7 will be placed at the end of Appendix B.2.

43. **Comment:** App. B.2. The Q-Q plots for the "clean area" need to be labeled as such rather than as "site 32". For the "Site 32" plots, were the data for the area near Building 237 removed or included?

    Response: The Q-Q plots for the area without debris in the vicinity of former Building 237 will be relabeled as "area without debris" rather than "Site 32."

    For the Site 32 plots the data for the area near Building 237 were included in the analysis. The data were included in the analysis to determine which chemicals at all of OU7 exceeded facility background.

44. **Comment:** App. B. 2 It is not clear why the background data for several compounds, e.g. Al, are different for the two comparisons. Please explain why a different group of background data was used to compare to the "clean fill" vs. the entire site. Or are the plots actually comparing the whole Site 32 to the "Clean fill" and they are mislabeled?

    Response: The surface soil plots included background groundwater concentrations along with background soil concentrations. The statistical tests and summary statistics in Table 1 were calculated using only the soil background concentrations. The plots were corrected and are presented in Attachment 7 to these responses to comments. The only visual conclusion affected is that manganese site concentrations in the revised plots appear similar to facility background concentrations. The Shapiro-Wilks test was used to determine if the two data sets are normally or lognormally distributed. The p-values for the Shapiro-Wilks normality tests were greater than 0.05; therefore, at the 5-percent significance level, it can be concluded that the two data sets are normally distributed. The two sample T-Test, Quantile Test, and Slippage Test indicate that site surface soil concentrations are not greater than background concentrations by more than one background standard deviation. Therefore, the final conclusion that site concentrations are not greater than background concentrations did not change. The corrected plots and updated Table 1 will be included in the Draft Final RI Report.

45. **Comment:** Since the intent of the formal statistics was to assess the Building 237 area compared to the site overall, a table comparing the relevant values for the "clean" area and the site would be useful. Further, in addition to plotting both data sets against background, plot them against each other to demonstrate that there is separation between concentrations at the two areas.

    Response: A table comparing the relevant values for the "clean" area and the site will be added along with a plot of the site against the clean fill area.

46. **Comment:** Appendix D-1 RAGS Part D Table 2-2. The COPC table needs to be revised or annotated in the appendix, based on use of non-detect reporting limits in background to rule out COPCs.

    Response: The COPC tables will be revised and references to background based on detection limit comparisons will be removed.

47. **Comment:** Appendix D.1, RAGS Part D Table 4, Tables 4.5.RME through 4.10.RME: Maine recommends a default soil recreational exposure frequency of 90 days/year and a default surface water and sediment exposure frequency of 78 days/year for wading exposures. The exposure frequency of 52 days/year for soil and 7 days/year for sediment and surface water should be changed to 90 days/year and 78 days/year, respectively, or additional site-specific justification should be provided. In addition, the total exposure duration should be 30 years, not 24 years, for a recreational scenario. A fraction ingested (FI) term of 1 (not 0.5) should be used for all media, unless a compelling site-specific justification is provided.

    Response: At the time the work plan was developed for the OU7 risk assessment Maine default soil recreational exposure guidelines did not exist and USEPA default recreational exposure guidelines do not exist; therefore, professional judgment of 52 (1 day per week each year) was used. The Maine

default soil recreational exposure frequency of 90 days/year could be a reasonable estimate for this site in the future if the current land use changed. Therefore, the 52 day exposure to soil assumption for recreational users will be changed to 90 days/year.

The 7 days/year sediment and surface water exposure frequency is based on professional judgment based on current and likely future site conditions. The shoreline controls cover the high- to mid-tide portion of the shoreline and the sediment in this area is soft and hard to walk on. Therefore, the Navy disagrees with using Maine default surface water and sediment guidelines for this site.

As for the lifetime recreational exposure duration being set equal to 30 years, the Navy respectfully disagrees with respect to the surface water and sediment exposures as mentioned above and discussed because a child recreational user from 0 to 6 years of age would have a difficult time accessing the OU7 shoreline and walking along the intertidal area due to the soft sediments and shoreline. Therefore, 24 years is used for the recreational scenario for this receptor.

The Fraction Ingested term was set at "0.5" to account for the receptor only being at the site part of the day.

48. **Comment:** Appendix D.1, RAGS Part D Table 5.1: The oral RfD for Aroclor-1254 (2E-05 mg/kg-day) should be used as a surrogate for Aroclor-1260.

    Response: Aroclor-1254 will be used a surrogate for Acoclor-1260 as requested. However the following text will be added to note the uncertainty associated with using the surrogate. "Aroclors are commercial mixtures of the 209 different individual PCB congeners. The toxicity of a particular PCB mixture (such as an Aroclor) is dependent upon the type and quantity of individual PCB congeners present in the PCB mixture. Aroclor-1254 and Aroclor-1260 consist of different mixtures of PCB congeners; therefore, Aroclor-1254 may not be an appropriate surrogate for Aroclor-1260."

49. **Comment:** App. D. 4. "Please see the associated detection limit exceedance tables in this appendix for chemical-specific exceedance percentages." Please ensure these tables are included in the Draft Final version of the RI report.

    Response: The associated detection limit exceedance tables e-mailed to MEDEP and USEPA on December 10, 2010 will be included in Appendix D.4 in the Draft Final RI report.

50. **Comment:** App. D.4. The last two pages of the Surface/Seep Water Data Usability Worksheets are incorrectly labeled Groundwater. Also, in the last Data Usability Worksheet page change November 2007 to November 1997 in the TtNUS, August 2000 reference.

    Response: The requested revisions will be made.

51. **Comment:** Appendix D.5.2: Do the facility-specific screening levels for sediment and surface water factor in the age-dependent adjustment factors for compounds with a mutagenic mode of action? Many of the exposure assumptions used to calculate the screening values are not consistent with current guidance. For example, the exposure frequency, as mentioned previously, should be 78 days/year for wading exposures, not 26 days/year as detailed in this appendix. In addition, a FI term of 1 should be used, not 0.5. These changes are required for consistency with current guidance and to account for future exposures which may be of greater duration and intensity than those that occur currently. The facility-specific screening levels may not be sufficiently conservative for COPC selection for surface water and sediment.

    Response: Age-dependent adjustment factors for compounds with a mutagenic mode of action were used in the facility-specific screening levels for sediment and surface water. Example calculations for the facility-specific screening levels will be provided in Appendix D of the Draft Final RI. Please see the Navy's response to MEDEP Comment No. 47 pertaining to sediment and surface water exposure assumptions.

RESPONSES TO USEPA COMMENTS DATED JANUARY 6, 2011
DRAFT REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 7
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

1. **Comment:** 6.0, 3rd paragraph: Figure 6-1 could not be found. Please include this figure at the end of § 6.

   Response: Figure 6-1, emailed to USEPA and MEDEP on November 20, 2010, will be included in the Draft Final RI Report.

2. **Comment:** 6.2.1, 2nd paragraph: The end of the 2nd paragraph states that the sample detection limit was used as a surrogate concentration for non-detected results. The ProUCL tables in Appendix D indicate that use of ½ the detection limit is not recommended, suggesting that ½ the detection was used as a substitution value. Please clarify and revise as appropriate. The use of ½ the detection limit or any other arbitrary substitute value is not recommended in the ProUCL guidance, rather EPA would prefer that the EPC be calculated using statistically derived substitution values calculated by ProUCL (i.e. by entering 0, rather than 1 next to the detection limit concentration in the input file). Please recalculate the EPCs using this mode of ProUCL and revise the risk calculations and text. Alternatively, demonstrate in the response to these comments that use of the ½ detection limit substitution value is conservative compared with the results of ProUCL calculations that do not use an arbitrary substitution concentration, but rather the statistically calculated substitution concentration. This should be done with several data sets that showed acceptable and unacceptable risk using ½ the detection limit.

   Response: Consistent with the text on page 6-6, the detection limit was entered into Pro UCL as the value for non-detects based on the Pro UCL Version 4.00.05 User Guide, "The data for variables with nondetect values are provided in two columns. One column consists of the detected numerical values with less than (< DL) values entered as the corresponding detection limits (or reporting limits), and the second column represents their detection status consisting of only 0 (for less than values) and 1 (for detected values) values." One half the detection limit was not used as a surrogate; however, this warning message is produced automatically by Pro UCL. Therefore the EPCs do not need to be recalculated.

3. **Comment:** 6.3.1.1.3: Please state in this section whether volatile organic chemicals were analyzed for in groundwater and whether they were detected.

   Response: VOCs were analyzed for but not detected in SSI. The following text will be added to Section 6.3.1.1.3, "VOCs were not detected in groundwater and therefore the evaluation of the inhalation pathway was not necessary."

4. **Comment:** 6.5.4: Table 6-2 was not found in § 6. Perhaps it is a table in Appendix D or the unnumbered table in § 6.6.2. Please clarify in the text the location of the table.

   Response: Table 6-2, emailed to USEPA and MEDEP on November 20, 2010, will be included in the Draft Final RI Report.

5. **Comment:** 6.6.2, page 6-36: In the first paragraph on page 6-36 change "contaminates" to "contaminants" where it occurs twice. Also change "$1x10^{-0}5$" to "$1x10^{-05}$".

   Response: The text will be corrected to $1x10^{-5}$.

6. **Comment:** 6.6.4: In the first paragraph on page 6-43 change "additively" to "additivity" where it occurs 3 times.

Response: The text will be corrected as recommended.

7. **Comment:** 6.7.2.2: In the first paragraph change "310^{-04}" to "$3x10^{-04}$", if that is correct.

   Response: The text will be change to 3×10^{-4}.

8. **Comment**: 6.7.2.2: Correct the last sentence of the 2nd paragraph where it states that the ILCRs of $3x10^{-05}$ and $4x10^{-05}$ exceeded "both the Maine target level and USEPA target risk range".

   Response: The statement will be corrected so that the text reads that the ILCRs of $3x10^{-5}$ and $4x10^{-5}$ exceeded the Maine target level but are within USEPA target risk range.

9. **Comment:** Appendix B.2:In the text at B.2.1 please describe how non-detects are used in the background determination. It is observed that conclusions concerning background are made for antimony, Aroclor 1248, Aroclor 1254, Aroclor 1260, many PAHs, dieldrin, and mercury from datasets that contain a high proportion of nondetects. Please justify why it is acceptable to use surrogate values for non-detects in determining background. It is unclear whether the text at B.2.1 applies to surface soil or subsurface soil or other media. Please clarify and provide text conclusions for each type of medium.

   Response: For the graphical displays, the Shapiro Wilk Test, and the Slippage Test one half the detection limit was used for non-detects. The Wilcoxon Rank Sum Test, T-Test, Gehan Test, and Quantile test were conducted using Pro UCL and the detection limits were used for non-detects. The background comparison for chemicals with relatively few detections were based only on the graphical evaluation and done to provide perspective on the potential contamination. Comparison of contaminates with few detections will be removed from the background analysis and the discussion will be moved to the nature and extent section to provide perspective on the extent and degree of contamination.

   The background outlier analysis refers to the soil background data only. The first sentence will be changed to, "The Portsmouth soil background data…".

10. **Comment:** Appendix D, Table 6.2: Review of the IRIS database shows that the inhalation unit risk for cadmium should be 1.8E-03 per ug/m^3, rather than 4.2E-03 per ug/m^3. Please revise the table and risk calculations.

    Response: The requested change will be made. The change to Table 6.2 will affect Tables 7.1A.RME, 7.1A.CTE, 9.1A.RME, and 9.1A.CTE in Appendix D.1, Tables 7.2A RME through 7.5A RME and Tables 7.2A.CTE through 7.6A.CTE in Appendix D.7, and Tables and text in Section 6 dealing with the inhalation pathways. These sections and tables will be updated as appropriate based on the updated calculations.

11. **Comment:** Appendix D, Table 6.2: The inhalation unit risk for total chromium should be "NA", rather than 1E-02 per ug/m^3 because the cancer guideline description for trivalent chromium is "D/Not classifiable as to human carcinogenicity". Please revise the table and any cancer risk calculation that used this or other values for unit risk because the text states that all chromium at the site was assumed to be trivalent.

    Response: The inhalation unit risk for total chromium was updated to "NA" after risks were calculated for the draft RI. This update will be made for the Draft Final RI Report. The change to Table 6.2 will affect Tables 7.1A.RME, 7.1A.CTE, 9.1A.RME, and 9.1A.CTE in Appendix D.1, Tables 7.2A RME through 7.5A RME and Tables 7.2A.CTE through 7.6A.CTE in Appendix D.7, and Tables and text in Section 6 dealing with the inhalation pathways. These sections and tables will be updated as appropriate based on the updated calculations.

12. **Comment:** It appears that ½ the detection limit was used as a replacement value for nondetects in

the ProUCL printouts. The use of ½ the detection limit or any other arbitrary substitute value is not recommended in the ProUCL guidance, rather EPA would prefer that the EPC be calculated using statistically derived substitution values calculated by ProUCL by entering 0, rather than 1 next to the detection limit concentration in the input file.

Response: One half the detection limit was not used as a replacement value for nondetects in Pro UCL. Please see the Navy's response to USEPA Comment No. 2 for additional information.

13. **Comment**: In order to provide transparent documentation and for EPA to reproduce the EPC calculations in a representative set of calculations, please provide the input concentrations (including substitute concentrations for non-detects) for all ProUCL calculations. It is preferred that the input concentrations be provided in an Excel file in the same appendix as the ProUCL output.

    Response: No substitute concentrations for nondetects were used for Pro UCL and the data input is the same as provided in the database for OU7 (Appendix B.1). The excel file of the Pro UCL input data will be provided to USEPA separately from the Draft Final RI Report. The excel files will not be included in an appendix of the document because the date provided in these excel files are already provided in the database provided in Appendix B.1.

