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Draft Final

# Background Investigation Addendum For Summer Groundwater Sampling Event at

## Naval Amphibious Base Little Creek
## Virginia Beach, Virginia

**Prepared for**

## Department of the Navy

**Atlantic Division**
**Naval Facilities Engineering Command**
**Norfolk, Virginia**

Contract No. N62470-95-D-6007
CTO-0198

**March 2003**

**Prepared by**

**CH2MHILL**

February 24, 2003

Ms. Mary Cooke
US Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103

Subject: Responses to Comments
Background Investigation Final Report
NAB Little Creek, Virginia Beach, VA
Navy Clean II Contract N62470-95-D-6007, CTO 148

Dear Ms. Cooke:

On behalf of LANTDIV, this letter provides responses to the comments that EPA provided on the Final Background Investigation Report for NAB Little Creek dated December 2000.

**Comment:**

1. Page ES-1 (Executive Summary): The statement is made that the objective of this background study is to establish concentrations of metals, pesticides, and PAHs. However, the 1999 work plan indicated that elevated concentrations of metals, VOCs, pesticides, and PAHs were detected in surface soils and groundwater. The reasons for these two different lists of chemicals is not clearly stated. Also, the document is not clear as to why TAL/TCL chemicals were not included in this background study.

Response:
All soil and groundwater samples were collected for analysis of TAL TCL chemicals, and all these compounds were included in the background study. Metals, pesticides and PAHs are compounds with the greatest potential for anthropogenic background conditions, and were the only compounds with a frequency of detection that warranted central tendency and upper bound statistical analysis. In contrast to pesticides (agricultural land use) or PAHs (roadways), there are no commonly known anthropogenic sources for constituents such as VOCs. Therefore, background data would not be used to risk manage or eliminated a non-anthropogenic source constituent such as VOCs as a constituent of potential concern (COPC) if detected at a site. The background data was used to compare metals, pesticides, and PAHs to site specific concentrations, but background data is not used to manage VOCs.

**Comment:**

2. Page ES-1: The executive summary does not adequately address why this background study does not include surface water or sediment. Both of these media are important to ecological risk assessment.

Response:

The scope for the background investigation as funded by the Navy and developed by the Partnering Team with EPA approval of the work plan was limited to soil and groundwater. Ecological risk assessments are being addressed at individual Sites at NAB Little Creek through communication and collaboration with the Navy, BTAG, the Partnering Team, and the Ecological Work Group. Surface water and sediment will be evaluated as-needed.

**Comment:**

3. Page ES-1: The reasons for limiting the chemicals of concern to metals, pesticides, and PAHs needs to adequately discussed.

Response:
See response to Comment 1.

**Comment:**

4. Page ES-1: In the second paragraph, the phrase "[i]n order to establish background water quality..." needs to be changed to: "[i]n order to establish background groundwater quality...."

Response:
The typographical error is noted and will be corrected.

**Comment:**

5. Page ES-1 (see also section 4.0 - Statistical Analysis of Background Data): There is a reference to comparing the background data to EPA Region III residential risk-based concentration. These are human health risk criteria. This document does not offer a similar comparison of background data to ecological risk criteria, such as EPA Region III BTAG screening values for ecological risk assessment. The reasons for this lack of use of this background data set from an ecological risk perspective need to be adequately discussed.

Response:
See response to Comment 2. Background values are higher than ecological screening values. The purpose of the investigation is to compare screening values that would be used in the absence of background data. BTAG values will be added to the comparison table for observation purposes. As ecological risk assessments are conducted at individual sites, use of background data and comparisons to EPA Region III BTAG screening values will be conducted as appropriate and through communication and collaboration with the Navy, EPA, DEQ, BTAG, the Partnering Team, and the Ecological Work Group.

