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Section: 13.03
Site 20903-5640 (White Oak)
Doc. #: 0019
00740

Addendum - Human Health Risk Evaluation for Soil

for

Site 9 - Industrial Wastewater Disposal Area 300

Former
Naval Surface Warfare Center
White Oak
Silver Spring, Maryland

Engineering Field Activity Chesapeake
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0839

February 2004

TETRA TECH NUS, INC.

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February 17, 2004

Project Number 4246

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Reference: CLEAN Contract No. N62467-D-94-0888
Contract Task Order 0839

Subject: Final Human Health Risk Evaluation Addendum—Site 9
Former Naval Surface Warfare Center, White Oak
Silver Spring, Maryland

Dear Walter:

Enclosed are two (2) copies of the Final Human Health Risk Evaluation Addendum for Site 9 of the former Naval Surface Warfare Center, White Oak, located in Silver Spring, Maryland. Data collected during a supplemental investigation at Site 9 in May 2003 were combined with the data evaluated in the RCRA Facility Investigation (RFI) for Site 9 in October 2000 for this addendum.

Minor comments were received from EPA on January 16, 2004 and responses were prepared and submitted as an appendix. Also, additional soil boring logs from data collected in May 2003 were also submitted as an appendix. Figure 1 was slightly modified to better reflect actual sampling locations. Based on the comments received from EPA, minor text changes were made. Please incorporate these attachments into the existing binder.

Please feel free to contact me at (412) 921-8291 with any comments or questions regarding the document.

Best regards,

Ronald J. Kotun, Ph.D.
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Enclosures

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ADDENDUM - HUMAN HEALTH RISK EVALUATION FOR SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300

FORMER
NAVAL SURFACE WARFARE CENTER
WHITE OAK
SILVER SPRING, MARYLAND

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Engineering Field Activity Chesapeake
Naval Facilities Engineering Command
Washington Navy Yard, Building 212
Washington, D.C. 20374-2121

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FEBRUARY 2004

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ADDENDUM - HUMAN HEALTH RISK EVALUATION FOR SOIL
SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC - WHITE OAK, SILVER SPRING MARYLAND

This report presents the results of the human health risk assessment (HHRA) for subsurface soil at Site 9, Industrial Wastewater Disposal Area 300, located at the former NSWC, White Oak. The risk assessment is an addendum to the risk assessment for Site 9 presented in the RCRA Facility Investigation (RFI) for Sites 2,3,4,7,8,9 and Paint Branch (TtNUS, Inc, October 2000) and follows the methodologies presented in Section 2 of the RFI. This evaluation was performed to account for additional sampling that occurred at the site in May 2003. The additional samples were collected to evaluate areas of newly found leaching wells not included in the RFI. The subsurface soil dataset evaluated in this addendum is expected to represent current conditions at the site.

The HHRA for Site 9 consists of the five components used in the risk assessment process. These include: (1) Data Evaluation; (2) Exposure Assessment; (3) Toxicity Assessment; (4) Risk Characterization, and (5) Uncertainty Analysis. Sections 2.8.1 through 2.8.5 of the RFI contain detailed discussions of the general methodologies followed for each component of the HHRA and Section 8.5 of the RFI discusses these components as they apply to Site 9. The following sections discuss these components as they apply to this addendum.

1.0 DATA EVALUATION

The data evaluation section is primarily concerned with the selection of potential contaminants of concern (PCOCs) that are representative of the type and magnitude of potential human health effects. The PCOC screening process involves the comparison of maximum site concentrations to risk-based screening levels and other health-based standards. A brief discussion of data usability is also provided in the following section.

This section addresses the usability of the data from the 1999 RFI and the 2003 sampling events for risk assessment purposes. The dataset for this addendum consists of validated data collected by Brown & Root Environmental in March 1995 for the Design Verification Study and validated data collected in May 2003 (the analytical data are presented in Appendix A and Data Validation Memoranda are presented in Appendix B). A discussion of data validation protocol followed for data generated for the NSWC-White Oak is provided in the Master Quality Assurance Project Plan QAPP (B&R Environmental, 1998). Analytical data qualified as estimated and data qualified for blank contamination (considered as non-detects) were used in the risk assessment. When determining exposure concentrations via statistical

procedures, non-detects were conservatively assumed to be present at a concentration equal to one-half the sample-specific quantitation limit.

1.1 Subsurface Soil Data Set

The subsurface soil samples used to evaluate potential risks in this addendum are summarized in this section. The soil data set consists of 12 subsurface soil samples collected during Design Verification Study in 1995 and 8 test pit samples collected in 2003. The sample locations are listed below.

Samples collected in March 1995

09-SB02	09-SB03-CUT	09-SB04-1012
09-SB05-1012	09-SB06-1214	09-SB07-1012
09-SB08-1214	09-SB12-1012	09-SB13-0810
09-SB14-1012	09-SB15-1214	09-SB19-1012

Test Pit Samples collected in May 2003

009TP3030001	009TP3060910	009TP3190102A
009TP3190304B	009TP3440607	009TP3450001B
009TP3450405A	009TP3760506	

Figure 1 shows the locations of the samples listed above.

1.2 Selection of Potential Chemicals of Concern (PCOCS)

The selection of PCOCs is a qualitative screening process with the purpose of limiting the number of chemicals to those site-related constituents that dominate overall potential risks. In this evaluation, a chemical is selected as a PCOC if the maximum detected concentration exceeds the PCOC screening levels, and, for inorganics, if the chemical is determined to be present at concentrations above background. Risk-based PCOC screening levels for residential soil ingestion and soil screening levels (SSLs) for transfers from soil to air are used to select PCOCs. The risk-based PCOC screening levels are based on USEPA Region III Risk-Based Concentrations (RBCs) (USEPA, April 2003) for residential land use and correspond to a systemic hazard quotient of 0.1 for noncarcinogenic health effects or a lifetime cancer risk of 1.0×10^{-6} for carcinogenic effects. The inhalation SSLs are used to screen out chemicals detected at insignificant concentrations and to justify the elimination of the inhalation exposure pathway, which is comprised of the generation of fugitive dust and volatile emissions. Region 3 SSLs for transfers from soil to groundwater are presented (see Table 1) in order to evaluate the potential for migration of

contaminants from soil to groundwater but are not used to select constituents for the quantitative risk evaluation.

The essential nutrients calcium, magnesium, potassium, and sodium are not identified as PCOCs. These inorganic chemicals are naturally abundant in environmental matrices and are only toxic at high doses. In addition, because of the lack of toxicity criteria, risk-based PCOC screening levels are not available for some chemicals. For these constituents (e.g., phenanthrene) surrogate chemicals (which have toxicity criteria) are used for screening purposes. For example, the RBC for pyrene is used as a surrogate for phenanthrene.

Inorganic constituents found at concentrations indicative of background levels are not considered to be site-related contaminants and are not retained as PCOCs. Site-specific background data are used to determine whether detected chemicals are present at naturally occurring levels. The base-wide background concentrations for soil (Tetra Tech NUS, Inc., December 1998) were compared to concentrations of inorganics by the Wilcoxon Rank Sum Test at the 80 percent confidence level. If the Wilcoxon test determined that the concentration of a constituent was significantly greater than background and the concentration was greater than its residential RBC, that metal was retained as a PCOC. All metals detected in soil samples for Site 9, with the exception of beryllium, cadmium, and mercury, were found to be within naturally occurring soil levels at the site. The implications of excluding constituents from the quantitative risks assessment are discussed in Section 5.0. The results of the Wilcoxon test are presented in Appendix C.

Chemicals eliminated from further evaluation at this step are assumed to present minimal risks to potential human receptors.

1.3 Identification of PCOCs in Subsurface Soil

As discussed in Section 9.0 of the RFI, the sources of contamination at Site 9 were wastewater containing explosives and solvents which were released through several leaching wells and above ground discharges to the soil. No surface soil samples were collected at Site 9 because the primary source of contamination stemmed from the leaching wells. As stated in the RFI, there was no evidence of surface soil contamination at the site.

The list of PCOCs developed for soil at Site 9 is based on the soil data consisting of the subsurface soil samples listed above. A summary of the PCOC selection process for exposure to soil is presented in Table 1. PCOCs for soil are those chemicals having maximum concentrations greater than screening levels based on USEPA Region III RBCs for residential soil ingestion and USEPA inhalation SSLs, and are determined to exceed basewide background levels (for inorganics).

The results of the screening presented in Table 1 indicate that only one constituent, mercury, was identified as a PCOC for soil at Site 9. Mercury was retained as a PCOC because its maximum detected concentration exceeded the risk-based screening level for residential land use and because it was determined to be above Basewide background levels by the Wilcoxon Rank Sum Test. The maximum concentrations of aluminum, antimony, arsenic, chromium, iron, lead, mercury, thallium, and vanadium were greater than screening concentrations but were determined to within representative basewide background levels. Therefore, these constituents were eliminated as PCOCs and were not carried through the quantitative risk assessment. The implications of eliminating these metals from the quantitative risk assessment are discussed in the uncertainty analysis (Section 5.0).

The maximum concentrations of all constituents detected in soil at Site 9 were less than the USEPA inhalation SSLs (Table 1). Therefore, based on this semi-quantitative evaluation, exposure to fugitive dust and volatile organic compounds potentially released from soil are considered to be relatively insignificant at the site and are not evaluated further in the risk assessment.

1.3.1 Migration from Subsurface Soil to Groundwater

Maximum soil concentrations were also compared to the USEPA Region 3 soil to groundwater SSLs using a Dilution and Attenuation Factor (DAF) of 1 (USEPA, April 2003). The comparison presented in Table 1 indicates that acetone, methylene chloride, trichloroethene (TCE), antimony, arsenic, chromium, manganese, selenium, and thallium were detected in subsurface soil at concentrations that exceeded Region 3 soil to groundwater SSLs. The exceedances of the SSLs may indicate the potential for chemicals to leach to groundwater and impact water quality. However, the concentrations of all of the inorganics which exceeded the SSLs were determined to be within Basewide background levels (Table 1). Acetone and methylene chloride which were detected at low levels in 3 of 20 and 1 of 20 samples, respectively, are common laboratory contaminants and are not likely related to past activities at the site. TCE (detected in 3 of 20 soil samples at concentrations ranging from 0.001 to 0.005 mg/kg) was identified as a PCOC for groundwater in the RFI. However, the source of TCE was determined to be the leaching wells on the site and not the soils. Additionally, the SSLs (DAF1) are very conservative because a DAF of 1 assumes that no dilution or attenuation occurs as a chemical migrates from soil to groundwater. The USEPA in the Soil Screening Guidance (USEPA, July 1996) recommends that a DAF of 20 be used as the default DAF and states that "A DAF of 20 is protective for sources up to 0.5 acre in size". Analyses presented in the SSL Guidance indicate that it can be protective of larger sources as well. If SSLs for a DAF of 20 were used in the comparisons presented in Table 1, only the maximum concentrations of methylene chloride, TCE, arsenic and manganese would exceed their respective SSLs. It should also be noted that in the Soil Screening Guidance (USEPA, July 1996), the USEPA has developed a migration to groundwater SSL of 0.06 mg/kg (DAF 20) for TCE using the MCL for TCE (5 ug/L) as target groundwater

concentration. This maximum soil concentration for the detected at the site (0.005 mg/kg) is less than this SSL. Based on this evaluation, it is unlikely that the concentrations of the above listed constituents in soil at Site 9 pose adverse impacts to groundwater.

2.0 EXPOSURE ASSESSMENT

A human health exposure assessment defines and evaluates, quantitatively or qualitatively, the type or magnitude of human exposure to PCOCs identified in environmental media at a site under investigation. The exposure assessment for this addendum employs the methodologies described in Sections 2.8.2 and 8.5.2 of the RFI. As identified in Section 2.8.2, the potential human receptors evaluated for exposure to soil at Site 9 include: full time workers, maintenance/utility workers, construction workers, adult recreational users, adolescent trespassers, day care center children, and child and adult residents. Pathway-specific information for these receptors, such as the values of exposure parameters used to quantify exposure, is presented in Tables 4.1 through 4.8 provided in Appendix D. The values of the exposure parameters presented in these tables are identical to the values employed in the RFI with the exception of some factors associated with dermal exposure (i.e., soil-to-skin adherence factors, dermal absorption factors, and skin surface areas). The values of these factors have been updated to reflect recent guidance provided in Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance, Dermal Risk Assessment) (USEPA, September 2001) and Updated Dermal Exposure Assessment Guidance from Region 3 (USEPA Region 3, June 2003).

Exposure Point Concentrations

The exposure point concentration (EPC), which is calculated for PCOCs only, is a reasonable maximum estimate of the chemical concentration that is likely to be contacted over time and is used to calculate estimated exposure intakes. The 95 percent upper confidence limit (UCL), which is based on the distribution of a data set, is considered to be the best estimate of the exposure concentration for data sets with 10 or more samples. The methodology for calculating the 95% UCLs is presented in Section 2.8.2.3 of the RFI. The 95 percent UCL is used as the exposure point concentration for mercury (1.82 mg/kg) in subsurface soil for this addendum. The EPC for mercury is presented in Table 3.1 in Appendix D.

3.0 TOXICITY ASSESSMENT

The toxicity assessment for NSWC, White Oak is presented in Section 2.8.3 of the RFI.

4.0 RISK CHARACTERIZATION

This section provides the methodologies and results for the characterization of the potential human health risks associated with the potential exposure to post-removal soil at Site 9.

Quantitative estimates of risk are calculated using intake and toxicity values according to risk assessment methods outlined in current USEPA guidance (USEPA, 1989). Lifetime cancer risks are expressed in the form of dimensionless probabilities, referred to as Incremental Lifetime Cancer Risks (ILCRs) which are derived using published cancer slope factors (CSFs). Noncarcinogenic risk estimates are presented in the form of Hazard Quotients (HQs) that are derived using published reference doses (RfDs).

ILCR estimates are generated for each PCOC using estimated exposure intakes and published CSFs, as follows:

$$\text{ILCR} = (\text{Estimated Exposure Intake})(\text{CSF})$$

The ILCRs for all PCOCs in an exposure scenario are summed to give a cumulative ILCR. An ILCR of 1×10^{-6} indicates that the exposed receptor has a one-in-one-million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million persons.

Noncarcinogenic risks are assessed using the concept of HQs and Hazard Indices (HIs). The HQ for a PCOC is the ratio of the estimated intake to the RfD, as follows:

$$\text{HQ} = (\text{Estimated Exposure Intake}) \ / \ (\text{RfD})$$

An HI is generated by summing the individual HQs for all of the PCOCs. It should be noted that HI is not a mathematical prediction of the severity of toxic effects and therefore is not a true "risk"; it is simply a numerical indicator of the possibility of the occurrence of noncarcinogenic (threshold) effects.

The calculations of the ILCRs and HQs for all receptors and exposure routes are provided in the RAGS Part D tables presented in Appendix D (Tables 7.1 through 7.8 present risk assessment calculations of the HQs and Tables 8.1 through 8.8 present the calculations of the ILCRs). Note that since mercury is not classified as a carcinogen, the carcinogenic calculations are not applicable to this addendum. Results of the risk characterization for Site 9 are discussed in Section 4.2.

4.1 Comparison of Quantitative Risk Estimates to Benchmarks

In order to interpret the quantitative risks and to aid risk managers in determining the need for remediation at a site, quantitative risk estimates are compared to typical benchmarks. Since the only constituent selected as a PCOC for soil at Site 9 (mercury) is classified as a noncarcinogen, benchmarks for carcinogenic effects are not applicable to soil at this site.

An HI exceeding unity (1.0) indicates that there may be potential noncarcinogenic health risks associated with exposure. If an HI exceeds unity, target organ effects from individual PCOCs contributing to the risk are considered. However, since only one constituent was selected as PCOC in this addendum, the discussion of target organ effects is not applicable.

4.2 Risk Characterization Results

This section summarizes the results of the risk characterization for post-removal conditions at Site 9. Potential risks for the reasonable maximum exposure (RME) are summarized in Table 2 and risks for the central tendency exposure (CTE) are presented in Table 3. Chemical specific-risks and total risks are presented in Tables 9.1 through 9.8 in Appendix D. A discussion of the estimated noncarcinogenic and carcinogenic risks is provided in the remainder of this section.

4.2.1 Noncarcinogenic Risks

As indicated in Tables 2 and 3, the HIs for all receptors are less than unity, indicating that no toxic effects are anticipated for these receptors under the exposure conditions specified for the RME and CTE scenarios.

4.2.2 Carcinogenic Risks

No carcinogens were identified as PCOCs in subsurface soil at Site 9.

5.0 UNCERTAINTY ANALYSIS

General uncertainties associated with the risk assessment for Site 9 are discussed in Sections 2.8.5 and 9.5.4 of the RFI. Uncertainties associated with the calculation of risk in this addendum are addressed in this section.

Some uncertainty associated with the identification of metals as PCOCs still exists. A statistical analysis (Wilcoxon Rank-Sum Test) of site metal concentrations compared to site-specific background concentrations was conducted to determine if site concentrations are significantly greater than the

background concentrations. If they are significantly greater than background, and the maximum detected concentrations are greater than the screening level, i.e., one-tenth the RBC for noncarcinogens and the RBC for carcinogens, they are identified as PCOCs. If the site concentration is not significantly greater than the background concentration, the metal is not identified as a PCOC, even if its maximum concentration is greater than the screening level. The statistical analysis accounts for the variability in concentrations. However, at times, a review of the data may suggest that certain metals should be identified as PCOCs even when the statistical analysis indicates otherwise.

Aluminum, antimony, arsenic, chromium (as hexavalent chromium), iron, lead, manganese, thallium, and vanadium were not selected as PCOCs because they were determined to be within background levels by the Wilcoxon Rank-Sum Test. If these constituents had been included in the quantitative risk assessment as directed in current USEPA guidance (USEPA, May 2002), the results of the recalculated risk assessment would be as follows:

- The cumulative HIs would be less than unity for all receptors, with the exception of the future child resident. The HI for the child resident would be 2.3, mainly from the ingestion of iron (HQ = 1.2). Note that the RfD for iron (and calculated risks) are not based on adverse health affects but rather on an amount needed to protect against a deficiency of this metal. Additionally, the USEPA Region III RBC presented for iron for residential exposure to soils (23,000 mg/kg) is based on a RfD of 0.3 mg/kg/day and assumes that the receptor of concern is the resident child. However, based on USEPA Region III guidance received by TtNUS Inc. in March of 2000, this RfD is not recommended for the evaluation of childhood exposures. The nutritional needs of children differ from adults and a more appropriate RfD for children would be 1.1 mg/kg/day. If this RfD were used to estimate risks for iron, the HQ for iron for the child resident would be 0.32 and the cumulative HI would be less than unity, on a target organ basis. Furthermore, some USEPA regions, e.g., Region 1, consider the use of the oral RfD for iron inappropriate and recommend that iron not be quantitatively evaluated in risk assessments.

- If arsenic were selected as a PCOC and if carcinogenic risks were evaluated, risks for all receptors would be within or less than the USEPA risk management range 10^{-6} to 10^{-4}. In addition, as shown in Tables 4 and 5, the maximum and UCL concentrations for arsenic are less than the UCL of the facility background data. Therefore, it is very likely that the concentrations of arsenic detected at Site 9 are within naturally occurring levels.

- If lead (detected at a maximum concentration of 1,800 mg/kg in Sample 009TP3450405A) would have been evaluated in the quantitative risk assessment, the effects of exposure to lead would have been based on the average lead concentration (115 mg/kg), as specified in EPA guidance for lead (USEPA, February 1994). This concentration is less than the 400 mg/kg screening level presented in

Table 1. If lead had been evaluated at this concentration by the adult and child lead models, the predicted blood lead levels and the probability of exceeding the blood lead level of concern (10 µg/dL) would have been acceptable. Therefore, the results and conclusions of the risk assessment would not have changed if lead had been included in the quantitative risk analysis.

An additional analysis of metals eliminated on the basis of background is presented in Tables 4 and 5. These tables provide comparisons of maximum and UCL concentrations detected in Site 9 soils with UCLs of metals from the Basewide background study. The comparisons presented in Table 4 indicate that aluminum, antimony, iron, lead, manganese, mercury, thallium, and vanadium had maximum detected concentrations greater than the UCL of the facility background concentrations and greater than their respective screening levels (Table 4). Of these, only mercury was selected as a PCOC and evaluated in the quantitative risk assessment. The other metals were eliminated as PCOCs on the basis of the Wilcoxon Rank-Sum Test results. The Site 9 UCL concentrations of these metals are less than the UCLs of the site-specific background concentrations, with the exception of manganese (Table 5). However, as indicated above, HQs for manganese for all potential receptors would be less than unity if manganese were quantitatively evaluated in the risk assessment.

Based on this analysis, the results and conclusions of the risk assessment are not affected by the elimination of the above mentioned metals from the quantitative risk evaluation.

6.0 SUMMARY AND CONCLUSIONS

A risk evaluation was performed for soil at Site 9, NWSC, White Oak. The data used for the soil evaluation represent post-removal conditions at the site. Potential receptors include full time workers, maintenance/utility workers, construction workers, adult recreational users, adolescent trespassers, day care center children, and hypothetical child and adult residents. The receptors were evaluated for exposure to soil by dermal contact and ingestion and semiquantitavely for exposure to air assumed to be impacted by particulate and vapor emissions from soil.

Mercury was identified as the only PCOC for soil at Site 9.

No carcinogens were identified as PCOCs in soil at the site.

Quantitative estimates of noncarcinogenic risks were developed for the potential receptors. The cumulative HIs were less than unity for all receptors. Therefore, adverse noncarcinogenic health effects are not anticipated for exposure to soil at Site 9.

In summary, estimated potential carcinogenic and noncarcinogenic health hazards associated with exposure to residual soil at Site 9 are expected to be less than or within USEPA benchmarks under residential, industrial, and recreational land use.

TABLE 1

OCCURRENCE, DISTRIBUTION, AND SELECTIONOF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SITE 9 -INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Nondetects(1)	Concentration Used for Screening(2)	Site Above Background ? (3)	Risk-Based COPC Screening Level(4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(5)
Volatiles (mg/kg)																
76-13-1	1,1,2-Trichlorotrifluoroethane	0.002	J	0.003	J	mg/kg	009TP3060910-D	2/8	0.009 - 0.022	0.003	NA	230000 N	120 930	SSL-MIGR SSL-INH	No	BSL
108-10-1	4-Methyl-2-Pentanone	0.001	J	0.002	J	mg/kg	09-SB12-1012	3/20	0.009 - 0.022	0.002	NA	630 N	0.93 490	SSL-MIGR SSL-INH	No	BSL
67-64-1	Acetone	0.007	J	0.2	J	mg/kg	009TP3030001	3/20	0.005 - 0.013	0.2	NA	780 N	0.12 NA	SSL-MIGR SSL-INH	No	BSL
75-71-8	Dichlorodifluoromethane	0.009	J	0.05		mg/kg	009TP3190102A	6/8	0.01 - 0.011	0.05	NA	1600 N	0.55 250	SSL-MIGR SSL-INH	No	BSL
100-41-4	Ethylbenzene	0.001	J	0.001	J	mg/kg	09-SB07-1012	1/20	0.009 - 0.022	0.001	NA	780 N	0.75 400	SSL-MIGR SSL-INH	No	BSL
75-09-2	Methylene Chloride	0.062		0.062		mg/kg	09-SB02-1012	1/20	0.002 - 0.022	0.062	NA	85 C	0.00095 13	SSL-MIGR SSL-INH	No	BSL
1330-20-7	Total Xylenes	0.006	J	0.006	J	mg/kg	09-SB07-1012	1/20	0.009 - 0.022	0.006	NA	1600 N	0.15 NA	SSL-MIGR SSL-INH	No	BSL
79-01-6	Trichloroethene	0.001	J	0.005	J	mg/kg	09-SB19-1012	3/20	0.009 - 0.022	0.005	NA	1.6 C	0.000013 4.6	SSL-MIGR SSL-INH	No	BSL
Semivolatile Organics (mg/kg)																
120-12-7	Anthracene	0.061	J	0.061	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.061	NA	2300 N	23 NA	SSL-MIGR SSL-INH	No	BSL
206-44-0	Fluoranthene	0.17	J	0.17	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.17	NA	310 N	310 NA	SSL-MIGR SSL-INH	No	BSL
85-01-8	Phenanthrene	0.19	J	0.19	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.19	NA	230(6) N	34(6) NA	SSL-MIGR SSL-INH	No	BSL
129-00-0	Pyrene	0.19	J	0.19	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.19	NA	230 N	34 NA	SSL-MIGR SSL-INH	No	BSL
Inorganics (mg/kg)																
7429-90-5	Aluminum	552		23000		mg/kg	009TP3190304B	20/20	---	23000	No	7800 N	NA NA	SSL-MIGR SSL-INH	No	BKG
7440-36-0	Antimony	0.35	L	12.9	L	mg/kg	009TP3450405A	2/20	0.24 - 1.7	12.9	No	3.1 N	0.66 NA	SSL-MIGR SSL-INH	No	BKG
7440-38-2	Arsenic	0.27		9.6		mg/kg	009TP3760506	17/20	1.4 - 4.2	9.6	No	0.43 C	0.0013 770	SSL-MIGR SSL-INH	No	BKG
7440-39-3	Barium	1.6		92.5		mg/kg	009TP3030001	18/20	4 - 5.6	92.5	No	550 N	110 710,000	SSL-MIGR SSL-INH	No	BSL,BKG
7440-41-7	Beryllium	0.16	L	1.9		mg/kg	09-SB06-1214	4/20	0.06 - 1.3	1.9	Yes	16 N	58 1,400	SSL-MIGR SSL-INH	No	BSL
7440-43-9	Cadmium	1.1		1.1		mg/kg	09-SB06-1214	1/20	0.06 - 1.3	1.1	Yes	3.9 N	1.4 1,800	SSL-MIGR SSL-INH	No	BSL
7440-70-2	Calcium	12.1		1410		mg/kg	009TP3190304B	13/20	9 - 61	1410	No	NA	NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	Chromium	2.3	J	37.1		mg/kg	009TP3450405A	20/20	---	37.1	No	23(7) N	2.1 280	SSL-MIGR SSL-INH	No	BKG
7440-48-4	Cobalt	0.68		22.8		mg/kg	009TP3030001	12/20	0.22 - 3.3	22.8	No	160 N	NA NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-50-8	Copper	1.8	J	184		mg/kg	009TP3030001	15/20	7.1 - 16	184	No	310 N	530 NA	SSL-MIGR SSL-INH	No	BSL,BKG
7439-89-6	Iron	412	J	50500		mg/kg	09-SB05-1012	20/20	---	50500	No	2300 N	NA NA	SSL-MIGR SSL-INH	No	BKG
7439-92-1	Lead	1.7	L	1800		mg/kg	009TP3450405A	19/20	1.4	1800	No	400(8)	NA NA	SSL-MIGR SSL-INH	No	BKG
7439-95-4	Magnesium	22.9	J	5570		mg/kg	09-SB06-1214	19/20	19.3	5570	No	NA	NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7439-96-5	Manganese	1.3	L	1120	J	mg/kg	09-SB06-1214	19/20	0.45 - 0.47	1120	No	160(9) N	48 69,000	SSL-MIGR SSL-INH	No	BKG

TABLE 1

OCCURRENCE, DISTRIBUTION, AND SELECTIONOF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SITE 9 -INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Nondetects[1]	Concentration Used for Screening[2]	Site Above Background ? (3)	Risk-Based COPC Screening Level[4]		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
7439-97-6	Mercury	0.033		3.8		mg/kg	009TP3450001B	13/20	0.011 - 0.32	3.8	Yes	2.3(10)	N	NA NA	SSL-MIGR SSL-INH	Yes	ASL
7440-02-0	Nickel	0.54		25.4		mg/kg	009TP3030001	13/20	1.8 - 4	25.4	No	160	N	NA NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-09-7	Potassium	42.8	J	3950		mg/kg	09-SB05-1012	17/20	158 - 3650	3950	No	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7782-49-2	Selenium	0.34	K	3.8		mg/kg	009TP3450405A	12/20	0.32 - 0.34	3.8	No	39	N	0.95 NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-28-0	Thallium	0.5		1.6	K	mg/kg	009TP3450405A	3/20	0.25 - 1.2	1.6	No	0.55	N	0.18 NA	SSL-MIGR SSL-INH	No	BKG
7440-62-2	Vanadium	3.6		60.8		mg/kg	009TP3760506	19/20	12.8	60.8	No	55	N	260 NA	SSL-MIGR SSL-INH	No	BKG
7440-66-6	Zinc	1.5		360		mg/kg	009TP3030001	15/20	0.66 - 9.1	360	No	2300	N	680 NA	SSL-MIGR SSL-INH	No	BSL,BKG
Miscellaneous Parameters (mg/kg)																	
TTNUS002	pH	4.41		6.78		mg/kg	09-SB03-CUT	12/12	---	6.78		NA	N	NA NA	SSL-MIGR SSL-INH	No	NTX
TTNUS041	Total Kjeldahl Nitrogen	14.9		248		mg/kg	09-SB13-0810	10/12	20.5 - 38.3	248		NA	N	NA NA	SSL-MIGR SSL-INH	No	NTX

Footnotes:
1 Values presented are sample-specific quantitation limits.
2 The maximum detected concentration is used for screening purposes.
3 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
4 The risk-based soil PCOC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 3, April 2003).
5 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
6 Pyrene is used as a surrogate for phenanthrene.
7 Hexavalent Chromium.
8 OSWER soil screening level for residential land use (USEPA, July 1994).
9 Manganese - nonfood.
10 Value is for mercuric chloride