ATTACHMENTS

Attachment 1: Facility Background BGS-08 Sample Location Map

Attachment 2: Surface Soil Detection Limit Evaluation (to be included in Appendix D.4)

Attachment 3: Subsurface Soil Detection Limit Evaluation (to be included in Appendix D.4)

Attachment 4: Summary of Surface Soil Locations Above Background (to be included in Appendix B.2)

Attachment 5: Summary of Subsurface Soil Locations Above Background (to be included in Appendix B.2)

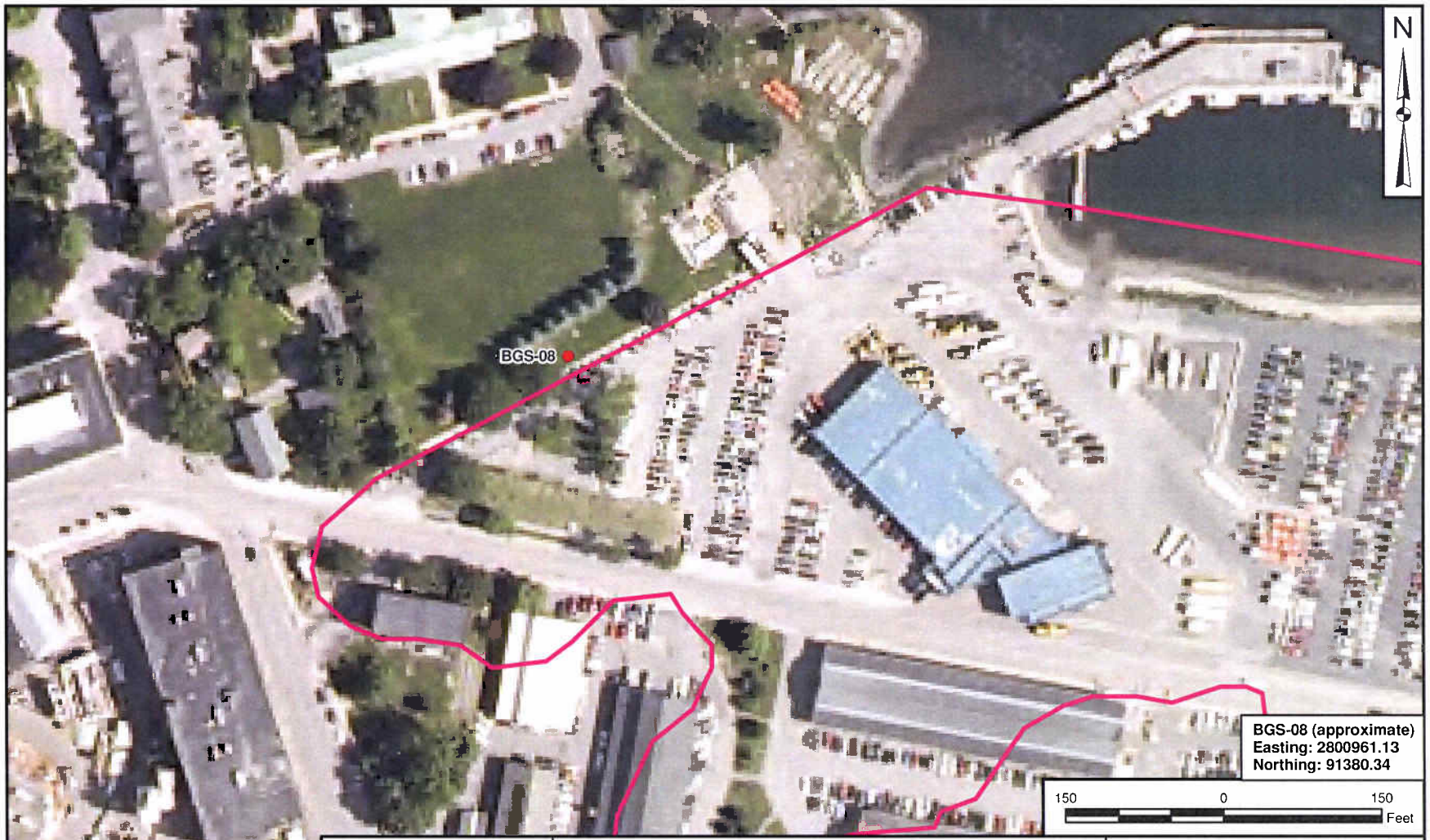
Attachment 6: Toxaphene ATSDR

Attachment 7: Surface Soil Background Plots (to be included in Appendix B.2)

Attachment 1

Facility Background BGS-08 Sample Location Map

PGH P:\GIS\PORTSMOUTH_NSY\MAPDOCS\MXD\OU7_BACKGROUND.MXD 02/16/11 TW



Legend

- Background Location
- OU 7 Boundary

TETRA TECH

FACILITY BACKGROUND BGS-08
SAMPLE LOCATION MAP
PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE

DRAWN BY: T. WHEATON 02/16/11
CHECKED BY: A. CHRISTIAN 02/16/11
APPROVED BY:

CONTRACT NUMBER: 112G00383
CTO 0055

FIGURE NUMBER	REV
FIGURE 2	0

Attachment 2

Surface Soil Detection Limit Evaluation (to be included in Appendix D.4)

Table 1
Surface Soil Detection Limit Exceedance Evaluation
Portsmouth Naval Shipyard
Kittery, Maine

Parameter	Minimum Screening Value		Number of Non-Detects Exceeding Screening Levels	Number of Analyses	Percent Exceeding	Frequency of Detection	Range of Detections	Range of Nondetects	Number Non-Detects Greater than 10 Times Screening Value	COPC?
Semivolatile Organics (ug/kg)										
1,4-DICHLOROBENZENE	2600	C	2	46	4.3%	0/46	--	32-6900	0	No
2,2'-OXYBIS(1-CHLOROPROPANE)	3500	C	2	57	3.5%	0/57	--	51-6900	0	No
2,4,6-TRICHLOROPHENOL	6100	N	2	57	3.5%	0/57	--	99-6900	0	No
2,4-DINITROPHENOL	12000	N	2	57	3.5%	0/57	--	270-17000	0	No
2,4-DINITROTOLUENE	1600	C	2	57	3.5%	0/57	--	35-6900	0	No
2,6-DINITROTOLUENE	6100	N	2	57	3.5%	0/57	--	42-6900	0	No
2-NITROANILINE	120	N	31	57	54.4%	0/57	--	43-17000	3	No
3,3'-DICHLOROBENZIDINE	1100	C	2	57	3.5%	0/57	--	200-6900	0	No
4,6-DINITRO-2-METHYLPHENOL	610	N	24	57	42.1%	0/57	--	230-17000	2	No
4-CHLOROANILINE	2400	C	2	57	3.5%	0/57	--	36-6900	0	No
BENZO(A)ANTHRACENE	150	C	3	57	5.3%	34/51	5.7-4500	3.8-6600	1	Yes
BENZO(A)PYRENE	15	C	16	57	28.1%	35/51	6-4000	3.8-6600	3	Yes
BENZO(B)FLUORANTHENE	150	C	2	57	3.5%	34/51	4.7-6100	39-6600	1	Yes
BENZO(K)FLUORANTHENE	1500	C	1	57	1.8%	33/51	4.3-3000	68-6600	0	Yes
BIS(2-CHLOROETHYL)ETHER	190	C	20	57	35.1%	0/57	--	3.5-6900	2	No
DIBENZO(A,H)ANTHRACENE	15	C	36	57	63.2%	15/51	3.6-1000	3.6-6900	15	Yes
HEXACHLOROBENZENE	300	C	20	57	35.1%	0/57	--	3.5-6900	2	No
HEXACHLOROBUTADIENE	6100	N	2	57	3.5%	0/57	--	38-6900	0	No
HEXACHLOROCYCLOPENTADIENE	2900	N	2	57	3.5%	0/57	--	40-6900	0	No
HEXACHLOROETHANE	6100	N	2	57	3.5%	0/57	--	35-6900	0	No
INDENO(1,2,3-CD)PYRENE	150	C	5	57	8.8%	29/51	11-2500	3.6-6900	2	Yes
N-NITROSO-DI-N-PROPYLAMINE	69	C	32	57	56.1%	0/57	--	3.5-6900	2	No
NAPHTHALENE	3900	C	2	57	3.5%	12/51	10-490	3.5-6900	0	No
NITROBENZENE	4400	C	2	57	3.5%	0/57	--	52-6900	0	No
PENTACHLOROPHENOL	3000	C	2	57	3.5%	0/57	--	200-17000	0	No
Pesticides/PCBs (ug/kg)										
AROCLOR-1221	170	C	7	67	10.4%	0/57	--	31-600	0	No
AROCLOR-1232	170	C	6	67	9.0%	0/57	--	19-370	0	No
AROCLOR-1242	220	C	3	67	4.5%	0/57	--	13-370	0	No
AROCLOR-1248	220	C	1	67	1.5%	1/60	1500	4.8-300	0	No
AROCLOR-1254	110	N	7	67	10.4%	1/60	280	15-370	0	No
AROCLOR-1260	220	C	3	67	4.5%	8/60	21-210	7.9-370	0	No
TOXAPHENE	440	C	5	46	10.9%	0/57	--	25-1500	0	No
Inorganics (mg/kg)										
ANTIMONY	3.1	N	1	57	1.8%	13/35	0.32-12.4	0.086-5.8	0	No
ARSENIC	0.39	C	1	61	1.6%	55/56	6.2-82.3	2.4-2.4	0	No

Attachment 3

Subsurface Soil Detection Limit Evaluation

Table 2
Subsurface Soil Detection Limit Exceedances Evaluation
Portsmouth Naval Shipyard
Kittery, Maine

Parameter	Minimum Screening Level		Number of Non-Detects Exceeding Screening Levels	Number of Analyses	Percent Exceeding	Frequency of Detection	Range of Detections	Range of Nondetects	Number Non-Detects Greater than 10 Times Screening Value	COPC?
Semivolatile Organics (ug/kg)										
2,4-DINITROTOLUENE	1600	N	1	81	1.2%	0/81	--	36-1900	0	No
2-NITROANILINE	120		38	81	46.9%	0/81	--	44-4700	2	No
3,3'-DICHLOROBENZIDINE	1100	C	1	81	1.2%	0/81	--	200-1900	0	No
4,6-DINITRO-2-METHYLPHENOL	610	N	35	81	43.2%	0/81	--	230-4700	0	No
BENZO(A)ANTHRACENE	150	C	7	81	8.6%	62/81	5.8-5100	53-460	0	Yes
BENZO(A)PYRENE	15	C	19	81	23.5%	61/81	6-4100	3.6-460	6	Yes
BENZO(B)FLUORANTHENE	150	C	6	81	7.4%	62/81	8.5-3200	40-460	0	Yes
BIS(2-CHLOROETHYL)ETHER	190	C	35	81	43.2%	0/81	--	3.6-1900	0	No
DIBENZO(A,H)ANTHRACENE	15	C	49	81	60.5%	29/81	21-750	3.6-1900	18	Yes
HEXACHLOROBENZENE	300	C	33	81	40.7%	0/81	--	3.6-1900	0	No
INDENO(1,2,3-CD)PYRENE	150	C	6	81	7.4%	58/81	4.9-2100	3.6-460	0	Yes
N-NITROSO-DI-N-PROPYLAMINE	69		47	81	58.0%	0/81	--	3.9-1900	1	No
PENTACHLOROPHENOL	3000	C	1	81	1.2%	0/81	--	200-4700	0	No
Pesticides/PCBs (ug/kg)										
ALDRIN	29	N	6	74	8.1%	1/74	2	1.2-140	0	No
ALPHA-BHC	77		4	74	5.4%	1/74	2.8	1.5-170	0	No
AROCLOR-1016	390		1	96	1.0%	0/96	--	13-680	0	No
AROCLOR-1221	170		3	96	3.1%	0/96	--	32-1400	0	No
AROCLOR-1232	170		2	96	2.1%	0/96	--	20-680	0	No
AROCLOR-1242	220		2	96	2.1%	0/96	--	13-680	0	No
AROCLOR-1248	220		2	96	2.1%	1/96	41000	4.9-680	0	No
AROCLOR-1254	110		2	96	2.1%	2/96	160-200	15-680	0	No
DIELDRIN	30	C	6	74	8.1%	2/74	32-160	1.3-150	0	No
HEPTACHLOR	110	C	4	74	5.4%	0/74	--	1.2-140	0	No
HEPTACHLOR EPOXIDE	53		4	74	5.4%	0/74	--	1.4-160	0	No
TOXAPHENE	440		8	74	10.8%	0/74	--	25-3500	0	No
Inorganics (mg/kg)										
ANTIMONY	3.1	N	1	85	1.2%	28/85	0.26-1430	0.093-3.2	0	Yes
ARSENIC	0.39	N	1	97	1.0%	95-87	4.2-65.7	3.9	0	No

Attachment 4

Summary of Surface Soil Locations Above Background

TABLE B-1
SUMMARY OF SURFACE SOIL LOCATIONS ABOVE BACKGROUND
PORTSMOUTH NAVAL SHIPYARD, KITTERY MAINE

Parameter	Locations in Surface Soil Above Inflection Point
ANTIMONY	TP-SB32, TP-MW05, TP-SB28, BG05
AROCLOR 1248	TP-SB120
AROCLOR 1254	TP-SB115
ARSENIC	TP-SB33,TP-SB120,TP-SB119,TP-SB19,TP-SB34,TP-SB38B
BAP HALF ND	TP-SB36,TP-SB19, TP-SB27, TP-SB15, TP-MW02, TP-SB120, TP-SB31
BAP POS	TP-SB31,TP-SB120,TP-SB15,TP-SB19,TP-SB36,TP-SB27
BARIUM	TP-SB27,TP-SB19
BENZO(A)ANTHRACENE	TP-SB27, TP-SB19,TP-SB36, TP-SB15, TP-SB120,TP-SB31
BENZO(A)PYRENE	TP-SB31, TP-SB120, TP-SB15, TP-SB27, TP-SB19,TP-SB36
BENZO(B)FLUROANTHENE	TP-SB120,TP-SB31,TP-SB15,TP-SB19,TP-SB36,TP-SB27,TP-SB37,TP-SB123
BENZO(G,H,I)PERYLENE	TP-SB120, TP-SB31, TP-MW02, TP-SB27, TP-SB19,TP-SB15, TP-SB36
BENZO(K)FLUORANTHENE	TP-SB31, TP-SB120,TP-SB15
CADMIUM	TP-SB23, TP-SB42,TP-SB32, TP-SB19,BGS-05, TP-SB27
COPPER	TP-SB32, TP-SB34,TP-SB19, TP-SB33,TP-SB23,TP-SB18
DIBENZO(A,H)ANTHRACENE	TP-SB31, TP-SB120
INDENO(1,2,3-CD)PYRENE	TP-SB31,TP-SB120, TP-SB27, TP-SB19, TP-SB15,TP-SB36
IRON	TP-SB27,TP-SB23,TP-SB19
MANGANESE	TP-SB19, TP-SB23, TP-SB25
MERCURY	TP-SB09, TP-SB34, TP-SB19
THALLIUM	TP-MW08,TP-MW09, TP-SB24,TP-SB31
VANADIUM	TP-SB23,TP-SB15,TP-SB120,TP-SB09
2,3,4,7,8-PECDF	TP-SB27
TEQ	TP-SB27