**Comment:**

6. Page 2-2, section 2.1 (Sampling Rationale and Sampling Locations): This section identifies 3 general categories of soil types at this federal facility. These are 1) dredged fill, 2) urban land State and urban land Tetotum, and 3) native State Loam and Tetotum Loam. Between these 3 general categories of soil there appear

to be 5 soil types on NAB Little Creek: dredged fill, urban land State, urban land Tetotum, native state loam and native Tetotum loam. However, this document is not clear if the soil samples have been located in all 5 of these soil types or if the number of soil samples (native - 5, urban - 14, and fill - 10) per each of the 5 soil types is sufficient to allow comparisons with site specific data.

Response:
The approach to the background investigation was based on a review of the Soil Survey for Virginia Beach, aerial photographs of past land use, and current land use. Because State and Tetotum loam soils are very similar (both are deep well drained loam with similar permeability and available water capacity) and past and current land use is most relevant to the presence of potential anthropogenic sources, Partnering Team consensus was to consider State loam and Tetotum loam together as a "Native" soil type. Much of NAB Little Creek was identified as Urban land. State urban and Tetotum urban soils were considered together as a Urban soil type. To address EPA comments, the Soil Survey for Virginia Beach was re-reviewed and it was noted that Urban Udorthents soil should have been included in the Background Report along with State urban and Tetotum urban. The Soil Survey describes all these soils as deep nearly level and moderately to well drained soils in areas covered by buildings, structures, and parking. Additionally, the soil survey notes that in many areas these soils and urbanized areas are so intermingled that it was not practical to map them separately. The exclusion of identifying Udorthents Urban in the text of the report does not affect the approach and distribution of sampling locations or the statistical analysis of results.

It was also noted during the re-review of the soil survey that Udorthent loam soils were erroneously identified as Urban Udorthents. This misidentification was applicable to five locations (U01, U04, U06, U07, U09). Statistical analyses were conducted to determine if these soil samples should have been included with the data set for Native soils. Box plots were generated to compare the 4 soil types: Native, Urban, Fill, and Udorthents loam soils (Attachment 1). The Kruskal-Wallis test was used to determine if there is statistical difference among these 4 soil types as compared to the original three soil types. Table RTC-1 (attached) shows the revised Kruskal-Wallis test results for 4 soil types (Native, Urban, Fill, and Udorthents loam) adjacent to the original Kruskal-Wallis results reported in the Background Report. Review of the box plots and comparison of the Kruskal-Wallis test results for 4 soil types to the original results for 3 soil types are similar for all parameters except calcium. For all parameters except calcium, Udorthents loam does not overlap with Native soils and is more similar to Urban and Fill. For calcium, Udorthents loam is more similar Native soils. Because Udorthents loam is more similar to Urban and Fill soils, upper tolerance limits and central tendency estimates calculated with these samples included in the urban soil data set as presented in the Background Report are appropriate. It should also be noted that the majority of the areas identified in the soil survey as Udorthents loam are currently more characteristic of urban areas (buildings, structures, and parking).

**Comment:**

7. Also relating to soil types, the draft screening and baseline ecological risk assessment for SWMUs 7 and 8 indicates there are 14 discrete soil units identified within the limits of the base. There appears to be major differences between the number and identity of the soil units portrayed in the background study compared with those identified in the SWMU 7 and 8 document. These inconsistencies need to be corrected and adequately discussed in all the documents on NAB Little Creek. The concerns raised in comment 6 above are made all the more important in light of this inconsistency in soil types and also need to be adequately addressed in all the NAB Little Creek documents.

Response:
Table RTC-2 (attached) identifies all the soil types at NAB Little Creek, background samples collected, and distribution on the Base. Of the 14 soil units noted in the draft screening baseline ecological risk assessment nine are soil units characteristic of the beach sands along the Chesapeake Bay where there are no SWMUs of concern. These soils do not warrant analytical or statistical analysis and inclusion in the background soil quality characterization. The remaining soils have all been addressed in the Background Study.