Associated Samples:

009TP3030001,NORMAL	009TP3760506,NORMAL	09-SB08-1214,NORMAL
009TP3060910	09-SB02-1012,NORMAL	09-SB12-1012,NORMAL
009TP3190102A,NORMAL	09-SB03-CUT,NORMAL	09-SB13-0810,NORMAL
009TP3190304B,NORMAL	09-SB04-1012,NORMAL	09-SB14-1012,NORMAL
009TP3440607,NORMAL	09-SB05-1012,NORMAL	09-SB15-1214-AVG,AVG
009TP3450001B,NORMAL	09-SB06-1214,NORMAL	09-SB19-1012,NORMAL
009TP3450405A,NORMAL	09-SB07-1012,NORMAL	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
K = Estimated Value, biased high
L = Estimated Value, biased low
N = Nocarcinogen
NA = Not Applicable/Not Available.
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, August 2003)
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for Dilution and Attenuation Factor of 1 (USEPA, Region 3, April 2003)

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level
NUT = Essential Nutrient
NTX = No toxicity criteria

TABLE 2

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURES
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Full Time Worker	Subsurface Soil	Ingestion	NA	--	--	--	0.006	--
		Dermal Contact	NA	--	--	--	0.0056	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.012	--
Maintenance/Utility Worker	Subsurface Soil	Ingestion	NA	--	--	--	0.0009	--
		Dermal Contact	NA	--	--	--	0.0008	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.0017	--
Construction Worker	Subsurface Soil	Ingestion	NA	--	--	--	0.02	--
		Dermal Contact	NA	--	--	--	0.006	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.03	--
Adult Recreational Users	Subsurface Soil	Ingestion	NA	--	--	--	0.0004	--
		Dermal Contact	NA	--	--	--	0.0004	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.0008	--
Adolescent Trespassers	Subsurface Soil	Ingestion	NA	--	--	--	0.002	--
		Dermal Contact	NA	--	--	--	0.003	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.005	--
Day Care Center Children	Subsurface Soil	Ingestion	NA	--	--	--	0.03	--
		Dermal Contact	NA	--	--	--	0.02	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.05	--
Adult Resident	Subsurface Soil	Ingestion	NA	--	--	--	0.008	--
		Dermal Contact	NA	--	--	--	0.005	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.013	--
Child Resident	Subsurface Soil	Ingestion	NA	--	--	--	0.08	--
		Dermal Contact	NA	--	--	--	0.03	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.11	--
Lifelong Resident (Child + Adult)	Subsurface Soil	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--

TABLE 3

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURES
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Full Time Worker	Subsurface Soil	Ingestion	NA	--	--	--	0.003	--
		Dermal Contact	NA	--	--	--	0.0005	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.003	--
Maintenance/Utility Worker	Subsurface Soil	Ingestion	NA	--	--	--	0.0002	--
		Dermal Contact	NA	--	--	--	0.00004	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.0003	--
Construction Worker	Subsurface Soil	Ingestion	NA	--	--	--	0.01	--
		Dermal Contact	NA	--	--	--	0.002	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.012	--
Adult Recreational Users	Subsurface Soil	Ingestion	NA	--	--	--	0.0001	--
		Dermal Contact	NA	--	--	--	0.00002	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.0001	--
Adolescent Trespassers	Subsurface Soil	Ingestion	NA	--	--	--	0.0005	--
		Dermal Contact	NA	--	--	--	0.0002	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.0007	--
Day Care Center Children	Subsurface Soil	Ingestion	NA	--	--	--	0.012	--
		Dermal Contact	NA	--	--	--	0.004	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.016	--
Adult Resident	Subsurface Soil	Ingestion	NA	--	--	--	0.0028	--
		Dermal Contact	NA	--	--	--	0.0005	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.003	--
Child Resident	Subsurface Soil	Ingestion	NA	--	--	--	0.026	--
		Dermal Contact	NA	--	--	--	0.004	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	0.03	--
Lifelong Resident (Child + Adult)	Subsurface Soil	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	NA	--	--	--	NA	--
		Inhalation	NA	--	--	--	NA	--
		Total	NA	--	--	--	NA	--

TABLE 4

COMPARISON OF MAXIMUM DETECTED CONCENTRATION TO RBCs AND BACKGROUND UCL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC WHITE OAK, SILVER SPRING, MARYLAND

Inorganic	Maximum Concentration mg/kg	Background UCL		Risk-Based PCOC Screening Level(1)	Maximum Greater Than Background (2)	Maximum Greater Than Screening Level	Retained For Further Evaluation? (3)
		Surface Soil	Subsurface Soil				
Aluminum	23000	14953	20961	7800 N	Yes	Yes	Yes
Antimony	12.9	ND	0.42	3.1 N	Yes	Yes	Yes
Arsenic	9.6	5.11	12.15	0.43 C	No	Yes	No
Barium	92.5	59.5	40.09	550 N	Yes	No	No
Beryllium	1.9	0.19	2.37	16 N	No	No	No
Cadmium	1.1	ND	0.179	3.9 N	Yes	No	No
Calcium	1410	1040	247	NA	Yes	No	No
Chromium(4)	37.1	29.35	41.05	23 N	No	Yes	No
Cobalt	22.8	11.81	16.6	470 N	Yes	No	No
Copper	184	11.52	21.62	310 N	Yes	No	No
Iron	50500	18946	28681	2300 N	Yes	Yes	Yes
Lead	1800	60.2	21.23	400	Yes	Yes	Yes
Magnesium	5570	1183	2987	NA	Yes	No	No
Manganese	1120	490	503	160 N	Yes	Yes	Yes
Mercury	3.8	0.142	0.051	2.3 N	Yes	Yes	Yes
Nickel	25.4	14.56	13.84	160 N	Yes	No	No
Potassium	3950	845	2792	NA	Yes	No	No
Selenium	3.8	0.68	2.73	39 N	Yes	No	No
Thallium	1.6	ND	ND	0.55 N	Yes	Yes	Yes
Vanadium	60.8	30.08	44.31	55 N	Yes	Yes	Yes
Zinc	360	30.67	84.2	2300 N	Yes	No	No

Notes:
1 USEPA Region 3 RBC Table, April, 2003 (CR = 1E-6, HI = 0.1).
2 The higher of the surface and subsurface soil background concentration is used in comparison.
3 Chemical is retained for further evaluation if the maximum detected concentration exceeded both the background UCL concentration and the RBC.
4 RBC is for hexavalent chromium.
Shading indicates that the maximum detected concentration was greater than the background concentration and/or RBC.

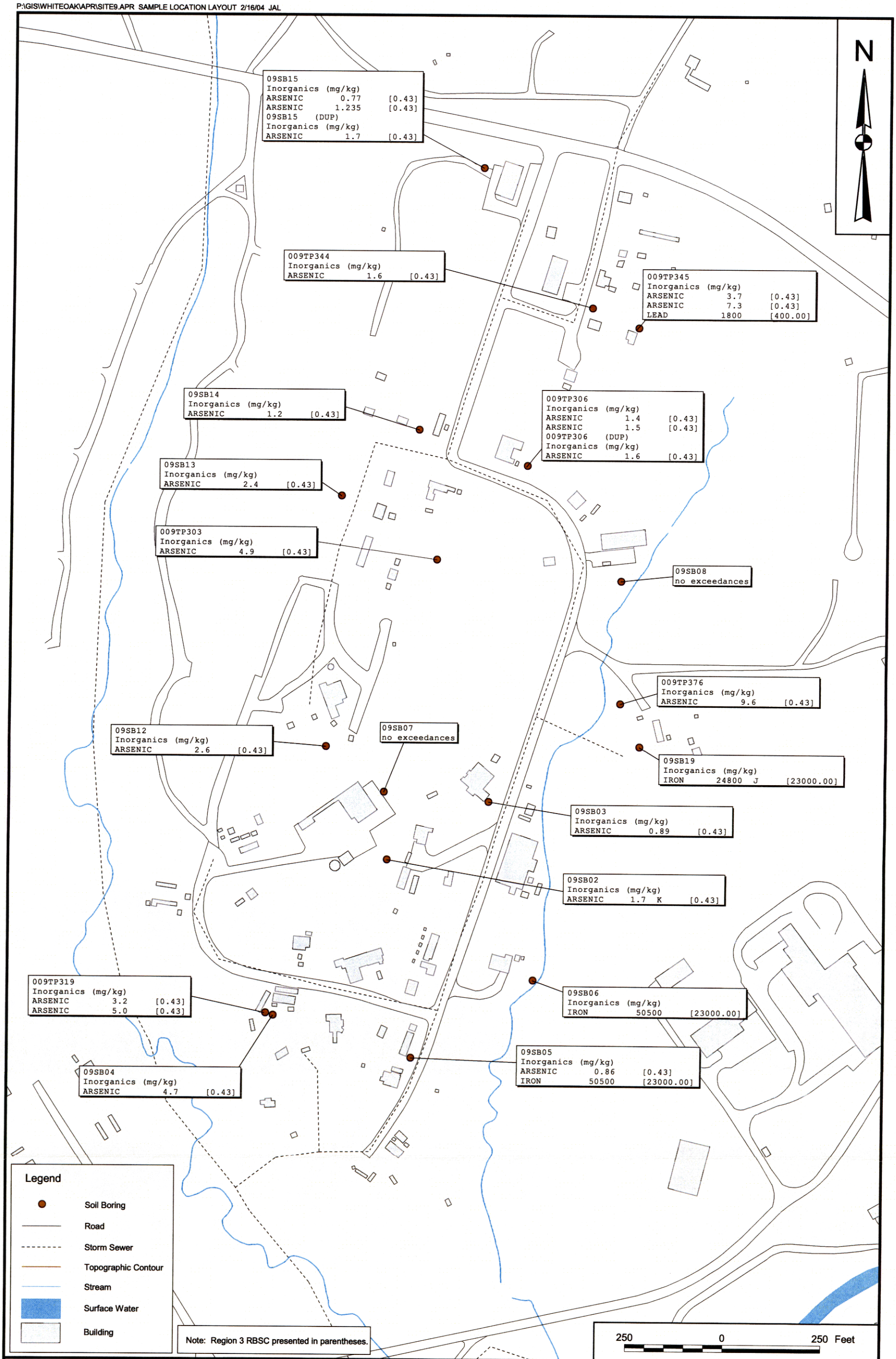
TABLE 5

COMPARISON OF UCL TO RBCs AND BACKGROUND UCL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC - WHITE OAK, SILVER SPRING, MARYLAND

Inorganic	UCL Concentration mg/kg	Background UCL		Risk-Based PCOC Screening Level(1)	Maximum Greater Than Background (2)	Maximum Greater Than Screening Level	Retained For Further Evaluation? (3)
		Surface Soil	Subsurface Soil				
Aluminum	11427	14953	20961	7800 N	No	Yes	No
Antimony	1.176	ND	0.42	3.1 N	Yes	No	No
Arsenic	4.84	5.11	12.15	0.43 C	No	Yes	No
Barium	92.5	59.5	40.09	550 N	Yes	No	No
Beryllium	0.911	0.19	2.37	16 N	No	No	No
Cadmium	0.6526	ND	0.179	7.8 N	Yes	No	No
Calcium	1410	1040	247	NA	Yes	No	No
Chromium(4)	23.36	29.35	41.05	23 N	No	Yes	No
Cobalt	11.88	11.81	16.6	470 N	No	No	No
Copper	31.4	11.52	21.62	310 N	Yes	No	No
Iron	26803	18946	28681	2300 N	No	Yes	No
Lead	280	60.2	21.23	400	Yes	No	No
Magnesium	5570	1183	2987	NA	Yes	No	No
Manganese	1120	490	503	160 N	Yes	Yes	Yes
Mercury	1.82	0.142	0.051	2.3 N	Yes	No	No
Nickel	18.15	14.56	13.84	160 N	Yes	No	No
Potassium	1185	845	2792	NA	No	No	No
Selenium	2.27	0.68	2.73	39 N	No	No	No
Thallium	0.55	ND	ND	0.55 N	Yes	No	No
Vanadium	36	30.08	44.31	55 N	Yes	No	No
Zinc	360	30.67	84.2	2300 N	Yes	No	No

Notes:
1 USEPA Region 3 RBC Table, April, 2002 (CR = 1E-6, HI = 0.1).
2 The higher of the surface and subsurface soil background concentration is used in comparison.
3 Chemical is retained for further evaluation if the maximum detected concentration exceeded both the background UCL concentration and the RBC.
4 RBC is for hexavalent chromium.
Shading indicates that the maximum detected concentration was greater than the background concentration and/or RBC.

P:\GIS\WHITEOAK\APR\SITE9.APR SAMPLE LOCATION LAYOUT 2/16/04 JAL



DRAWN BY	DATE	Tetra Tech NUS, Inc.	CONTRACT NUMBER	OWNER NUMBER
A. JANOCHA	8/15/03		4246	—
CHECKED BY	DATE	SUMMARY OF EXCEEDANCES OF REGION 3 RBCS FOR CONSTITUENTS IN SUBSURFACE SOIL SITE 9 FORMER NSWC WHITE OAK	APPROVED BY —	DATE —
T. JACKMAN	8/21/03		APPROVED BY —	DATE —
COST/SCHEDULE-AREA			DRAWING NO. FIGURE 1	REV 0
SCALE AS NOTED				

APPENDIX A

ANALYTICAL DATA

order	001	002	003	004	005	006	007	008	009	010	011
location	009TP303	009TP306	009TP306	009TP306	009TP319	009TP319	009TP344	009TP345	009TP345	009TP376	09SB02
nsample	009TP3030001	009TP3060910	009TP3060910-AVG	009TP3060910-D	009TP3190102A	009TP3190304B	009TP3440607	009TP3450001B	009TP3450405A	009TP3760506	09-SB02-1012
sample	009TP3030001	009TP3060910	009TP3060910-AVG	009FD051503-01	009TP3190102A	009TP3190304B	009TP3440607	009TP3450001B	009TP3450405A	009TP3760506	09-SB02-1012
matrix	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SB
sample_dat	05/15/03	05/15/03	05/15/03	05/15/03	05/14/03	05/14/03	05/15/03	05/14/03	05/14/03	05/15/03	04/05/95
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T
cto_proj	4246	4246	4246	4246	4246	4246	4246	4246	4246	4246	
proj_manag	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	GEORGE,RD
sort	**c_001**	**c_002**	**c_003**	**c_004**	**c_005**	**c_006**	**c_007**	**c_008**	**c_009**	**c_010**	**c_011**
Volatile Organics (ug/kg)											
1,1,1-TRICHLOROETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
1,1,2,2-TETRACHLOROETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
1,1,2-TRICHLOROETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
1,1,2-TRICHLOROTRIFLUOROETHANE	22 U	11 U	3 J	3 J	10 U	9 U	12 U	11 U	10 U	2 J	
1,1-DICHLOROETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
1,1-DICHLOROETHENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
1,2,4-TRICHLOROBENZENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
1,2-DIBROMO-3-CHLOROPROPANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
1,2-DIBROMOETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
1,2-DICHLOROBENZENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
1,2-DICHLOROETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
1,2-DICHLOROPROPANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
1,3-DICHLOROBENZENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
1,4-DICHLOROBENZENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
2-BUTANONE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
2-HEXANONE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
4-METHYL-2-PENTANONE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
ACETONE	200 J	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
BENZENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
BROMODICHLOROMETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
BROMOFORM	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
BROMOMETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
CARBON DISULFIDE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
CARBON TETRACHLORIDE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
CHLOROBENZENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
CHLORODIBROMOMETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
CHLOROETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
CHLOROFORM	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
CHLOROMETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
CIS-1,2-DICHLOROETHENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
CIS-1,3-DICHLOROPROPENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
CYCLOHEXANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
DICHLORODIFLUOROMETHANE	29	9 J	9.5 J	10 J	50	11	18	11 U	18	10 U	
ETHYLBENZENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
ISOPROPYLBENZENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
METHYL ACETATE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
METHYL CYCLOHEXANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
METHYL TERT-BUTYL ETHER	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
METHYLENE CHLORIDE	10 B	5 B	6.5 B	8 B	6 B	6 B	6 B	5 B	5 B	4 B	62
STYRENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
TETRACHLOROETHENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
TOLUENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
TOTAL 1,2-DICHLOROETHENE											11 U
TOTAL XYLENES	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
TRANS-1,2-DICHLOROETHENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
TRANS-1,3-DICHLOROPROPENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U

from nine_sam.dbf
from nine_res.dbf
from nine_resa.xls
from q:\sql_server\white_oak\upload

order	001	002	003	004	005	006	007	008	009	010	011
location	009TP303	009TP306	009TP306	009TP306	009TP319	009TP319	009TP344	009TP345	009TP345	009TP376	09SB02
nsample	009TP3030001	009TP3060910	009TP3060910-AVG	009TP3060910-D	009TP3190102A	009TP3190304B	009TP3440607	009TP3450001B	009TP3450405A	009TP3760506	09-SB02-1012
sample	009TP3030001	009TP3060910	009TP3060910-AVG	009FD051503-01	009TP3190102A	009TP3190304B	009TP3440607	009TP3450001B	009TP3450405A	009TP3760506	09-SB02-1012
matrix	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SB
sample_dat	05/15/03	05/15/03	05/15/03	05/15/03	05/14/03	05/14/03	05/15/03	05/14/03	05/14/03	05/15/03	04/05/95
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T
cto_proj	4246	4246	4246	4246	4246	4246	4246	4246	4246	4246	
proj_manag	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	GEORGE,RD
sort	**c_001**	**c_002**	**c_003**	**c_004**	**c_005**	**c_006**	**c_007**	**c_008**	**c_009**	**c_010**	**c_011**
TRICHLOROETHENE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
TRICHLOROFLUOROMETHANE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	
VINYL CHLORIDE	22 U	11 U	12 U	13 U	10 U	9 U	12 U	11 U	10 U	10 U	11 U
Semivolatile Organics (ug/kg)											
1,2,4-TRICHLOROBENZENE											380 U
1,2-DICHLOROBENZENE											380 U
1,3-DICHLOROBENZENE											380 U
1,4-DICHLOROBENZENE											380 U
2,2'-OXYBIS(1-CHLOROPROPANE)											380 U
2,4,5-TRICHLOROPHENOL											950 U
2,4,6-TRICHLOROPHENOL											380 U
2,4-DICHLOROPHENOL											380 U
2,4-DIMETHYLPHENOL											380 U
2,4-DINITROPHENOL											950 U
2,4-DINITROTOLUENE											380 U
2,6-DINITROTOLUENE											380 U
2-CHLORONAPHTHALENE											380 U
2-CHLOROPHENOL											380 U
2-METHYLNAPHTHALENE											380 U
2-METHYLPHENOL											380 U
2-NITROANILINE											950 U
2-NITROPHENOL											380 U
3,3'-DICHLOROBENZIDINE											380 U
3-NITROANILINE											950 U
4,6-DINITRO-2-METHYLPHENOL											950 U
4-BROMOPHENYL PHENYL ETHER											380 U
4-CHLORO-3-METHYLPHENOL											380 U
4-CHLOROANILINE											380 U
4-CHLOROPHENYL PHENYL ETHER											380 U
4-METHYLPHENOL											380 U
4-NITROANILINE											950 U
4-NITROPHENOL											950 U
ACENAPHTHENE											380 U
ACENAPHTHYLENE											380 U
ANTHRACENE											380 U
BENZO(A)ANTHRACENE											380 U
BENZO(A)PYRENE											380 U
BENZO(B)FLUORANTHENE											380 U
BENZO(G,H,I)PERYLENE											380 U
BENZO(K)FLUORANTHENE											380 U
BIS(2-CHLOROETHOXY)METHANE											380 U
BIS(2-CHLOROETHYL)ETHER											380 U
BIS(2-ETHYLHEXYL)PHTHALATE											380 U
BUTYL BENZYL PHTHALATE											380 U
CARBAZOLE											380 U
CHRYSENE											380 U
DI-N-BUTYL PHTHALATE											380 U

from nine_sam.dbf
from nine_res.dbf
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from q:\sc[illegible]r\white_oak\upload

order	001	002	003	004	005	006	007	008	009	010	011
location	009TP303	009TP306	009TP306	009TP306	009TP319	009TP319	009TP344	009TP345	009TP345	009TP376	09SB02
nsample	009TP3030001	009TP3060910	009TP3060910-AVG	009TP3060910-D	009TP3190102A	009TP3190304B	009TP3440607	009TP3450001B	009TP3450405A	009TP3760506	09-SB02-1012
sample	009TP3030001	009TP3060910	009TP3060910-AVG	009FD051503-01	009TP3190102A	009TP3190304B	009TP3440607	009TP3450001B	009TP3450405A	009TP3760506	09-SB02-1012
matrix	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SB
sample_dat	05/15/03	05/15/03	05/15/03	05/15/03	05/14/03	05/14/03	05/15/03	05/14/03	05/14/03	05/15/03	04/05/95
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T
cto_proj	4246	4246	4246	4246	4246	4246	4246	4246	4246	4246	
proj_manag	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	GEORGE,RD
sort	**c_001**	**c_002**	**c_003**	**c_004**	**c_005**	**c_006**	**c_007**	**c_008**	**c_009**	**c_010**	**c_011**
DI-N-OCTYL PHTHALATE											380 U
DIBENZO(A,H)ANTHRACENE											380 U
DIBENZOFURAN											380 U
DIETHYL PHTHALATE											380 U
DIMETHYL PHTHALATE											380 U
FLUORANTHENE											380 U
FLUORENE											380 U
HEXACHLOROBENZENE											380 U
HEXACHLOROBUTADIENE											380 U
HEXACHLOROCYCLOPENTADIENE											380 U
HEXACHLOROETHANE											380 U
INDENO(1,2,3-CD)PYRENE											380 U
ISOPHORONE											380 U
N-NITROSO-DI-N-PROPYLAMINE											380 U
N-NITROSODIPHENYLAMINE											380 U
NAPHTHALENE											380 U
NITROBENZENE											380 U
PENTACHLOROPHENOL											950 U
PHENANTHRENE											380 U
PHENOL											380 U
PYRENE											380 U
Explosives (ug/kg)											
1,3,5-TRINITROBENZENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	40.2 U
1,3-DINITROBENZENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	37.21 U
2,4 DINITROTOLUENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	51.57 U
2,4,6-TRINITROTOLUENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	35.59 U
2,6 DINITROTOLUENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	47.65 U
2-AMINO-4,6-DINITROTOLUENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	46.67 U
2-NITROTOLUENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	81.39 U
3-NITROTOLUENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	81.79 U
4-AMINO-2,6-DINITROTOLUENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	40.85 U
4-NITROTOLUENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	87.25 U
HMX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	70.49 U
NITRO-BENZENE	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	35.21 U
NITROGLYCERIN	2500 U	2500 U	2500 U	2500 U	2500 U	2500 U	2500 U	2500 U	2500 U	2500 U	
RDX	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	50.9 U
TETRYL	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	162.65 U
Inorganics (mg/kg)											
ALUMINUM	16200	4800	5115	5430	14400	23000	552	9730	8980	16100	3790
ANTIMONY	1.5 B	1.1 B	1.1 B	1.1 B	0.57 B	0.64 B	1.2 B	0.92 B	12.9 L	1.7 B	1.1 B
ARSENIC	4.9	1.4	1.5	1.6	3.2	5	1.6	3.7	7.3	9.6	1.7 K
BARIUM	92.5	15.7	18.2	20.7	70.9	74.9	7.1	65.9	89.7	27.2	3.6
BERYLLIUM	1.3 B	0.15 B	0.13 B	0.11 B	0.47 B	0.73 B	0.07 B	0.65 B	1.0 B	0.31 B	0.14 U
CADMIUM	0.59 B	0.41 B	0.525 B	0.64 B	0.06 U	0.06 UL	0.27 B	0.06 U	0.06 U	0.06 UL	0.52 U
CALCIUM	1210	290	317	344	755	1410	65.9	437	645	384	19.7 B
CHROMIUM	26	8.2	8.55	8.9	19.2	28	24.8	15.8	37.1	35.2	12.5
COBALT	22.8	0.68	0.785	0.89	7.1	9	0.22 U	3.9	2	1.8	3.1 U

from nine_sam.dbf
from nine_res.dbf
from nine_resa.xls
from q:\sql_server\white_oak\upload

nine_resa.xls -
full appendix results
[draft copy]

order	**001**	**002**	**003**	**004**	**005**	**006**	**007**	**008**	**009**	**010**	**011**
location	009TP303	009TP306	009TP306	009TP306	009TP319	009TP319	009TP344	009TP345	009TP345	009TP376	09SB02
nsample	009TP3030001	009TP3060910	009TP3060910-AVG	009TP3060910-D	009TP3190102A	009TP3190304B	009TP3440607	009TP3450001B	009TP3450405A	009TP3760506	09-SB02-1012
sample	009TP3030001	009TP3060910	009TP3060910-AVG	009FD051503-01	009TP3190102A	009TP3190304B	009TP3440607	009TP3450001B	009TP3450405A	009TP3760506	09-SB02-1012
matrix	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SB
sample_dat	05/15/03	05/15/03	05/15/03	05/15/03	05/14/03	05/14/03	05/15/03	05/14/03	05/14/03	05/15/03	04/05/95
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T
cto_proj	4246	4246	4246	4246	4246	4246	4246	4246	4246	4246	
proj_manag	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	KOTUN,R	GEORGE,RD
sort	**c_001**	**c_002**	**c_003**	**c_004**	**c_005**	**c_006**	**c_007**	**c_008**	**c_009**	**c_010**	**c_011**
COPPER	184	8.5	9.2	9.9	8.5	10.5	5.9	11.2	46.7	11.9	9
IRON	16700	5620	6200	6780	14200	20400	5550	11500	12300	21300	15800
LEAD	158	3.8	4.35	4.9	46	11.7	11.6	205	1800	8.9	3.5
MAGNESIUM	2420 J	203 J	235.5 J	268 J	1170 J	2070 J	19.3 B	835 J	478 J	514 J	120 K
MANGANESE	247	7.1	8.6	10.1	197	139	4.8	117	48.3	14.3	1.3 L
MERCURY	0.2	0.011 U	0.0115 U	0.012 U	0.13	0.033	0.043	3.8	2.9	0.044	0.06
NICKEL	25.4	2.6	2.9	3.2	10	15.3	0.54	18.7	9.6	7.6	3.8 UL
POTASSIUM	707 J	173 J	197 J	221 J	665 J	1140 J	42.8 J	427 J	351 J	578 J	75.4
SELENIUM	2.2 K	1.4 K	1.35 K	1.3 K	1.6 K	1.5 K	1.3 K	2.2	3.8	1.9 K	0.32 UL
SILVER	0.12 U	0.08 U	0.08 U	0.08 U	0.08 U	0.07 UL	0.09 B	0.38 U	0.73 U	0.08 UL	0.08 U
SODIUM	55.9 U	117 B	126.5 B	136 B	149 B	176 B	133 B	180 U	350 U	254 B	17.2 U
THALLIUM	1.2 U	0.78 U	0.8 U	0.82 U	0.77 U	1.3 K	0.71 U	0.78 U	1.6 K	0.8 U	0.27 U
VANADIUM	35.5	13.1	14.05	15	30.9	44.2	16.5	27.6	32	60.8	19.4
ZINC	360	32.1	36.35	40.6	59.7	67	38.5	43.1	306	18.4	1.4 UL
Miscellaneous Parameters (mg/kg)											
CYANIDE											1.1 U
PERCHLORATE	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U				0.08 U	
PH (su)											4.91 S.U.
TOTAL KJELDAHL NITROGEN											38.3 B

from nine_sam.dbf
from nine_res.dbf
from nine_resa.xls
from q:\sc[illegible]er\white_oak\upload

order	012	013	014	015	016	017	018	019	020	021
location	09SB03	09SB04	09SB05	09SB06	09SB07	09SB08	09SB12	09SB13	09SB14	09SB15
nsample	09-SB03-CUT	09-SB04-1012	09-SB05-1012	09-SB06-1214	09-SB07-1012	09-SB08-1214	09-SB12-1012	09-SB13-0810	09-SB14-1012	09-SB15-1214
sample	09-SB03-CUT	09-SB04-1012	09-SB05-1012	09-SB06-1214	09-SB07-1012	09-SB08-1214	09-SB12-1012	09-SB13-0810	09-SB14-1012	09-SB15-1214
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sample_dat	03/21/95	03/22/95	03/22/95	03/22/95	03/24/95	03/24/95	03/22/95	03/21/95	03/21/95	03/21/95
validated	T	T	T	T	T	T	T	T	T	T
cto_proj										
proj_manag	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD
sort	**c_012**	**c_013**	**c_014**	**c_015**	**c_016**	**c_017**	**c_018**	**c_019**	**c_020**	**c_021**
Volatile Organics (ug/kg)										
1,1,1-TRICHLOROETHANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
1,1,2,2-TETRACHLOROETHANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
1,1,2-TRICHLOROETHANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
1,1,2-TRICHLOROTRIFLUOROETHANE										
1,1-DICHLOROETHANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
1,1-DICHLOROETHENE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
1,2,4-TRICHLOROBENZENE										
1,2-DIBROMO-3-CHLOROPROPANE										
1,2-DIBROMOETHANE										
1,2-DICHLOROBENZENE										
1,2-DICHLOROETHANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
1,2-DICHLOROPROPANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
1,3-DICHLOROBENZENE										
1,4-DICHLOROBENZENE										
2-BUTANONE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
2-HEXANONE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
4-METHYL-2-PENTANONE	11 U	1 J	1 J	11 U	11 U	11 U	2 J	11 U	12 U	11 U
ACETONE	12 J	12 U	12 U	11 B	11 U	5 B	7 B	7 J	12 U	11 U
BENZENE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
BROMODICHLOROMETHANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
BROMOFORM	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
BROMOMETHANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
CARBON DISULFIDE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
CARBON TETRACHLORIDE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
CHLOROBENZENE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
CHLORODIBROMOMETHANE										
CHLOROETHANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
CHLOROFORM	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
CHLOROMETHANE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
CIS-1,2-DICHLOROETHENE										
CIS-1,3-DICHLOROPROPENE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
CYCLOHEXANE										
DICHLORODIFLUOROMETHANE										
ETHYLBENZENE	11 U	12 U	12 U	11 U	1 J	11 U	12 U	11 U	12 U	11 U
ISOPROPYLBENZENE										
METHYL ACETATE										
METHYL CYCLOHEXANE										
METHYL TERT-BUTYL ETHER										
METHYLENE CHLORIDE	19 B	5 B	6 B	6 B	11 U	2 B	6 B	13 B	18 B	21 B
STYRENE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
TETRACHLOROETHENE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
TOLUENE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
TOTAL 1,2-DICHLOROETHENE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
TOTAL XYLENES	11 U	12 U	12 U	11 U	6 J	11 U	12 U	11 U	12 U	11 U
TRANS-1,2-DICHLOROETHENE										
TRANS-1,3-DICHLOROPROPENE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U