Monitoring well locations refer to the collocated soil sample location

Attachment 5

Summary of Subsurface Soil Locations Above Background

TABLE B-2
SUMMARY OF SUBSURFACE SOIL LOCATIONS ABOVE BACKGROUND
PORTSMOUTH NAVAL SHIPYARD, KITTERY MAINE

Parameter	Locations in Above Inflection Point
ANTIMONY	TP-SB24, TP-SB20B, TP-SB36,TP-SB32
AROCLOR 1248	TP-SB108
AROCLOR 1254	TP-SB114, TP-SB99
AROCLOR 1260	TP-SB14, TP-SB112
ARSENIC	TP-SB34
BAP HALF ND	TP-SB39, TP-SB14, TP-TP-MW05, TP-SB36,TP-SB31,TP-SB18
BAP POS	TP-SB39, TP-SB14, TP-TP-MW05, TP-SB36, TP-SB31, TP-SB18
BARIUM	TP-SB37, TP-SB36, TP-SB33B, TP-SB27, TP-SB37, TP-SB33, TP-SB40
BENZO(A)ANTHRACENE	TP-SB39, TP-SB36, TP-SB33B, TP-SB27, TP-SB37, TP-SB33, TP-SB40
BENZO(A)PYRENE	TP-SB39,TP-SB14,TP-SB36,TP-MW05,TP-SB31,TP-SB18
BENZO(B)FLUROANTHENE	TP-SB39,TP-MW05, TP-SB36, TP-SB18,TP-SB31
BENZO(G,H,I)PERYLENE	TP-SB39, TP-MW05, TP-SB31,TP-SB36
BENZO(K)FLUORANTHENE	TP-SB39,TP-SB31,TP-MW05, TP-SB36
CADMIUM	TP-SB37, TP-SB35,40,TP-SB36, 20B, TP-SB35
CHROMIUM	TP-SB35,TP-MW09
COBALT	TP-SB35,TP-SB15
COPPER	TP-SB19,TP-SB35,TP-SB36
DIBENZO(A,H)ANTHRACENE	TP-MW05, TP-SB39
INDENO(1,2,3-CD)PYRENE	TP-SB39,TP-MW05, TP-SB31, TP-SB14, TP-SB36, TP-SB18, TP-SB35
IRON	TP-SB23
LEAD	TP-SB24,TP-SB37
MERCURY	TP-SB37, TP-SB14
NICKEL	TP-SB35, TP-MW09, TP-SB14,TP-SB23
THALLIUM	TP-MW09, TP-SB24
VANADIUM	TP-SB23, MW-01, TP-SB35,TP-SB23
ZINC	TP-SB19,TP-SB35,TP-SB37,TP-SB36, TP-SB14,TP-SB37
DIELDRIN	TP-SB14,TP-SB27
1,2,3,4,6,7,8-HPCDF	TP-SB27

Monitoring well locations refer to the collocated soil sample location

Attachment 6

Toxaphene ATSDR

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

TOXAPHENE

CAS # 8001-35-2

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2010

This fact sheet answers the most frequently asked health questions (FAQs) about toxaphene. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Toxaphene is a pesticide which is currently banned for all uses in the United States. Breathing, eating, or drinking high levels of toxaphene could damage the nervous system, the liver, and kidneys, and even cause death. Toxaphene has been found in at least 68 of the 1,699 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is toxaphene?

Toxaphene is a mixture of hundreds of different chlorinated compounds. It was one of the most heavily used pesticides in the Unites States until 1982, when it was canceled for most uses. All registered uses were banned by 1990. Toxaphene was used primarily in the southern United States to control insect pests on cotton and other crops.

Toxaphene is usually found as a solid or a gas. In its original form, toxaphene is a yellow to amber waxy solid that has a piney odor.

What happens to toxaphene when it enters the environment?

- When released to the environment, it can enter the air, the soil, and water.
- It does not dissolve well in water and evaporates easily.
- Toxaphene is more likely found in air, soil, and sediment at the bottom of lakes or streams, than in surface water.
- Toxaphene can stay in the environment for a long time because it breaks down very slowly.
- Toxaphene can be carried long distances in the air.
- Toxaphene accumulates in fatty tissues of fish and mammals.

How might I be exposed to toxaphene?

- People living near a location with heavy toxaphene contamination, such as a hazardous waste site, may be exposed to higher levels through breathing contaminated air or through direct skin contact with contaminated soil or water.
- People who eat large quantities of fish, shellfish, or wild game animals from areas contaminated with toxaphene may have higher exposure to this substance since these animals tend to accumulate toxaphene in fatty tissues.
- Individuals may be exposed to toxaphene through drinking water contaminated with toxaphene runoff from contaminated soils.

How can toxaphene affect my health?

Breathing, eating, or drinking high amounts of toxaphene could damage the nervous system, liver, and kidneys, and even cause death. However, since toxaphene is no longer used in the United States, most people would not be exposed to high levels of it.

Studies showed that animals which ate food or drank water containing toxaphene had effects on the liver, kidneys, and immune system.

It is not known whether toxaphene can affect reproduction in humans.

How likely is toxaphene to cause cancer?

It is not known whether toxaphene would cause cancer in people. Toxaphene caused liver cancer in mice and possible thyroid cancer in rats that were given large amounts of toxaphene by mouth.

The Department of Health and Human Services (DHHS) has determined that toxaphene may reasonably be anticipated to be a carcinogen. The International Agency for Research on Cancer (IARC) has determined that toxaphene is possibly carcinogenic to humans. The EPA has determined that toxaphene is a probable human carcinogen.

How can toxaphene affect children?

Toxaphene would be expected to affect children in the same manner as adults. It is not known whether children are more susceptible than adults to the effects of toxaphene.

A few studies in animals have shown minor changes in fetal development. We do not know if toxaphene would cause developmental effects in humans.

How can families reduce the risk of exposure to toxaphene?

- ❑ For people who live in areas where surface waters (for example lakes) have been contaminated with toxaphene, consumption of toxaphene-contaminated foods such as fish may need to be reduced.
- ❑ Avoid drinking water contaminated with toxaphene.

Is there a medical test to determine whether I've been exposed to toxaphene?

Toxaphene and some of its breakdown products can be detected in blood, urine, breast milk, and body tissues. Urine and blood tests are the most common tests used. These tests are not available at most doctor' offices, but can be done at special laboratories that have the right equipment.

These tests cannot determine how much toxaphene you have been exposed to, or whether you will experience any health effects.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to toxaphene in drinking water at concentrations of 0.004 milligrams per liter (mg/L) for up to 10 days is not expected to cause any adverse effects in a child.

The EPA has determined that lifetime exposure to 0.01 mg/L toxaphene in the drinking water is not expected to cause any adverse noncancer effects if the only source of exposure to toxaphene is the drinking water.

The Food and Drug Administration (FDA) has determined that the concentration of toxaphene in bottled drinking water should not exceed 0.003 mg/L.

The Occupational Safety and Health Administration (OSHA) set a legal limit of 0.5 mg/m^3 for toxaphene in air averaged over an 8 hour work day.

References

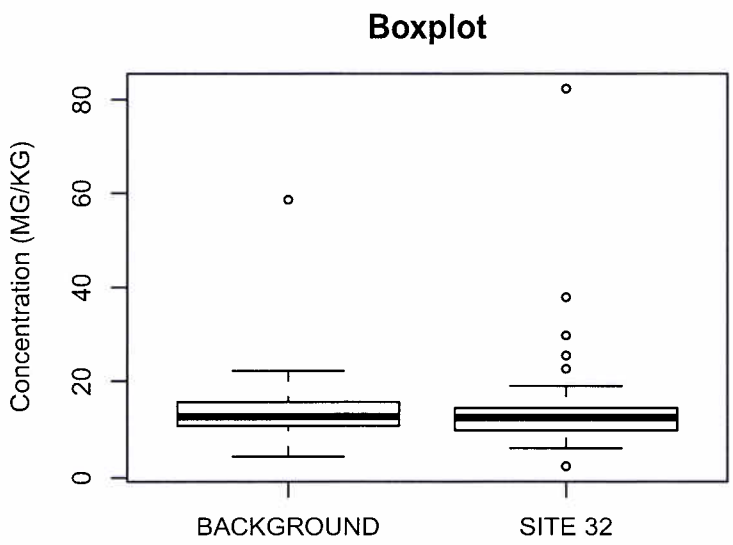
Agency for Toxic Substances and Disease Registry (ATSDR). 2010. Toxicological Profile for Toxaphene (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

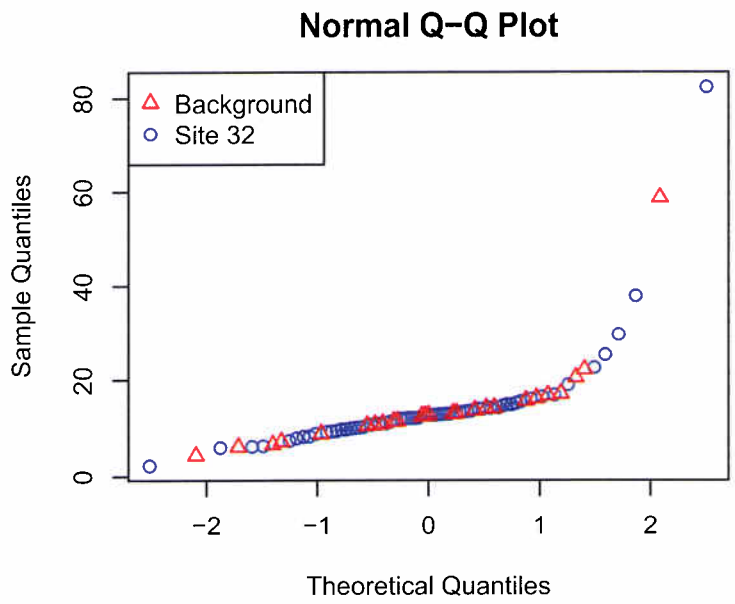
Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-62, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

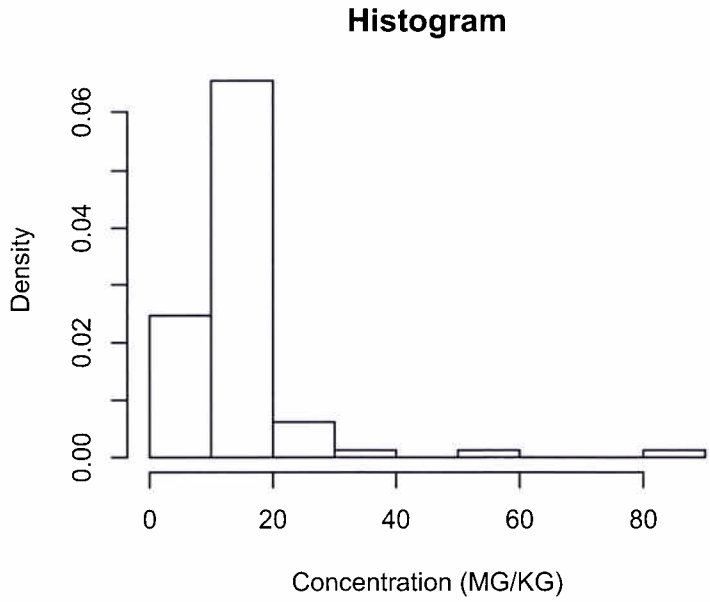
Attachment 7

Surface Soil Background Plots

ARSENIC
Surface Soil

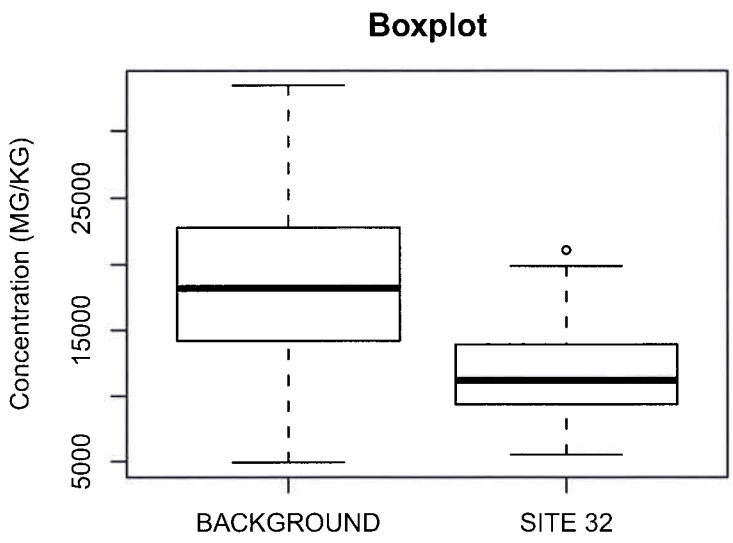


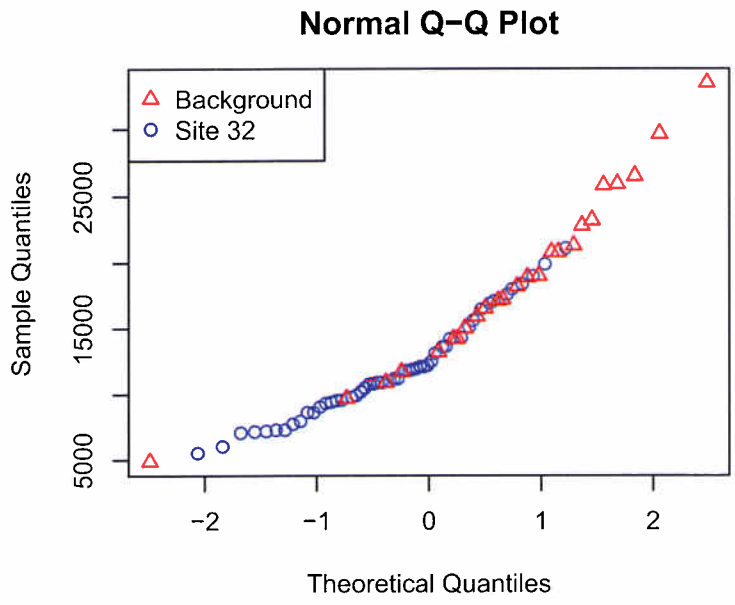


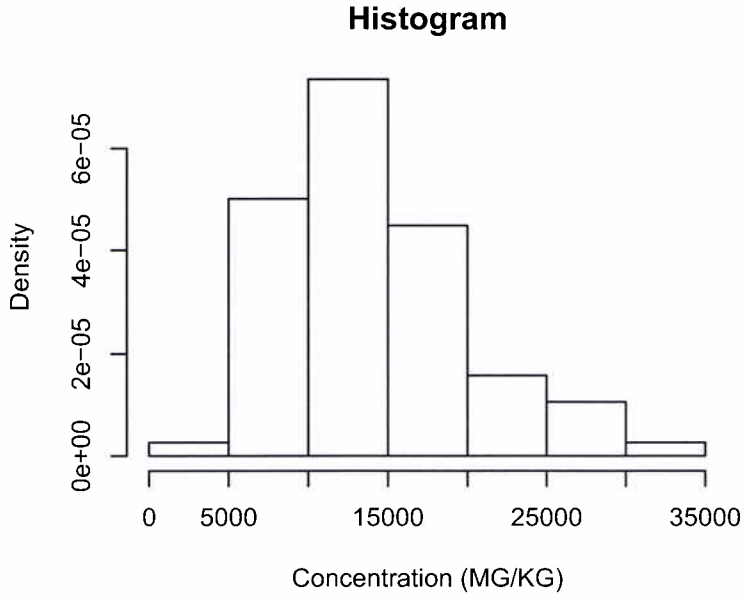


	Site 32	Background
Minimum	2	4
25th Percentile	10	11
Median	12	13
Mean	14	14
75th Percentile	14	16
Maximum	82	59