**Comment:**

8. Page 3-1, section 3.1.2.1 (dissolved metals): The statement is made that mercury was not detected in any sample. This section needs to clearly indicate if these samples were analyzed for mercury using low detection methodologies. The use of these low detection methodologies has been utilized at other federal facilities to get more accurate concentrations.

Response:
The "low detection" limit for mercury is 0.2 ug/L. As outlined in the approved Master Project Plans for NAB Little Creek and the approved Final Site-Specific Project Plans for the Background Investigation, the analytical method used for mercury was CLP ILM04.

**Comment:**

9. Page 3-3 section 3.2.2 (Metals - Soils): The statement is made that metals detected in two or more background soil samples are presented in Table 3-2. Neither the text nor the table adequately discusses the reasons for the need for a chemical to be detected in two or more background samples before it is included in the background data set. These reasons need to adequately discussed in this section. The reasons why metals must be detected in two or more soil samples is made more confusing when in sections 3.2.4 and 3.2.5, respectively, SVOCs and pesticides/PCBs only have to be detected in one or more soil samples to be included in the background data set.

Response:

Table 3-2 shows results for all constituents detected in **one** or more samples. The reference to "2 or more samples" is a typographical error and will be corrected. All detected constituents were included in the background data set.

**Comment:**

10. Page 4-2, section 4.1.1 (Boxplot Analysis): The statement is made "...LBG-MW02 is the only well constructed in dredged fill material which may account for the fact that eight parameter maximums were reported for samples from that well. These data may be qualitatively reviewed as appropriate when evaluating groundwater at site in dredge fill." Considering the fact that only one well was located in dredged fill, this section needs to clearly discuss those appropriate situations when these data may be qualitative used. This discussion needs to clearly indicate the uncertainty associated with using a single sample.

Response:
Groundwater is treated as a single unit throughout the base. LBG-MW02 was not used in statistical analyses because concentrations were found to statistically differ from background. A reference will be made to the Section 5 summary, providing further explanation to Section 4.1.1. Data from LBG-MW02 may be evaluated qualitatively against future groundwater investigations in dredge fill areas; however data from the dredge fill is not specifically used to establish 'background' values.

When site evaluations are conducted at NAB Little Creek and background data is used in those evaluations to identify constituents of concern or as part of risk management, discussions on the use of the background data and any uncertainty associated with the data will be presented in the specific site evaluation documents.

**Comment:**

11. The following comments were submitted on the October 1999 Draft Work Plan and Sampling and Analysis Plan for Soil and Groundwater Background Investigation. Based on the review of the final document, whether or not these comments have been adequately addressed is not clear. This document needs to clearly and adequately discuss these previous comments. These previous comments are:

**Comment:**

1. On page 1-1, the Introduction (section 1.0) indicated that elevated concentrations of metals, VOCs, pesticides, and PAHs have been detected in soils and groundwater. Yet, the 1991 background study (paragraph 3 on page 1-1) indicated that only subsurface soils and groundwater samples were taken and that the subsurface soil analyses included metals and moisture; while the groundwater analyses included metals, organics, TPH, TOC, and TOX. Because this previous data set does not appear to have analyzed for all of the standard contaminants, there will be difficulty in utilizing these data to direct the current data collection

effort. The use of these previous data needs to be more adequately discussed in this document.

Response:
The background soil and groundwater data obtained in 1991 was not used to direct the data collection efforts. The available historical background data was reviewed for evaluation of data usability. These historical data did not meet the data quality objectives (e.g. appropriate analytical methods and detection limits) and were not used to supplement the background data set obtained from this background investigation.

**Comment:**
2. On page 2-1, the statement is made (section 2.0 Sampling Rationale and Sampling Locations) that the specific goal is to establish background concentrations of metals, pesticides, and PAHs in surface and subsurface soils and groundwater. This document does not clearly indicate if the list of potential contaminants has been limited to only these three categories of contaminants. If additional contaminants are discovered at individual sites and are not included in the background study then no relationship can be established.