from nine_sam.dbf
from nine_res.dbf
from nine_resa.xls
from q:\sql_server\white_oak\upload

order	012	013	014	015	016	017	018	019	020	021
location	09SB03	09SB04	09SB05	09SB06	09SB07	09SB08	09SB12	09SB13	09SB14	09SB15
nsample	09-SB03-CUT	09-SB04-1012	09-SB05-1012	09-SB06-1214	09-SB07-1012	09-SB08-1214	09-SB12-1012	09-SB13-0810	09-SB14-1012	09-SB15-1214
sample	09-SB03-CUT	09-SB04-1012	09-SB05-1012	09-SB06-1214	09-SB07-1012	09-SB08-1214	09-SB12-1012	09-SB13-0810	09-SB14-1012	09-SB15-1214
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sample_dat	03/21/95	03/22/95	03/22/95	03/22/95	03/24/95	03/24/95	03/22/95	03/21/95	03/21/95	03/21/95
validated	T	T	T	T	T	T	T	T	T	T
cto_proj										
proj_manag	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD
sort	**c_012**	**c_013**	**c_014**	**c_015**	**c_016**	**c_017**	**c_018**	**c_019**	**c_020**	**c_021**
TRICHLOROETHENE	11 U	12 U	12 U	11 U	1 J	3 J	12 U	11 U	12 U	11 U
TRICHLOROFLUOROMETHANE										
VINYL CHLORIDE	11 U	12 U	12 U	11 U	11 U	11 U	12 U	11 U	12 U	11 U
Semivolatile Organics (ug/kg)										
1,2,4-TRICHLOROBENZENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
1,2-DICHLOROBENZENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
1,3-DICHLOROBENZENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
1,4-DICHLOROBENZENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
2,2'-OXYBIS(1-CHLOROPROPANE)	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
2,4,5-TRICHLOROPHENOL	940 U	970 U	1020 U	960 U	930 U	930 U	990 U	960 U	960 U	930 U
2,4,6-TRICHLOROPHENOL	370 U	390 U	410 U	380 U	370 U	370 U	400 U	380 U	380 U	370 U
2,4-DICHLOROPHENOL	370 U	390 U	410 U	380 U	370 U	370 U	400 U	380 U	380 U	370 U
2,4-DIMETHYLPHENOL	370 U	390 U	410 U	380 U	370 U	370 U	400 U	380 U	380 U	370 U
2,4-DINITROPHENOL	940 U	970 U	1020 U	960 U	930 U	930 U	990 U	960 U	960 U	930 U
2,4-DINITROTOLUENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
2,6-DINITROTOLUENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
2-CHLORONAPHTHALENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
2-CHLOROPHENOL	370 U	390 U	410 U	380 U	370 U	370 U	400 U	380 U	380 U	370 U
2-METHYLNAPHTHALENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
2-METHYLPHENOL	370 U	390 U	410 U	380 U	370 U	370 U	400 U	380 U	380 U	370 U
2-NITROANILINE	940 UR	970 U	1020 U	960 U	930 U	930 U	990 U	960 UR	960 UR	930 UR
2-NITROPHENOL	370 U	390 U	410 U	380 U	370 U	370 U	400 U	380 U	380 U	370 U
3,3'-DICHLOROBENZIDINE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
3-NITROANILINE	940 UR	970 U	1020 U	960 U	930 U	930 U	990 U	960 UR	960 UR	930 UR
4,6-DINITRO-2-METHYLPHENOL	940 U	970 U	1020 U	960 U	930 U	930 U	990 U	960 U	960 U	930 U
4-BROMOPHENYL PHENYL ETHER	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
4-CHLORO-3-METHYLPHENOL	370 U	390 U	410 U	380 U	370 U	370 U	400 U	380 U	380 U	370 U
4-CHLOROANILINE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
4-CHLOROPHENYL PHENYL ETHER	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
4-METHYLPHENOL	370 U	390 U	410 U	380 U	370 U	370 U	400 U	380 U	380 U	370 U
4-NITROANILINE	940 UR	970 U	1020 U	960 U	930 U	930 U	990 U	960 UR	960 UR	930 UR
4-NITROPHENOL	940 U	970 U	1020 U	960 U	930 U	930 U	990 U	960 U	960 U	930 U
ACENAPHTHENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
ACENAPHTHYLENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
ANTHRACENE	61 J	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
BENZO(A)ANTHRACENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
BENZO(A)PYRENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
BENZO(B)FLUORANTHENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
BENZO(G,H,I)PERYLENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
BENZO(K)FLUORANTHENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
BIS(2-CHLOROETHOXY)METHANE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
BIS(2-CHLOROETHYL)ETHER	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
BIS(2-ETHYLHEXYL)PHTHALATE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
BUTYL BENZYL PHTHALATE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
CARBAZOLE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
CHRYSENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
DI-N-BUTYL PHTHALATE	370 UR	110 B	69 B	81 B	120 B	50 B	400 U	120 B	48 B	70 B

from nine_sam.dbf
from nine_res.dbf
from nine_resa.xls
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order	012	013	014	015	016	017	018	019	020	021
location	09SB03	09SB04	09SB05	09SB06	09SB07	09SB08	09SB12	09SB13	09SB14	09SB15
nsample	09-SB03-CUT	09-SB04-1012	09-SB05-1012	09-SB06-1214	09-SB07-1012	09-SB08-1214	09-SB12-1012	09-SB13-0810	09-SB14-1012	09-SB15-1214
sample	09-SB03-CUT	09-SB04-1012	09-SB05-1012	09-SB06-1214	09-SB07-1012	09-SB08-1214	09-SB12-1012	09-SB13-0810	09-SB14-1012	09-SB15-1214
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sample_dat	03/21/95	03/22/95	03/22/95	03/22/95	03/24/95	03/24/95	03/22/95	03/21/95	03/21/95	03/21/95
validated	T	T	T	T	T	T	T	T	T	T
cto_proj										
proj_manag	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD
sort	**c_012**	**c_013**	**c_014**	**c_015**	**c_016**	**c_017**	**c_018**	**c_019**	**c_020**	**c_021**
DI-N-OCTYL PHTHALATE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
DIBENZO(A,H)ANTHRACENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
DIBENZOFURAN	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
DIETHYL PHTHALATE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
DIMETHYL PHTHALATE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
FLUORANTHENE	170 J	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
FLUORENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
HEXACHLOROBENZENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
HEXACHLOROBUTADIENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
HEXACHLOROCYCLOPENTADIENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
HEXACHLOROETHANE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
INDENO(1,2,3-CD)PYRENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
ISOPHORONE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
N-NITROSO-DI-N-PROPYLAMINE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
N-NITROSODIPHENYLAMINE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
NAPHTHALENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
NITROBENZENE	370 UR	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
PENTACHLOROPHENOL	940 U	970 U	1020 U	960 U	930 U	930 U	990 U	960 U	960 U	930 U
PHENANTHRENE	190 J	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
PHENOL	370 U	390 U	410 U	380 U	370 U	370 U	400 U	380 U	380 U	370 U
PYRENE	190 J	390 U	410 U	380 U	370 U	370 U	400 U	380 UR	380 UR	370 UR
Explosives (ug/kg)										
1,3,5-TRINITROBENZENE	40.2 U	40.2 U	40.2 U	40.2 U	40.2 UJ	40.2 UJ	40.2 U	40.2 U	40.2 U	40.2 U
1,3-DINITROBENZENE	37.21 U	37.21 U	37.21 U	37.21 U	37.21 UJ	37.21 UJ	37.21 U	37.21 U	37.21 U	37.21 U
2,4 DINITROTOLUENE	51.57 U	51.57 U	51.57 U	51.57 U	51.57 UJ	51.57 UJ	51.57 U	51.57 U	51.57 U	51.57 U
2,4,6-TRINITROTOLUENE	35.59 U	35.59 U	35.59 U	35.59 U	35.59 UJ	35.59 UJ	35.59 U	35.59 U	35.59 U	35.59 U
2,6 DINITROTOLUENE	47.65 U	47.65 U	47.65 U	47.65 U	47.65 UJ	47.65 UJ	47.65 U	47.65 U	47.65 U	47.65 U
2-AMINO-4,6-DINITROTOLUENE	46.67 U	46.67 U	46.67 U	46.67 U	46.67 UJ	46.67 UJ	46.67 U	46.67 U	46.67 U	46.67 U
2-NITROTOLUENE	81.39 U	81.39 U	81.39 U	81.39 U	81.39 UJ	81.39 UJ	81.39 U	81.39 U	81.39 U	81.39 U
3-NITROTOLUENE	81.79 U	81.79 U	81.79 U	81.79 U	81.79 UJ	81.79 UJ	81.79 U	81.79 U	81.79 U	81.79 U
4-AMINO-2,6-DINITROTOLUENE	40.85 U	40.85 U	40.85 U	40.85 U	40.85 UJ	40.85 UJ	40.85 U	40.85 U	40.85 U	40.85 U
4-NITROTOLUENE	87.25 U	87.25 U	87.25 U	87.25 U	87.25 UJ	87.25 UJ	87.25 U	87.25 U	87.25 U	87.25 U
HMX	70.49 U	70.49 U	70.49 U	70.49 U	70.49 UJ	70.49 UJ	70.49 U	70.49 U	70.49 U	70.49 U
NITRO-BENZENE	35.21 U	35.21 U	35.21 U	35.21 U	35.21 UJ	35.21 UJ	35.21 U	35.21 U	35.21 U	35.21 U
NITROGLYCERIN										
RDX	50.9 U	50.9 U	50.9 U	50.9 U	50.9 UJ	50.9 UJ	50.9 U	50.9 U	50.9 U	50.9 U
TETRYL	162.65 U	162.65 U	162.65 U	162.65 U	162.65 UJ	162.65 UJ	162.65 U	162.65 U	162.65 U	162.65 U
Inorganics (mg/kg)										
ALUMINUM	2250 J	14600	13500	15900	8650	3830	3190	10100 J	3100 J	1930 J
ANTIMONY	0.25 UL	0.35 L	0.27 UL	0.25 UL	0.46 B	0.35 B	0.26 UL	0.25 UL	0.25 UL	0.74 UL
ARSENIC	0.89	4.7	0.86	0.27	4.2 B	1.4 B	2.6	2.4	1.2	0.77
BARIUM	6.7	20	60.6	78.2	18.4	5.6 B	3.4	17.5	1.6	4.9
BERYLLIUM	0.07 UL	0.44	1.9	1.9	0.53 B	0.31 B	0.27 B	0.16 L	0.07 UL	0.07 UL
CADMIUM	0.26 U	0.53 U	0.56 U	1.1	0.51 U	1.1 B	0.55 U	0.98 B	0.41 B	0.26 U
CALCIUM	283	18.0 U	916	738	35.5 B	17.8 B	18.5 U	33.6	9.0 U	18.6
CHROMIUM	7.8 J	24.7 J	20.9 J	23.8 J	15.9	6.8	20.5 J	16.6 J	7.2 J	11.4 J
COBALT	1.9	3.2 U	10.9	18.9	3.2	3.1 U	3.3 U	2.6	1.6 U	1.5 U

from nine_sam.dbf
from nine_res.dbf
from nine_resa.xls
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nine_resa.xls -
full appendix results
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order	012	013	014	015	016	017	018	019	020	021
location	09SB03	09SB04	09SB05	09SB06	09SB07	09SB08	09SB12	09SB13	09SB14	09SB15
nsample	09-SB03-CUT	09-SB04-1012	09-SB05-1012	09-SB06-1214	09-SB07-1012	09-SB08-1214	09-SB12-1012	09-SB13-0810	09-SB14-1012	09-SB15-1214
sample	09-SB03-CUT	09-SB04-1012	09-SB05-1012	09-SB06-1214	09-SB07-1012	09-SB08-1214	09-SB12-1012	09-SB13-0810	09-SB14-1012	09-SB15-1214
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sample_dat	03/21/95	03/22/95	03/22/95	03/22/95	03/24/95	03/24/95	03/22/95	03/21/95	03/21/95	03/21/95
validated	T	T	T	T	T	T	T	T	T	T
cto_proj										
proj_manag	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD	GEORGE,RD
sort	**c_012**	**c_013**	**c_014**	**c_015**	**c_016**	**c_017**	**c_018**	**c_019**	**c_020**	**c_021**
COPPER	8.7 J	9.9 B	14.8 B	46.7	16.0 B	14.7 B	7.1 B	8.2 J	7.6 J	18.1 J
IRON	5260 J	21500	50500	50500	18100 J	5020 J	10700	18300 J	11800 J	3930 J
LEAD	3.7 L	9.3	5.4	5.6	6.3 J	1.4 B	4.7	5.6 L	2.8 L	1.7 L
MAGNESIUM	107 J	219	4520	5570	191	90.2	46	587 J	22.9 J	96.7 J
MANGANESE	19.6 J	17.0 J	847 J	1120 J	16.5	8.5	6.8 J	73.1 J	2.8 J	0.47 UJ
MERCURY	0.19 B	0.24 B	0.89 J	0.37 J	0.15 B	0.11 B	0.34 J	0.88 J	0.15 B	0.32 J
NICKEL	1.9 U	5	16.9	18	4.7	3.8 U	4.0 U	4.1	2.0 U	1.9 U
POTASSIUM	130	322 B	3950	3650 B	182	90.2	158 B	405	88.9	191
SELENIUM	0.32 UL	0.34 K	0.34 U	0.32 U	0.55 L	0.62 L	0.33 U	0.32 UL	0.32 UL	0.64 L
SILVER	0.08 U	0.08 U	0.09 U	0.08 U	0.08 UJ	0.08 UJ	0.08 U	0.08 U	0.08 U	0.08 U
SODIUM	17.2 U	26.4 B	92.1 B	86.8 B	16.9 U	17.0 U	27.2 B	17.5 U	17.5 U	16.9 U
THALLIUM	0.26 U	0.27 U	0.28 U	0.5	0.27 U	0.27 U	0.27 U	0.26 U	0.26 U	0.26 U
VANADIUM	10.1	41.2	40.4	37.7	56.7	12.8 U	26.3	26.4	17.4	20.5
ZINC	3.2	9.1 B	58.5	76.1	4.8 B	9.7 J	4.3 B	10.8	1.5	0.69 U
Miscellaneous Parameters (mg/kg)										
CYANIDE	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U
PERCHLORATE										
PH (su)	6.78 S.U.	4.41 S.U.	4.78 S.U.	5.22 S.U.	4.85 S.U.	4.75 S.U.	4.74 S.U.	4.68 S.U.	4.66 S.U.	5.02 S.U.
TOTAL KJELDAHL NITROGEN	56.8	15.2	20.5 U	14.9	22.7	19.4	30.5	248	79	45.2

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from nine_res.dbf
from nine_resa.xls
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matrix	SB	SB	SB	QC	QC
sample_dat	03/21/95	03/21/95	03/24/95	05/14/03	05/15/03
validated	T	T	T	Y	Y
cto_proj				4246	4246
proj_manag	GEORGE,RD	GEORGE,RD	GEORGE,RD	KOTUN,R	KOTUN,R
sort	**c_022**	**c_023**	**c_024**	**c_025**	**c_026**
Volatile Organics (ug/kg)					
1,1,1-TRICHLOROETHANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
1,1,2,2-TETRACHLOROETHANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
1,1,2-TRICHLOROETHANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
1,1,2-TRICHLOROTRIFLUOROETHANE				10 U UG/L	10 U UG/L
1,1-DICHLOROETHANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
1,1-DICHLOROETHENE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
1,2,4-TRICHLOROBENZENE				10 U UG/L	10 U UG/L
1,2-DIBROMO-3-CHLOROPROPANE				10 U UG/L	10 U UG/L
1,2-DIBROMOETHANE				10 U UG/L	10 U UG/L
1,2-DICHLOROBENZENE				10 U UG/L	10 U UG/L
1,2-DICHLOROETHANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
1,2-DICHLOROPROPANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
1,3-DICHLOROBENZENE				10 U UG/L	10 U UG/L
1,4-DICHLOROBENZENE				10 U UG/L	10 U UG/L
2-BUTANONE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
2-HEXANONE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
4-METHYL-2-PENTANONE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
ACETONE	11 U	11 U	12 U	10 U UG/L	11 J UG/L
BENZENE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
BROMODICHLOROMETHANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
BROMOFORM	11 U	11 U	12 U	10 U UG/L	10 U UG/L
BROMOMETHANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
CARBON DISULFIDE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
CARBON TETRACHLORIDE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
CHLOROBENZENE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
CHLORODIBROMOMETHANE				10 U UG/L	10 U UG/L
CHLOROETHANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
CHLOROFORM	11 U	11 U	12 U	10 U UG/L	10 U UG/L
CHLOROMETHANE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
CIS-1,2-DICHLOROETHENE				10 U UG/L	10 U UG/L
CIS-1,3-DICHLOROPROPENE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
CYCLOHEXANE				10 U UG/L	10 U UG/L
DICHLORODIFLUOROMETHANE				10 U UG/L	10 U UG/L
ETHYLBENZENE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
ISOPROPYLBENZENE				10 U UG/L	10 U UG/L
METHYL ACETATE				10 U UG/L	10 U UG/L
METHYL CYCLOHEXANE				10 U UG/L	10 U UG/L
METHYL TERT-BUTYL ETHER				10 U UG/L	10 U UG/L
METHYLENE CHLORIDE	21.5 B	22 B	3 B	13 UG/L	11 UG/L
STYRENE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
TETRACHLOROETHENE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
TOLUENE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
TOTAL 1,2-DICHLOROETHENE	11 U	11 U	12 U		
TOTAL XYLENES	11 U	11 U	12 U	10 U UG/L	10 U UG/L
TRANS-1,2-DICHLOROETHENE				10 U UG/L	10 U UG/L
TRANS-1,3-DICHLOROPROPENE	11 U	11 U	12 U	10 U UG/L	10 U UG/L

from nine_sam.dbf
from nine_res.dbf
from nine_resa.xls
from q:\sql_server\white_oak\upload

nine_resa.xls -
full appendix results
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order	022	023	024	025	026
location	09SB15	09SB15	09SB19	QAQC	QAQC
nsample	09-SB15-1214-AVG	09-SB15-1214-D	09-SB19-1012	TB051403	TB051503
sample	09-SB15-1214-AVG	09-SB15-1214-D	09-SB19-1012	TB051403	TB051503
matrix	SB	SB	SB	QC	QC
sample_dat	03/21/95	03/21/95	03/24/95	05/14/03	05/15/03
validated	T	T	T	Y	Y
cto_proj				4246	4246
proj_manag	GEORGE,RD	GEORGE,RD	GEORGE,RD	KOTUN,R	KOTUN,R
sort	**c_022**	**c_023**	**c_024**	**c_025**	**c_026**
TRICHLOROETHENE	11 U	11 U	5 J	10 U UG/L	10 U UG/L
TRICHLOROFLUOROMETHANE				10 U UG/L	10 U UG/L
VINYL CHLORIDE	11 U	11 U	12 U	10 U UG/L	10 U UG/L
Semivolatile Organics (ug/kg)					
1,2,4-TRICHLOROBENZENE	365 UR	360 UR	390 U		
1,2-DICHLOROBENZENE	365 UR	360 UR	390 U		
1,3-DICHLOROBENZENE	365 UR	360 UR	390 U		
1,4-DICHLOROBENZENE	365 UR	360 UR	390 U		
2,2'-OXYBIS(1-CHLOROPROPANE)	365 UR	360 UR	390 U		
2,4,5-TRICHLOROPHENOL	915 U	900 U	980 U		
2,4,6-TRICHLOROPHENOL	365 U	360 U	390 U		
2,4-DICHLOROPHENOL	365 U	360 U	390 U		
2,4-DIMETHYLPHENOL	365 U	360 U	390 U		
2,4-DINITROPHENOL	915 U	900 U	980 U		
2,4-DINITROTOLUENE	365 UR	360 UR	390 U		
2,6-DINITROTOLUENE	365 UR	360 UR	390 U		
2-CHLORONAPHTHALENE	365 UR	360 UR	390 U		
2-CHLOROPHENOL	365 U	360 U	390 U		
2-METHYLNAPHTHALENE	365 UR	360 UR	390 U		
2-METHYLPHENOL	365 U	360 U	390 U		
2-NITROANILINE	915 UR	900 UR	980 U		
2-NITROPHENOL	365 U	360 U	390 U		
3,3'-DICHLOROBENZIDINE	365 UR	360 UR	390 U		
3-NITROANILINE	915 UR	900 UR	980 U		
4,6-DINITRO-2-METHYLPHENOL	915 U	900 U	980 U		
4-BROMOPHENYL PHENYL ETHER	365 UR	360 UR	390 U		
4-CHLORO-3-METHYLPHENOL	365 U	360 U	390 U		
4-CHLOROANILINE	365 UR	360 UR	390 U		
4-CHLOROPHENYL PHENYL ETHER	365 UR	360 UR	390 U		
4-METHYLPHENOL	365 U	360 U	390 U		
4-NITROANILINE	915 UR	900 UR	980 U		
4-NITROPHENOL	915 U	900 U	980 U		
ACENAPHTHENE	365 UR	360 UR	390 U		
ACENAPHTHYLENE	365 UR	360 UR	390 U		
ANTHRACENE	365 UR	360 UR	390 U		
BENZO(A)ANTHRACENE	365 UR	360 UR	390 U		
BENZO(A)PYRENE	365 UR	360 UR	390 U		
BENZO(B)FLUORANTHENE	365 UR	360 UR	390 U		
BENZO(G,H,I)PERYLENE	365 UR	360 UR	390 U		
BENZO(K)FLUORANTHENE	365 UR	360 UR	390 U		
BIS(2-CHLOROETHOXY)METHANE	365 UR	360 UR	390 U		
BIS(2-CHLOROETHYL)ETHER	365 UR	360 UR	390 U		
BIS(2-ETHYLHEXYL)PHTHALATE	365 UR	360 UR	390 U		
BUTYL BENZYL PHTHALATE	365 UR	360 UR	390 U		
CARBAZOLE	365 UR	360 UR	390 U		
CHRYSENE	365 UR	360 UR	390 U		
DI-N-BUTYL PHTHALATE	70 B	360 UR	78 B		

from nine_sam.dbf
from nine_res.dbf
from nine_resa.xls
from q:\s[illegible]er\white_oak\upload

order	022	023	024	025	026
location	09SB15	09SB15	09SB19	QAQC	QAQC
nsample	09-SB15-1214-AVG	09-SB15-1214-D	09-SB19-1012	TB051403	TB051503
sample	09-SB15-1214-AVG	09-SB15-1214-D	09-SB19-1012	TB051403	TB051503
matrix	SB	SB	SB	QC	QC
sample_dat	03/21/95	03/21/95	03/24/95	05/14/03	05/15/03
validated	T	T	T	Y	Y
cto_proj				4246	4246
proj_manag	GEORGE,RD	GEORGE,RD	GEORGE,RD	KOTUN,R	KOTUN,R
sort	**c_022**	**c_023**	**c_024**	**c_025**	**c_026**
DI-N-OCTYL PHTHALATE	365 UR	360 UR	390 U		
DIBENZO(A,H)ANTHRACENE	365 UR	360 UR	390 U		
DIBENZOFURAN	365 UR	360 UR	390 U		
DIETHYL PHTHALATE	365 UR	360 UR	390 U		
DIMETHYL PHTHALATE	365 UR	360 UR	390 U		
FLUORANTHENE	365 UR	360 UR	390 U		
FLUORENE	365 UR	360 UR	390 U		
HEXACHLOROBENZENE	365 UR	360 UR	390 U		
HEXACHLOROBUTADIENE	365 UR	360 UR	390 U		
HEXACHLOROCYCLOPENTADIENE	365 UR	360 UR	390 U		
HEXACHLOROETHANE	365 UR	360 UR	390 U		
INDENO(1,2,3-CD)PYRENE	365 UR	360 UR	390 U		
ISOPHORONE	365 UR	360 UR	390 U		
N-NITROSO-DI-N-PROPYLAMINE	365 UR	360 UR	390 U		
N-NITROSODIPHENYLAMINE	365 UR	360 UR	390 U		
NAPHTHALENE	365 UR	360 UR	390 U		
NITROBENZENE	365 UR	360 UR	390 U		
PENTACHLOROPHENOL	915 U	900 U	980 U		
PHENANTHRENE	365 UR	360 UR	390 U		
PHENOL	365 U	360 U	390 U		
PYRENE	365 UR	360 UR	390 U		
Explosives (ug/kg)					
1,3,5-TRINITROBENZENE	40.2 U	40.2 U	40.2 UJ		
1,3-DINITROBENZENE	37.21 U	37.21 U	37.21 UJ		
2,4 DINITROTOLUENE	51.57 U	51.57 U	51.57 UJ		
2,4,6-TRINITROTOLUENE	35.59 U	35.59 U	35.59 UJ		
2,6 DINITROTOLUENE	47.65 U	47.65 U	47.65 UJ		
2-AMINO-4,6-DINITROTOLUENE	46.67 U	46.67 U	46.67 UJ		
2-NITROTOLUENE	81.39 U	81.39 U	81.39 UJ		
3-NITROTOLUENE	81.79 U	81.79 U	81.79 UJ		
4-AMINO-2,6-DINITROTOLUENE	40.85 U	40.85 U	40.85 UJ		
4-NITROTOLUENE	87.25 U	87.25 U	87.25 UJ		
HMX	70.49 U	70.49 U	70.49 UJ		
NITRO-BENZENE	35.21 U	35.21 U	35.21 UJ		
NITROGLYCERIN					
RDX	50.9 U	50.9 U	50.9 UJ		
TETRYL	162.65 U	162.65 U	162.65 UJ		
Inorganics (mg/kg)					
ALUMINUM	1413.5 J	897 J	5450		
ANTIMONY	0.49 UL	0.24 UL	0.76 B		
ARSENIC	1.235	1.7	2.2 B		
BARIUM	4.1	3.3	4.0 B		
BERYLLIUM	0.065 UL	0.06 UL	0.45 B		
CADMIUM	0.255 U	0.25 U	1.3 B		
CALCIUM	15.35	12.1	61.0 B		
CHROMIUM	6.85 J	2.3 J	34.2		
COBALT	1.5 U	1.5 U	3.2 U		

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from q:\sql_server\white_oak\upload

nine_resa.xls -
full appendix results
[draft copy]

order	**022**	**023**	**024**	**025**	**026**
location	09SB15	09SB15	09SB19	QAQC	QAQC
nsample	09-SB15-1214-AVG	09-SB15-1214-D	09-SB19-1012	TB051403	TB051503
sample	09-SB15-1214-AVG	09-SB15-1214-D	09-SB19-1012	TB051403	TB051503
matrix	SB	SB	SB	QC	QC
sample_dat	03/21/95	03/21/95	03/24/95	05/14/03	05/15/03
validated	T	T	T	Y	Y
cto_proj				4246	4246
proj_manag	GEORGE,RD	GEORGE,RD	GEORGE,RD	KOTUN,R	KOTUN,R
sort	**c_022**	**c_023**	**c_024**	**c_025**	**c_026**
COPPER	9.95 J	1.8 J	35.1		
IRON	2171 J	412 J	24800 J		
LEAD	2.05 L	2.4 L	2.2 J		
MAGNESIUM	99.85 J	103 J	58.5		
MANGANESE	0.46 UJ	0.45 UJ	11.2		
MERCURY	0.22 J	0.24 B	0.32 B		
NICKEL	1.85 U	1.8 U	4.0 U		
POTASSIUM	147	103	109		
SELENIUM	0.92 L	1.2 L	0.33 UL		
SILVER	0.075 U	0.07 U	0.08 UJ		
SODIUM	16.6 U	16.3 U	17.8 U		
THALLIUM	0.255 U	0.25 U	0.28 U		
VANADIUM	12.05	3.6	45.9		
ZINC	0.675 U	0.66 U	12.6 J		
Miscellaneous Parameters (mg/kg)					
CYANIDE	1.1 U	1.1 U	1.2 U		
PERCHLORATE					
PH (su)	4.9 S.U.	4.78 S.U.	5.17 S.U.		
TOTAL KJELDAHL NITROGEN	42	38.8	29.5		

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from nine_resa.xls
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APPENDIX B

DATA VALIDATION MEMORANDA

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. KOTUN**	**DATE:**	**JULY 1, 2003**
FROM:	**BERNARD F SPADA III**	**COPIES:**	**DV FILE**
SUBJECT:	**ORGANIC DATA VALIDATION- VOC/EXP** **CTO 839, NSWC WHITE OAK** **SDG 83903**		

SAMPLES: 2/Aqueous

TB051403* TB051503*

9/Soil

009FD051503-01	009TP3030001	009TP3060910
009TP3190102A	009TP3190304B	009TP3440607
009TP3450001B	009TP3450405A	009TP3760506

Overview

The sample set for CTO 839 NSWC White Oak, SDG 83903 consists of eight (8) environmental soil samples, two (2) trip blanks, and one (1) field duplicate. All environmental soil samples were analyzed for volatile organic compounds (VOC) and explosives (EXP). The trip blanks denoted with an asterisk (*) were analyzed for VOC only. The field duplicate pair included in this SDG is 009FD051503-01 and 009TP3060910.