ALUMINUM
Surface Soil

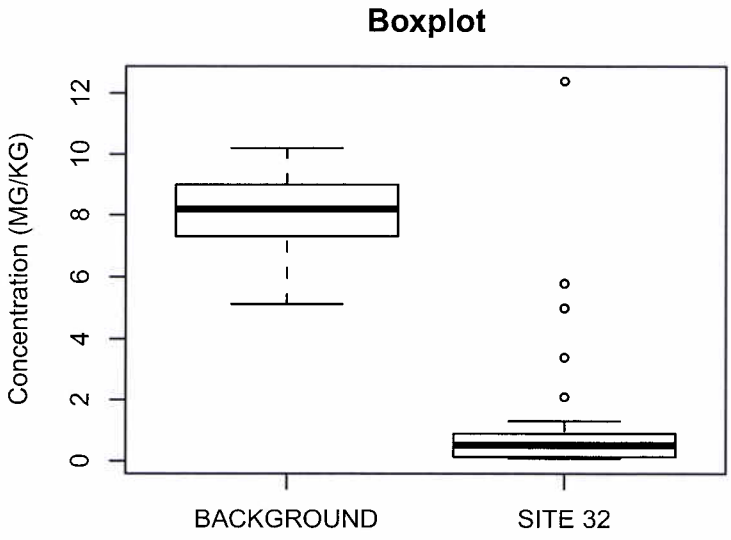


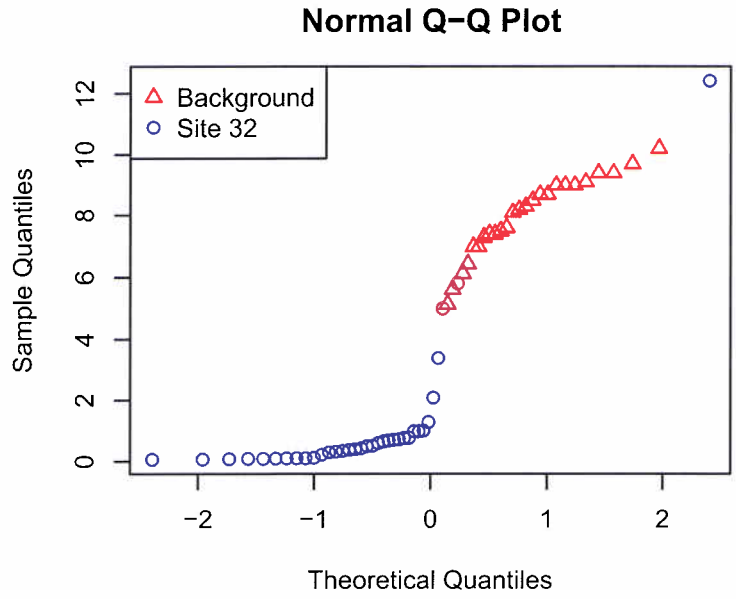


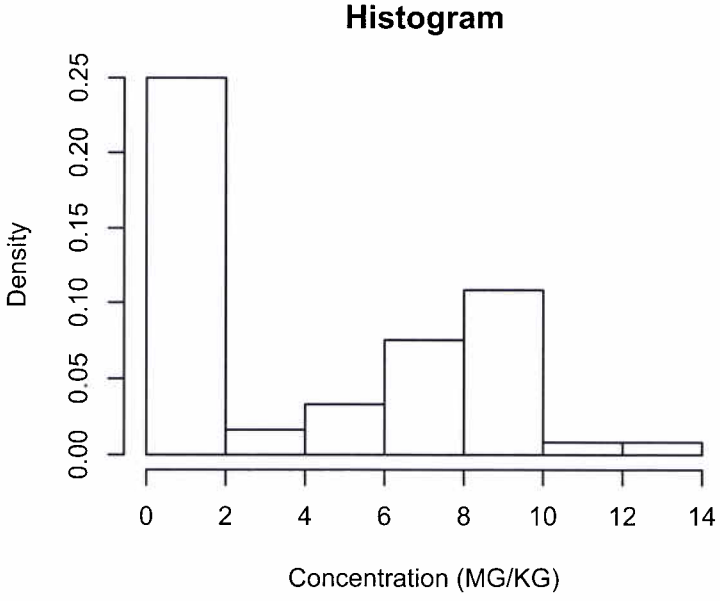


	Site 32	Background
Minimum	5520	4930
25th Percentile	9370	14200
Median	11200	18200
Mean	11860	18670
75th Percentile	13920	22800
Maximum	21100	33500

ANTIMONY
Surface Soil



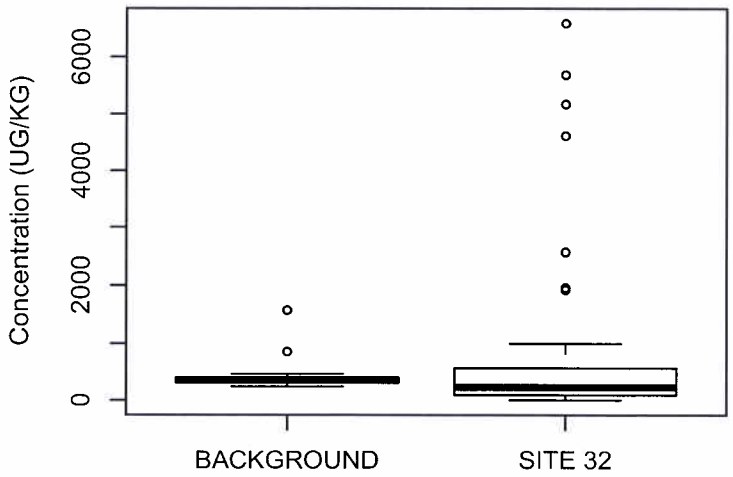




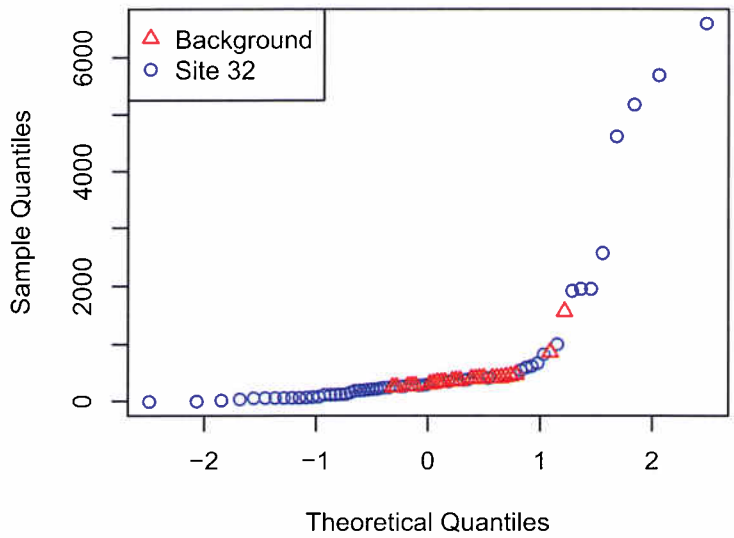
	Site 32	Background
Minimum	0	5
25th Percentile	0	7
Median	1	8
Mean	1	8
75th Percentile	1	9
Maximum	12	10

BAP EQUIVALENT-HALFND
Surface Soil

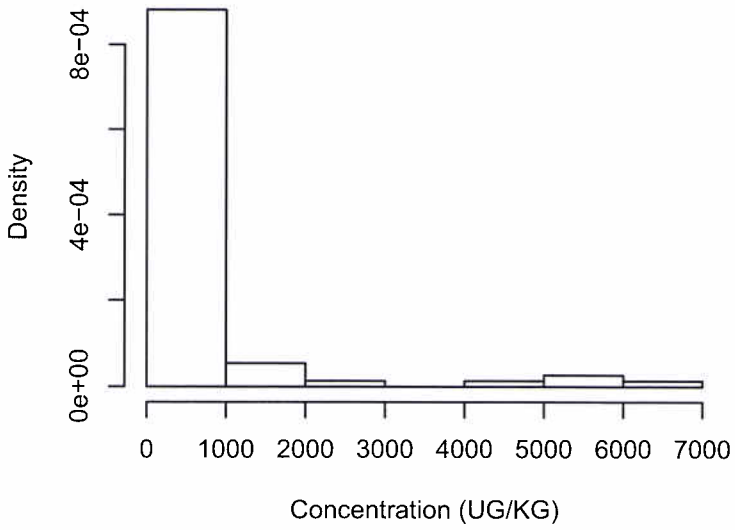
Boxplot



Normal Q-Q Plot

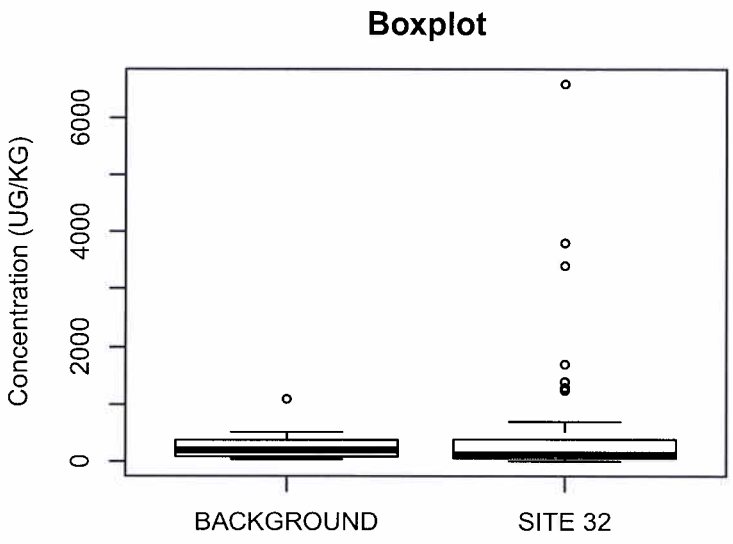


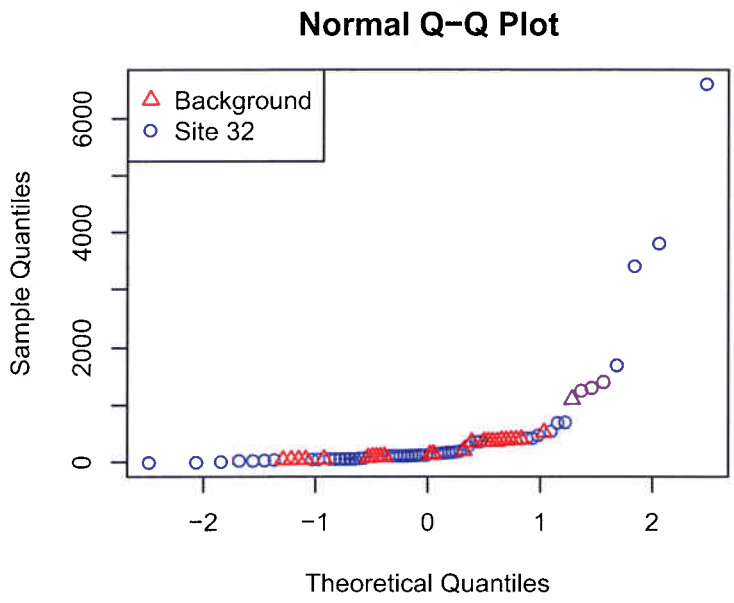
Histogram

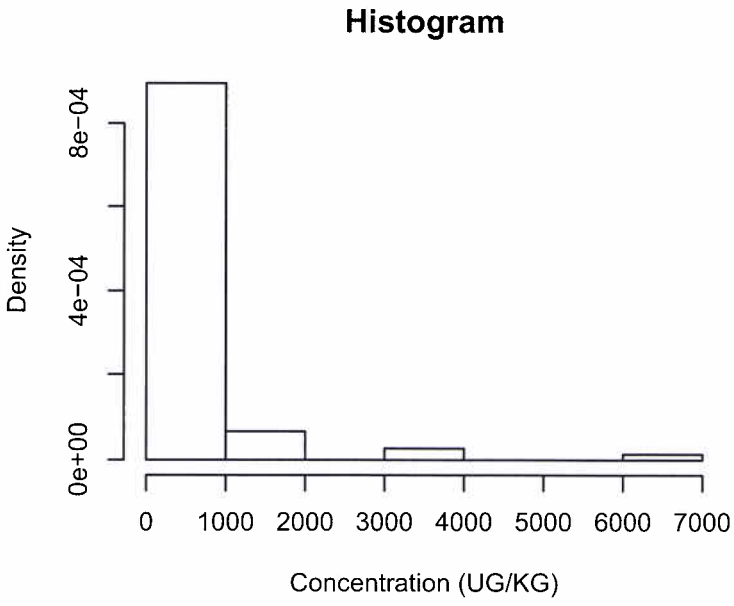


	Site 32	Background
Minimum	5	243
25th Percentile	94	306
Median	229	360
Mean	800	420
75th Percentile	567	406
Maximum	6600	1575