Response:
Background concentrations were only established for those naturally occurring and anthropogenic compounds (metals, PAHs, and pesticides) for the purpose of comparison to site data to more accurately identify site related contaminants. The potential list of contaminants from a given source area may not be limited to metals, PAHs, and pesticides, however, other contaminants (e.g. VOCs) would be considered source related contaminants that would not be present under natural or anthropogenic conditions and would therefore not be compared to background conditions. Analysis of background samples for a full range of parameters was conducted to ensure that the background locations selected have indeed not been impacted from a potential site related source area.

**Comment:**
3. On page 3-2 (first paragraph) the statement is made that only one CERCLA site is located in the soil type State Loam and Tetotum Loam, but "...the collection of...background samples from State and Tetotum soils is not considered warranted for this background investigation." The reason for not including this soil type in the background study does not appear rigorous. The elimination of this soil type from the background study needs to be re-evaluated and the explanation needs to be rewritten.

Response:
The Background Investigation was jointly scoped by the Navy, EPA and DEQ during the Partnering process and included input from BTAG during the November 1999 Partnering meeting. No sites were located in Native soil. Only AOCs or Appendix B sites were located in Native soils. The Partnering Team reached consensus that the expense of more fully characterizing the Native soil quality was not warranted.

**Comment:**

4. In section 2.1 (Soil Sampling Locations), on page 3-2, the statement is made that surface soil samples will be from 0 to 0.5 feet and subsurface samples will be from 1 to 3 feet. A 2-foot composite sample will likely underestimate the maximum contaminant concentrations, therefore, the subsurface sample(s) need to be no more than half a foot in length. This may result in more than one subsurface soil sample being taken.

Response:
Following discussions with BTAG and EPA toxicologist during the November 1999 Partnering meeting, the Team reached consensus to collect subsurface samples from 1 to 3 feet below ground surface.

**Comment:**

5. On page 3-4, in section 2.1, there is a reference to the NAB Little Creek Master Project Plans. BTAG has not had an opportunity to review this document.

Response:
Noted

**Comment:**

6. In section 2.2 (Groundwater Sampling Locations), page 3-4, the statement is made that "All background wells monitor groundwater in the shallow Columbia Aquifer at depths less than 20 feet." There is no reference to groundwater samples in deeper aquifers. This apparent omission needs to be adequately explained.

Response:
Because no contamination has been found in the deeper aquifer at the most contaminated sites at NAB Little Creek, the Partnering Team reached consensus that it was not necessary to establish background groundwater quality for the underlying deeper aquifers.

**Comment:**

7. According to section 3.2.2 (Field Sampling Activities), page 3-6), there are to be 8 groundwater samples, 24 surface soil samples, and 24 subsurface soil samples. There is no indication that these sample sizes are sufficient to support the statistics proposed in this document. The justification for these samples sizes needs to be discussed in this section.

Response:
The Background Investigation was jointly scoped by the Navy, EPA and DEQ during the Partnering process with Team consensus that a minimum of eight samples would be required for statistical analysis.

**Comment:**
8. Regarding groundwater sampling, this document suggests that this is to be a one-time event (see Table 3-1 on page 3-7). This data collection effort will not address seasonal variations in contaminant concentrations nor will it address tidal influences. These issues will need to be addressed.

Response:
It was acknowledged during the November 1999 Partnering meeting that a second round of groundwater samples would be collected to supplement the background groundwater data. A second round of background groundwater samples was collected in June 2001.

**Comment:**
9. The data evaluation section (3.4) needs to be rewritten. Concerns with this section include:

a. The conditions under which an outlier will be removed from the data set needs to be clearly understood and agreed to. If the sampling data points are agreed to by everyone, and we believe them to be valid, then there is less reason to eliminate data from consideration regardless of its value.