The samples were collected by Tetra Tech NUS on May 14 and 15, 2003 and analyzed by Laucks Testing Laboratories. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using CLP Method OLM04.2 and SW-846 Method 8330 analytical and reporting protocols.

The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, GCMS tuning, initial/continuing calibrations, laboratory method blank results, surrogate spike recoveries, blank spike/blank spike duplicate results, chromatographic resolution, compound identification, compound quantitation, field duplicate precision, and detection limits. Areas of concern are listed below.

Major

- None.

Minor

- The volatile continuing calibration performed on May 21 at 17:34 exceeded the 25% difference (but was <50%) quality control criteria for acetone, methyl acetate, and MTBE. The positive result for acetone was qualified as estimated (J) in samples 009TP3030001 and TB051503. No qualifications were made to the remaining compounds because they were non-detected.

- The following compounds were detected in the method blank:

Compound	Maximum Concentration	Blank Action Level
Methylene chloride	7.0 ug/kg	70 ug/kg
1,2-Dibromo-3-chloropropane	2.0 ug/kg	10 ug/kg
1,2,4-Trichlorobenzene	2.0 ug/kg	10 ug/kg

Sample aliquot, and dilution factors were taken into consideration when applying the blank action levels. Positive results for methylene chloride below the blank action level were qualified as false positives, (B). The trip blank samples were not qualified for the above method blank contamination.

Notes

The laboratory did not include results for cis-1,2-dichloroethene and trans-1,2-dichloroethene as requested by the lab specification. The laboratory re-processed the data and submitted new results upon request.

All positive results below the reporting limit were qualified as estimated (J) due to uncertainty near the detection limit.

The laboratory reported the trip blanks as soils (ug/kg). The validator changed the results to water units (ug/L). The laboratory was not requested to re-submit the Form Is on this basis. No qualifications were made on this basis.

The volatile continuing calibration performed on May 22 at 11:05 exceeded the 25% difference (but was <50%) quality control criteria for acetone, chloromethane, methyl acetate, methylene chloride, and 2-butanone. No qualifications were made on this basis because all results for the aforementioned compounds in sample 009FD051503-01 were non-detected or qualified for method blank contamination.

The relative percent difference (RPD) for 1,1-dichloroethene, benzene, toluene, and chlorobenzene exceeded the 20% RPD quality control criteria in the MS/MSD of sample 009TP3760506. No qualifications were made on this basis because the percent recoveries were all compliant.

The laboratory reported EXP surrogate percent recoveries from one column only. No qualifications were made on this basis.

Executive Summary

Laboratory Performance: Qualifications were made based on calibration non-compliances and method blank contamination.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to U.S. EPA National Functional Guidelines for Data Validation as modified by EPA Region III (9/94) and the NFESC guidelines entitled Navy IRCDQM (Sept. 1999). The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Bernard F Spada III

Tetra Tech NUS
Bernard F Spada III
Chemist/Data Validator

Edward Rodlunza / for

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

PROJ_NO: 4246

SDG: 83903 MEDIA: WATER DATA FRACTION: OV

nsample	TB051403
samp_date	5/14/2003
lab_id	0305209-05
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	10	U	
1,1,2,2-TETRACHLOROETHANE	10	U	
1,1,2-TRICHLOROETHANE	10	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	10	U	
1,1-DICHLOROETHANE	10	U	
1,1-DICHLOROETHENE	10	U	
1,2,4-TRICHLOROBENZENE	10	U	
1,2-DIBROMO-3-CHLOROPROPANE	10	U	
1,2-DIBROMOETHANE	10	U	
1,2-DICHLOROBENZENE	10	U	
1,2-DICHLOROETHANE	10	U	
1,2-DICHLOROPROPANE	10	U	
1,3-DICHLOROBENZENE	10	U	
1,4-DICHLOROBENZENE	10	U	
2-BUTANONE	10	U	
2-HEXANONE	10	U	
4-METHYL-2-PENTANONE	10	U	
ACETONE	10	U	
BENZENE	10	U	
BROMODICHLOROMETHANE	10	U	
BROMOFORM	10	U	
BROMOMETHANE	10	U	
CARBON DISULFIDE	10	U	
CARBON TETRACHLORIDE	10	U	
CHLOROBENZENE	10	U	
CHLORODIBROMOMETHANE	10	U	
CHLOROETHANE	10	U	
CHLOROFORM	10	U	
CHLOROMETHANE	10	U	
CIS-1,3-DICHLOROPROPENE	10	U	

nsample	TB051403
samp_date	5/14/2003
lab_id	0305209-05
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CYCLOHEXANE	10	U	
DICHLORODIFLUOROMETHANE	10	U	
ETHYLBENZENE	10	U	
ISOPROPYLBENZENE	10	U	
METHYL ACETATE	10	U	
METHYL CYCLOHEXANE	10	U	
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	13		
STYRENE	10	U	
TETRACHLOROETHENE	10	U	
TOLUENE	10	U	
TOTAL XYLENES	10	U	
TRANS-1,3-DICHLOROPROPENE	10	U	
TRICHLOROETHENE	10	U	
TRICHLOROFLUOROMETHANE	10	U	
VINYL CHLORIDE	10	U	

nsample	TB051503
samp_date	5/15/2003
lab_id	0305228-06
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	10	U	
1,1,2,2-TETRACHLOROETHANE	10	U	
1,1,2-TRICHLOROETHANE	10	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	10	U	
1,1-DICHLOROETHANE	10	U	
1,1-DICHLOROETHENE	10	U	
1,2,4-TRICHLOROBENZENE	10	U	
1,2-DIBROMO-3-CHLOROPROPANE	10	U	
1,2-DIBROMOETHANE	10	U	
1,2-DICHLOROBENZENE	10	U	
1,2-DICHLOROETHANE	10	U	
1,2-DICHLOROPROPANE	10	U	
1,3-DICHLOROBENZENE	10	U	
1,4-DICHLOROBENZENE	10	U	
2-BUTANONE	10	U	
2-HEXANONE	10	U	
4-METHYL-2-PENTANONE	10	U	
ACETONE	11	J	C
BENZENE	10	U	
BROMODICHLOROMETHANE	10	U	
BROMOFORM	10	U	
BROMOMETHANE	10	U	
CARBON DISULFIDE	10	U	
CARBON TETRACHLORIDE	10	U	
CHLOROBENZENE	10	U	
CHLORODIBROMOMETHANE	10	U	
CHLOROETHANE	10	U	
CHLOROFORM	10	U	
CHLOROMETHANE	10	U	
CIS-1,3-DICHLOROPROPENE	10	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: WATER DATA FRACTION: OV

nsample	TB051503
samp_date	5/15/2003
lab_id	0305228-06
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CYCLOHEXANE	10	U	
DICHLORODIFLUOROMETHANE	10	U	
ETHYLBENZENE	10	U	
ISOPROPYLBENZENE	10	U	
METHYL ACETATE	10	U	
METHYL CYCLOHEXANE	10	U	
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	11		
STYRENE	10	U	
TETRACHLOROETHENE	10	U	
TOLUENE	10	U	
TOTAL XYLENES	10	U	
TRANS-1,3-DICHLOROPROPENE	10	U	
TRICHLOROETHENE	10	U	
TRICHLOROFLUOROMETHANE	10	U	
VINYL CHLORIDE	10	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: OV

nsample	009FD051503-01	nsample	009FD051503-01	nsample	009TP3030001
samp_date	5/15/2003	samp_date	5/15/2003	samp_date	5/15/2003
lab_id	0305228-03	lab_id	0305228-03	lab_id	0305228-04
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	76	Pct_Solids	76	Pct_Solids	57
DUP_OF:	009TP03060910	DUP_OF:	009TP03060910	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	13	U	
1,1,2,2-TETRACHLOROETHANE	13	U	
1,1,2-TRICHLOROETHANE	13	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	3	J	P
1,1-DICHLOROETHANE	13	U	
1,1-DICHLOROETHENE	13	U	
1,2,4-TRICHLOROBENZENE	13	U	
1,2-DIBROMO-3-CHLOROPROPANE	13	U	
1,2-DIBROMOETHANE	13	U	
1,2-DICHLOROBENZENE	13	U	
1,2-DICHLOROETHANE	13	U	
1,2-DICHLOROPROPANE	13	U	
1,3-DICHLOROBENZENE	13	U	
1,4-DICHLOROBENZENE	13	U	
2-BUTANONE	13	U	
2-HEXANONE	13	U	
4-METHYL-2-PENTANONE	13	U	
ACETONE	13	U	
BENZENE	13	U	
BROMODICHLOROMETHANE	13	U	
BROMOFORM	13	U	
BROMOMETHANE	13	U	
CARBON DISULFIDE	13	U	
CARBON TETRACHLORIDE	13	U	
CHLOROBENZENE	13	U	
CHLORODIBROMOMETHANE	13	U	
CHLOROETHANE	13	U	
CHLOROFORM	13	U	
CHLOROMETHANE	13	U	
CIS-1,2-DICHLOROETHENE	13	U	

Parameter	Result	Val Qual	Qual Code
CIS-1,3-DICHLOROPROPENE	13	U	
CYCLOHEXANE	13	U	
DICHLORODIFLUOROMETHANE	10	J	P
ETHYLBENZENE	13	U	
ISOPROPYLBENZENE	13	U	
METHYL ACETATE	13	U	
METHYL CYCLOHEXANE	13	U	
METHYL TERT-BUTYL ETHER	13	U	
METHYLENE CHLORIDE	8	B	A
STYRENE	13	U	
TETRACHLOROETHENE	13	U	
TOLUENE	13	U	
TOTAL XYLENES	13	U	
TRANS-1,2-DICHLOROETHENE	13	U	
TRANS-1,3-DICHLOROPROPENE	13	U	
TRICHLOROETHENE	13	U	
TRICHLOROFLUOROMETHANE	13	U	
VINYL CHLORIDE	13	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	22	U	
1,1,2,2-TETRACHLOROETHANE	22	U	
1,1,2-TRICHLOROETHANE	22	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	22	U	
1,1-DICHLOROETHANE	22	U	
1,1-DICHLOROETHENE	22	U	
1,2,4-TRICHLOROBENZENE	22	U	
1,2-DIBROMO-3-CHLOROPROPANE	22	U	
1,2-DIBROMOETHANE	22	U	
1,2-DICHLOROBENZENE	22	U	
1,2-DICHLOROETHANE	22	U	
1,2-DICHLOROPROPANE	22	U	
1,3-DICHLOROBENZENE	22	U	
1,4-DICHLOROBENZENE	22	U	
2-BUTANONE	22	U	
2-HEXANONE	22	U	
4-METHYL-2-PENTANONE	22	U	
ACETONE	200	J	C
BENZENE	22	U	
BROMODICHLOROMETHANE	22	U	
BROMOFORM	22	U	
BROMOMETHANE	22	U	
CARBON DISULFIDE	22	U	
CARBON TETRACHLORIDE	22	U	
CHLOROBENZENE	22	U	
CHLORODIBROMOMETHANE	22	U	
CHLOROETHANE	22	U	
CHLOROFORM	22	U	
CHLOROMETHANE	22	U	
CIS-1,2-DICHLOROETHENE	22	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: OV

nsample	009TP3030001
samp_date	5/15/2003
lab_id	0305228-04
qc_type	NM
units	UG/KG
Pct_Solids	57
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CIS-1,3-DICHLOROPROPENE	22	U	
CYCLOHEXANE	22	U	
DICHLORODIFLUOROMETHANE	29		
ETHYLBENZENE	22	U	
ISOPROPYLBENZENE	22	U	
METHYL ACETATE	22	U	
METHYL CYCLOHEXANE	22	U	
METHYL TERT-BUTYL ETHER	22	U	
METHYLENE CHLORIDE	10	B	A
STYRENE	22	U	
TETRACHLOROETHENE	22	U	
TOLUENE	22	U	
TOTAL XYLENES	22	U	
TRANS-1,2-DICHLOROETHENE	22	U	
TRANS-1,3-DICHLOROPROPENE	22	U	
TRICHLOROETHENE	22	U	
TRICHLOROFLUOROMETHANE	22	U	
VINYL CHLORIDE	22	U	

nsample	009TP3060910
samp_date	5/15/2003
lab_id	0305228-02
qc_type	NM
units	UG/KG
Pct_Solids	87
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	11	U	
1,1,2,2-TETRACHLOROETHANE	11	U	
1,1,2-TRICHLOROETHANE	11	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	11	U	
1,1-DICHLOROETHANE	11	U	
1,1-DICHLOROETHENE	11	U	
1,2,4-TRICHLOROBENZENE	11	U	
1,2-DIBROMO-3-CHLOROPROPANE	11	U	
1,2-DIBROMOETHANE	11	U	
1,2-DICHLOROBENZENE	11	U	
1,2-DICHLOROETHANE	11	U	
1,2-DICHLOROPROPANE	11	U	
1,3-DICHLOROBENZENE	11	U	
1,4-DICHLOROBENZENE	11	U	
2-BUTANONE	11	U	
2-HEXANONE	11	U	
4-METHYL-2-PENTANONE	11	U	
ACETONE	11	U	
BENZENE	11	U	
BROMODICHLOROMETHANE	11	U	
BROMOFORM	11	U	
BROMOMETHANE	11	U	
CARBON DISULFIDE	11	U	
CARBON TETRACHLORIDE	11	U	
CHLOROBENZENE	11	U	
CHLORODIBROMOMETHANE	11	U	
CHLOROETHANE	11	U	
CHLOROFORM	11	U	
CHLOROMETHANE	11	U	
CIS-1,2-DICHLOROETHENE	11	U	

nsample	009TP3060910
samp_date	5/15/2003
lab_id	0305228-02
qc_type	NM
units	UG/KG
Pct_Solids	87
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CIS-1,3-DICHLOROPROPENE	11	U	
CYCLOHEXANE	11	U	
DICHLORODIFLUOROMETHANE	9	J	P
ETHYLBENZENE	11	U	
ISOPROPYLBENZENE	11	U	
METHYL ACETATE	11	U	
METHYL CYCLOHEXANE	11	U	
METHYL TERT-BUTYL ETHER	11	U	
METHYLENE CHLORIDE	5	B	A
STYRENE	11	U	
TETRACHLOROETHENE	11	U	
TOLUENE	11	U	
TOTAL XYLENES	11	U	
TRANS-1,2-DICHLOROETHENE	11	U	
TRANS-1,3-DICHLOROPROPENE	11	U	
TRICHLOROETHENE	11	U	
TRICHLOROFLUOROMETHANE	11	U	
VINYL CHLORIDE	11	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: OV

nsample	009TP3190102A
samp_date	5/14/2003
lab_id	0305209-03
qc_type	NM
units	UG/KG
Pct_Solids	84
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	10	U	
1,1,2,2-TETRACHLOROETHANE	10	U	
1,1,2-TRICHLOROETHANE	10	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	10	U	
1,1-DICHLOROETHANE	10	U	
1,1-DICHLOROETHENE	10	U	
1,2,4-TRICHLOROBENZENE	10	U	
1,2-DIBROMO-3-CHLOROPROPANE	10	U	
1,2-DIBROMOETHANE	10	U	
1,2-DICHLOROBENZENE	10	U	
1,2-DICHLOROETHANE	10	U	
1,2-DICHLOROPROPANE	10	U	
1,3-DICHLOROBENZENE	10	U	
1,4-DICHLOROBENZENE	10	U	
2-BUTANONE	10	U	
2-HEXANONE	10	U	
4-METHYL-2-PENTANONE	10	U	
ACETONE	10	U	
BENZENE	10	U	
BROMODICHLOROMETHANE	10	U	
BROMOFORM	10	U	
BROMOMETHANE	10	U	
CARBON DISULFIDE	10	U	
CARBON TETRACHLORIDE	10	U	
CHLOROBENZENE	10	U	
CHLORODIBROMOMETHANE	10	U	
CHLOROETHANE	10	U	
CHLOROFORM	10	U	
CHLOROMETHANE	10	U	
CIS-1,2-DICHLOROETHENE	10	U	

nsample	009TP3190102A
samp_date	5/14/2003
lab_id	0305209-03
qc_type	NM
units	UG/KG
Pct_Solids	84
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CIS-1,3-DICHLOROPROPENE	10	U	
CYCLOHEXANE	10	U	
DICHLORODIFLUOROMETHANE	50		
ETHYLBENZENE	10	U	
ISOPROPYLBENZENE	10	U	
METHYL ACETATE	10	U	
METHYL CYCLOHEXANE	10	U	
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	6	B	A
STYRENE	10	U	
TETRACHLOROETHENE	10	U	
TOLUENE	10	U	
TOTAL XYLENES	10	U	
TRANS-1,2-DICHLOROETHENE	10	U	
TRANS-1,3-DICHLOROPROPENE	10	U	
TRICHLOROETHENE	10	U	
TRICHLOROFLUOROMETHANE	10	U	
VINYL CHLORIDE	10	U	

nsample	009TP3190304B
samp_date	5/14/2003
lab_id	0305209-04
qc_type	NM
units	UG/KG
Pct_Solids	84
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	9	U	
1,1,2,2-TETRACHLOROETHANE	9	U	
1,1,2-TRICHLOROETHANE	9	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	9	U	
1,1-DICHLOROETHANE	9	U	
1,1-DICHLOROETHENE	9	U	
1,2,4-TRICHLOROBENZENE	9	U	
1,2-DIBROMO-3-CHLOROPROPANE	9	U	
1,2-DIBROMOETHANE	9	U	
1,2-DICHLOROBENZENE	9	U	
1,2-DICHLOROETHANE	9	U	
1,2-DICHLOROPROPANE	9	U	
1,3-DICHLOROBENZENE	9	U	
1,4-DICHLOROBENZENE	9	U	
2-BUTANONE	9	U	
2-HEXANONE	9	U	
4-METHYL-2-PENTANONE	9	U	
ACETONE	9	U	
BENZENE	9	U	
BROMODICHLOROMETHANE	9	U	
BROMOFORM	9	U	
BROMOMETHANE	9	U	
CARBON DISULFIDE	9	U	
CARBON TETRACHLORIDE	9	U	
CHLOROBENZENE	9	U	
CHLORODIBROMOMETHANE	9	U	
CHLOROETHANE	9	U	
CHLOROFORM	9	U	
CHLOROMETHANE	9	U	
CIS-1,2-DICHLOROETHENE	9	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: OV

nsample	009TP3190304B
samp_date	5/14/2003
lab_id	0305209-04
qc_type	NM
units	UG/KG
Pct_Solids	84
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CIS-1,3-DICHLOROPROPENE	9	U	
CYCLOHEXANE	9	U	
DICHLORODIFLUOROMETHANE	11		
ETHYLBENZENE	9	U	
ISOPROPYLBENZENE	9	U	
METHYL ACETATE	9	U	
METHYL CYCLOHEXANE	9	U	
METHYL TERT-BUTYL ETHER	9	U	
METHYLENE CHLORIDE	6	B	A
STYRENE	9	U	
TETRACHLOROETHENE	9	U	
TOLUENE	9	U	
TOTAL XYLENES	9	U	
TRANS-1,2-DICHLOROETHENE	9	U	
TRANS-1,3-DICHLOROPROPENE	9	U	
TRICHLOROETHENE	9	U	
TRICHLOROFLUOROMETHANE	9	U	
VINYL CHLORIDE	9	U	

nsample	009TP3440607
samp_date	5/15/2003
lab_id	0305228-05
qc_type	NM
units	UG/KG
Pct_Solids	94
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	12	U	
1,1,2,2-TETRACHLOROETHANE	12	U	
1,1,2-TRICHLOROETHANE	12	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	12	U	
1,1-DICHLOROETHANE	12	U	
1,1-DICHLOROETHENE	12	U	
1,2,4-TRICHLOROBENZENE	12	U	
1,2-DIBROMO-3-CHLOROPROPANE	12	U	
1,2-DIBROMOETHANE	12	U	
1,2-DICHLOROBENZENE	12	U	
1,2-DICHLOROETHANE	12	U	
1,2-DICHLOROPROPANE	12	U	
1,3-DICHLOROBENZENE	12	U	
1,4-DICHLOROBENZENE	12	U	
2-BUTANONE	12	U	
2-HEXANONE	12	U	
4-METHYL-2-PENTANONE	12	U	
ACETONE	12	U	
BENZENE	12	U	
BROMODICHLOROMETHANE	12	U	
BROMOFORM	12	U	
BROMOMETHANE	12	U	
CARBON DISULFIDE	12	U	
CARBON TETRACHLORIDE	12	U	
CHLOROBENZENE	12	U	
CHLORODIBROMOMETHANE	12	U	
CHLOROETHANE	12	U	
CHLOROFORM	12	U	
CHLOROMETHANE	12	U	
CIS-1,2-DICHLOROETHENE	12	U	

nsample	009TP3440607
samp_date	5/15/2003
lab_id	0305228-05
qc_type	NM
units	UG/KG
Pct_Solids	94
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CIS-1,3-DICHLOROPROPENE	12	U	
CYCLOHEXANE	12	U	
DICHLORODIFLUOROMETHANE	18		
ETHYLBENZENE	12	U	
ISOPROPYLBENZENE	12	U	
METHYL ACETATE	12	U	
METHYL CYCLOHEXANE	12	U	
METHYL TERT-BUTYL ETHER	12	U	
METHYLENE CHLORIDE	6	B	A
STYRENE	12	U	
TETRACHLOROETHENE	12	U	
TOLUENE	12	U	
TOTAL XYLENES	12	U	
TRANS-1,2-DICHLOROETHENE	12	U	
TRANS-1,3-DICHLOROPROPENE	12	U	
TRICHLOROETHENE	12	U	
TRICHLOROFLUOROMETHANE	12	U	
VINYL CHLORIDE	12	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: OV

nsample	009TP3450001B
samp_date	5/14/2003
lab_id	0305209-02
qc_type	NM
units	UG/KG
Pct_Solids	80
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	11	U	
1,1,2,2-TETRACHLOROETHANE	11	U	
1,1,2-TRICHLOROETHANE	11	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	11	U	
1,1-DICHLOROETHANE	11	U	
1,1-DICHLOROETHENE	11	U	
1,2,4-TRICHLOROBENZENE	11	U	
1,2-DIBROMO-3-CHLOROPROPANE	11	U	
1,2-DIBROMOETHANE	11	U	
1,2-DICHLOROBENZENE	11	U	
1,2-DICHLOROETHANE	11	U	
1,2-DICHLOROPROPANE	11	U	
1,3-DICHLOROBENZENE	11	U	
1,4-DICHLOROBENZENE	11	U	
2-BUTANONE	11	U	
2-HEXANONE	11	U	
4-METHYL-2-PENTANONE	11	U	
ACETONE	11	U	
BENZENE	11	U	
BROMODICHLOROMETHANE	11	U	
BROMOFORM	11	U	
BROMOMETHANE	11	U	
CARBON DISULFIDE	11	U	
CARBON TETRACHLORIDE	11	U	
CHLOROBENZENE	11	U	
CHLORODIBROMOMETHANE	11	U	
CHLOROETHANE	11	U	
CHLOROFORM	11	U	
CHLOROMETHANE	11	U	
CIS-1,2-DICHLOROETHENE	11	U	

nsample	009TP3450001B
samp_date	5/14/2003
lab_id	0305209-02
qc_type	NM
units	UG/KG
Pct_Solids	80
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CIS-1,3-DICHLOROPROPENE	11	U	
CYCLOHEXANE	11	U	
DICHLORODIFLUOROMETHANE	11	U	
ETHYLBENZENE	11	U	
ISOPROPYLBENZENE	11	U	
METHYL ACETATE	11	U	
METHYL CYCLOHEXANE	11	U	
METHYL TERT-BUTYL ETHER	11	U	
METHYLENE CHLORIDE	5	B	A
STYRENE	11	U	
TETRACHLOROETHENE	11	U	
TOLUENE	11	U	
TOTAL XYLENES	11	U	
TRANS-1,2-DICHLOROETHENE	11	U	
TRANS-1,3-DICHLOROPROPENE	11	U	
TRICHLOROETHENE	11	U	
TRICHLOROFLUOROMETHANE	11	U	
VINYL CHLORIDE	11	U	

nsample	009TP3450405A
samp_date	5/14/2003
lab_id	0305209-01
qc_type	NM
units	UG/KG
Pct_Solids	85
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	10	U	
1,1,2,2-TETRACHLOROETHANE	10	U	
1,1,2-TRICHLOROETHANE	10	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	10	U	
1,1-DICHLOROETHANE	10	U	
1,1-DICHLOROETHENE	10	U	
1,2,4-TRICHLOROBENZENE	10	U	
1,2-DIBROMO-3-CHLOROPROPANE	10	U	
1,2-DIBROMOETHANE	10	U	
1,2-DICHLOROBENZENE	10	U	
1,2-DICHLOROETHANE	10	U	
1,2-DICHLOROPROPANE	10	U	
1,3-DICHLOROBENZENE	10	U	
1,4-DICHLOROBENZENE	10	U	
2-BUTANONE	10	U	
2-HEXANONE	10	U	
4-METHYL-2-PENTANONE	10	U	
ACETONE	10	U	
BENZENE	10	U	
BROMODICHLOROMETHANE	10	U	
BROMOFORM	10	U	
BROMOMETHANE	10	U	
CARBON DISULFIDE	10	U	
CARBON TETRACHLORIDE	10	U	
CHLOROBENZENE	10	U	
CHLORODIBROMOMETHANE	10	U	
CHLOROETHANE	10	U	
CHLOROFORM	10	U	
CHLOROMETHANE	10	U	
CIS-1,2-DICHLOROETHENE	10	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: OV

nsample	009TP3450405A
samp_date	5/14/2003
lab_id	0305209-01
qc_type	NM
units	UG/KG
Pct_Solids	85
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CIS-1,3-DICHLOROPROPENE	10	U	
CYCLOHEXANE	10	U	
DICHLORODIFLUOROMETHANE	18		
ETHYLBENZENE	10	U	
ISOPROPYLBENZENE	10	U	
METHYL ACETATE	10	U	
METHYL CYCLOHEXANE	10	U	
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	5	B	A
STYRENE	10	U	
TETRACHLOROETHENE	10	U	
TOLUENE	10	U	
TOTAL XYLENES	10	U	
TRANS-1,2-DICHLOROETHENE	10	U	
TRANS-1,3-DICHLOROPROPENE	10	U	
TRICHLOROETHENE	10	U	
TRICHLOROFLUOROMETHANE	10	U	
VINYL CHLORIDE	10	U	

nsample	009TP3760506
samp_date	5/15/2003
lab_id	0305228-01
qc_type	NM
units	UG/KG
Pct_Solids	82
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	10	U	
1,1,2,2-TETRACHLOROETHANE	10	U	
1,1,2-TRICHLOROETHANE	10	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	2	J	P
1,1-DICHLOROETHANE	10	U	
1,1-DICHLOROETHENE	10	U	
1,2,4-TRICHLOROBENZENE	10	U	
1,2-DIBROMO-3-CHLOROPROPANE	10	U	
1,2-DIBROMOETHANE	10	U	
1,2-DICHLOROBENZENE	10	U	
1,2-DICHLOROETHANE	10	U	
1,2-DICHLOROPROPANE	10	U	
1,3-DICHLOROBENZENE	10	U	
1,4-DICHLOROBENZENE	10	U	
2-BUTANONE	10	U	
2-HEXANONE	10	U	
4-METHYL-2-PENTANONE	10	U	
ACETONE	10	U	
BENZENE	10	U	
BROMODICHLOROMETHANE	10	U	
BROMOFORM	10	U	
BROMOMETHANE	10	U	
CARBON DISULFIDE	10	U	
CARBON TETRACHLORIDE	10	U	
CHLOROBENZENE	10	U	
CHLORODIBROMOMETHANE	10	U	
CHLOROETHANE	10	U	
CHLOROFORM	10	U	
CHLOROMETHANE	10	U	
CIS-1,2-DICHLOROETHENE	10	U	

nsample	009TP3760506
samp_date	5/15/2003
lab_id	0305228-01
qc_type	NM
units	UG/KG
Pct_Solids	82
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
CIS-1,3-DICHLOROPROPENE	10	U	
CYCLOHEXANE	10	U	
DICHLORODIFLUOROMETHANE	10	U	
ETHYLBENZENE	10	U	
ISOPROPYLBENZENE	10	U	
METHYL ACETATE	10	U	
METHYL CYCLOHEXANE	10	U	
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	4	B	A
STYRENE	10	U	
TETRACHLOROETHENE	10	U	
TOLUENE	10	U	
TOTAL XYLENES	10	U	
TRANS-1,2-DICHLOROETHENE	10	U	
TRANS-1,3-DICHLOROPROPENE	10	U	
TRICHLOROETHENE	10	U	
TRICHLOROFLUOROMETHANE	10	U	
VINYL CHLORIDE	10	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: EXP

nsample	009FD051503-01	nsample	009TP3030001	nsample	009TP3060910
samp_date	5/15/2003	samp_date	5/15/2003	samp_date	5/15/2003
lab_id	0305228-03	lab_id	0305228-04	lab_id	0305228-02
qc_type	NM	qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG	units	MG/KG
Pct_Solids	76	Pct_Solids	57	Pct_Solids	87
DUP_OF:	009TP03060910	DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,3,5-TRINITROBENZENE	0.5	U	
1,3-DINITROBENZENE	0.5	U	
2,4,6-TRINITROTOLUENE	0.5	U	
2,4-DINITROTOLUENE	0.5	U	
2,6-DINITROTOLUENE	0.5	U	
2-AMINO-4,6-DINITROTOLUENE	0.5	U	
2-NITROTOLUENE	0.5	U	
3-NITROTOLUENE	0.5	U	
4-AMINO-2,6-DINITROTOLUENE	0.5	U	
4-NITROTOLUENE	0.5	U	
HMX	0.5	U	
NITROBENZENE	0.5	U	
NITROGLYCERIN	2.5	U	
RDX	0.5	U	
TETRYL	0.5	U	