BENZO(A)PYRENE
Surface Soil

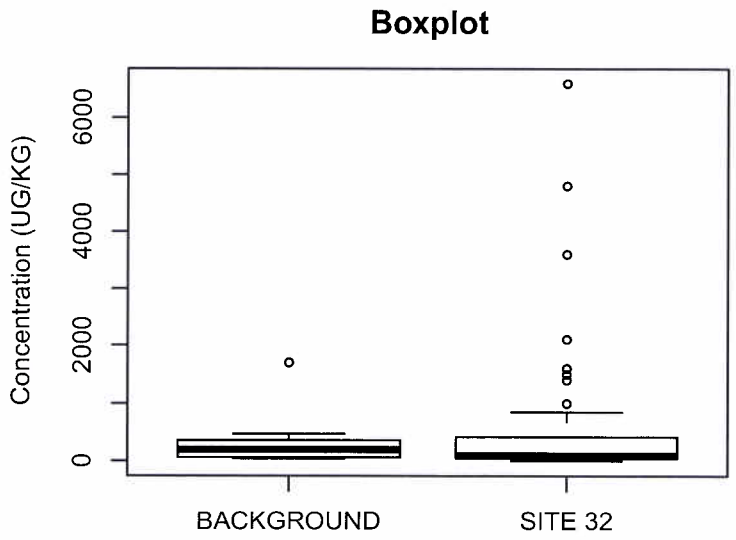


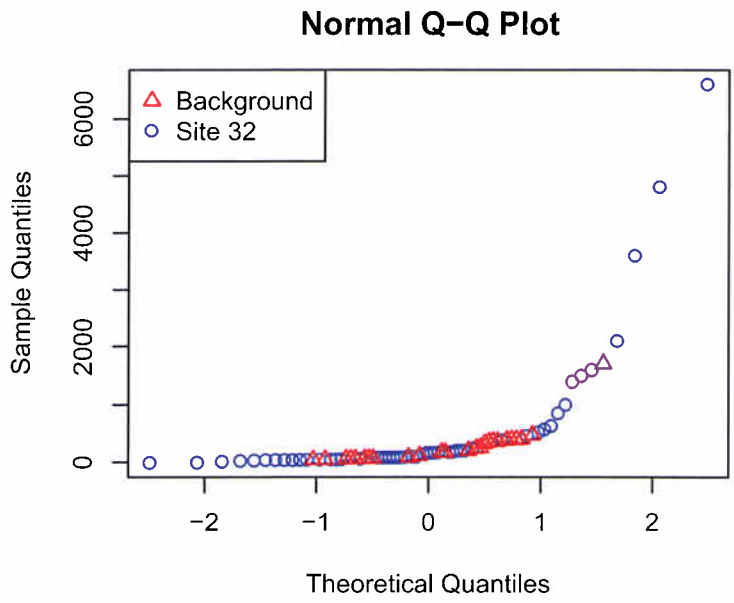


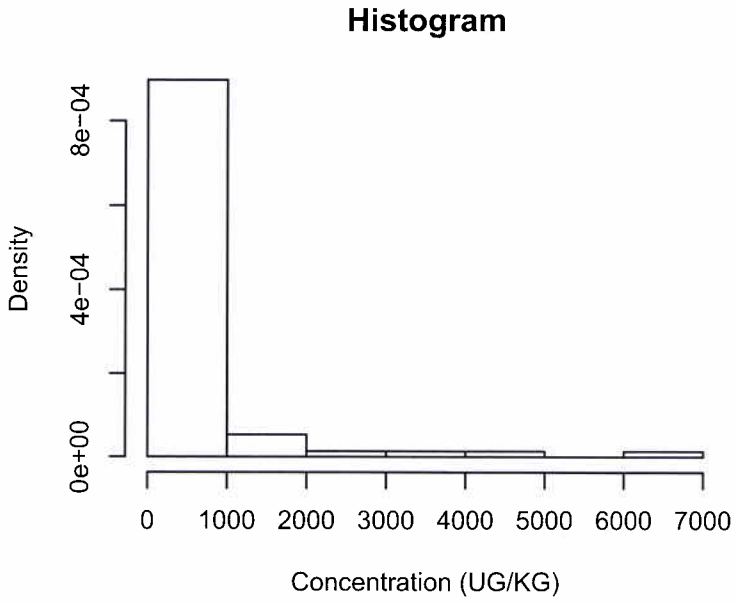


	Site 32	Background
Minimum	4	36
25th Percentile	56	85
Median	120	200
Mean	526	259
75th Percentile	390	380
Maximum	6600	1100

BENZO(B)FLUORANTHENE
Surface Soil

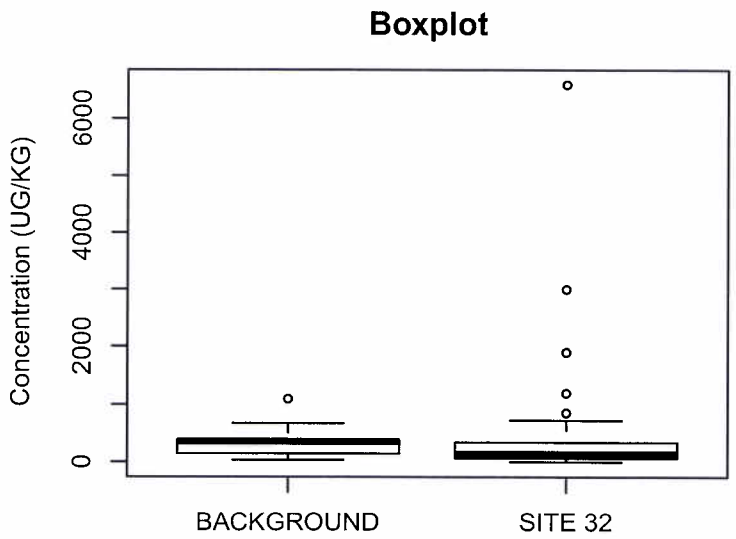


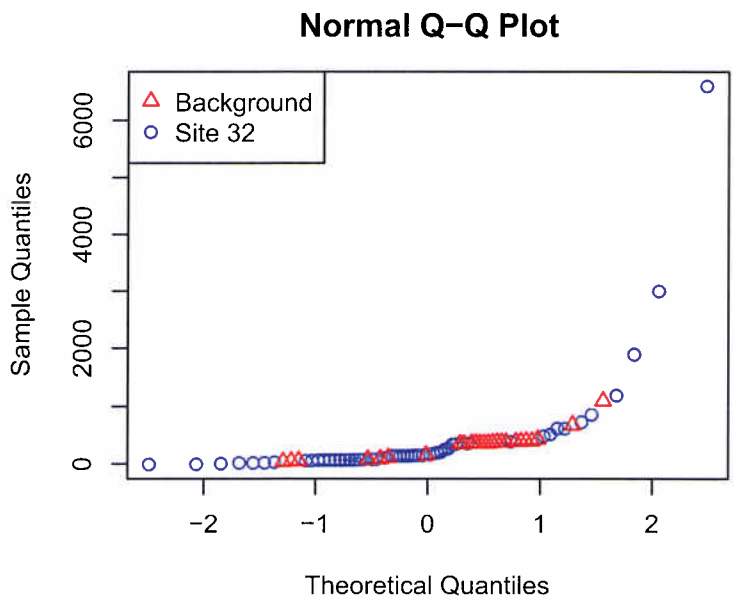


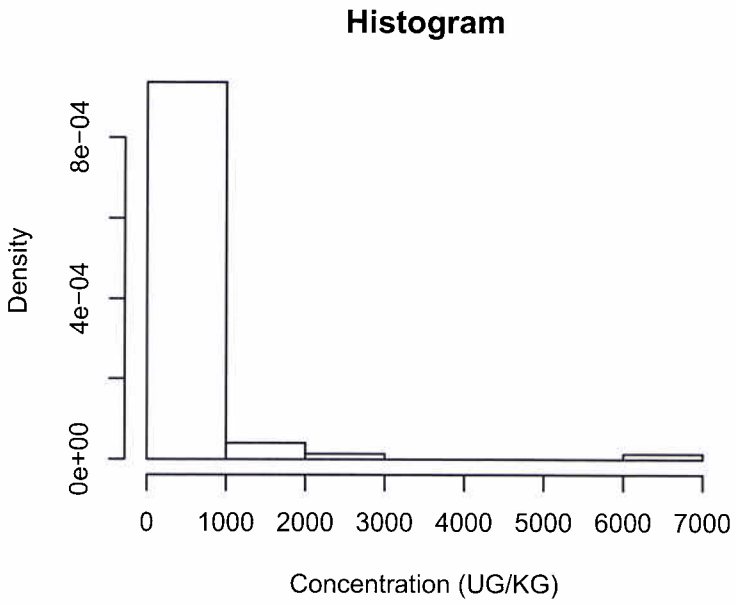


	Site 32	Background
Minimum	5	41
25th Percentile	46	62
Median	94	200
Mean	577	272
75th Percentile	420	360
Maximum	6600	1700

BENZO(K)FLUORANTHENE
Surface Soil

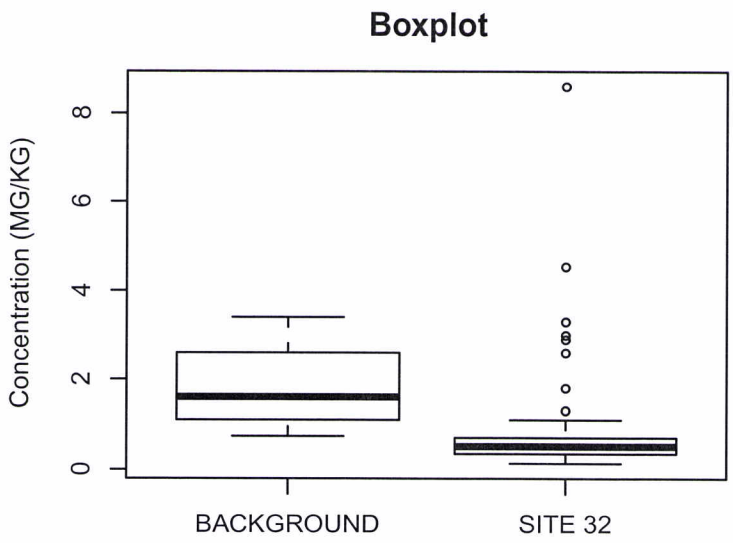


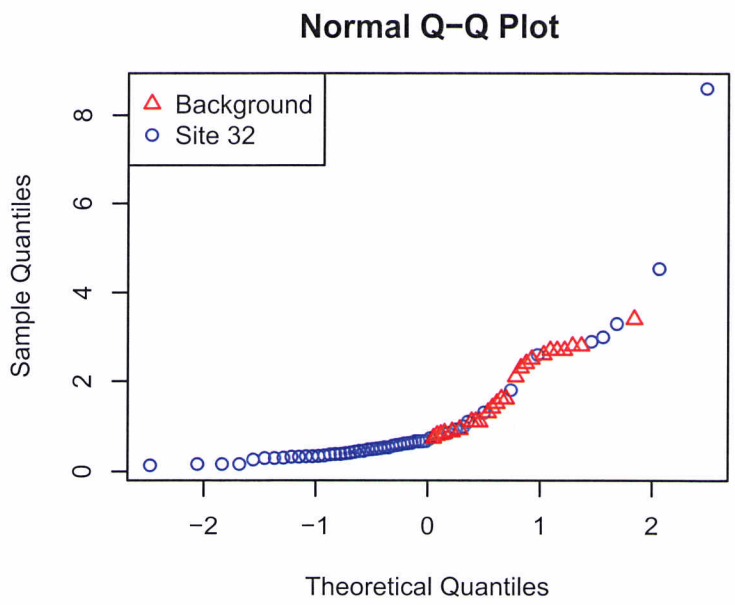


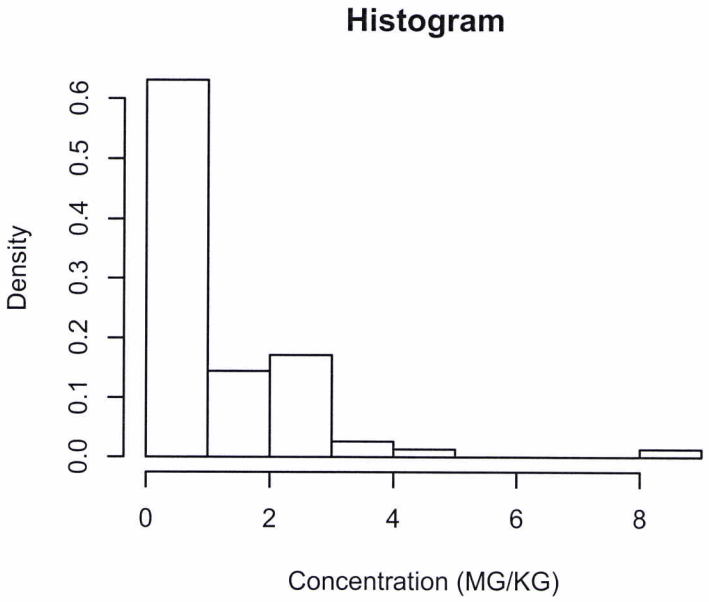


	Site 32	Background
Minimum	4	38
25th Percentile	69	150
Median	140	360
Mean	426	335
75th Percentile	345	390
Maximum	6600	1100

CADMIUM
Surface Soil

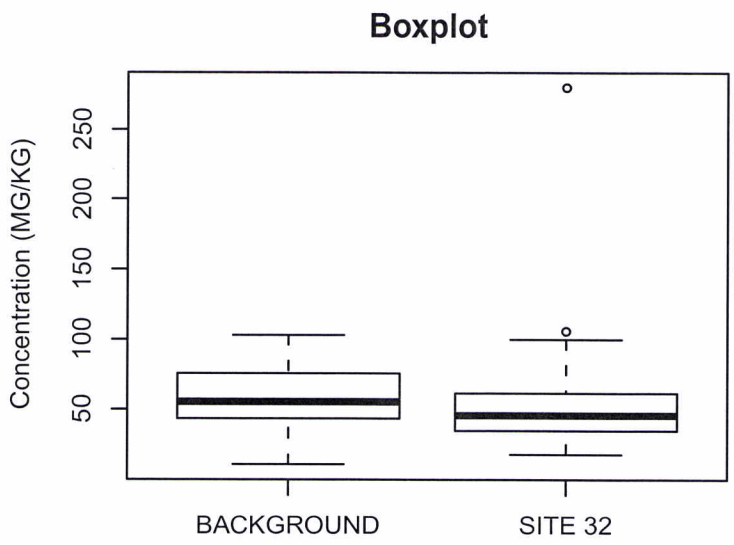


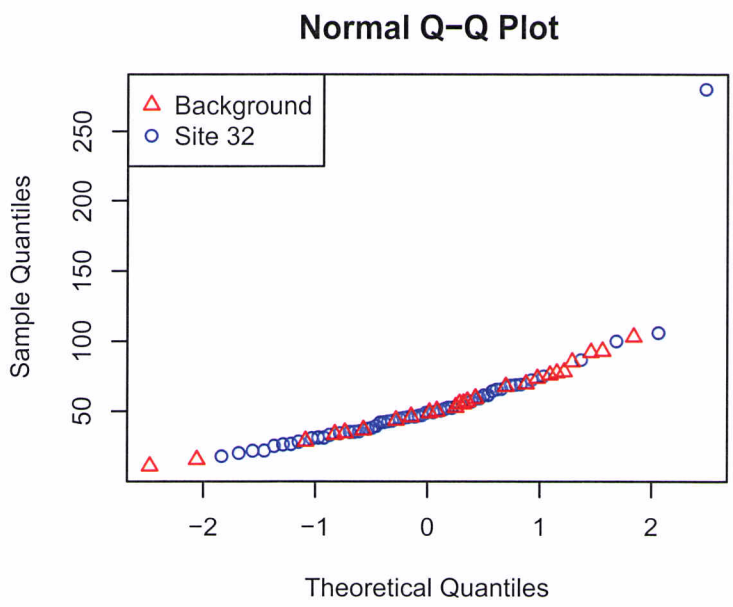


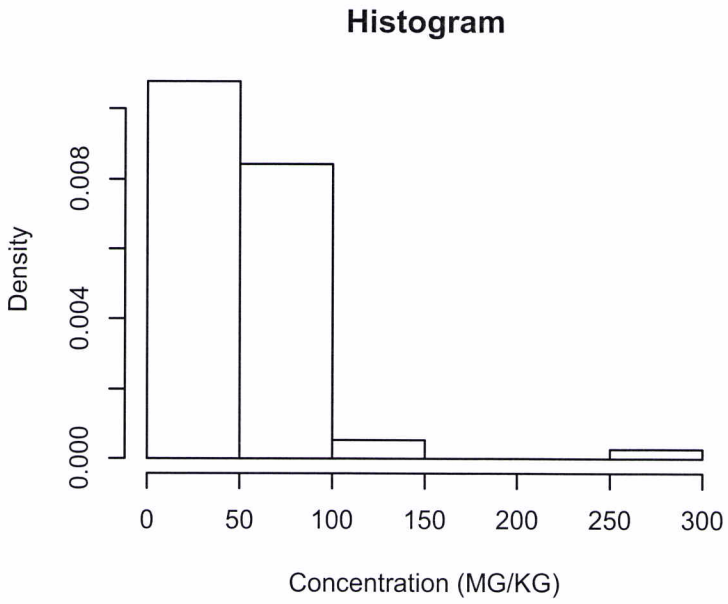


	Site 32	Background
Minimum	0	1
25th Percentile	0	1
Median	1	2
Mean	1	2
75th Percentile	1	3
Maximum	9	3