Response:
As stated in the Final Work Plan for the Background Investigation, "A measurement will not be deleted from a data set solely on the basis of a statistical outlier." The data met an acceptable level of variability and was use in the statistical analysis.

b. The selection of an adequate number of sample locations depends upon desired levels of confidence and power of the data as well as an acceptable variability in the data. If these are not acceptable, additional data needs to be collected. These concepts need to be adequately addressed in this document.

Response:
Noted

c. The statement is made that the upper limit of the background concentration may be established by "...calculating the mean background concentration plus three standard deviations...." At a minimum, support for this methodology must be documented in the text.

Response:

Summary statistics for background data included frequency of detection, minimum, maximum, and mean concentrations. Three standard deviations about the mean concentration was not determined for the background data.

d. The upper limit of the background concentration may be established by "...calculating the upper tolerance limit at the 95% probability level." Again, support for this methodology must be documented in the text.

Response:
The upper tolerance levels define an upper bound of concentrations that could be expected (95% probability) in areas un-impacted by the facility. It is reasonable to use the upper tolerance levels in conjunction with background central tendency estimates for comparison to site data to evaluate site-related releases. Use of these statistics are consistent with environmental industry practices and was agreed to by the Partnering Team.

e. Another recommendation would be to utilize a statistical test to compare one data set (site related) to another data set (background). This may involve calculating the 95% upper confidence level of the arithmetic mean of the data set.

Response:
Noted

# Change Pages

# Executive Summary

This Background Investigation Report for Naval Amphibious Base (NAB) Little Creek, Virginia Beach, Virginia has been prepared by CH2M HILL under the Comprehensive Long Term Environmental Action Navy (CLEAN) Contract No. N62470-95-D6007, Contract Task Order (CTO) 148. The objective of the background investigation is to establish background concentrations of metals, pesticides, and PAHs in surface and subsurface soil, and groundwater for use in comparison to Installation Restoration (IR) Program site data to better identify release-related constituents of concern.

In order to establish background groundwater quality, samples were collected at six existing background wells, one new background well, and three wells located upgradient of base IR sites. To establish background soil quality, non-impacted areas that represent underlying hydrogeologic conditions at NAB Little Creek and areas indicative of anthropogenic background conditions were identified for background sampling locations. These areas include fill areas comprised of dredged sediments and past agricultural land use areas where pesticides may have been used. Potential upgradient sources of groundwater contamination and areas where airborne emissions may have influenced soil conditions were also taken into consideration in developing the background sampling plan. A total of 29 surface and 29 subsurface soil samples were collected.

Groundwater samples were generally of high quality in comparison to applicable water quality standards. Samples were slightly acidic with a mean pH of 5.46. Of the 178 parameters quantified, 45 constituents were detected in one or more samples. The 45 parameters detected, primarily metals, were further evaluated using boxplot analysis and compared to applicable water quality criteria (maximum contaminant levels and Virginia Groundwater Quality Standards). The total metals detected that exceeded the applicable water quality standards were arsenic, aluminum, thallium, antimony, manganese, sodium, zinc, and iron; and the pesticide, dieldrin. Statistical analyses of the data suggest that groundwater quality from monitoring wells LBG-MW02 and LS07-MW03 may be statistically different. Consequently, analytical results from these wells were not included in characterizing background groundwater quality and establishing 95 percent upper tolerance limits.