Parameter	Result	Val Qual	Qual Code
1,3,5-TRINITROBENZENE	0.5	U	
1,3-DINITROBENZENE	0.5	U	
2,4,6-TRINITROTOLUENE	0.5	U	
2,4-DINITROTOLUENE	0.5	U	
2,6-DINITROTOLUENE	0.5	U	
2-AMINO-4,6-DINITROTOLUENE	0.5	U	
2-NITROTOLUENE	0.5	U	
3-NITROTOLUENE	0.5	U	
4-AMINO-2,6-DINITROTOLUENE	0.5	U	
4-NITROTOLUENE	0.5	U	
HMX	0.5	U	
NITROBENZENE	0.5	U	
NITROGLYCERIN	2.5	U	
RDX	0.5	U	
TETRYL	0.5	U	

Parameter	Result	Val Qual	Qual Code
1,3,5-TRINITROBENZENE	0.5	U	
1,3-DINITROBENZENE	0.5	U	
2,4,6-TRINITROTOLUENE	0.5	U	
2,4-DINITROTOLUENE	0.5	U	
2,6-DINITROTOLUENE	0.5	U	
2-AMINO-4,6-DINITROTOLUENE	0.5	U	
2-NITROTOLUENE	0.5	U	
3-NITROTOLUENE	0.5	U	
4-AMINO-2,6-DINITROTOLUENE	0.5	U	
4-NITROTOLUENE	0.5	U	
HMX	0.5	U	
NITROBENZENE	0.5	U	
NITROGLYCERIN	2.5	U	
RDX	0.5	U	
TETRYL	0.5	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: EXP

nsample	009TP3190102A	nsample	009TP3190304B	nsample	009TP3440607
samp_date	5/14/2003	samp_date	5/14/2003	samp_date	5/15/2003
lab_id	0305209-03	lab_id	0305209-04	lab_id	0305228-05
qc_type	NM	qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG	units	MG/KG
Pct_Solids	84	Pct_Solids	84	Pct_Solids	94
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,3,5-TRINITROBENZENE	0.5	U	
1,3-DINITROBENZENE	0.5	U	
2,4,6-TRINITROTOLUENE	0.5	U	
2,4-DINITROTOLUENE	0.5	U	
2,6-DINITROTOLUENE	0.5	U	
2-AMINO-4,6-DINITROTOLUENE	0.5	U	
2-NITROTOLUENE	0.5	U	
3-NITROTOLUENE	0.5	U	
4-AMINO-2,6-DINITROTOLUENE	0.5	U	
4-NITROTOLUENE	0.5	U	
HMX	0.5	U	
NITROBENZENE	0.5	U	
NITROGLYCERIN	2.5	U	
RDX	0.5	U	
TETRYL	0.5	U	

Parameter	Result	Val Qual	Qual Code
1,3,5-TRINITROBENZENE	0.5	U	
1,3-DINITROBENZENE	0.5	U	
2,4,6-TRINITROTOLUENE	0.5	U	
2,4-DINITROTOLUENE	0.5	U	
2,6-DINITROTOLUENE	0.5	U	
2-AMINO-4,6-DINITROTOLUENE	0.5	U	
2-NITROTOLUENE	0.5	U	
3-NITROTOLUENE	0.5	U	
4-AMINO-2,6-DINITROTOLUENE	0.5	U	
4-NITROTOLUENE	0.5	U	
HMX	0.5	U	
NITROBENZENE	0.5	U	
NITROGLYCERIN	2.5	U	
RDX	0.5	U	
TETRYL	0.5	U	

Parameter	Result	Val Qual	Qual Code
1,3,5-TRINITROBENZENE	0.5	U	
1,3-DINITROBENZENE	0.5	U	
2,4,6-TRINITROTOLUENE	0.5	U	
2,4-DINITROTOLUENE	0.5	U	
2,6-DINITROTOLUENE	0.5	U	
2-AMINO-4,6-DINITROTOLUENE	0.5	U	
2-NITROTOLUENE	0.5	U	
3-NITROTOLUENE	0.5	U	
4-AMINO-2,6-DINITROTOLUENE	0.5	U	
4-NITROTOLUENE	0.5	U	
HMX	0.5	U	
NITROBENZENE	0.5	U	
NITROGLYCERIN	2.5	U	
RDX	0.5	U	
TETRYL	0.5	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: EXP

nsample	009TP3450001B
samp_date	5/14/2003
lab_id	0305209-02
qc_type	NM
units	MG/KG
Pct_Solids	80
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,3,5-TRINITROBENZENE	0.5	U	
1,3-DINITROBENZENE	0.5	U	
2,4,6-TRINITROTOLUENE	0.5	U	
2,4-DINITROTOLUENE	0.5	U	
2,6-DINITROTOLUENE	0.5	U	
2-AMINO-4,6-DINITROTOLUENE	0.5	U	
2-NITROTOLUENE	0.5	U	
3-NITROTOLUENE	0.5	U	
4-AMINO-2,6-DINITROTOLUENE	0.5	U	
4-NITROTOLUENE	0.5	U	
HMX	0.5	U	
NITROBENZENE	0.5	U	
NITROGLYCERIN	2.5	U	
RDX	0.5	U	
TETRYL	0.5	U	

nsample	009TP3450405A
samp_date	5/14/2003
lab_id	0305209-01
qc_type	NM
units	MG/KG
Pct_Solids	85
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,3,5-TRINITROBENZENE	0.5	U	
1,3-DINITROBENZENE	0.5	U	
2,4,6-TRINITROTOLUENE	0.5	U	
2,4-DINITROTOLUENE	0.5	U	
2,6-DINITROTOLUENE	0.5	U	
2-AMINO-4,6-DINITROTOLUENE	0.5	U	
2-NITROTOLUENE	0.5	U	
3-NITROTOLUENE	0.5	U	
4-AMINO-2,6-DINITROTOLUENE	0.5	U	
4-NITROTOLUENE	0.5	U	
HMX	0.5	U	
NITROBENZENE	0.5	U	
NITROGLYCERIN	2.5	U	
RDX	0.5	U	
TETRYL	0.5	U	

nsample	009TP3760506
samp_date	5/15/2003
lab_id	0305228-01
qc_type	NM
units	MG/KG
Pct_Solids	82
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,3,5-TRINITROBENZENE	0.5	U	
1,3-DINITROBENZENE	0.5	U	
2,4,6-TRINITROTOLUENE	0.5	U	
2,4-DINITROTOLUENE	0.5	U	
2,6-DINITROTOLUENE	0.5	U	
2-AMINO-4,6-DINITROTOLUENE	0.5	U	
2-NITROTOLUENE	0.5	U	
3-NITROTOLUENE	0.5	U	
4-AMINO-2,6-DINITROTOLUENE	0.5	U	
4-NITROTOLUENE	0.5	U	
HMX	0.5	U	
NITROBENZENE	0.5	U	
NITROGLYCERIN	2.5	U	
RDX	0.5	U	
TETRYL	0.5	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. KOTUN**	**DATE:**	**JUNE 30, 2003**
FROM:	**ETHAN G. LEE**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – TAL METALS AND PERCHLORATE**
NSWC WHITE OAK - CTO-839
SAMPLE DELIVERY GROUP (SDG) – 83903

SAMPLES: 9/SOIL/

009FD051503-01	009TP3030001	009TP3060910
009TP3190102A	009TP3190304B	009TP3440607
009TP3450001B	009TP3450405A	009TP3760506

Overview

The sample set for CTO 839, NSWC White Oak, SDG 83903, consists of nine (9) soil environmental samples. One (1) field duplicate pair (009FD051503-01 / 009TP3060910) is included in this SDG.

All samples were analyzed for target analyte list (TAL) metals. All samples except 009TP3440607, 009TP3450001B, and 009TP3450405A were also analyzed for perchlorate. The samples were collected by Tetra Tech NUS May 14-15, 2003 and analyzed by Laucks Testing Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. Metals analyses were conducted using CLP method ILM04.0. Perchlorate analyses were conducted using EPA method 314.0.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data. The data review was based on data completeness, holding times, calibration data, laboratory method/preparation blanks, ICP interference results, matrix spike results, post digestion spike results, laboratory duplicate results, laboratory control sample (LCS) results, ICP serial dilution results, field duplicate results, detection limits, and analyte quantitation.

Metals analyses were conducted using Inductively Coupled Plasma (ICP) methodologies. Mercury analyses were conducted using Cold Vapor Atomic Absorption (CVAA) methodology.

Minor Problems

- The contract required detection limit (CRDL) percent recovery (%R) run on 5/21/03 at 13:03 was above the 110% control limit for selenium, affecting all samples. Positive results <2X CRDL reported for selenium were qualified as biased high (K).

- The CRDL %R run on 5/21/03 at 10:45 was above the 110% control limit for thallium, affecting all samples. Positive results <2X CRDL reported for thallium were qualified as biased high (K).

- The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Aluminum	39.6 ug/L	39.6 mg/kg
Antimony[1]	0.696 mg/kg	3.48 mg/kg
Beryllium[1]	0.280 mg/kg	1.4 mg/kg
Cadmium[1]	0.164 mg/kg	0.820 mg/kg
Calcium	75.5 ug/L	75.5 mg/kg
Chromium[1]	0.220 mg/kg	1.1 mg/kg
Iron[1]	3.886 mg/kg	19.43 mg/kg
Magnesium	21.1 ug/L	21.1 mg/kg
Silver	0.6 ug/L	0.6 mg/kg
Sodium[1]	103.744 mg/kg	518.72 mg/kg
Zinc	3.0 ug/L	3.0 mg/kg

[1] Maximum concentration present in laboratory preparation blank.

An action level of 5X the maximum concentration was used to evaluate the sample data for blank contamination. Sample aliquot, percent solids, and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the action level for antimony, beryllium, cadmium, magnesium, silver, and sodium were qualified (B) as a result of laboratory blank contamination. The remaining analytes were not qualified because the results were either greater than the action level or they were nondetects.

- The interfering analytes aluminum and iron were present in sample 009TP3190304B at concentrations comparable to the concentrations of aluminum and iron, respectively; in the interference check sample (ICS) solution. Several analytes, namely antimony, barium, beryllium, cadmium, chromium, copper, lead, manganese, silver, sodium, and zinc were present in the ICS solution at concentrations that exceeded the absolute value of the instrument detection limit (IDL). Interference effects exist for cadmium and silver in the affected sample. Nondetected results reported for cadmium and silver were qualified as biased low (UL).

- The interfering analyte iron was present in sample 009TP3760506 at a concentration comparable to the concentration of iron in the ICS solution. Several analytes, namely antimony, barium, beryllium, cadmium, chromium, copper, lead, manganese, silver, sodium, and zinc were present in the ICS solution at concentrations that exceeded the absolute value of the IDL. Interference effects exist for cadmium and silver in the affected sample. Nondetected results reported for cadmium and silver were qualified as biased low (UL).

- The matrix spike %R was below the 75% control limit for antimony. The positive result reported for antimony in sample 009TP3450405A was qualified as biased low (L).

- The ICP serial dilution percent differences (%Ds) were above the 10% control limit and the initial sample concentrations were >50X the IDL for magnesium and potassium. Positive results reported for magnesium and potassium were qualified as estimated (J).

Notes

The CRDL %Rs run on 5/21/03 at 10:45 and 13:03 were above the 110% control limit for lead, affecting all samples. No qualification action was required because all results were >2X CRDL.

The matrix spike %Rs were below the 75% control limit for aluminum and iron. No qualification action was required because the initial sample concentrations were >4X the spike added.

Dilutions were performed for silver and sodium in samples 009TP3450001B and 009TP3450405A due to matrix interferences.

Executive Summary

Laboratory Performance: Selenium and thallium were qualified due to calibration noncompliance. Several analytes were present in the laboratory method/preparation blanks.

Other Factors Affecting Data Quality: Cadmium and silver were qualified due to ICP interference in samples 009TP3190304B and 009TP3760506. Antimony was qualified due to matrix spike noncompliance. Magnesium and potassium were qualified due to ICP serial dilution noncompliance.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", April 1993 and the NFESC document entitled "Navy IRCDQM" (September 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Ethan G. Lee
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Data Qualifier Key:

U	-	Value is a nondetect as reported by the laboratory.
UL	-	Nondetect is considered biased low as a result of technical noncompliance.
B	-	Positive result is an artifact of blank contamination and should not be considered present.
J	-	Positive result is considered estimated as a result of technical noncompliance.
K	-	Positive result is considered biased high as a result of technical noncompliance.
L	-	Positive result is considered biased low as a result of technical noncompliance.

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: M

nsample	009FD051503-01
samp_date	5/15/2003
lab_id	0305228-03
qc_type	NM
units	MG/KG
Pct_Solids	76.3
DUP_OF:	009TP3060910

Parameter	Result	Val Qual	Qual Code
ALUMINUM	5430		
ANTIMONY	1.1	B	A
ARSENIC	1.6		
BARIUM	20.7		
BERYLLIUM	0.11	B	A
CADMIUM	0.64	B	A
CALCIUM	344		
CHROMIUM	8.9		
COBALT	0.89		
COPPER	9.9		
IRON	6780		
LEAD	4.9		
MAGNESIUM	268	J	I
MANGANESE	10.1		
MERCURY	0.012	U	
NICKEL	3.2		
POTASSIUM	221	J	I
SELENIUM	1.3	K	C
SILVER	0.08	U	
SODIUM	136	B	A
THALLIUM	0.82	U	
VANADIUM	15.0		
ZINC	40.6		

nsample	009TP3030001
samp_date	5/15/2003
lab_id	0305228-04
qc_type	NM
units	MG/KG
Pct_Solids	56.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	16200		
ANTIMONY	1.5	B	A
ARSENIC	4.9		
BARIUM	92.5		
BERYLLIUM	1.3	B	A
CADMIUM	0.59	B	A
CALCIUM	1210		
CHROMIUM	26.0		
COBALT	22.8		
COPPER	184		
IRON	16700		
LEAD	158		
MAGNESIUM	2420	J	I
MANGANESE	247		
MERCURY	0.20		
NICKEL	25.4		
POTASSIUM	707	J	I
SELENIUM	2.2	K	C
SILVER	0.12	U	
SODIUM	55.9	U	
THALLIUM	1.2	U	
VANADIUM	35.5		
ZINC	360		

nsample	009TP3060910
samp_date	5/15/2003
lab_id	0305228-02
qc_type	NM
units	MG/KG
Pct_Solids	87.3
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	4800		
ANTIMONY	1.1	B	A
ARSENIC	1.4		
BARIUM	15.7		
BERYLLIUM	0.15	B	A
CADMIUM	0.41	B	A
CALCIUM	290		
CHROMIUM	8.2		
COBALT	0.68		
COPPER	8.5		
IRON	5620		
LEAD	3.8		
MAGNESIUM	203	J	I
MANGANESE	7.1		
MERCURY	0.011	U	
NICKEL	2.6		
POTASSIUM	173	J	I
SELENIUM	1.4	K	C
SILVER	0.08	U	
SODIUM	117	B	A
THALLIUM	0.78	U	
VANADIUM	13.1		
ZINC	32.1		

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: M

nsample	009TP3190102A	nsample	009TP3190304B	nsample	009TP3440607
samp_date	5/14/2003	samp_date	5/14/2003	samp_date	5/15/2003
lab_id	0305209-03	lab_id	0305209-04	lab_id	0305228-05
qc_type	NM	qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG	units	MG/KG
Pct_Solids	84	Pct_Solids	83.9	Pct_Solids	94.3
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	14400		
ANTIMONY	0.57	B	A
ARSENIC	3.2		
BARIUM	70.9		
BERYLLIUM	0.47	B	A
CADMIUM	0.06	U	
CALCIUM	755		
CHROMIUM	19.2		
COBALT	7.1		
COPPER	8.5		
IRON	14200		
LEAD	46.0		
MAGNESIUM	1170	J	I
MANGANESE	197		
MERCURY	0.13		
NICKEL	10.0		
POTASSIUM	665	J	I
SELENIUM	1.6	K	C
SILVER	0.08	U	
SODIUM	149	B	A
THALLIUM	0.77	U	
VANADIUM	30.9		
ZINC	59.7		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	23000		
ANTIMONY	0.64	B	A
ARSENIC	5.0		
BARIUM	74.9		
BERYLLIUM	0.73	B	A
CADMIUM	0.06	UL	K
CALCIUM	1410		
CHROMIUM	28.0		
COBALT	9.0		
COPPER	10.5		
IRON	20400		
LEAD	11.7		
MAGNESIUM	2070	J	I
MANGANESE	139		
MERCURY	0.033		
NICKEL	15.3		
POTASSIUM	1140	J	I
SELENIUM	1.5	K	C
SILVER	0.07	UL	K
SODIUM	176	B	A
THALLIUM	1.3	K	C
VANADIUM	44.2		
ZINC	67.0		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	552		
ANTIMONY	1.2	B	A
ARSENIC	1.6		
BARIUM	7.1		
BERYLLIUM	0.07	B	A
CADMIUM	0.27	B	A
CALCIUM	65.9		
CHROMIUM	24.8		
COBALT	0.22	U	
COPPER	5.9		
IRON	5550		
LEAD	11.6		
MAGNESIUM	19.3	B	A
MANGANESE	4.8		
MERCURY	0.043		
NICKEL	0.54		
POTASSIUM	42.8	J	I
SELENIUM	1.3	K	C
SILVER	0.09	B	A
SODIUM	133	B	A
THALLIUM	0.71	U	
VANADIUM	16.5		
ZINC	38.5		

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: M

nsample	009TP3450001B	nsample	009TP3450405A	nsample	009TP3760506
samp_date	5/14/2003	samp_date	5/14/2003	samp_date	5/15/2003
lab_id	0305209-02	lab_id	0305209-01	lab_id	0305228-01
qc_type	NM	qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG	units	MG/KG
Pct_Solids	80.1	Pct_Solids	85.1	Pct_Solids	81.5
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	9730		
ANTIMONY	0.92	B	A
ARSENIC	3.7		
BARIUM	65.9		
BERYLLIUM	0.65	B	A
CADMIUM	0.06	U	
CALCIUM	437		
CHROMIUM	15.8		
COBALT	3.9		
COPPER	11.2		
IRON	11500		
LEAD	205		
MAGNESIUM	835	J	I
MANGANESE	117		
MERCURY	3.8		
NICKEL	18.7		
POTASSIUM	427	J	I
SELENIUM	2.2		
SILVER	0.38	U	
SODIUM	180	U	
THALLIUM	0.78	U	
VANADIUM	27.6		
ZINC	43.1		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	8980		
ANTIMONY	12.9	L	D
ARSENIC	7.3		
BARIUM	89.7		
BERYLLIUM	1.0	B	A
CADMIUM	0.06	U	
CALCIUM	645		
CHROMIUM	37.1		
COBALT	2.0		
COPPER	46.7		
IRON	12300		
LEAD	1800		
MAGNESIUM	478	J	I
MANGANESE	48.3		
MERCURY	2.9		
NICKEL	9.6		
POTASSIUM	351	J	I
SELENIUM	3.8		
SILVER	0.73	U	
SODIUM	350	U	
THALLIUM	1.6	K	C
VANADIUM	32.0		
ZINC	306		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	16100		
ANTIMONY	1.7	B	A
ARSENIC	9.6		
BARIUM	27.2		
BERYLLIUM	0.31	B	A
CADMIUM	0.06	UL	K
CALCIUM	384		
CHROMIUM	35.2		
COBALT	1.8		
COPPER	11.9		
IRON	21300		
LEAD	8.9		
MAGNESIUM	514	J	I
MANGANESE	14.3		
MERCURY	0.044		
NICKEL	7.6		
POTASSIUM	578	J	I
SELENIUM	1.9	K	C
SILVER	0.08	UL	K
SODIUM	254	B	A
THALLIUM	0.80	U	
VANADIUM	60.8		
ZINC	18.4		

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: MISC

nsample	009FD051503-01
samp_date	5/15/2003
lab_id	0305228-03
qc_type	NM
Pct_Solids	76.3
DUP_OF:	009TP3060910

Parameter	units	Result	Val Qual	Qual Code
PERCHLORATE	MG/KG	0.08	U	

nsample	009TP3030001
samp_date	5/15/2003
lab_id	0305228-04
qc_type	NM
Pct_Solids	56.8
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
PERCHLORATE	MG/KG	0.08	U	

nsample	009TP3060910
samp_date	5/15/2003
lab_id	0305228-02
qc_type	NM
Pct_Solids	87.3
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
PERCHLORATE	MG/KG	0.08	U	

PROJ_NO: 4246

SDG: 83903 MEDIA: SOIL DATA FRACTION: MISC

nsample	009TP3190102A	nsample	009TP3190304B	nsample	009TP3760506
samp_date	5/14/2003	samp_date	5/14/2003	samp_date	5/15/2003
lab_id	0305209-03	lab_id	0305209-04	lab_id	0305228-01
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids	84	Pct_Solids	83.9	Pct_Solids	81.5
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
PERCHLORATE	MG/KG	0.08	U	

Parameter	units	Result	Val Qual	Qual Code
PERCHLORATE	MG/KG	0.08	U	

Parameter	units	Result	Val Qual	Qual Code
PERCHLORATE	MG/KG	0.08	U	

APPENDIX C

SUMMARY OF WILCOXON RANK SUM TEST RESULTS

AND

95% UCL CALCULATIONS

WHITE OAK - SITE 9
SUMMARY OF WILCOXON RANK SUM TESTS - SUBSURFACE SOIL DATA

Parameter	SITE Rank Sum	SITE Valid N	SITE Avg Rank	BACK Rank Sum	BACK Valid N	BACK Avg Rank	U	Z	p-level 1-sided	adjusted Z	p-level 1-sided	SITE GREATER THAN BACKGROUND?
ALUMINUM	337.0	20	16.9	483.0	20	24.2	127	-1.9747	0.0483	-1.9747	0.0483	NO
ANTIMONY	414.5	20	20.7	405.5	20	20.3	196	0.1217	0.9031	0.1220	0.9029	NO
ARSENIC	340.5	20	17.0	479.5	20	24.0	131	-1.8800	0.0601	-1.8803	0.0601	NO
BARIUM	356.0	20	17.8	464.0	20	23.2	146	-1.4607	0.1441	-1.4607	0.1441	NO
BERYLLIUM	**560.0**	**20**	**28.0**	**260.0**	**20**	**13.0**	**50**	**4.0575**	**0.0000**	**4.0920**	**0.0000**	**YES**
CADMIUM	**497.0**	**20**	**24.9**	**323.0**	**20**	**16.2**	**113**	**2.3534**	**0.0186**	**2.3788**	**0.0174**	**YES**
CALCIUM	405.5	20	20.3	414.5	20	20.7	196	-0.1217	0.9031	-0.1217	0.9031	NO
CHROMIUM	399.0	20	20.0	421.0	20	21.1	189	-0.2976	0.7660	-0.2976	0.7660	NO
COBALT	369.5	20	18.5	450.5	20	22.5	160	-1.0955	0.2733	-1.0958	0.2732	NO
COPPER	391.5	20	19.6	428.5	20	21.4	182	-0.5004	0.6168	-0.5005	0.6167	NO
IRON	377.5	20	18.9	442.5	20	22.1	168	-0.8791	0.3793	-0.8793	0.3793	NO
LEAD	314.0	20	15.7	506.0	20	25.3	104	-2.5968	0.0094	-2.5969	0.0094	NO
MAGNESIUM	341.0	20	17.1	479.0	20	24.0	131	-1.8665	0.0620	-1.8665	0.0620	NO
MANGANESE	321.0	20	16.1	499.0	20	25.0	111	-2.4075	0.0161	-2.4075	0.0161	NO
MERCURY	**528.0**	**20**	**26.4**	**292.0**	**20**	**14.6**	**82**	**3.1919**	**0.0014**	**3.1975**	**0.0014**	**YES**
NICKEL	358.5	20	17.9	461.5	20	23.1	149	-1.3931	0.1636	-1.3934	0.1635	NO
POTASSIUM	334.0	20	16.7	486.0	20	24.3	124	-2.0558	0.0398	-2.0558	0.0398	NO
SELENIUM	407.5	20	20.4	412.5	20	20.6	198	-0.0676	0.9461	-0.0677	0.9460	NO
SILVER	246.0	20	12.3	574.0	20	28.7	36	-4.4362	0.0000	-4.5349	0.0000	NO
SODIUM	381.0	20	19.1	439.0	20	22.0	171	-0.7845	0.4328	-0.7845	0.4327	NO
THALLIUM	390.0	20	19.5	430.0	20	21.5	180	-0.5410	0.5885	-0.5422	0.5877	NO
VANADIUM	400.5	20	20.0	419.5	20	21.0	191	-0.2570	0.7972	-0.2570	0.7972	NO
ZINC	392.5	20	19.6	427.5	20	21.4	183	-0.4734	0.6359	-0.4734	0.6359	NO

From File	C:\ProUCL\Data\ProUCLDATASite9b.xls			
Summary Statistics for	MERCURY		Summary Statistics for	ln(MERCURY)
Number of Samples	20		Minimum	-5.158555
Minimum	0.00575		Maximum	1.335001
Maximum	3.8		Mean	-1.856126
Mean	0.5247875		Standard Deviation	1.560795
Median	0.125		Variance	2.43608
Standard Deviation	1.00885732			
Variance	1.01779309		Shapiro-Wilk Test Statisitic	0.960531
Coefficient of Variation	1.9224111		Shapiro-Wilk 5% Critical Value	0.905
Skewness	2.70130683		Data are Lognormal at 5% Significance Level	
95 % UCL (Assuming Normal Data)			Estimates Assuming Lognormal Distribution	
Student's-t	0.91485794		MLE Mean	0.528303
			MLE Standard Deviation	1.70603
95 % UCL (Adjusted for Skewness)			MLE Coefficient of Variation	3.229265
Adjusted-CLT	1.04144323		MLE Skewness	43.36308
Modified-t	0.93756821		MLE Median	0.156277
			MLE 80% Quantile	0.58435
95 % Non-parametric UCL			MLE 90% Quantile	1.161248
CLT	0.89584568		MLE 95% Quantile	2.036803
Jackknife	0.91485794		MLE 99% Quantile	5.896049
Standard Bootstrap	0.8981329			
Bootstrap-t	1.80492235		MVU Estimate of Median	0.147017
Chebyshev (Mean, Std)	1.50809998		MVU Estimate of Mean	0.469796
			MVU Estimate of Std. Dev.	1.034855
			MVU Estimate of SE of Mean	0.197183
			UCL Assuming Lognormal Distribution	
			95% H-UCL	1.824312
			95% Chebyshev (MVUE) UCL	1.329298
			99% Chebyshev (MVUE) UCL	2.431744
			Recommended UCL to use:	
			95 % Chebyshev (MVUE) UCL	

APPENDIX D

RAGS-PART D TABLES
AND
RISK ASSESSMENT CALCULATIONS

TABLE 1

SELECTION OF EXPOSURE PATHWAYS
SITE 9 - INDUSRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil	Subsurface Soil	Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Ingestion	On-site	Quant(1)	Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing.
						Dermal	On-site	Quant(1)	
		Air	Vapors and Particulates in Air - Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Inhalation	On-site	Qual(2)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (3)for transfers from soil to air.