CHROMIUM
Surface Soil

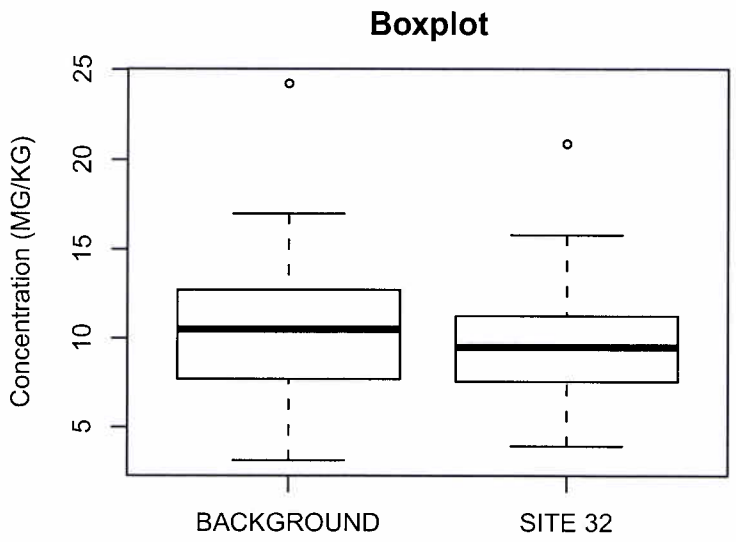


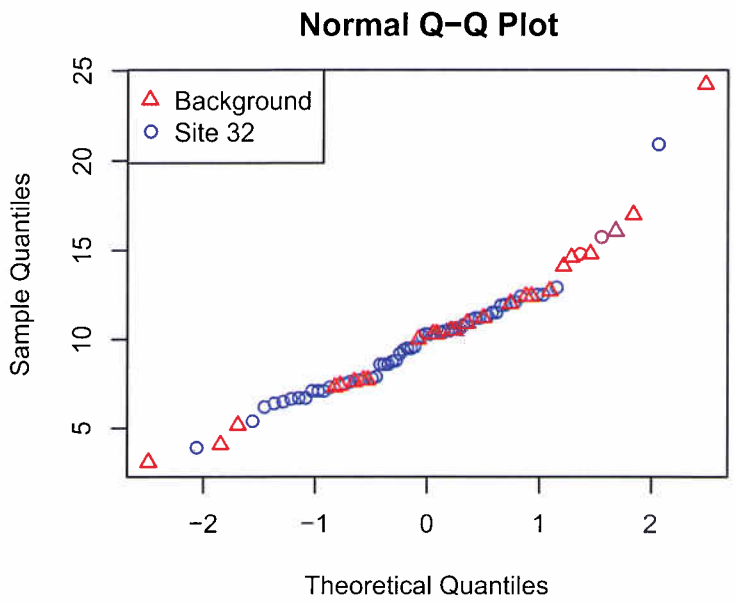


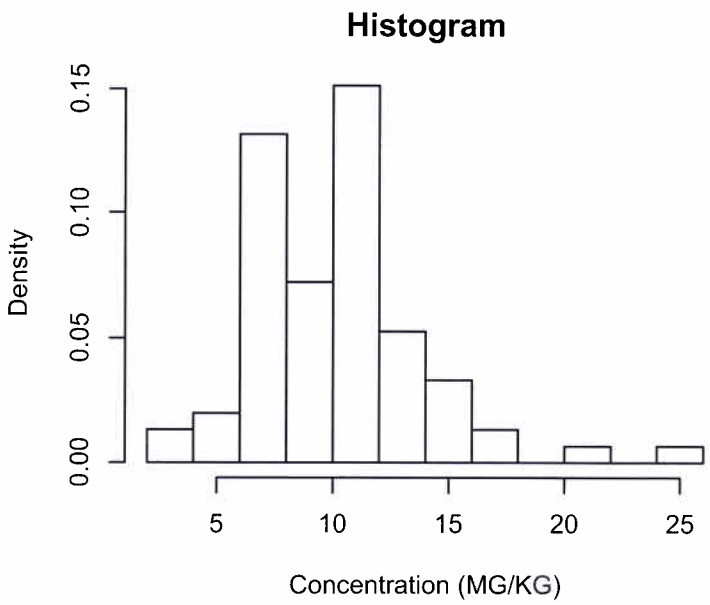


	Site 32	Background
Minimum	19	12
25th Percentile	35	44
Median	46	55
Mean	53	58
75th Percentile	61	76
Maximum	280	103

COBALT
Surface Soil

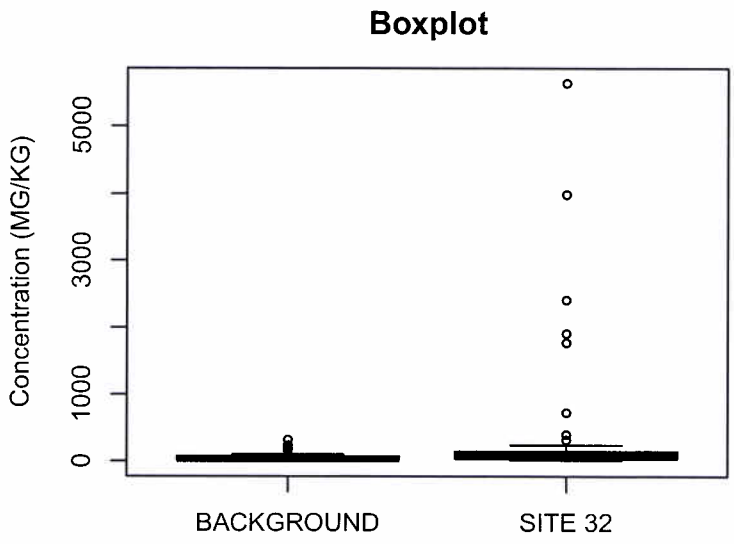


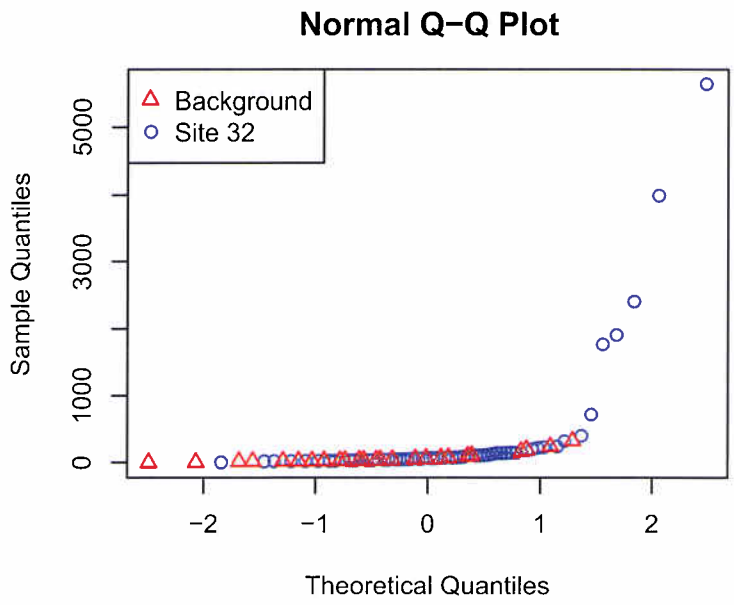


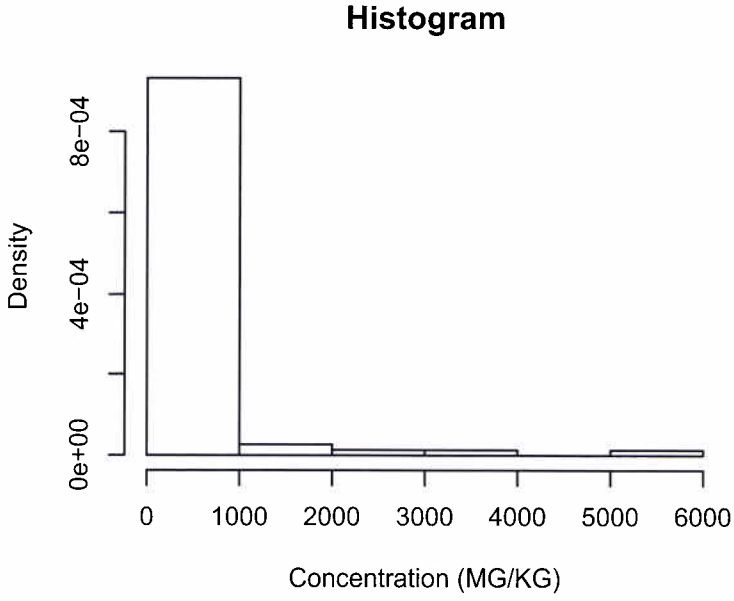


	Site 32	Background
Minimum	4	3
25th Percentile	8	8
Median	10	10
Mean	10	11
75th Percentile	11	13
Maximum	21	24

COPPER
Surface Soil

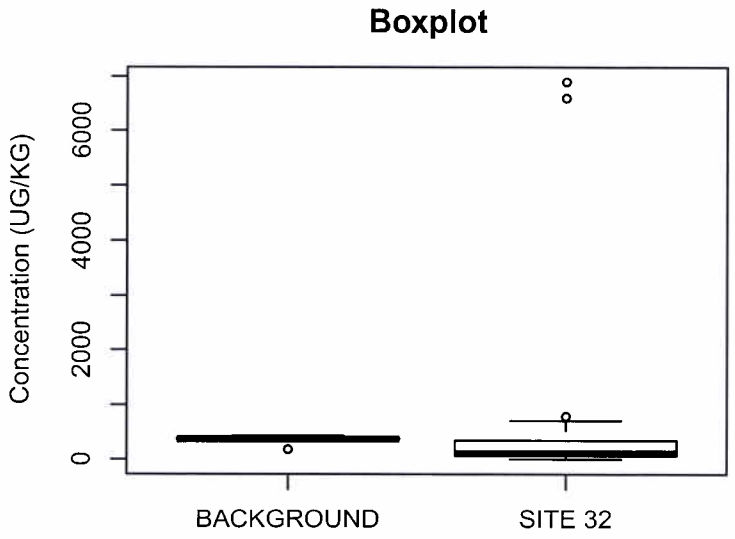


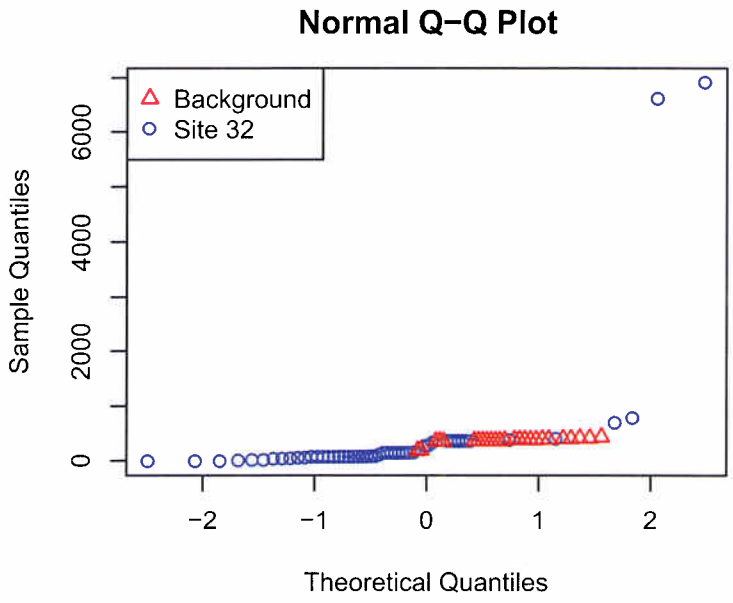


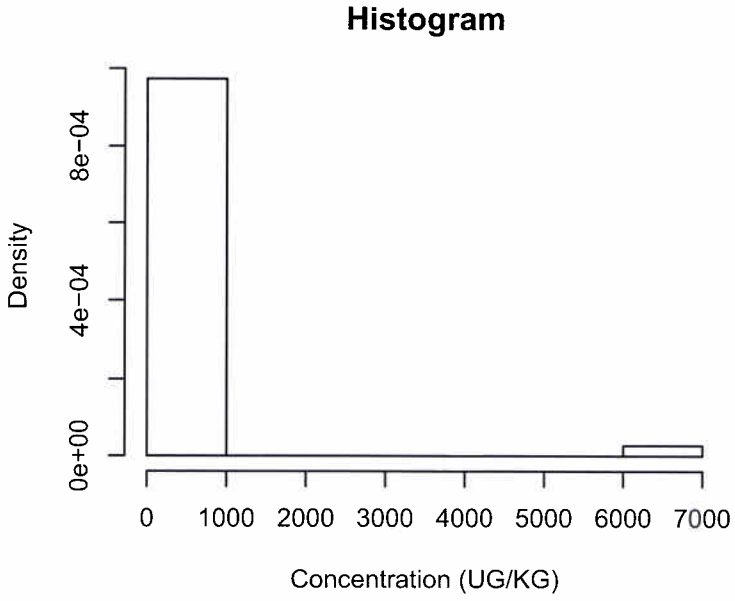


	Site 32	Background
Minimum	13	8
25th Percentile	40	20
Median	68	33
Mean	402	67
75th Percentile	142	68
Maximum	5620	316