Analytical data from background soils represent surface and subsurface soils in fill, urban and native soil areas. Forty-six of 149 total parameters quantified were detected in one or more samples. Arsenic is the only metal to exceed an EPA Region III residential risk-based concentration. Arsenic exceeded this criteria in all detected results. Benzo(a)pyrene was detected in two of the 58 samples, both of which exceeded the risk criteria. The only pesticide to exceed criteria was dieldrin, which was detected in five of 58 samples and exceeded the residential risk value in only one sample. Statistical analysis using boxplots and the Kruskal-Wallis test showed that metal concentrations in native materials were statistically different (higher metal concentrations) from urban and dredged fill soils. Lead, zinc, and 4,4 DDT also demonstrated a statistical difference between subsurface and surface soils. Consequently for these metals, 95 percent upper tolerance limits and 95 percent

Total organic carbon percentages in fill material surface soil samples ranged from 0.338 to 2.55 percent. Average percentage of TOC for fill samples was 1.13 percent. TOC percentages in native surface soils ranged from 1.09 to 2.19 with an average of 1.61 percent. TOC percentages in urban surface soils ranged from 0.531 to 3.23 with an average of 1.36 percent. Average TOC percentage for all surface soils was 1.33 percent.

### 3.2.2 Metals

A total of 22 out of 24 metals were detected in one or more soil samples. Ten metals (aluminum. calcium, chromium, iron, lead, magnesium, manganese, vanadium, barium, and zinc) were detected in 97 percent to 100 percent of the samples. Silver and thallium were not detected in any of the samples, and selenium, antimony, and mercury were only detected in two or three of the samples. The remaining metals were detected in 23 to 44 of the 58 samples. A summary of metals detected in one or more background soil samples is presented in Table 3-2. Statistical analysis of all soil sample results are presented in greater detail in Section 4.

Arsenic is the only metal detected that exceeds a residential RBC. Arsenic was detected in 35 of 57 samples, all of which exceed the residential RBCs of 0.43 mg/kg. The detection limit for arsenic, 0.58 mg/kg, also exceeds the residential RBC. Five samples exceeded the arsenic industrial RBC of 3.8 mg/kg. These are: surface soil samples at LBG- N02 (4.1 mg/kg), LBG- N05 (4.5 mg/kg), and LBG- U03 (5.4 mg/kg), and subsurface samples LBG-U01 (4.4 mg/kg) and LBG-U04 (11.4 mg/kg). Mean arsenic concentration of detected results in surface soil and subsurface soil is 1.9 mg/kg and 2.2 mg/kg, respectively.

Although the maximum concentrations were relatively evenly distributed among fill, urban, and native soil sample locations, most were reported for surface soil samples. In general, metal concentrations in native soils were higher than either urban or fill soil types. Evaluation of background data with respect to statistical differences in metal concentrations in soils from fill, urban, native, surface, and subsurface soils is presented in detail in Section 4.

### 3.2.3 TCL Volatile Organic Compounds

There were no detections of volatile organic compounds in any of the background surface soil samples. Methylene chloride was detected at a concentration of 13 ug/kg in one subsurface soil sample, LBG-U13. The residential RBC value for this compound is 85,000 ug/kg. There were no other detections of volatile organic compounds in any soil samples.

### 3.2.4 TCL Semivolatile Organic Compounds

A total of 12 semivolatile organic compounds were detected in one or more soil samples. These are: two phthalates (di-n-butylphthalate and bis(2-ethylhexyl-phthalate), and ten PAHs (fluoranthene, pyrene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene). With the exception of benzo(a)pyrene in two urban soil samples, all were detected at levels well below the residential RBC values. Benzo(a)pyrene was detected in the surface soil sample at LBG-U10 (300 ug/kg) and subsurface soil sample at LBG-U05 (360 ug/kg). These two detected results, exceed the residential RBC of 87 ug/kg. The detection limit for benzo(a)pyrene also exceeds this criteria.