Footnotes:

1 Quantitative.

2 Qualitative.

3 USEPA Soil Screening Levels (USEPA, August 2003).

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Nondetects[1]	Concentration Used for Screening[2]	Site Above Background ? (3)	Risk-Based COPC Screening Level[4]		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[5]
Volatiles (mg/kg)																	
76-13-1	1,1,2-Trichlorotrifluoroethan	0.002	J	0.003	J	mg/kg	009TP3060910-D	2/8	0.009 - 0.022	0.003	NA	230000	N	120 930	SSL-MIGR SSL-INH	No -	BSL
108-10-1	4-Methyl-2-Pentanone	0.001	J	0.002	J	mg/kg	09-SB12-1012	3/20	0.009 - 0.022	0.002	NA	630	N	0.93 490	SSL-MIGR SSL-INH	No	BSL
67-64-1	Acetone	0.007	J	0.2	J	mg/kg	009TP3030001	3/20	0.005 - 0.013	0.2	NA	780	N	0.12 NA	SSL-MIGR SSL-INH	No	BSL
75-71-8	Dichlorodifluoromethane	0.009	J	0.05		mg/kg	009TP3190102A	6/8	0.01 - 0.011	0.05	NA	1600	N	0.55 250	SSL-MIGR SSL-INH	No	BSL
100-41-4	Ethylbenzene	0.001	J	0.001	J	mg/kg	09-SB07-1012	1/20	0.009 - 0.022	0.001	NA	780	N	0.75 400	SSL-MIGR SSL-INH	No	BSL
75-09-2	Methylene Chloride	0.062		0.062		mg/kg	09-SB02-1012	1/20	0.002 - 0.022	0.062	NA	85	C	0.00095 13	SSL-MIGR SSL-INH	No	BSL
1330-20-7	Total Xylenes	0.006	J	0.006	J	mg/kg	09-SB07-1012	1/20	0.009 - 0.022	0.006	NA	1600	N	0.15 NA	SSL-MIGR SSL-INH	No	BSL
79-01-6	Trichloroethene	0.001	J	0.005	J	mg/kg	09-SB19-1012	3/20	0.009 - 0.022	0.005	NA	1.6	C	0.000013 4.6	SSL-MIGR SSL-INH	No	BSL
Semivolatile Organics (mg/kg)																	
120-12-7	Anthracene	0.061	J	0.061	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.061	NA	2300	N	23 NA	SSL-MIGR SSL-INH	No	BSL
206-44-0	Fluoranthene	0.17	J	0.17	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.17	NA	310	N	310 NA	SSL-MIGR SSL-INH	No	BSL
85-01-8	Phenanthrene	0.19	J	0.19	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.19	NA	230(6)	N	34(6) NA	SSL-MIGR SSL-INH	No	BSL
129-00-0	Pyrene	0.19	J	0.19	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.19	NA	230	N	34 NA	SSL-MIGR SSL-INH	No	BSL
Inorganics (mg/kg)																	
7429-90-5	Aluminum	552		23000		mg/kg	009TP3190304B	20/20	---	23000	No	7800	N	NA NA	SSL-MIGR SSL-INH	No	BKG
7440-36-0	Antimony	0.35	L	12.9	L	mg/kg	009TP3450405A	2/20	0.24 - 1.7	12.9	No	3.1	N	0.66 NA	SSL-MIGR SSL-INH	No	BKG
7440-38-2	Arsenic	0.27		9.6		mg/kg	009TP3760506	17/20	1.4 - 4.2	9.6	No	0.43	C	0.0013 770	SSL-MIGR SSL-INH	No	BKG
7440-39-3	Barium	1.6		92.5		mg/kg	009TP3030001	18/20	4 - 5.6	92.5	No	550	N	110 710,000	SSL-MIGR SSL-INH	No	BSL,BKG
7440-41-7	Beryllium	0.16	L	1.9		mg/kg	09-SB06-1214	4/20	0.06 - 1.3	1.9	Yes	16	N	58 1,400	SSL-MIGR SSL-INH	No	BSL
7440-43-9	Cadmium	1.1		1.1		mg/kg	09-SB06-1214	1/20	0.06 - 1.3	1.1	Yes	3.9	N	1.4 1,800	SSL-MIGR SSL-INH	No	BSL
7440-70-2	Calcium	12.1		1410		mg/kg	009TP3190304B	13/20	9 - 61	1410	No	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7440-47-3	Chromium	2.3	J	37.1		mg/kg	009TP3450405A	20/20	---	37.1	No	23(7)	N	2.1 280	SSL-MIGR SSL-INH	No	BKG
7440-48-4	Cobalt	0.68		22.8		mg/kg	009TP3030001	12/20	0.22 - 3.3	22.8	No	160	N	NA NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-50-8	Copper	1.8	J	184		mg/kg	009TP3030001	15/20	7.1 - 16	184	No	310	N	530 NA	SSL-MIGR SSL-INH	No	BSL,BKG
7439-89-6	Iron	412	J	50500		mg/kg	09-SB05-1012	20/20	---	50500	No	2300	N	NA NA	SSL-MIGR SSL-INH	No	BKG
7439-92-1	Lead	1.7	L	1800		mg/kg	009TP3450405A	19/20	1.4	1800	No	400(8)		NA NA	SSL-MIGR SSL-INH	No	BKG
7439-95-4	Magnesium	22.9	J	5570		mg/kg	09-SB06-1214	19/20	19.3	5570	No	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Nondetects[1]	Concentration Used for Screening[2]	Site Above Background ? (3)	Risk-Based COPC Screening Level[4]		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[5]
7439-96-5	Manganese	1.3	L	1120	J	mg/kg	09-SB06-1214	19/20	0.45 - 0.47	1120	No	160(9)	N	48 69,000	SSL-MIGR SSL-INH	No	BKG
7439-97-6	Mercury	0.033		3.8		mg/kg	009TP3450001B	13/20	0.011 - 0.32	3.8	Yes	2.3(10)	N	NA NA	SSL-MIGR SSL-INH	Yes	ASL
7440-02-0	Nickel	0.54		25.4		mg/kg	009TP3030001	13/20	1.8 - 4	25.4	No	160	N	NA NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-09-7	Potassium	42.8	J	3950		mg/kg	09-SB05-1012	17/20	158 - 3650	3950	No	NA		NA NA	SSL-MIGR SSL-INH	No	NUT, BKG
7782-49-2	Selenium	0.34	K	3.8		mg/kg	009TP3450405A	12/20	0.32 - 0.34	3.8	No	39	N	0.95 NA	SSL-MIGR SSL-INH	No	BSL,BKG
7440-28-0	Thallium	0.5		1.6	K	mg/kg	009TP3450405A	3/20	0.25 - 1.2	1.6	No	0.55	N	0.18 NA	SSL-MIGR SSL-INH	No	BKG
7440-62-2	Vanadium	3.6		60.8		mg/kg	009TP3760506	19/20	12.8	60.8	No	55	N	260 NA	SSL-MIGR SSL-INH	No	BKG
7440-66-6	Zinc	1.5		360		mg/kg	009TP3030001	15/20	0.66 - 9.1	360	No	2300	N	680 NA	SSL-MIGR SSL-INH	No	BSL,BKG
Miscellaneous Parameters (mg/kg)																	
TTNUS002	pH	4.41		6.78		mg/kg	09-SB03-CUT	12/12	---	6.78		NA	N	NA NA	SSL-MIGR SSL-INH	No	NTX
TTNUS041	Total Kjeldahl Nitrogen	14.9		248		mg/kg	09-SB13-0810	10/12	20.5 - 38.3	248		NA	N	NA NA	SSL-MIGR SSL-INH	No	NTX

Footnotes:
1 Values presented are sample-specific quantitation limits.
2 The maximum detected concentration is used for screening purposes.
3 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
4 The risk-based soil PCOC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 3, April 2003).
5 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
6 Pyrene is used as a surrogate for phenanthrene.
7 Hexavalent Chromium.
8 OSWER soil screening level for residential land use (USEPA, July 1994).
9 Manganese - nonfood.
10 Value is for mercuric chloride

Associated Samples:

009TP3030001,NORMAL	009TP3760506,NORMAL	09-SB08-1214,NORMAL
009TP3060910	09-SB02-1012,NORMAL	09-SB12-1012,NORMAL
009TP3190102A,NORMAL	09-SB03-CUT,NORMAL	09-SB13-0810,NORMAL
009TP3190304B,NORMAL	09-SB04-1012,NORMAL	09-SB14-1012,NORMAL
009TP3440607,NORMAL	09-SB05-1012,NORMAL	09-SB15-1214-AVG,AVG
009TP3450001B,NORMAL	09-SB06-1214,NORMAL	09-SB19-1012,NORMAL
009TP3450405A,NORMAL	09-SB07-1012,NORMAL	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
K = Estimated Value, biased high
L = Estimated Value, biased low
N = Nocarcinogen
NA = Not Applicable/Not Available.
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, August 2003)
SSL-MIGR = Soil Screening Level for transfers from soil to groundwater for Dilution and Attenuation Factor of 1 (USEPA, Region 3, April 2003)

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level

For Elimination as a COPC:
BKG = Within background levels
BSL = Below COPC Screening Level
NUT = Essential Nutrient
NTX = No toxicity criteria

TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: SubsurfaceSoil
Exposure Point: Subsurface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	mg/kg	8.99E+03	1.14E+04	2.30E+04		mg/kg	1.14E+04	95% UCL-N	W - Test (1)	1.14E+04	95% UCL-N	W - Test (1)
Antimony	mg/kg	9.71E-01	2.06E+00	1.29E+01	L	mg/kg	1.18E+00	95% UCL-T	W - Test (2)	1.18E+00	95% UCL-T	W - Test (2)
Arsenic	mg/kg	2.83E+00	3.76E+00	9.60E+00		mg/kg	4.84E+00	95% UCL-T	W - Test (3)	4.84E+00	95% UCL-T	W - Test (3)
Chromium	mg/kg	1.96E+01	2.34E+01	3.71E+01		mg/kg	2.34E+01	95% UCL-N	W - Test (1)	2.34E+01	95% UCL-N	W - Test (1)
Iron	mg/kg	1.71E+04	2.22E+04	5.05E+04		mg/kg	2.68E+04	95% UCL-T	W - Test (3)	2.68E+04	95% UCL-T	W - Test (3)
Manganese	mg/kg	1.45E+02	2.60E+02	1.12E+03	J	mg/kg	1.12E+03	Maximum	W - Test (4)	1.12E+03	Maximum	W - Test (4)
Mercury	mg/kg	5.25E-01	9.15E-01	3.80E+00		mg/kg	1.82E+00	95% UCL-T	W - Test (3)	1.82E+00	95% UCL-T	W - Test (3)
Thallium	mg/kg	3.70E-01	5.25E-01	1.60E+00	K	mg/kg	5.52E-01	95% UCL-T	W - Test (2)	5.52E-01	95% UCL-T	W - Test (2)
Vanadium	mg/kg	3.01E+01	3.60E+01	6.08E+01		mg/kg	3.60E+01	95% UCL-N	W - Test (1)	3.60E+01	95% UCL-N	W - Test (1)
Lead	mg/kg	1.15E+02	2.70E+02	1.80E+03		mg/kg	1.15E+02	Average	(5)	1.15E+02	Average	(5)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are normally distributed.
(1) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(3) Shapiro-Wilk W Test indicates data are log-normally distributed.
(4) Log-normal 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.
(5) Use of the average concentration as the EPC for lead is recommended by USEPA lead guidance (USEPA, January 2003).

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal RfD(2)	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ(3)
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	08/01/03

(1) USEPA, September, 2001.
(2) RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
(3) Date of IRIS

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, August 2003)

TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) = Cs x IRs x EF x ED / BW x AT x CF
	IRs	Ingestion Rate of Soil	(mg/day)	100	USEPA, May 1993	50	USEPA, May 1993	
	EF	Exposure Frequency	(days/year)	250	USEPA, May 1993	219	USEPA, May 1993	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	USEPA December 1989	3,285	USEPA December 1989	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) = Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	0.2	USEPA, September 2001	0.02	USEPA, September 2001	
	SA	Skin Surface Area	(cm^2)	3,300	USEPA, September 2001	3,300	USEPA, September 2001	
	ABS	Absorption Factor	(unitless)	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	EF	Exposure Frequency	(days/year)	250	USEPA, May 1993	219	USEPA, May 1993	
	ED	Exposure Duration	(years)	25	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	USEPA December 1989	3,285	USEPA December 1989	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.49E-07
Noncancer Ingestion Intake - RME = 9.78E-07

Cancer Ingestion Intake - CTE = 5.51E-08
Noncancer Ingestion Intake - CTE = 4.29E-07

Cancer Dermal Intake - RME = 2.31E-06
Noncancer Dermal Intake - RME = 6.46E-06

Cancer Dermal Intake - CTE = 7.27E-08
Noncancer Dermal Intake - CTE = 5.66E-07

TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.0E-03
	(total)												**5.95E-03**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.18E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	5.61E-03
	(total)												**5.61E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	6.4E-07	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	4.2E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	7.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-03
	(total)												**2.61E-03**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.03E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.91E-04
	(total)												**4.91E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.0E-07	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.3E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE/UTILITY WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) = Cs x IRs x EF x ED / BW x AT x CF
	IRs	Ingestion Rate of Soil	(mg/day)	100	USEPA, May 1993	50	USEPA, May 1993	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	USEPA December 1989	3,285	USEPA December 1989	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) = Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	0.2	USEPA, September 2001	0.02	USEPA, September 2001	
	SA	Skin Surface Area	(cm^2)	3,300	USEPA, September 2001	3,300	USEPA, September 2001	
	ABS	Absorption Factor	(unitless)	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	USEPA December 1989	3,285	USEPA December 1989	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 5.03E-08
Noncancer Ingestion Intake - RME = 1.41E-07

Cancer Ingestion Intake - CTE = 4.53E-09
Noncancer Ingestion Intake - CTE = 3.52E-08

Cancer Dermal Intake - RME = 3.32E-07
Noncancer Dermal Intake - RME = 9.30E-07

Cancer Dermal Intake - CTE = 5.98E-09
Noncancer Dermal Intake - CTE = 4.65E-08

TABLE 7.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE/UTILITY WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	2.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.6E-04
	(total)												**8.57E-04**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.70E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	8.08E-04
	(total)												**8.08E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE/UTILITY WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	9.2E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	6.1E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 7.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE/UTILITY WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	6.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-04
	(total)												**2.14E-04**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.48E-10	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.04E-05
	(total)												**4.04E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.5E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE/UTILITY WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.3E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.1E-10	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) = Cs x IRs x EF x ED / BW x AT x CF
	IRs	Ingestion Rate of Soil	(mg/day)	480	USEPA, May 1993	240	USEPA, May 1993	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	365	USEPA December 1989	365	USEPA December 1989	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) = Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	0.3	USEPA, September 2001	0.1	USEPA, September 2001	
	SA	Skin Surface Area	(cm^2)	3,300	USEPA, September 2001	3,300	USEPA, September 2001	
	ABS	Absorption Factor	(unitless)	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	365	USEPA December 1989	365	USEPA December 1989	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.83E-08
Noncancer Ingestion Intake - RME = 3.38E-06

Cancer Ingestion Intake - CTE = 2.42E-08
Noncancer Ingestion Intake - CTE = 1.69E-06

Cancer Dermal Intake - RME = 9.96E-08
Noncancer Dermal Intake - RME = 6.97E-06

Cancer Dermal Intake - CTE = 3.32E-08
Noncancer Dermal Intake - CTE = 2.32E-06

TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	6.2E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-02
	(total)												**2.06E-02**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.27E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	6.06E-03
	(total)												**6.06E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Metals - 0.01

TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.8E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.8E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Metals - 0.01

TABLE 7.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	3.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.0E-02
	(total)												**1.03E-02**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	4.24E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.02E-03
	(total)												**2.02E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Metals - 0.01

TABLE 8.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	4.4E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	6.1E-10	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Metals - 0.01

TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	USEPA, May 1993	50	USEPA, May 1993	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	USEPA December 1989	3,285	USEPA December 1989	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	0.08	USEPA, September 2001	0.01	USEPA, September 2001	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	9,000	USEPA, August 1997	9,000	USEPA, August 1997	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	USEPA December 1989	3,285	USEPA December 1989	

Daily Intake Calculations

Ingestion Intake = (IR x FI x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.68E-08
Noncancer Ingestion Intake - RME = 6.26E-08

Cancer Ingestion Intake - CTE = 2.01E-09
Noncancer Ingestion Intake - CTE = 1.57E-08

Cancer Dermal Intake - RME = 1.93E-07
Noncancer Dermal Intake - RME = 4.51E-07

Cancer Dermal Intake - CTE = 3.62E-09
Noncancer Dermal Intake - CTE = 2.82E-08

TABLE 7.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.8E-04
	(total)												**3.81E-04**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.23E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.92E-04
	(total)												**3.92E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.7E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	4.9E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	3.5E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 7.4a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	2.9E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.5E-05
	(total)												**9.52E-05**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	5.14E-10	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.45E-05
	(total)												**2.45E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.4a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	3.7E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	6.6E-11	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adolescent Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	USEPA, May 1993	50	USEPA, May 1993	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	43	USEPA, August 1997	43	USEPA, August 1997	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	USEPA December 1989	3,650	USEPA December 1989	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	0.3	USEPA, September 2001	0.04	USEPA, September 2001	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3,263	USEPA, August 1997	3,263	USEPA, August 1997	
	ABS	Absorption Factor	(unitless)	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	43	USEPA, August 1997	43	USEPA, August 1997	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	USEPA December 1989	3,650	USEPA December 1989	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.73E-08
Noncancer Ingestion Intake - RME = 3.31E-07

Cancer Ingestion Intake - CTE = 1.18E-08
Noncancer Ingestion Intake - CTE = 8.28E-08

Cancer Dermal Intake - RME = 4.63E-07
Noncancer Dermal Intake - RME = 3.24E-06

Cancer Dermal Intake - CTE = 3.09E-08
Noncancer Dermal Intake - CTE = 2.16E-07

TABLE 7.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adolescent Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	6.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-03
	(total)												**2.01E-03**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	5.92E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.82E-03
	(total)												**2.82E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adolescent Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.6E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.5E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 7.5a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adolescent Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.0E-04
	(total)												**5.04E-04**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	3.94E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.88E-04
	(total)												**1.88E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.9E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.5a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Adolescent Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	2.2E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	5.6E-10	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) = Cs x IRs x EF x ED / BW x AT x CF
	IRs	Ingestion Rate of Soil	(mg/day)	200	USEPA, May 1993	100	USEPA, May 1993	
	EF	Exposure Frequency	(days/year)	250	USEPA, May 1993	219	USEPA, May 1993	
	FI	Fraction Ingested	(unitless)	0.5	Professional Judgement	0.5	Professional Judgement	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	15	USEPA December 1989	15	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	USEPA December 1989	1,095	USEPA December 1989	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) = Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	0.2	USEPA, September 2001	0.04	USEPA, September 2001	
	SA	Skin Surface Area	(cm^2)	2,800	USEPA, September 2001	2,800	USEPA, September 2001	
	ABS	Absorption Factor	(unitless)	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	EF	Exposure Frequency	(days/year)	250	USEPA, May 1993	219	USEPA, May 1993	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	15	USEPA December 1989	15	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	USEPA December 1989	1,095	USEPA December 1989	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.91E-07
Noncancer Ingestion Intake - RME = 4.57E-06

Cancer Ingestion Intake - CTE = 8.57E-08
Noncancer Ingestion Intake - CTE = 2.00E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 1.92E-07
Noncancer Dermal Intake - CTE = 4.48E-06

TABLE 7.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.3E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.8E-02
	(total)												**2.78E-02**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	4.66E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.22E-02
	(total)												**2.22E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	7.1E-07	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	4.0E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 8.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	1.6E-07	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	3.5E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Metals - 0.01

TABLE 7.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	3.6E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-02
	(total)												**1.22E-02**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.17E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.89E-03
	(total)												**3.89E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Metals - 0.01

TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	USEPA, May 1993	50	USEPA, May 1993	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	USEPA, May 1993	234	USEPA, May 1993	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	USEPA, May 1993	7	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	USEPA December 1989	2,555	USEPA December 1989	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	0.07	USEPA, September 2001	0.01	USEPA, September 2001	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	5,700	USEPA, September 2001	5,700	USEPA, September 2001	
	ABS	Absorption Factor	(unitless)	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	EF	Exposure Frequency	(days/year)	350	USEPA, May 1993	234	USEPA, May 1993	
	ED	Exposure Duration	(years)	24	USEPA, May 1993	7	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	70	USEPA December 1989	70	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	USEPA December 1989	2,555	USEPA December 1989	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.87E-06
Noncancer Dermal Intake - RME = 5.47E-06

Cancer Dermal Intake - CTE = 5.22E-08
Noncancer Dermal Intake - CTE = 5.22E-07

TABLE 7.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	2.5E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.3E-03
	(total)												**8.33E-03**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	9.97E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.75E-03
	(total)												**4.75E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.6E-07	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	3.4E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 7.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.8E-03
	(total)												**2.78E-03**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	9.52E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.54E-04
	(total)												**4.54E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.4E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	9.5E-10	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHLD RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	USEPA, May 1993	100	USEPA, May 1993	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	350	USEPA, May 1993	234	USEPA, May 1993	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	6	USEPA, May 1993	2	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	15	USEPA December 1989	15	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	USEPA December 1989	730	USEPA December 1989	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	USEPA, May 1993	95%UCL	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	0.2	USEPA, September 2001	0.04	USEPA, September 2001	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	2,800	USEPA, September 2001	2,800	USEPA, September 2001	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	EF	Exposure Frequency	(days/year)	350	USEPA, May 1993	234	USEPA, May 1993	
	ED	Exposure Duration	(years)	6	USEPA, May 1993	2	USEPA, May 1993	
	CF	Conversion Factor	(mg/kg)	1.00E-06	USEPA December 1989	1.00E-06	USEPA December 1989	
	BW	Body Weight	(kg)	15	USEPA December 1989	15	USEPA December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA December 1989	25,550	USEPA December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	USEPA December 1989	730	USEPA December 1989	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 3.07E-06
Noncancer Dermal Intake - RME = 3.58E-05

Cancer Dermal Intake - CTE = 1.37E-07
Noncancer Dermal Intake - CTE = 4.79E-06

TABLE 7.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHLD RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	2.3E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.8E-02
	(total)												**7.77E-02**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	6.53E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.11E-02
	(total)												**3.11E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHLD RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	2.0E-06	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	5.6E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 7.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHLD RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	7.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-02
	(total)												**2.60E-02**
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	8.73E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.16E-03
	(total)												**4.16E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032

Other metals - 0.01

TABLE 8.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHLD RESIDENTS TO SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	2.2E-07	mg/kg-day		(mg/kg-day)-1	
	(total)										
Dermal	Mercury	1.82E+00	mg/kg	1.82E+00	mg/kg	M	2.5E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA Region 3, June 2003):

Arsenic - 0.032
Other metals - 0.01

TABLE 9.1 - REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury				
						Total Risk Across Surface Soil	

Total Risk Across All Media and All Exposure Routes

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Mercury	CNS	6.0E-03		5.6E-03	1.2E-02
				Total Hazard Index Across All Media and All Exposure Routes	1.2E-02

Total CNS HI = 1.2E-02

TABLE 9.2 - REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	8.6E-04		8.1E-04	1.7E-03
						Total Risk Across Surface Soil						Total Hazard Index Across All Media and All Exposure Routes	1.7E-03

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 1.7E-03

TABLE 9.3 - REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	2.1E-02		6.1E-03	2.7E-02
						Total Risk Across Surface Soil			Total Hazard Index Across All Media and All Exposure Routes				2.7E-02

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 2.7E-02

TABLE 9.4 - REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	3.8E-04		3.9E-04	7.7E-04
						Total Risk Across Surface Soil			Total Hazard Index Across All Media and All Exposure Routes				7.7E-04

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 7.7E-04

TABLE 9.5 - REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury				
			Total Risk Across Surface Soil				

Total Risk Across All Media and All Exposure Routes

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Mercury	CNS	2.0E-03		2.8E-03	4.8E-03
Total Hazard Index Across All Media and All Exposure Routes					4.8E-03

Total CNS HI = 4.8E-03

TABLE 9.6 - REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	2.8E-02		2.2E-02	5.0E-02
						Total Risk Across Surface Soil	0.0E+00					Total Hazard Index Across All Media and All Exposure Routes	5.0E-02

Total Risk Across All Media and All Exposure Routes 0.0E+00

Total CNS HI = 5.0E-02

TABLE 9.7 - REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	8.3E-03		4.7E-03	1.3E-02
						Total Risk Across Surface Soil						Total Hazard Index Across All Media and All Exposure Routes	1.3E-02

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 1.3E-02

TABLE 9.8 - REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	7.8E-02		3.1E-02	1.1E-01
						Total Risk Across Surface Soil			Total Hazard Index Across All Media and All Exposure Routes				1.1E-01

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 1.1E-01

TABLE 9.1a - CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	2.6E-03		4.9E-04	3.1E-03
						Total Risk Across Surface Soil			Total Hazard Index Across All Media and All Exposure Routes				3.1E-03

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 3.1E-03

TABLE 9.2a - CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	2.1E-04		4.0E-05	2.5E-04
						Total Risk Across Surface Soil						Total Hazard Index Across All Media and All Exposure Routes	2.5E-04

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 2.5E-04

TABLE 9.3a - CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury				
						Total Risk Across Surface Soil	

Total Risk Across All Media and All Exposure Routes

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Mercury	CNS	1.0E-02		2.0E-03	1.2E-02
				Total Hazard Index Across All Media and All Exposure Routes	1.2E-02

Total CNS HI = 1.2E-02

TABLE 9.4a - CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	9.5E-05		2.4E-05	1.2E-04
						Total Risk Across Surface Soil						Total Hazard Index Across All Media and All Exposure Routes	1.2E-04

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 1.2E-04

TABLE 9.5a - CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	5.0E-04		1.9E-04	6.9E-04
						Total Risk Across Surface Soil			Total Hazard Index Across All Media and All Exposure Routes				6.9E-04

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 6.9E-04

TABLE 9.6a - CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	1.2E-02		3.9E-03	1.6E-02
						Total Risk Across Surface Soil	0.0E+00					Total Hazard Index Across All Media and All Exposure Routes	1.6E-02

Total Risk Across All Media and All Exposure Routes 0.0E+00

Total CNS HI = 1.6E-02

TABLE 9.7a - CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury				
						Total Risk Across Surface Soil	

Total Risk Across All Media and All Exposure Routes

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Mercury	CNS	2.8E-03		4.5E-04	3.2E-03
				Total Hazard Index Across All Media and All Exposure Routes	3.2E-03

Total CNS HI = 3.2E-03

TABLE 9.8a - CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Mercury					Mercury	CNS	2.6E-02		4.2E-03	3.0E-02
						Total Risk Across Surface Soil						Total Hazard Index Across All Media and All Exposure Routes	3.0E-02

Total Risk Across All Media and All Exposure Routes

Total CNS HI = 3.0E-02

APPENDIX E

SOIL SAMPLE LOGS

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP303 0001
Sample Location: Bldg. 303
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.: 3221

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/15/03 Time: 14:15 Method: Disposable Trowel Monitor Reading (ppm): 0.0	0-1'	Brown	Soil Type: Silty Loam Fill: Natural Material Moisture: Dry Some Organics

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers	✓	
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar	✓	
Perchlorates (EPA 314.0)	(1) 4 oz. Jar	✓	
Explosives (SW-846 8330)	(1) 4 oz. Jar	✓	

OBSERVATIONS / NOTES:

Location: N: 39.0224 W: 76.97904
Instrument: Photovac 2020 Serial #: DQHS313

Open Air discharge - No Leaching Well

MAP:

See Attached Figure

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

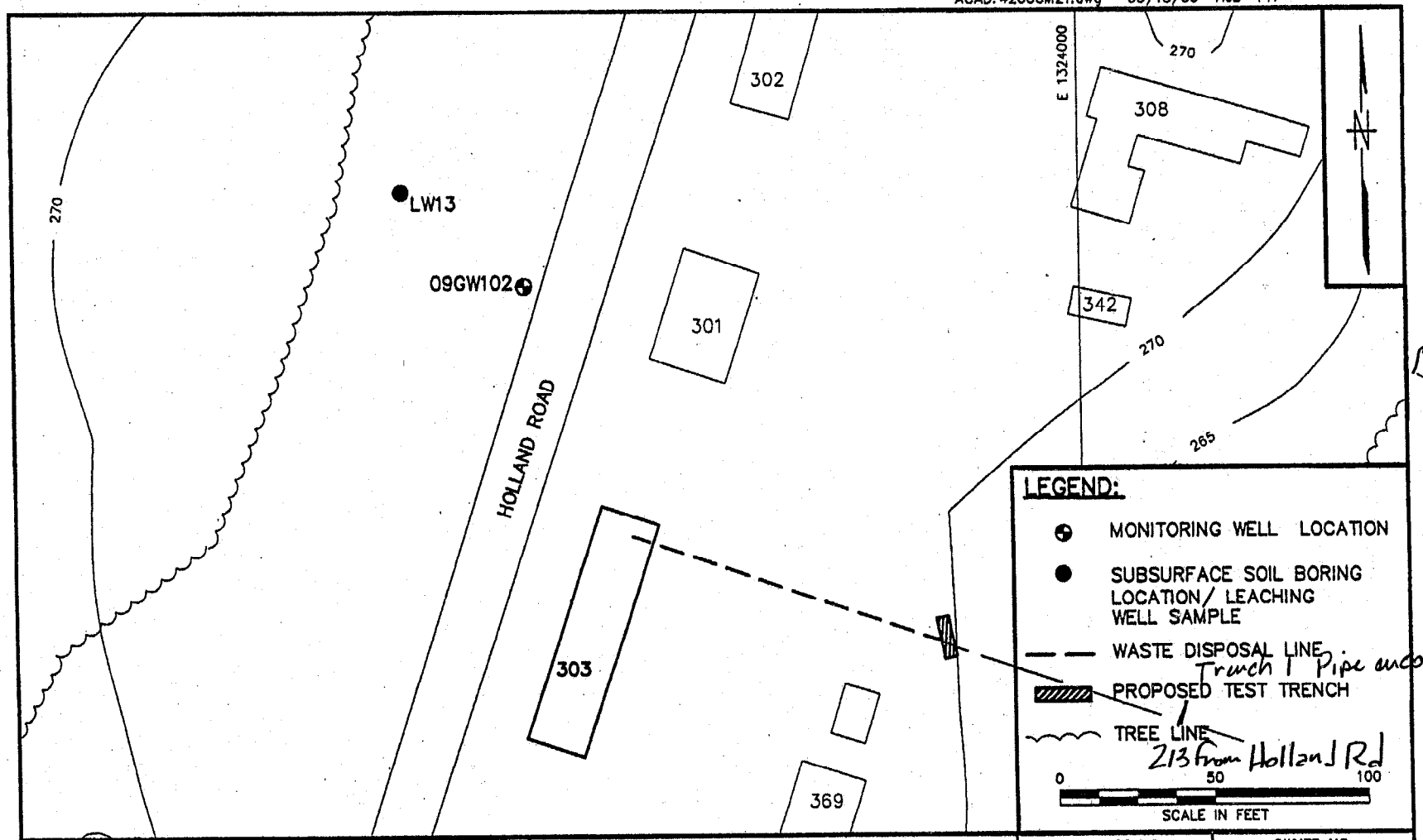
Tom Dickson

4" ID T

SAMPLE 5' DOWNGRADIENT

CONCRETE CHANNEL · 42' W x 60' L

ACAD: 4200CM21.dwg 03/18/03 HJB PIT



Trench 1 Pipe encounter @ 2'2" deep

213 from Holland Rd

DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDING 303 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 2	REV. 0