DIBENZO(A,H)ANTHRACENE
Surface Soil

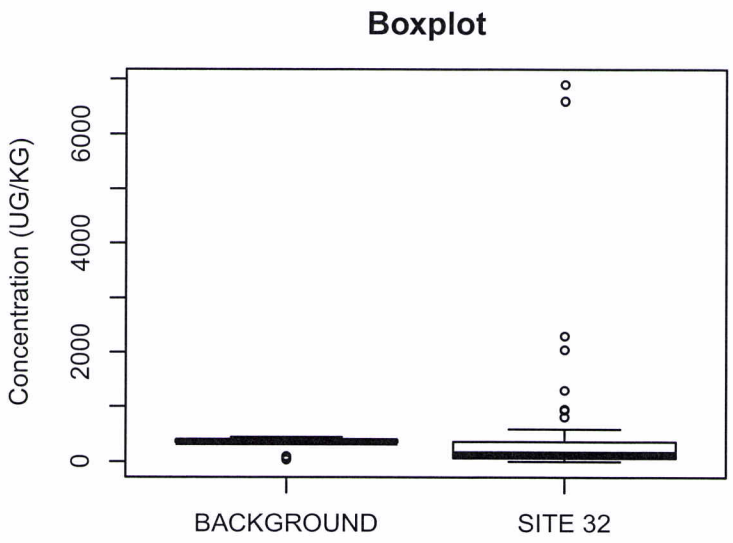


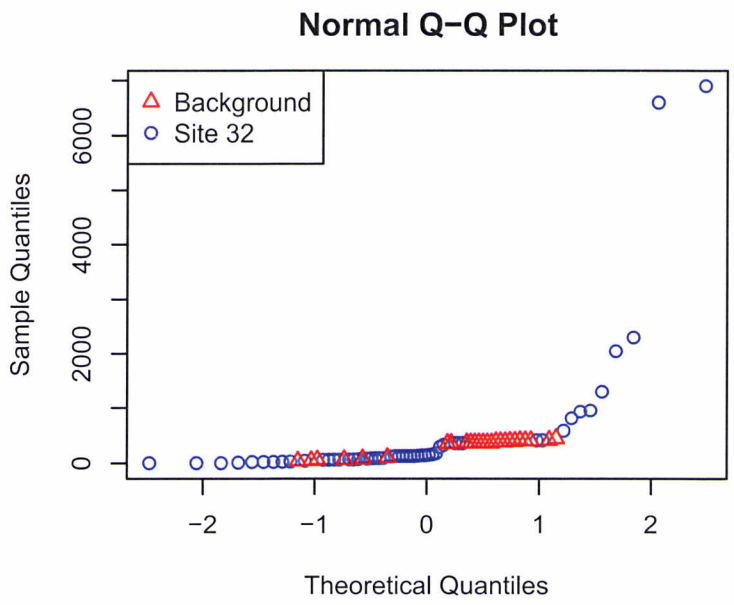


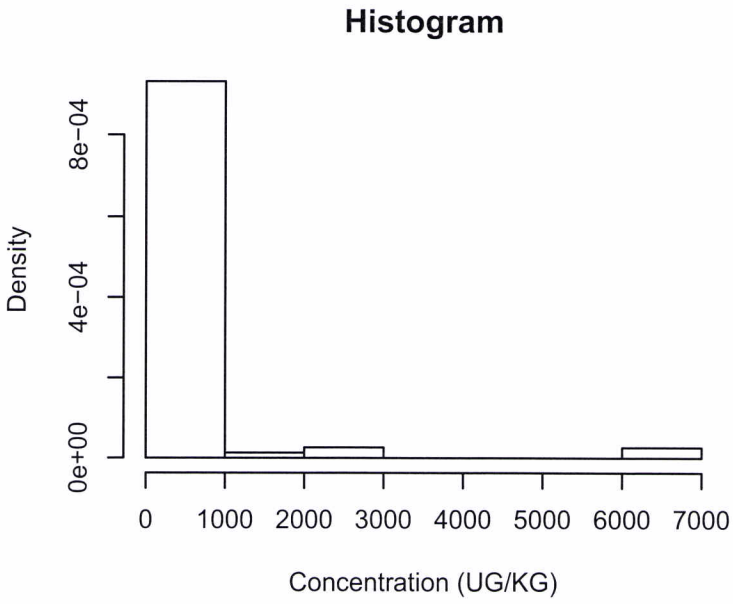


	Site 32	Background
Minimum	4	180
25th Percentile	68	360
Median	110	370
Mean	428	362
75th Percentile	345	390
Maximum	6900	430

INDENO(1,2,3-CD)PYRENE
Surface Soil

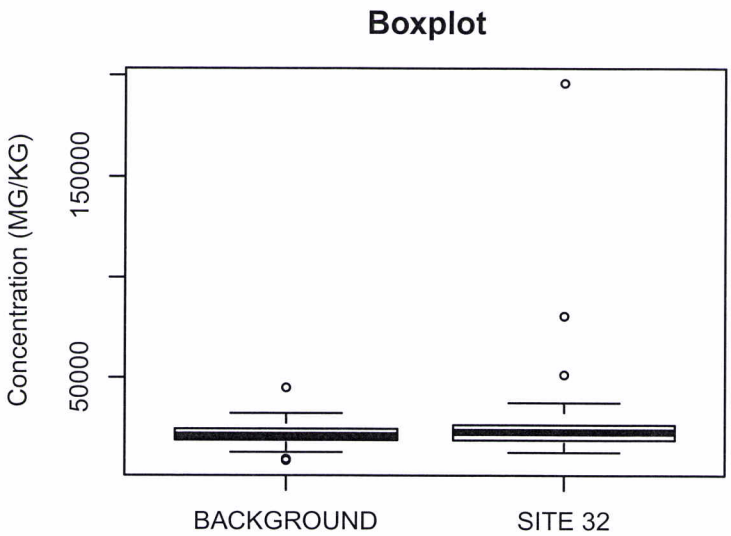


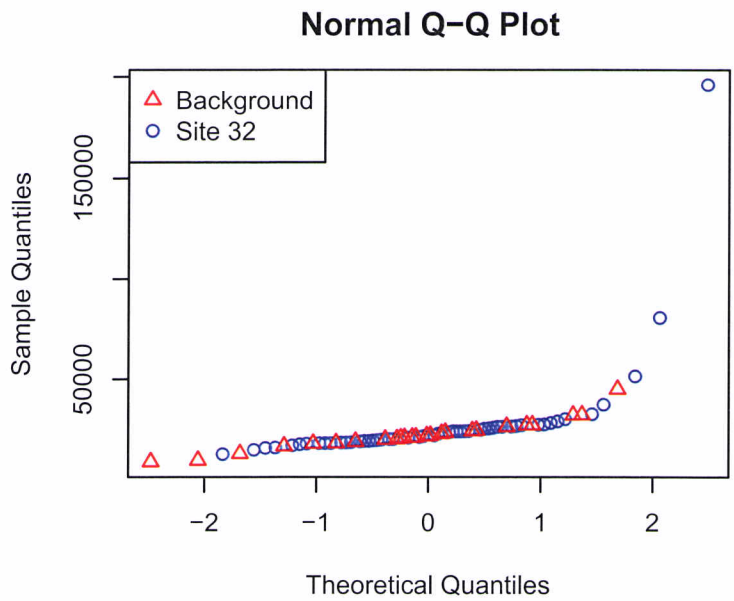


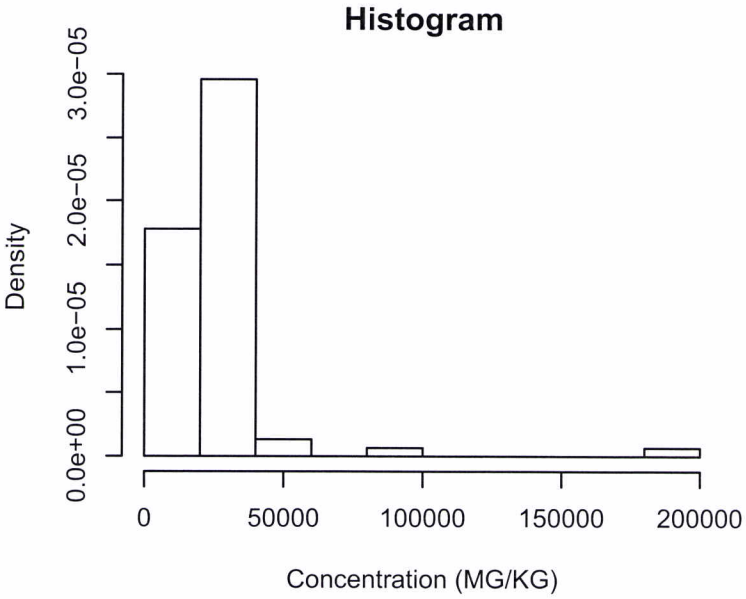


	Site 32	Background
Minimum	4	38
25th Percentile	64	350
Median	130	360
Mean	546	303
75th Percentile	360	390
Maximum	6900	440

IRON
Surface Soil

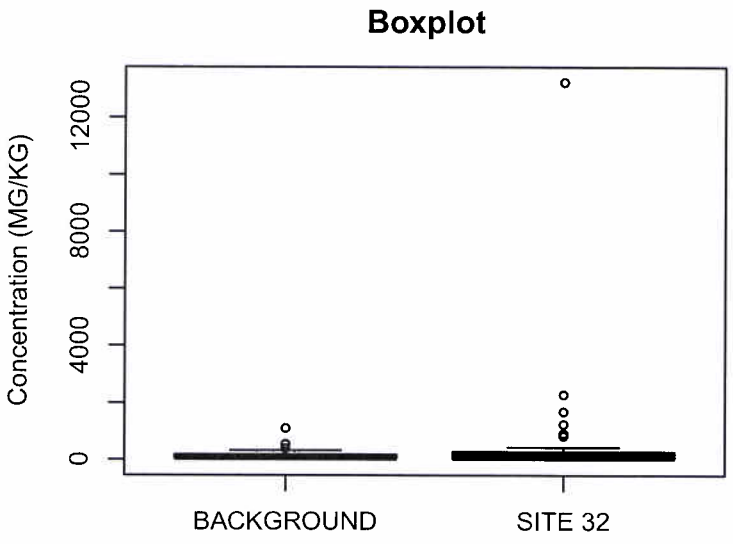


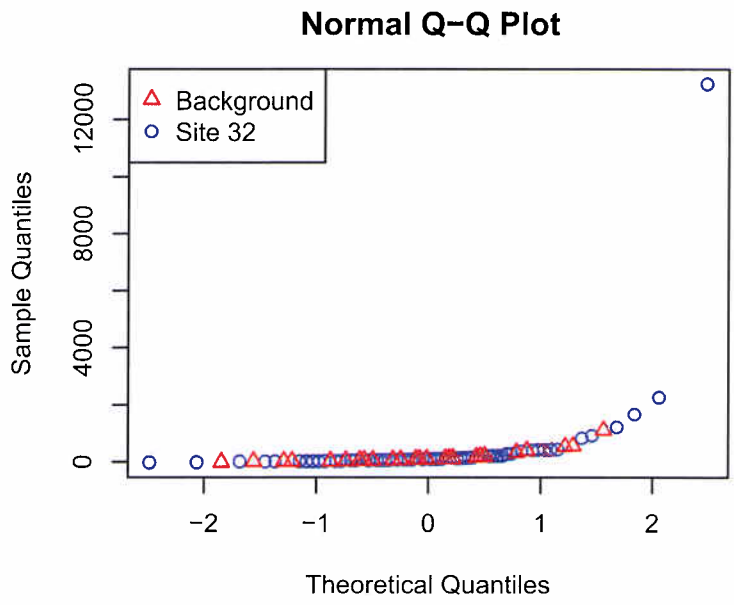


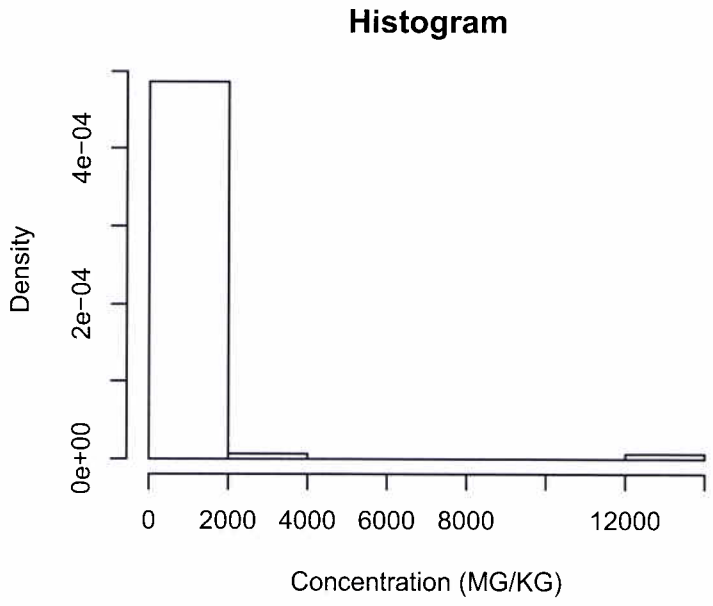


	Site 32	Background
Minimum	12600	8730
25th Percentile	18800	18900
Median	22800	21100
Mean	27550	22200
75th Percentile	26400	24500
Maximum	196000	45000

LEAD
Surface Soil

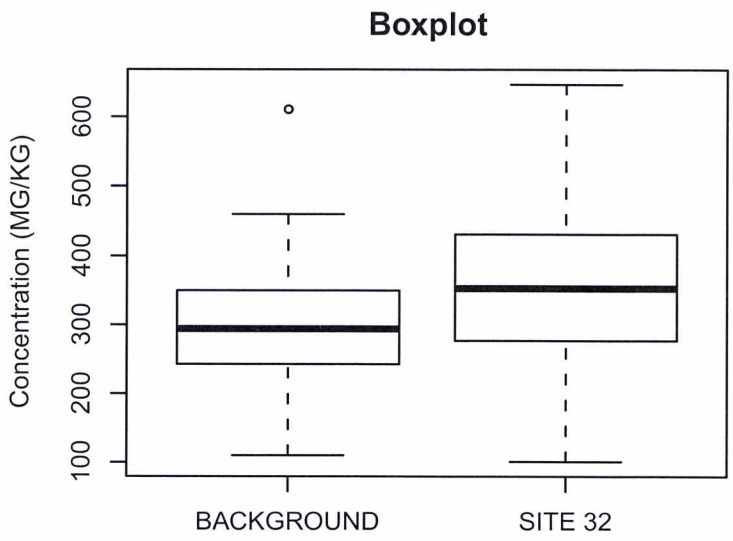


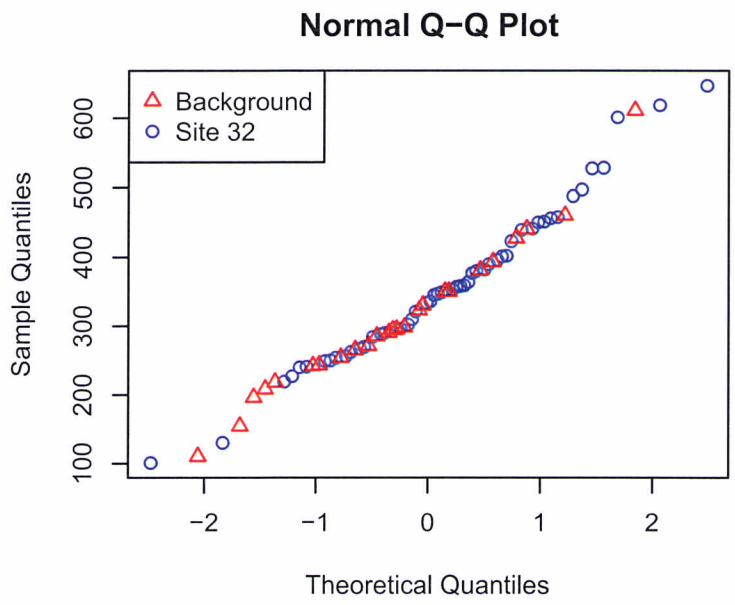


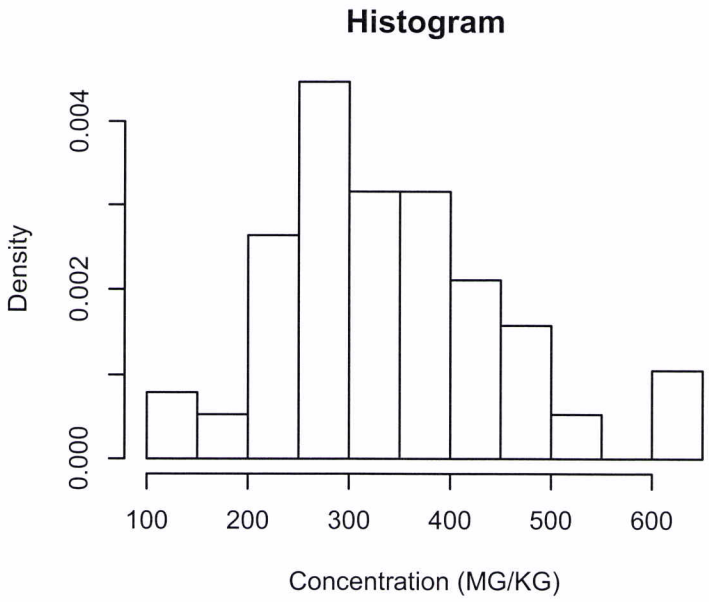


	Site 32	Background
Minimum	6	10
25th Percentile	49	51
Median	98	90
Mean	511	177
75th Percentile	275	173
Maximum	13200	1100