# Addendum for Final Background Report

# NAVAL AMPHIBIOUS BASE LITTLE CREEK BACKGROUND GROUNDWATER EVALUATION

PREPARED FOR: NAB Little Creek Tier 1 Partnering Team

PREPARED BY: Alta Turner/BOS

DATE: February 24, 2003

**Introduction**

The NAB Little Creek facility has established a network of groundwater monitoring wells to assess conditions in groundwater believed to be representative of background conditions. The first complete round of sampling was conducted in January 2000 ; 12 samples were collected from 10 individual monitoring wells. Groundwater samples, including duplicate split-samples from two wells [LBG-MW02 and LBG-MW05], were analyzed for 178 parameters. Results from the first round of sampling were summarized in a Technical Memorandum (TM) dated July 2, 2000. A preliminary conclusion indicated that samples from two wells exhibited anomalous behavior, potentially indicative of impacts from site activities. While recognizing that a single round provides only a marginal basis to exclude those data, the TM pointed out that the chemical results from the two wells were consistently elevated as compared to the other wells within the background network.

In September 2000, a supplementary TM expanded on the preliminary evaluation. Following review of preliminary results and further evaluation of well locations, the Project Team determined that the two wells identified in the original report [LBG-MW02 and LS07-MW03] represented atypical conditions resulting from mounding and/or proximity to fill areas. The Team also determined that the particulars of installation location justified removing results from those wells from further evaluation of potential background groundwater conditions at the facility. The supplementary TM documented evaluations of duplicate sample results, examined distributions of the 45 parameters for which one or more background results exceed applicable water quality criteria, and estimated upper bounds of expected values from the revised subset of background locations. The supplementary TM also noted two major caveats in the interpretation and application of the background values presented. The first caveat centered on the reduced reliability in upper bound estimates as the result of decreased detection frequency. The second caveat noted that the nonparametric upper tolerance levels [UTLs] for several parameters [dissolved and total fractions of AS, FE, NA and K, along with total AL and dissolved BA] were high and should be verified and/or modified, as appropriate, based upon results from additional sampling.

Both reports resulted in a re-sampling summer event, scheduled for June 2001. During preparation for that event, preliminary field evaluations indicated that two of the original 10 wells [LS10-MW08 and LBG-MW06] had either been lost and/or failed structurally, requiring installation replacement. June sampling was successfully performed at the remaining eight wells in the network. The two replacement wells [LS10-MW09 for LS10-MW08 and LBG-MW12 for LBG-MW06] were installed as close to the location and screen depth of the original wells and sampled in October 2001. The parameter list, with minor discrepancies, paralleled the winter event.

This TM summarizes results from the two events, designated 'winter' [JAN2000] and 'summer' [JUN2001 and OCT2001]. This TM includes the following sections:

1 Description of Available Data
2 Discussion of Field Duplicate Results
3 Parameter Summary with Comparison to Critical Values
4 Well - Season Comparisons
5 Conclusions and Recommendations

## 1.0 Available Data

All sample results from the background groundwater monitoring wells network were gathered from the Little Creek Facility database. The full extent of groundwater sampling from the Little Creek background well network is summarized, as follows:

| | *Winter Event* | | *Summer Event* | |
|---|---|---|---|---|
| Well | JAN2000 | JUN2000 | JUN2001 | OCT2001 |
| *LBG-MW02* | X + DUP | -- | X | -- |
| LBG-MW04 | X | -- | X | -- |
| LBG-MW05 | X + DUP | -- | X | -- |
| **LBG-MW06_12** | | | | |
| LBG-MW06 | X | -- | -- | -- |
| LBG-MW12 | -- | -- | -- | X |
| LBG-MW08 | X | X | X | |
| LBG-MW10 | X | -- | X + DUP | |
| LBG-MW11 | X | -- | X | |
| *LS07-MW03* | X | -- | X | |
| LS10-MW05 | X | -- | X | |
| **LS10-MW08_09** | | | | |
| LS10-MW08 | X | -- | -- | |
| LS10-MW09 | -- | -- | -- | X |

Well Events For reasons described above, sampling across the facility background groundwater monitoring network is not completely balanced across wells and events. Asymmetries in available data from previously conducted sampling are noted, as follows:

- The 10 unique well locations within the background monitoring well network include two locations represented by samples collected in different installations as close to the original installation as practicable. These two locations have been renamed to facilitate identification of the locations with different installations sampled at the two events and printed **in bold** above.