FORM CADD NO. T+NUS_AH.DWG - REV 0 - 1/22/98

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP304
Sample Location: Bldg.304
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:			Soil Type:
Time:			Fill Natural Material Organics
Method: Disposable Trowel			Moisture:
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

No Locking Well in the area designated - No Sample

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers		
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar		
Perchlorates (EPA 314.0)	(1) 4 oz. Jar		
Explosives (SW-846 8330)	(1) 4 oz. Jar		

OBSERVATIONS / NOTES:

Location: N: W:
Instrument: Photovac 2020 Serial #:

MAP:

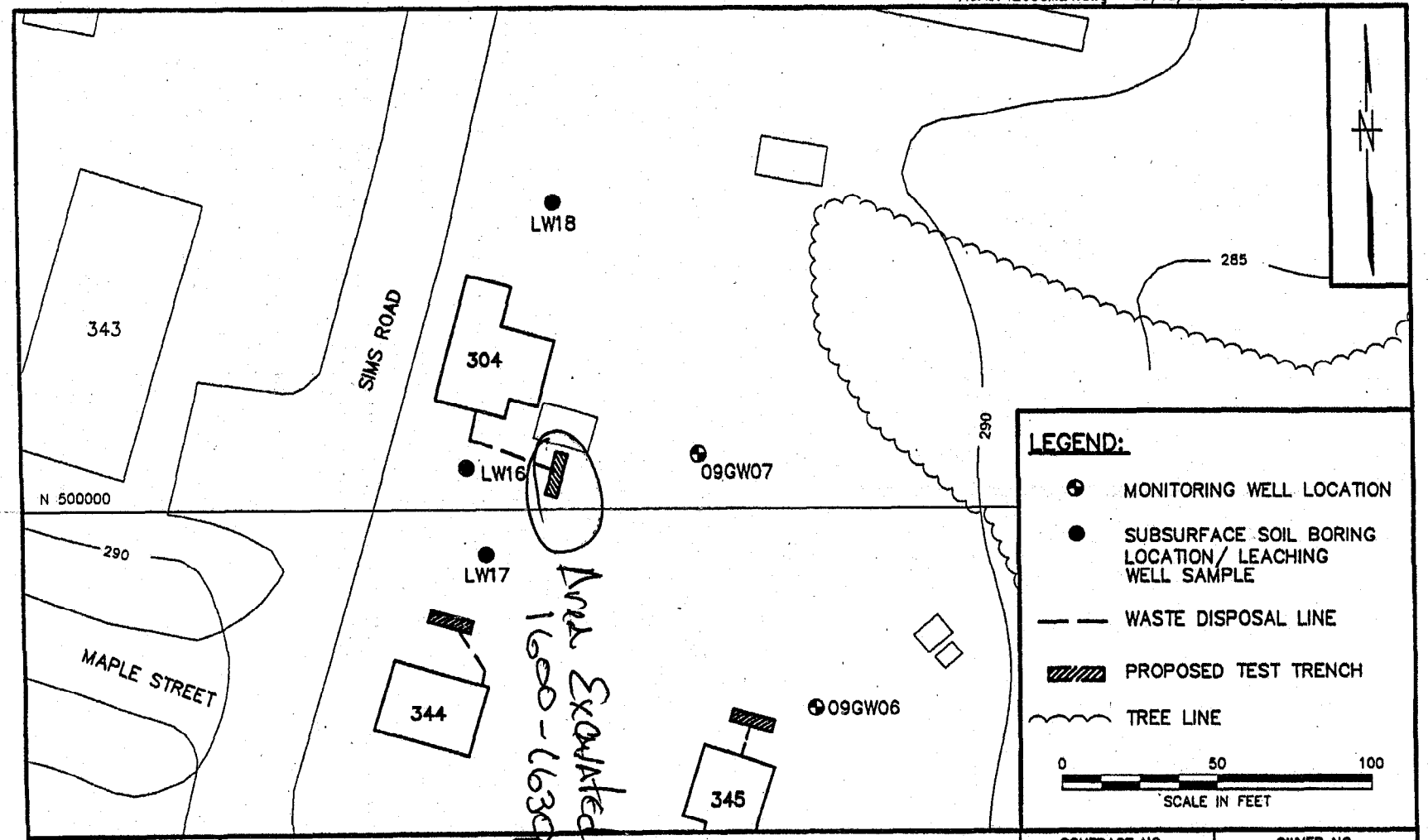
See Attached Figure

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Tom Dickson

ACAD: 4200CM24.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDINGS 304, 344 AND 345 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 3	REV. 0

FORM CADD NO. T+NUS_AH.DWG - REV 0 - 1/22/98

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP306 0910
Sample Location: Bldg. 306
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.: 3221

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 05/15/03 Time: 10:40 Method: Disposable Trowel Monitor Reading (ppm): 0.0	09-10'	orgish brown	Soil Type: fine sand (Fill) Natural Material Organics Moisture: moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers	✓ 2	
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar	✓ 2	
Perchlorates (EPA 314.0)	(1) 4 oz. Jar	✓ 2	
Explosives (SW-846 8330)	(1) 4 oz. Jar	✓ 2	

OBSERVATIONS / NOTES:

Location: N: 39.03843 W: 76.95837
Instrument: Photovac 2020 Serial #:

Brick Constructed leaching Well
LW11 Boring Went through Center
Sampled under perforated base

MAP:

See Attached Figure

Circle if Applicable:

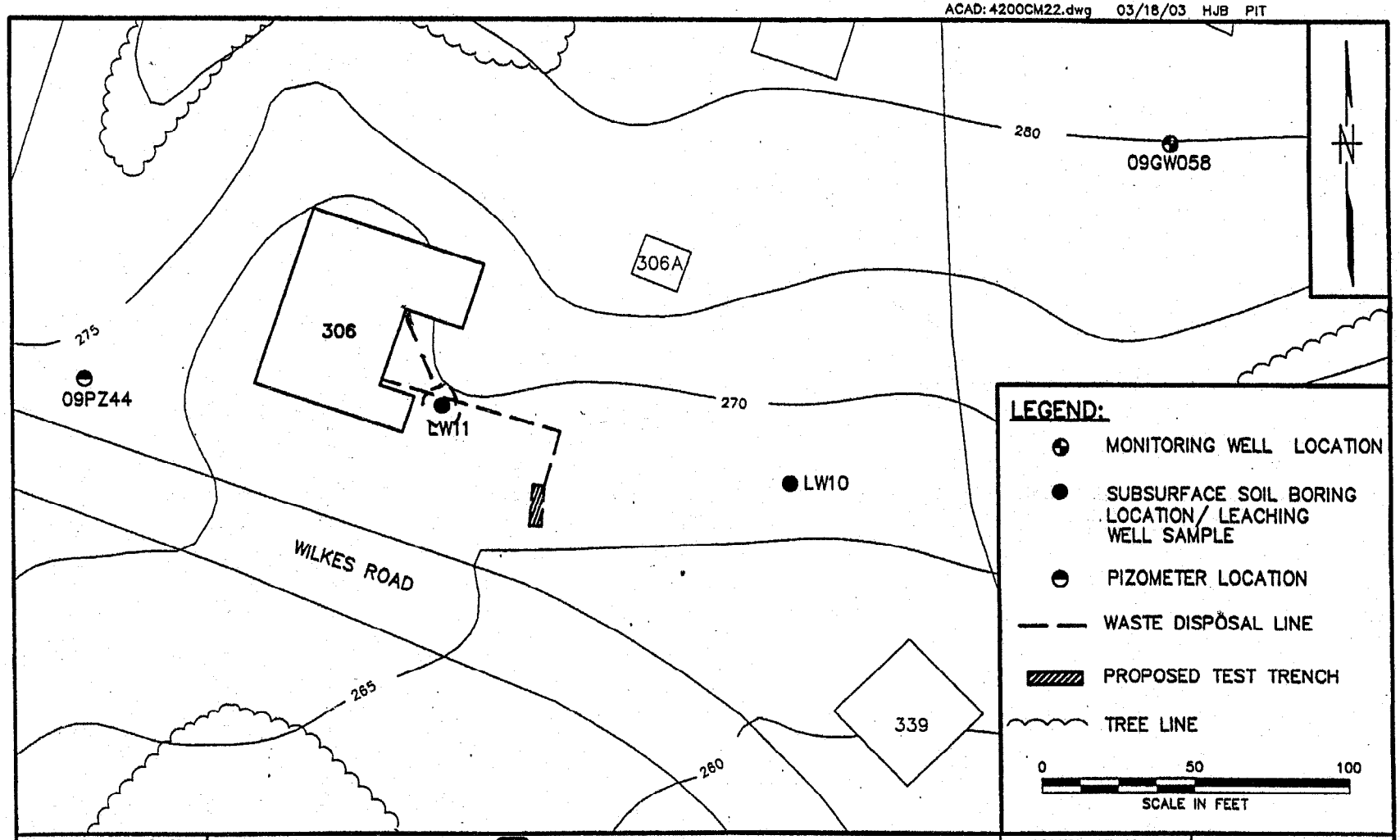
MS/MSD

Duplicate ID No.: 009FD051503-01

Signature(s):

Tom Dickson

ACAD: 4200CM22.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDING 306 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 4	REV. 0

FORM CADD NO. T+NUS_AH.DWG - REV 0 - 1/22/98

LEACHING WELL TOP - 36" BGS ; 60" DIAMETER, BRICK LINED

SAMPLE DEPTH 9-10'

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP307
Sample Location: Bldg. 307
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 05/15/03			Soil Type:
Time:			Fill Natural Material Organics
Method: Disposable Trowel			Moisture:
Monitor Reading (ppm): 0.0			

Leach Well Location Undetermined

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

No Sample - Leach Location

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers		
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar		
Perchlorates (EPA 314.0)	(1) 4 oz. Jar		
Explosives (SW-846 8330)	(1) 4 oz. Jar		

OBSERVATIONS / NOTES:

Location: N: W:
Instrument: Photovac 2020 Serial #:

Began digging 1110-1115
1st Attempt - No Pipe
2nd "
3rd "
4th "

Test pits cut accross the outwe West Face of 307 Cross Sectioning this Approach Final determination - No Leaching Well

MAP:

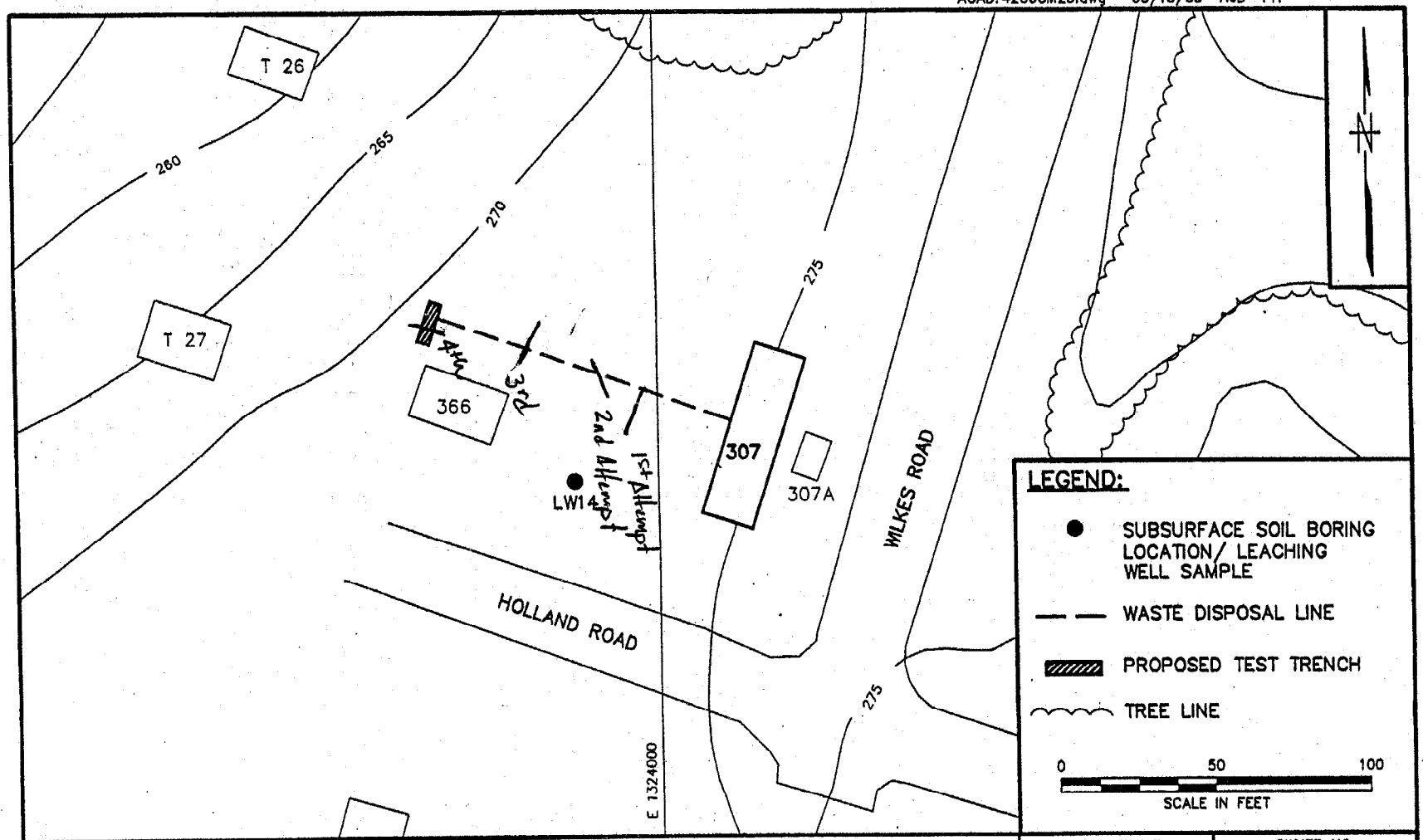
See Attached Figure

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

ACAD: 4200CM23.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDING 307 AND 307A SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 5	REV. 0

FORM CADD NO. T+NUS_AH.DWG - REV 0 - 1/22/98

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP3190102A
Sample Location: Bldg 319
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.: 3220

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/14 Time: 1101 Method: Disposable Trowel Monitor Reading (ppm): 0.0	12-24" bgs	Dark Brown	Soil Type: Br. Silty Sand w/ gravel Fill (Natural Material) Organics Moisture: damp

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers	3	
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar	1	
Perchlorates (EPA 314.0)	(1) 4 oz. Jar	1	
Explosives (SW-846 8330)	(1) 4 oz. Jar	1	

OBSERVATIONS / NOTES:

Location: N: 3903452 W: 76-96049
Instrument: Photovac 2020 Serial #:

This sample was collected down gradient of an AST (Kerosene or diesel)

MAP:

See Attached Figure

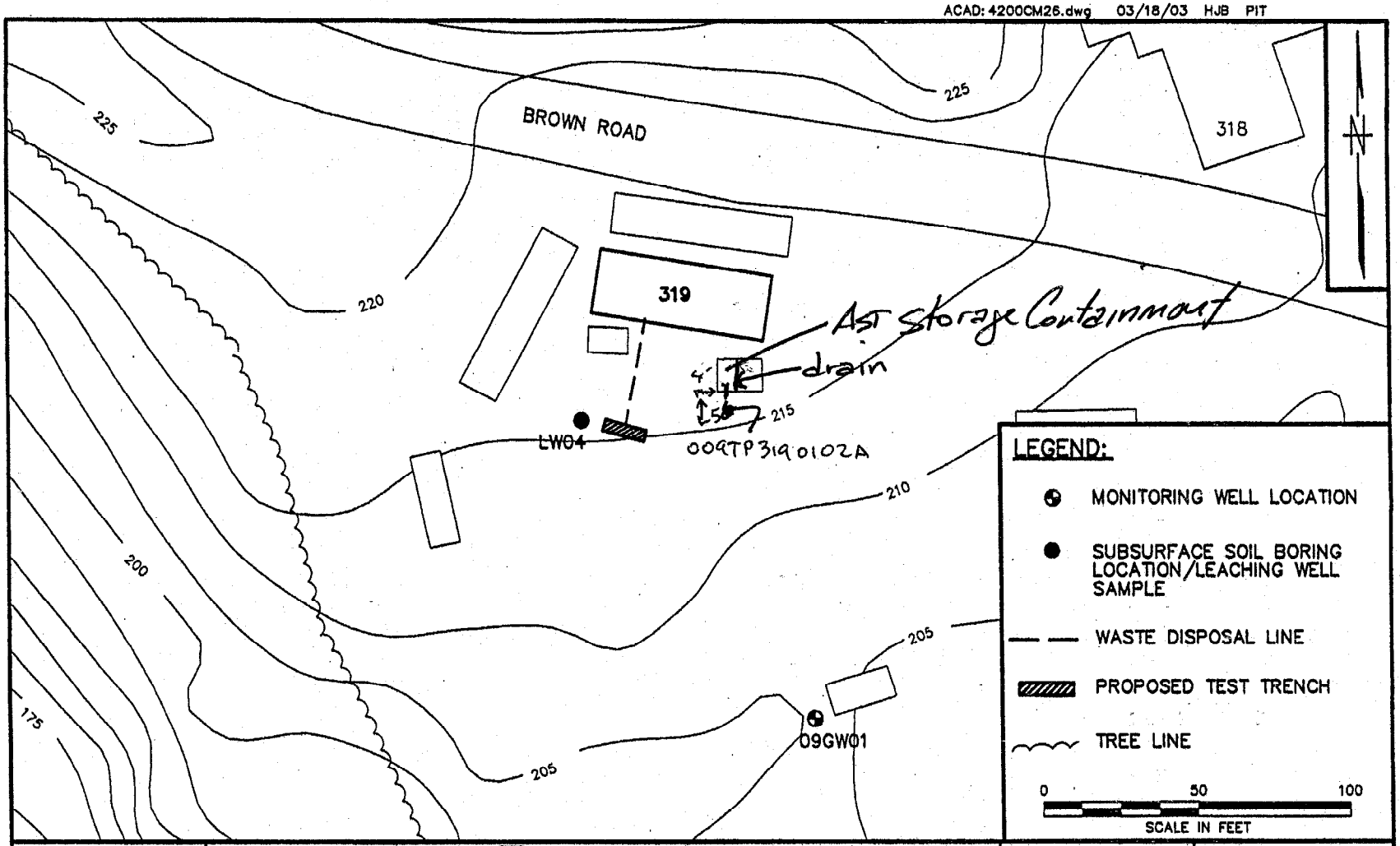
Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tom Dickson

ACAD: 4200CM26.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 3/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDING 319 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 6	REV. 0

FORM CADD NO. TtNUS_AH.DWG - REV 0 - 1/22/98

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP319030413
Sample Location: Bldg. 319
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.: 3220

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 05/14/03 Time: 1450 Method: Disposable Trowel Monitor Reading (ppm):	3.5-4.0	brn	Soil Type: Silty Clay, trace Sand (Fill) Natural Material Organics Moisture: Moist to wet

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers	✓	
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar	✓	
Perchlorates (EPA 314.0)	(1) 4 oz. Jar	✓	
Explosives (SW-846 8330)	(1) 4 oz. Jar	✓	

OBSERVATIONS / NOTES:

Location: N: 39.03448 W: 076.96056 (Center box)
Instrument: Photovac 2020 Serial #:

End of Pipe N: 39.03444 W: 076.96056 (62' from box)
Water Line crosses @ this pt
N6' South 12 Corrugated drain pipe

MAP:

See Attached Figure

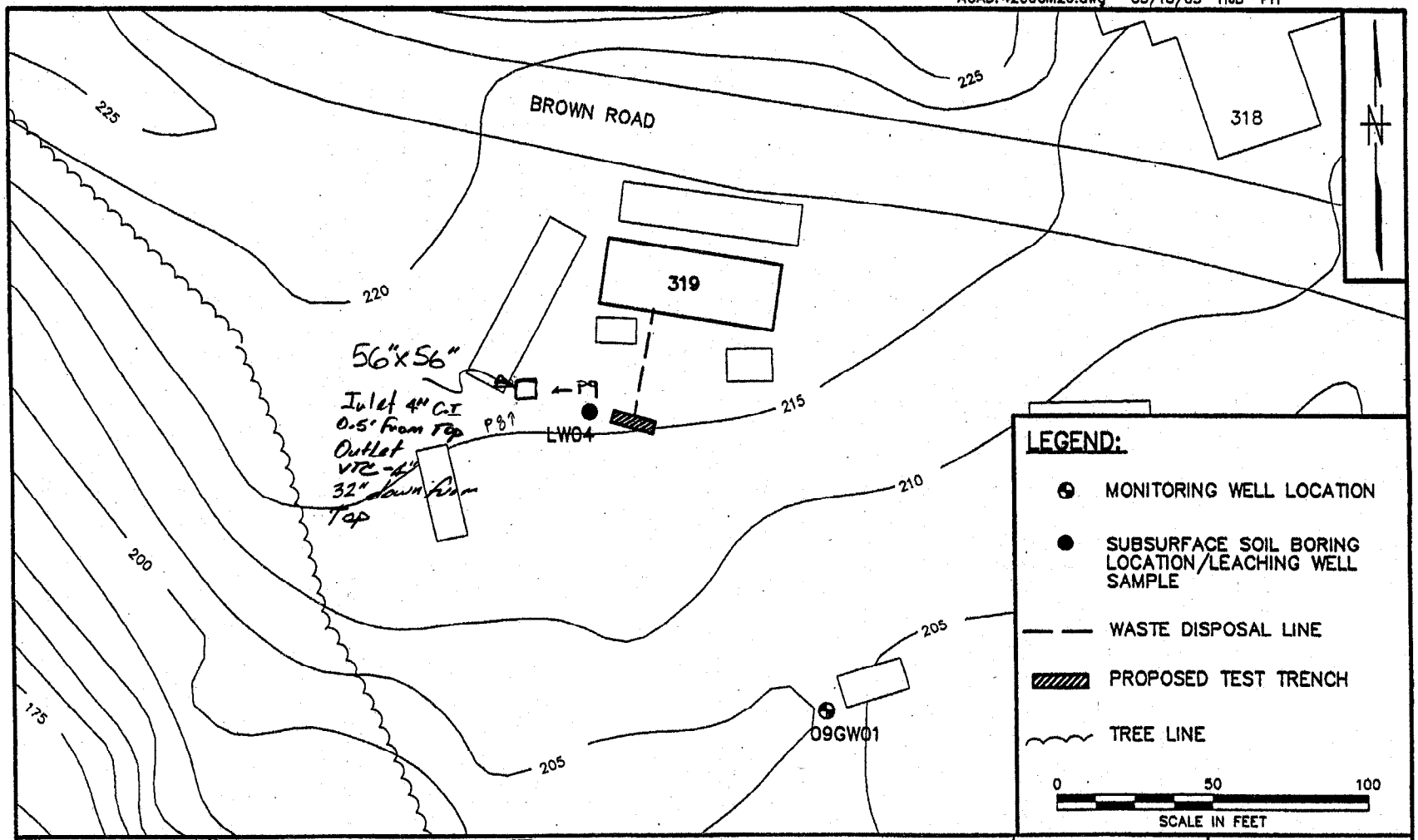
Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tom Dickson

ACAD: 4200CM26.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 3/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDING 319 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 6	REV. 0

FORM CADD NO. TtNUS_AH.DWG - REV 0 - 1/22/98

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP327
Sample Location: Bldg. 327
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			Soil Type:
Method: Disposable Trowel			Fill Natural Material Organics
Monitor Reading (ppm):			Moisture:

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

Deleted from Planned Activities

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers		
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar		
Perchlorates (EPA 314.0)	(1) 4 oz. Jar		
Explosives (SW-846 8330)	(1) 4 oz. Jar		

OBSERVATIONS / NOTES:

Location: N: W:
Instrument: Photovac 2020 Serial #:

MAP:

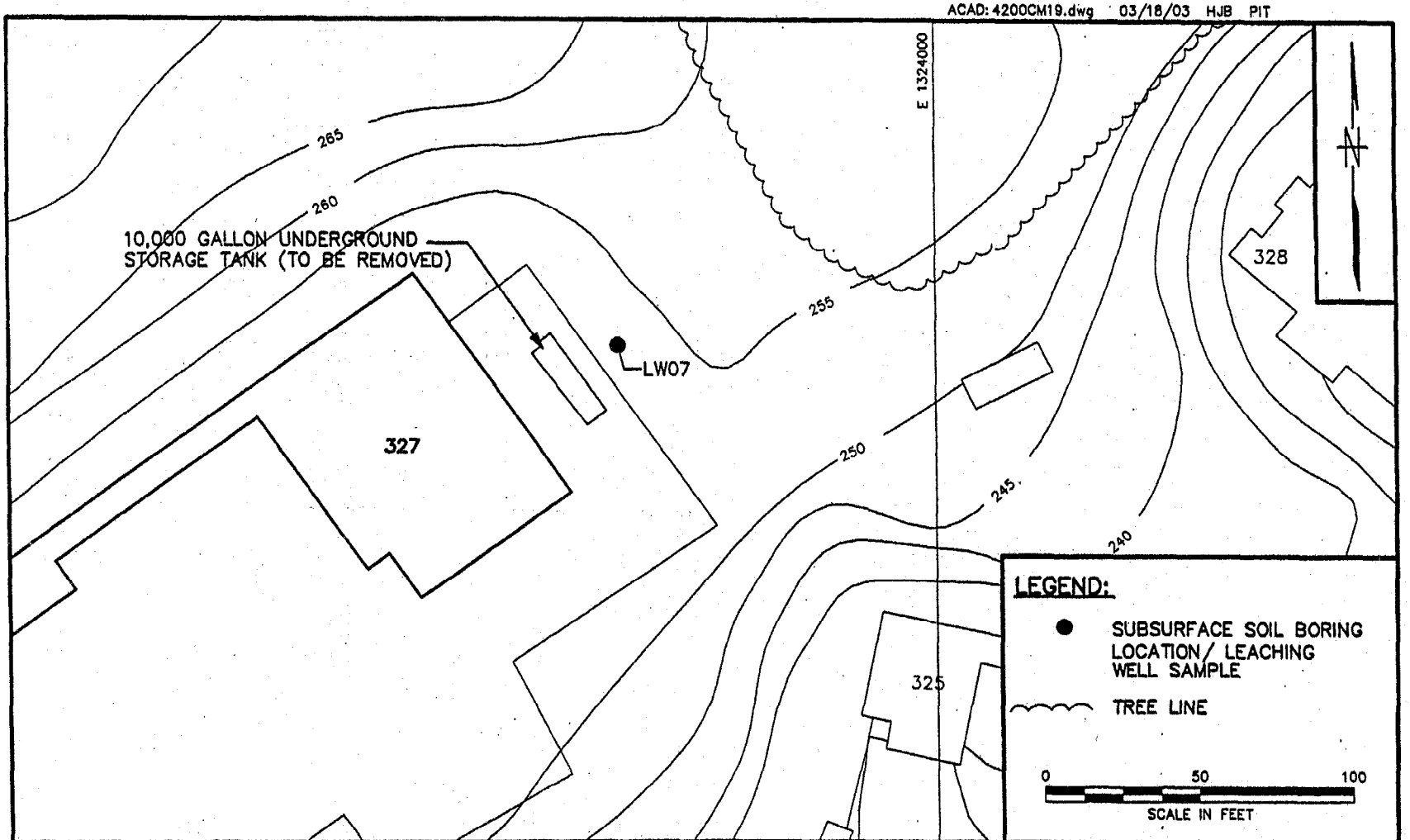
See Attached Figure

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

ACAD: 4200CM19.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDING 327 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 7	REV. 0

FORM CADD NO. T+NUS_AH.DWG – REV 0 – 1/22/98

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP344 0607
Sample Location: Bldg. 344
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.: 3221