MANGANESE
Surface Soil

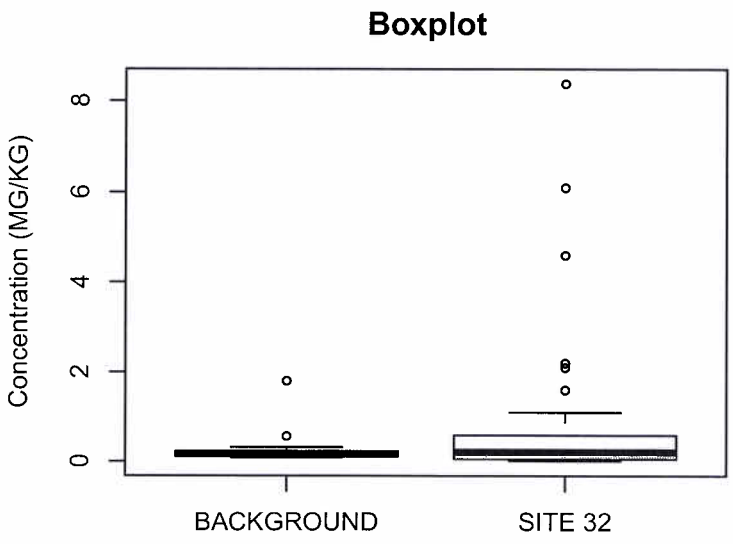


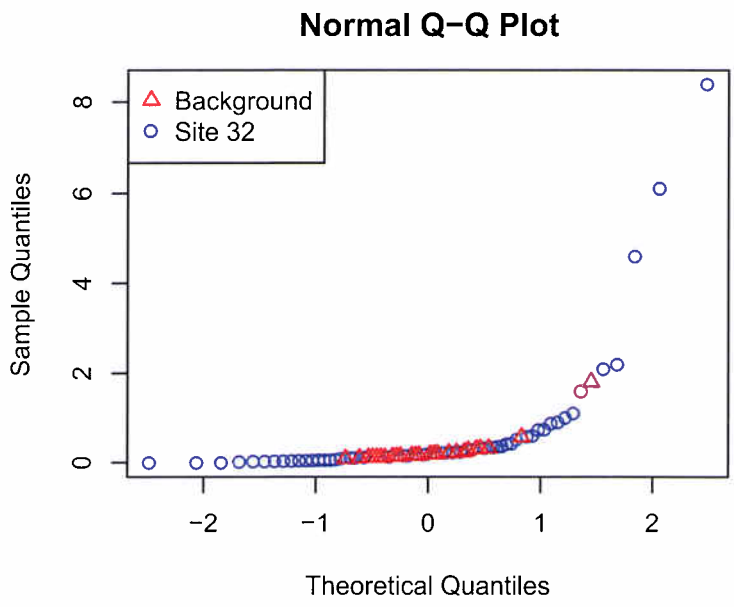


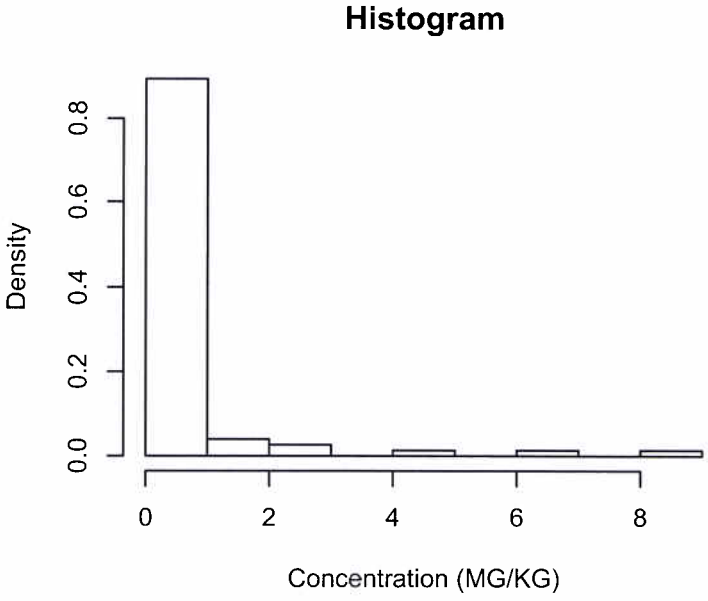


	Site 32	Background
Minimum	101	110
25th Percentile	277	243
Median	353	294
Mean	359	308
75th Percentile	431	350
Maximum	648	611

MERCURY
Surface Soil

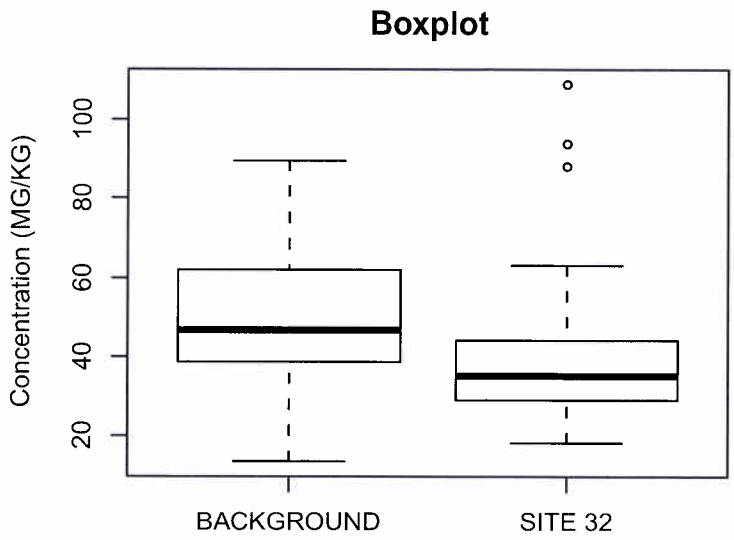


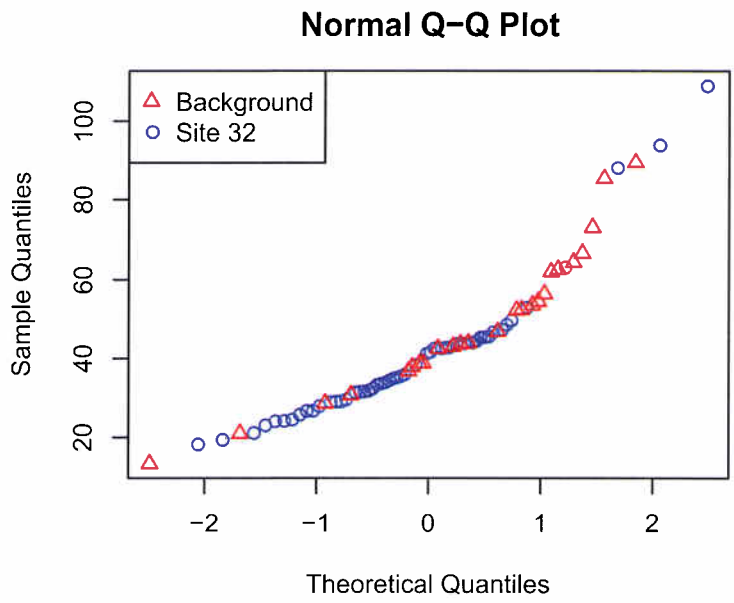


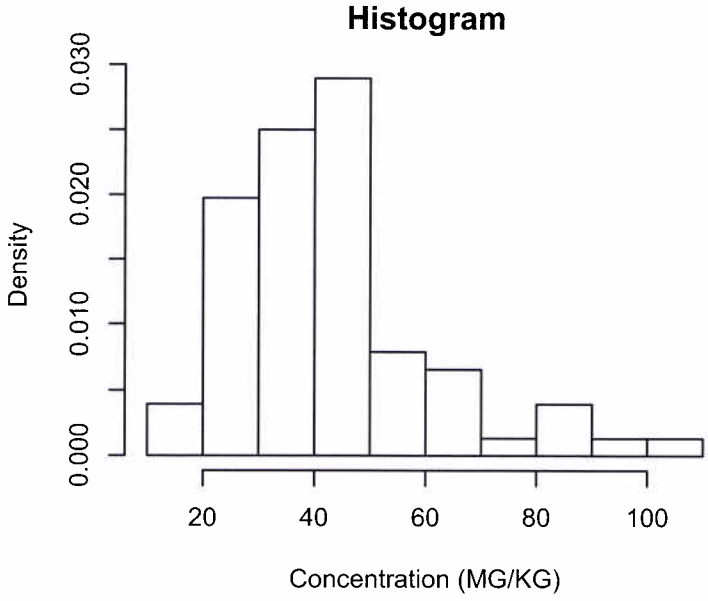


	Site 32	Background
Minimum	0	0
25th Percentile	0	0
Median	0	0
Mean	1	0
75th Percentile	1	0
Maximum	8	2

VANADIUM
Surface Soil

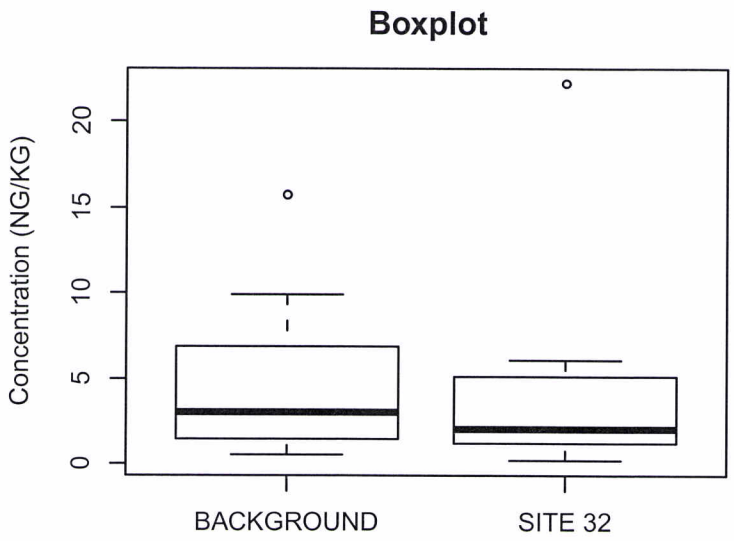


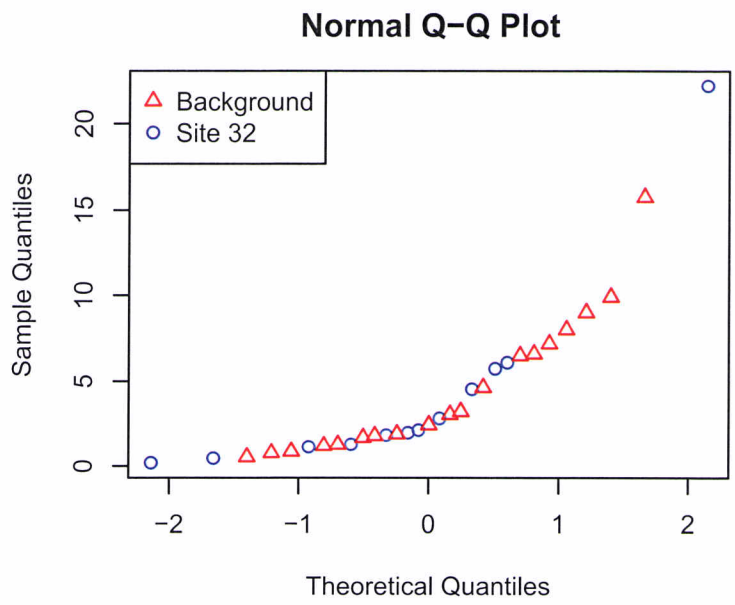


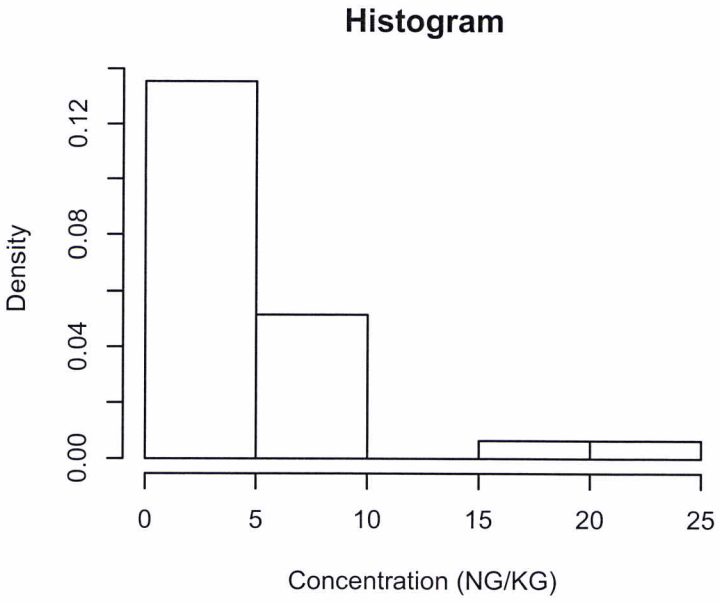


	Site 32	Background
Minimum	18	14
25th Percentile	29	39
Median	35	47
Mean	40	50
75th Percentile	44	62
Maximum	109	90

TEQ WHO−2005 − HALFND
Surface Soil







	Site 32	Background
Minimum	0	1
25th Percentile	1	1
Median	2	3
Mean	4	5
75th Percentile	5	7
Maximum	22	16