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/15/03 Time: 15:25 Method: Disposable Trowel Monitor Reading (ppm): 0	6-7	lt brn to brn	Soil Type: Fine Grain Sand Fill ~~Natural Material~~ ~~Organics~~ Moisture: damp

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers		
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar		
Perchlorates (EPA 314.0)	(1) 4 oz. Jar		
Explosives (SW-846 8330)	(1) 4 oz. Jar		

OBSERVATIONS / NOTES:

Location: N: 39.03954 W: 76.95771
Instrument: Photovac 2020 Serial #:

Sampled underneath gravel drainage bed - No Structured Leaching Well

MAP:

See Attached Figure

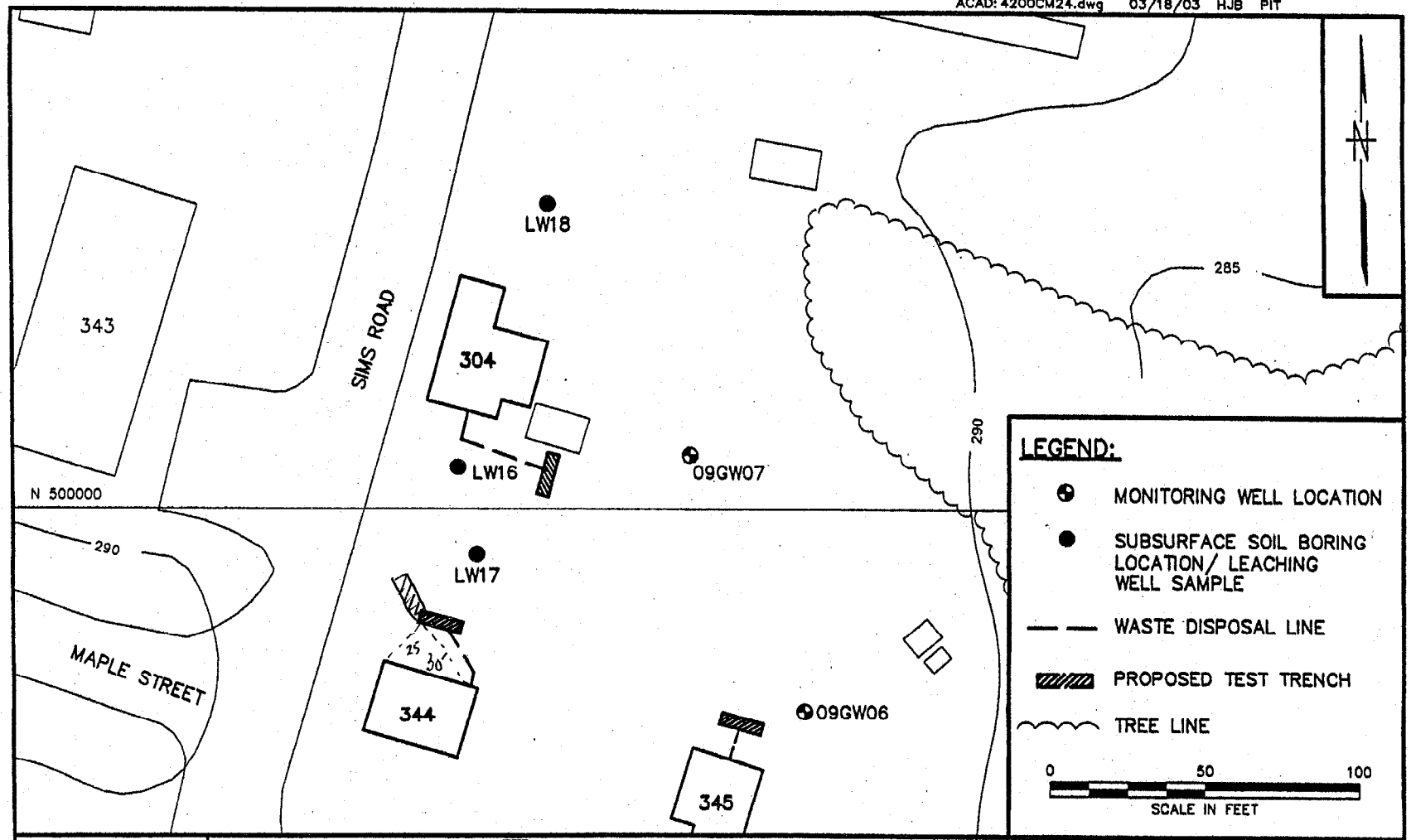
Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tom Dickson

ACAD: 4200CM24.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDINGS 304, 344 AND 345 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 3	REV. 0

FORM CADD NO. TtNUS_AH.DWG - REV 0 - 1/22/98

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP345~~04~~05A
Sample Location: Bldg. 345
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.: 3220

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 05/14/03 Time: 0927 Method: Disposable Trowel Monitor Reading (ppm): 0.0	4.5' bgs	lt brn to brn	Soil Type: Sandy (fine grain) Clay Fill / Natural Material / Organics Moisture: Slightly moist/damp

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers	3	
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar	1	
Perchlorates (EPA 314.0)	(1) 4 oz. Jar	No	
Explosives (SW-846 8330)	(1) 4 oz. Jar	1	

OBSERVATIONS / NOTES:

Location: N: 39.03936 W: 76.95741
Instrument: Photovac 2020 Serial #:

Sample collected @ the change in direction of the piping

Weather Cool 50's; Sunny

MAP:

See Attached Figure

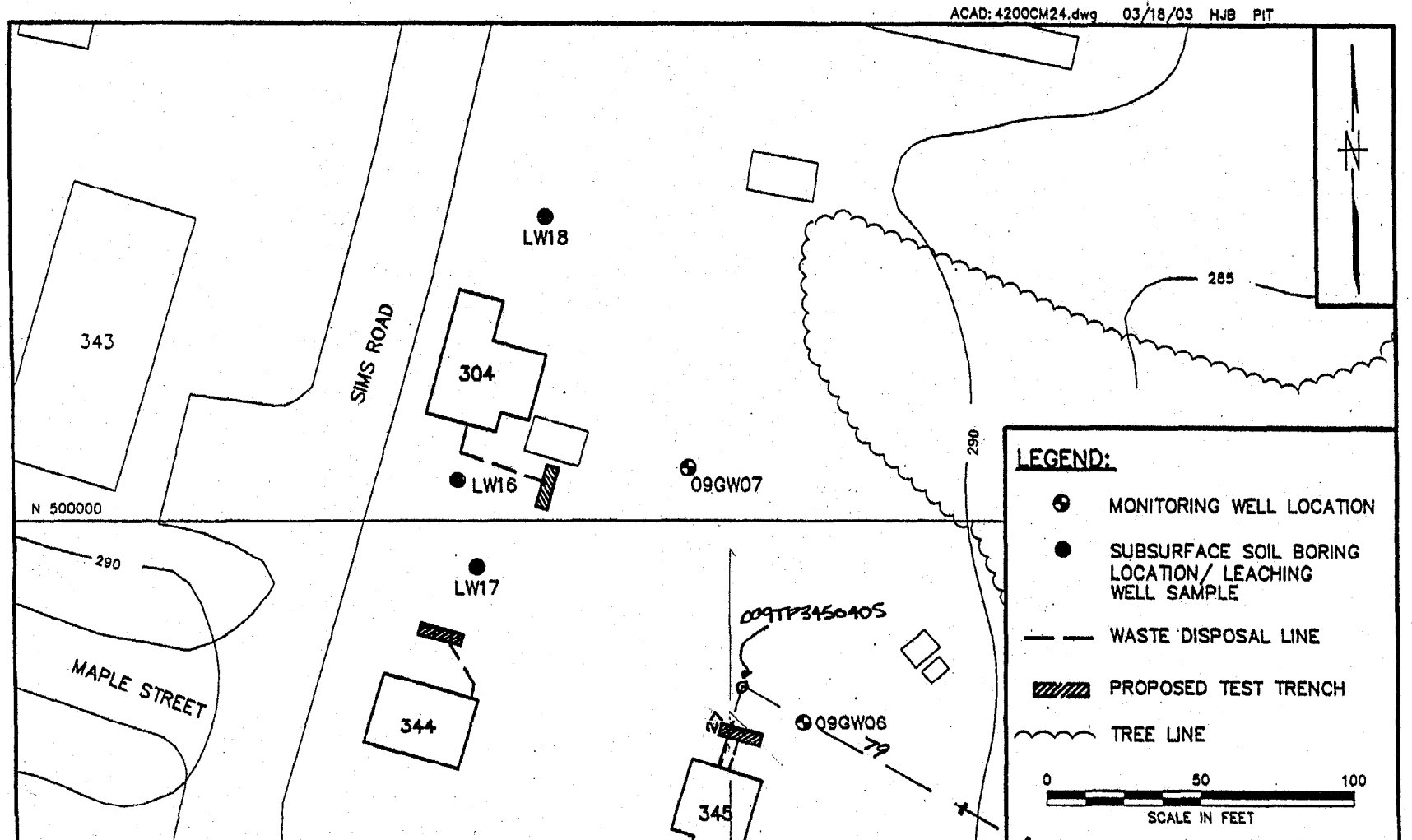
Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tom Dickson

ACAD: 4200CM24.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDINGS 304, 344 AND 345 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC-WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED-AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 3	REV. 0

FORM CADD NO. T+NUS_AH.DWG - REV 0 - 1/22/98

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP34500018
Sample Location: Bldg 345
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.: 3220

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 05/14/03	0.5-1.0 bgs	brn	Soil Type: Fine Sandy Clay Cohesive
Time: 1023			Fill · Natural Material · Organics
Method: Disposable Trowel			Moisture: damp to Slightly Moist
Monitor Reading (ppm): 0.0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers	3	
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar	1	
Perchlorates (EPA 314.0)	(1) 4 oz. Jar	No	
Explosives (SW-846 8330)	(1) 4 oz. Jar	1	

OBSERVATIONS / NOTES:

Location: N: 39.03930 W: 076.95715
Instrument: Photovac 2020 Serial #:

This sample was collected @ the terminal discharge (open air) of the pipe (no leaching well)

MAP:

See Attached Figure

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

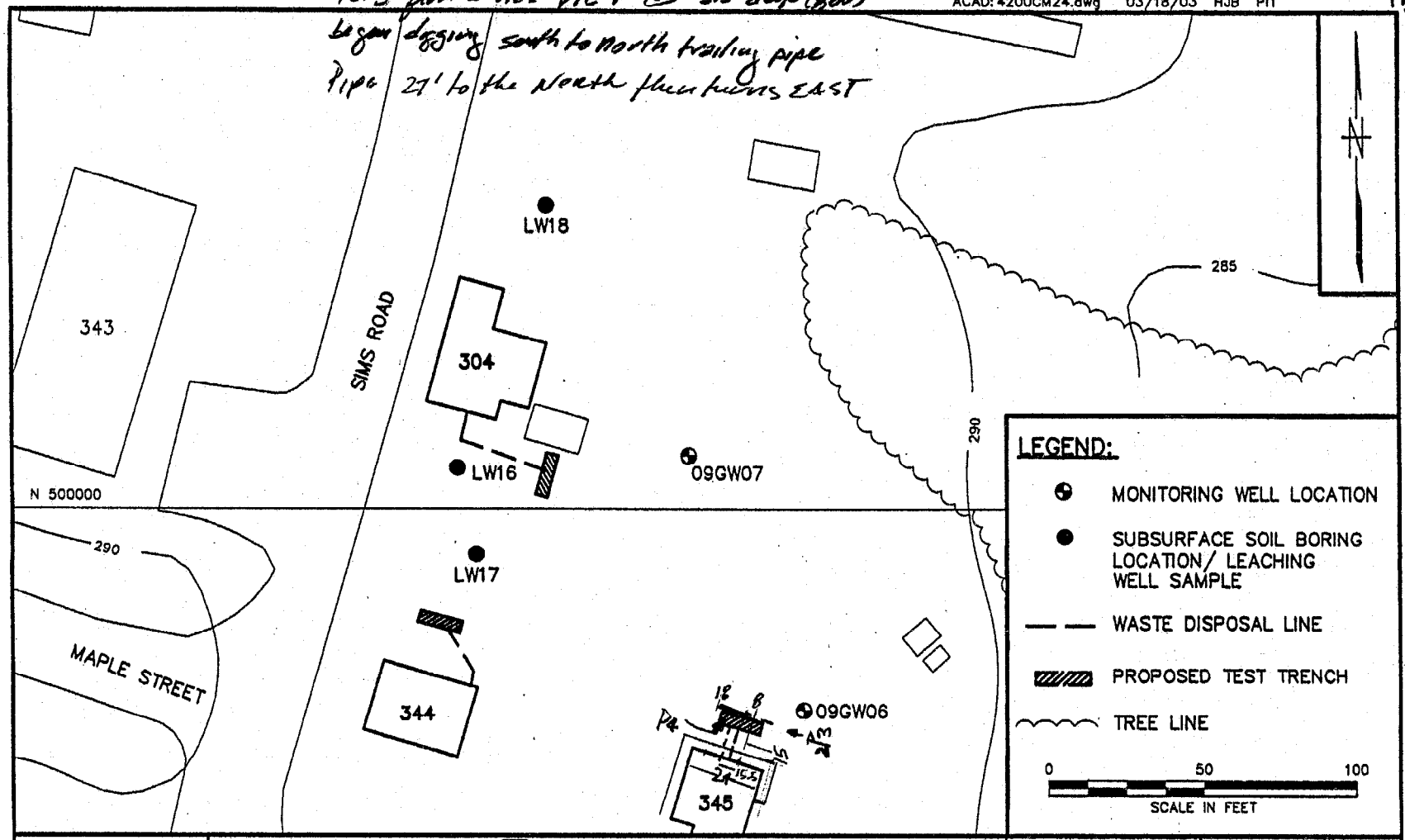
Tom Dickson

Bill W

TtNUS SN TD

ACAD: 4200CM24.dwg 03/18/03 HJB PIT

15.5 from E side VTC 4" @ ~3.5' deep (8:00)
began digging south to north trailing pipe
Pipe 27' to the North then turns EAST



DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDINGS 304, 344 AND 345 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 3	REV. 0

FORM CADD NO. TtNUS_AH.DWG - REV 0 - 1/22/98

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC White Oak
Project No.: CTO 0839 (4246)

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009TP376 0506
Sample Location: Bldg. 376
Sampled By: Tom Dickson/Scott Nesbit
C.O.C. No.: 3221

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/15/03 Time: 08:20 Method: Disposable Trowel Monitor Reading (ppm): 0	5.0-5.5'	Orange, grey mottling	Soil Type: stiff clay w/gravel Fill (Lime Stone) Natural Material Organics Moisture: damp to wet

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOCs (SW-846 5035)	(3) Encore Samplers	✓	
Inorganics (SW-846 6010B/7471A)	(1) 4 oz. Jar	✓	
Perchlorates (EPA 314.0)	(1) 4 oz. Jar	✓	
Explosives (SW-846 8330)	(1) 4 oz. Jar	✓	

OBSERVATIONS / NOTES:

Location: N: 39.03660 W: 76.95732
Instrument: Photovac 2020 Serial #:

MAP:

See Attached Figure

Circle if Applicable:

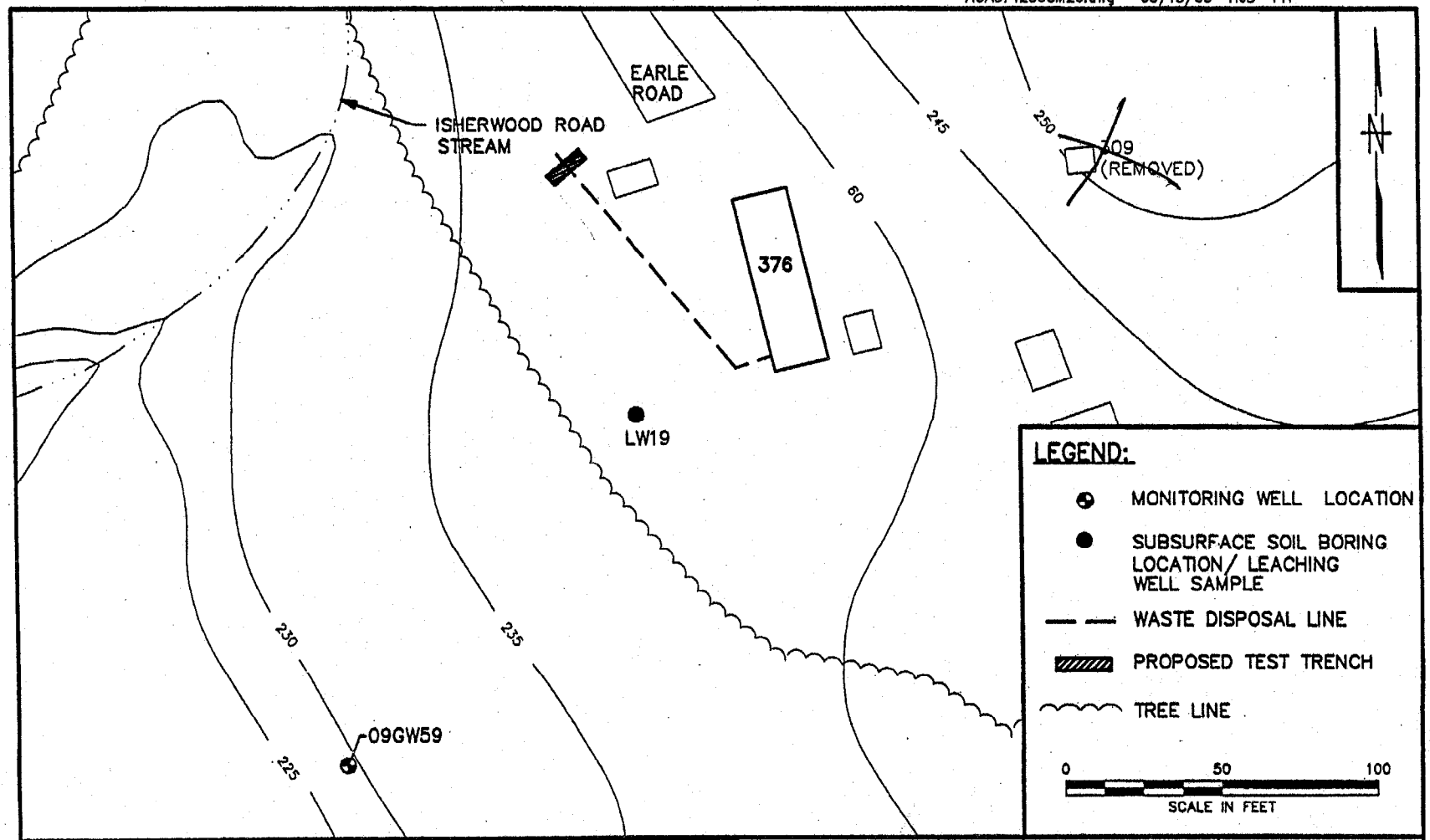
MS/MSD

Duplicate ID No.:

Signature(s):

Tom Dickson

ACAD: 4200CM20.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDING 376 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 8	REV. 0

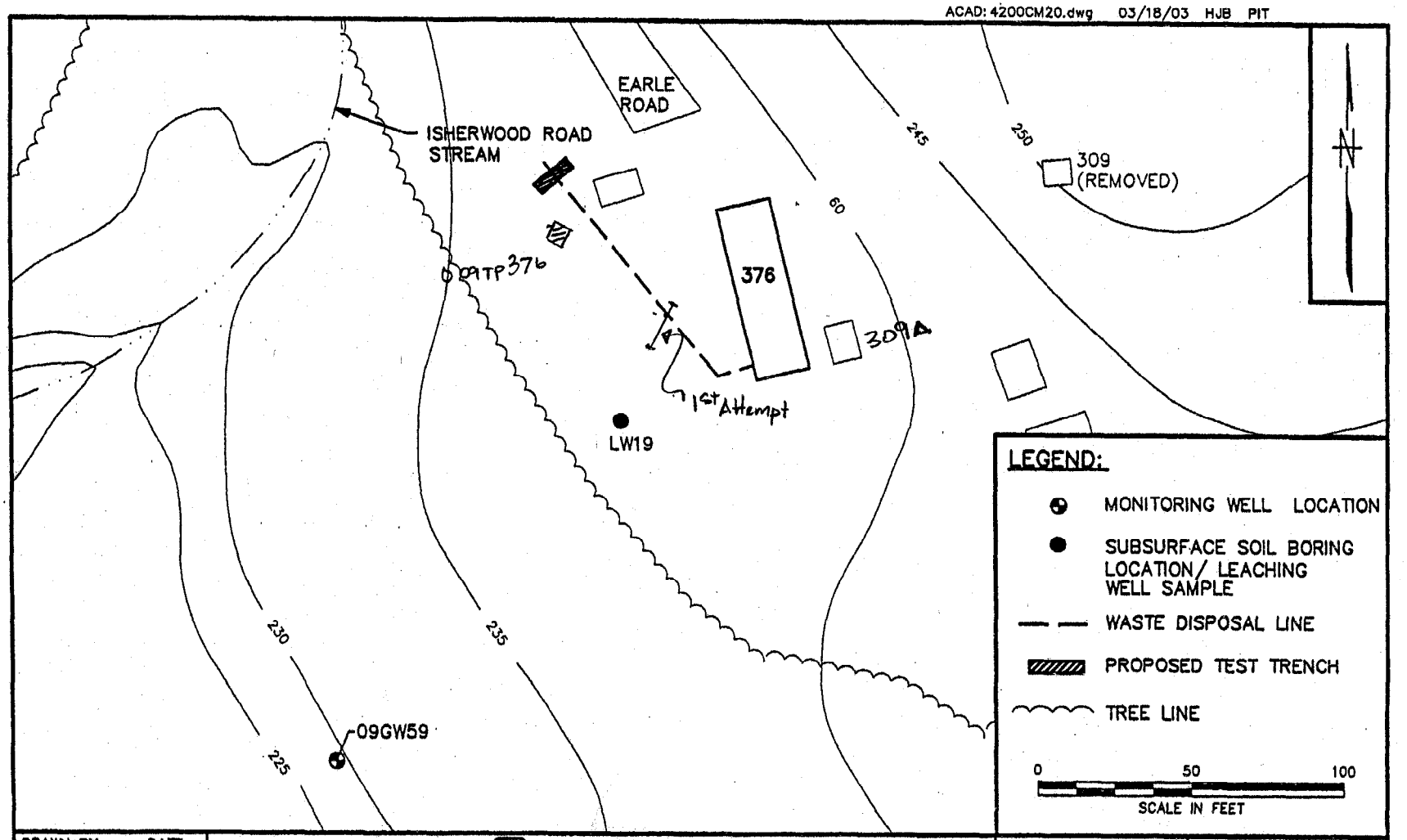
FORM CADD NO. T4NUS_AH.DWG - REV 0 - 1/22/98

SAMPLE DEPTH 5.0-5.5 FT
TRENCH DEPTH 3.0 bgs
6.0' x 6.0' DIMENSIONS

39.03 N
76.95732 W

5/15

ACAD: 4200CM20.dwg 03/18/03 HJB PIT



DRAWN BY HJB DATE 2/18/03	Tetra Tech NUS, Inc.	CONTRACT NO. 4200	OWNER NO. 0301
CHECKED BY DATE	BUILDING 376 SITE 9 – INDUSTRIAL WASTEWATER DISPOSAL 300 AREA PHASE II TEST TRENCHING NSWC–WHITE OAK SILVER SPRING, MARYLAND	APPROVED BY	DATE
COST/SCHED–AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 8	REV. 0

FORM CADD NO. TtNUS_AH.DWG - REV 0 - 1/22/98

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103

January 16, 2004

Walter Legg
Department of the Navy
Engineering Field Activity Chesapeake
Washington Navy Yard, Building 212
1314 Harwood Street SE
Washington, DC 20374-5018

Subject: Site 9 HHRA Addendum

Dear Mr. Legg:

The EPA has reviewed the **Draft Addendum - Human Health Risk Evaluation for Soil for Site 9 - Industrial Wastewater Disposal Area 300 Naval Surface Warfare Center (NSWC) White Oak**, located in Silver Springs, Maryland. This document is dated August 2003.

Specific Comments

1 Section 1.2. The report states, "Region 3 SSLs for transfers from soil to groundwater are presented (see Table 1) in order to evaluate the potential for migration of contaminants from soil to groundwater but are not used to select constituents for the quantitative risk evaluation." Please explain why contaminants from the soil to groundwater pathways will not be used to select constituents for the quantitative risk evaluation? In addition, Table 1 does not include the SSLs from the soil to groundwater pathways.

Response 1: SSLs for transfers from soil to groundwater were not used to select constituents for the quantitative risk evaluation because the SSLs are not wholly risk-based numbers. If a chemical were selected as a COPC on the basis of its SSL only, little, if any, useful information would be added to the risk assessment. For example, as shown in Table 1, the migration to groundwater SSL for TCE is 0.000013 mg/kg and the risk-based screening concentration is 1.6 mg/kg which is based on a cancer risk of 1E-6. If the concentration of TCE were less than the screening value but exceeded the SSL value and TCE were included in the risk assessment, the risks from TCE would be less than 1E-6 and could be as low as 10E-11. Using SSLs for risk-based screening would defeat the purpose of the COPC screening process because chemicals with low risks would be added to the risk assessment. The Region 3 SSLs are presented in the Potential ARAR/TBC Value column in Table 1.

2 Section 1.3.1. The report states, "If SSLs for a DAF of 20 were used in the comparisons presented in Table 2-1 . . . " Table 2-1 cannot be located in the report nor can a table be located where soils are compared to SSLs for transfer from soil to groundwater. The report should include a table comparing subsurface soil maximum detected results to EPA's SSLs for transfer from soil to groundwater at a DAF = 20.

Response 2: This was a "typo". Table 2-1 is Table 1 which does include the SSLs.

Only SSLs for a DAF of 1 were included in Table 1 because these are more conservative and the SSLs for a DAF of 20 can easily be derived from the DAF 1 values.

3 Section 5.0. Although EPA is willing to accept this document in regards to background elimination, the presented format defeats the entire purpose of EPA's guidance that requires background elimination at the conclusion of the risk assessment process. EPA's goal for requiring background elimination at the conclusion of the risk assessment process is to allow all stakeholders to evaluate risk for the entire site (site and background risk combined).
The presented format does not allow stakeholders to evaluate the cumulative risk from site and background contamination. According to Section 1.3, aluminum, antimony, arsenic, chromium, iron, lead, mercury, thallium, and vanadium exceeded EPA's screening criteria however the uncertainty section only discusses the potential risk from iron, arsenic, and lead. Further, the actual carcinogenic and non-carcinogenic risk from background arsenic exposure is not presented within the text of the report, nor are the risks from aluminum, antimony, chromium, mercury, thallium, and vanadium discussed. In the future, background risk must be included within the risk evaluation tables as required by the following guidance; EPA, *"Role of Background in the CERCLA Cleanup Program,"* Office of Soil Waste and Emergency Response, Office of Emergency and Remedial Response, April 26, 2002 and EPA, *"The Role of Background Soil Constituents in Superfund Risk Assessment and Risk Management,"* Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, August 14, 2001. Please make all efforts to adhere to EPA's guidance.

Response 3: Risks were calculated according to both EPA and Navy background guidance. Risks were initially evaluated using Navy guidance (i.e., constituents were eliminated on basis of background). Risks were then recalculated including all chemicals that exceeded screening levels, as per EPA guidance, and presented in the first bullet in Section 5.0. Section 5.0 indicates that when all chemicals were included the cumulative HIs were less than unity for all receptors, with the exception of the future child resident. The HI for the child resident was 2.3, mainly from the ingestion of iron (HQ = 1.2). The risks for background arsenic were also calculated and are discussed semi-quantitatively in the second bullet in Section 5.0.

4 Table 1.0, 3.1, 7.1 through 7.8. Since the toxicity of methyl mercury is more conservative than mercuric chloride, EPA recommends the use of methyl mercury as the surrogate for mercury to ensure protectiveness. If the Navy feels that mercuric chloride should be used as the surrogate for mercury, than the report should include the necessary documentation information to prove that mercury is present in this form.

Response 4: Disagree. Frequently Asked Question No. 11 provided by Region 3 with the RBC Tables states that the mercury numbers should be suited to the conditions at the site (e.g., whether mercury is likely to be organic or inorganic). Methyl mercury is used as a surrogate for mercury when ingestion of food, especially fish, is a concern. Because of a more similar chemical/physical environment, mercuric chloride is a more suitable surrogate for the media of concern at this site.

5 Table 1.0. An incorrect RBC is recorded for vanadium. According to the most recent RBC Table dated 10/15/2003, the correct residential soil RBC for vanadium is 2.3E+01.

Response 5: The Site 9 Addendum was completed in August 2003 and therefore used the vanadium residential soil RBC from the April 2003 Region3 RBC Table to develop a screening level (55 mg/kg) . It would not be useful to revise the risk assessment using the October 2003 screening value (2.3 mg/kg) because: (1) the maximum detected site concentration (60.8 mg/kg) would still exceed the screening level; and, (2) vanadium was found to be within facility background levels.

If you have any questions concerning these comments, please call me at (215) 814-3364.

Sincerely,

Bruce W. Beach
Remedial Project Manager
Federal Facilities Section

cc: Mark Callaghan, MDE
Phil Tully, Shaw
Scott MacEwen, CH2M Hill
Scott Nesbit, Tetra Tech NUS
Robert Ridgway, GSA