- Two of the installations were excluded from background calculations and applied to results from the *WinterEvent* [LBG-MW02 and LS07-MW03] due to their comparatively elevated levels [printed in *italic* above]. They were resampled during the *SummerEvent* to ascertain whether their comparatively elevated results during the JAN2000 sampling are consistent through time. Results from the two events in these wells are discussed in comparatively greater detail below.

Well Locations The background monitoring well network, as it exists, includes the wells located in Figure 1.

Field Duplicates Duplicate samples, collected from four wells over the three events [designated in the above matrix as 'X + DUP'], are summarized in Section 2.

Parameters Quantified A total of 187 unique parameters have been quantified in one or more samples, although most samples collected were analyzed for set of 175 common parameters. The discrepant 12 parameters represent miscellaneous quantifications in one or two samples, presumably resulting from inconsistencies in either the laboratory requests or the parameters quantified by the laboratory. Discrepancies were not limited to any single event or analytical class. Rather, as indicated in Table 1, which lists the 17 records associated with the 12 quantified in a single sample, the occasional additional parameters occurred in organic and water chemistry classes in various wells in the three primary and secondary sampling events:

The full set of parameters quantified in the majority [19 - 21 of the 21 unique samples] includes: 23 dissolved FMETAL, 24 METAL, 28 PPCB, 59 SVOA and 41 VOA analytes [no WC analytes]. Critical values for all parameters quantified include groundwater levels representing maximum contaminant levels [MCLs], maximum contaminant level guidelines [MCLGs], risk-based critical values for tap-water [RBCtap] and Virginia groundwater standards [VA GW STDs], listed in Table 2.

## 2.0 Field Duplicate Results

Four samples were replicated in the field during sampling of the background monitoring well network; two locations during the winter event [LBG-MW02 and LBG-MW05], one location during the primary summer event [LBG-MW10], and one location during the supplemental summer event [LS10-MW08_09]. One of the duplicates from the JAN2000 sample was analyzed for only 152 of the 175 parameters quantified in the remaining duplicate pairs.

Of the 677 pairs of duplicated analyte results, qualifiers from the 653 pairs were the same. Of these, 63 pairs were reported as detect-detect [DD], 590 pairs as nondetect-nondetect [UU]. The remaining 24 pairs were either UD or DU. In the latter case, where reported qualifiers differ between the duplicates, it would be expected that the detected result is quite close to the reported detection limit; that is, that the discrepant values represent instrument limitations at the limit of detection where the signal to noise ratio is low.

In all three cases of qualifier pairings, the reproducibility of reported chemical concentrations has been evaluated using the relative percent difference [RPD] between the pairs. RPD is defined as the percentage of the average concentration [of the two duplicate analyses] which is represented by the difference between the two reported measures; or, the difference between the reported concentrations divided by the average of the two and multiplied by 100. The 'expected value' of a perfect duplicate analysis is 0 percent. In the case of groundwater sampling, when duplicates represent a second sample [as opposed to a second aliquot taken from a single sample in a sampling device] discrepancies in reported concentrations between field duplicates reflect small-scale spatial or temporal variability. In such cases, there is no 'correct' RPD for duplicate field collections because spatial and temporal variations exist and are not controllable. While there is no 'correct' RPD, acceptable RPD levels for laboratory split samples [which are both controllable and expected to approach zero] range between 30 and 100 percent, depending upon the specific analyte.

Overall, samples and parameters have RPD values ranging between –189 and +157 percent, averaging –0.9, with a median value of 0.0. Potential differences among RPDs within qualifier class [UU, DD or UD/DU], analytical class, station location and/or sampling event have been examined through summary statistics and graphical displays known as boxplots. Boxplots are statistical graphics which can be used to visually compare subgroups. Figure 2 describes components to the plot and briefly summarizes interpretation of the display.

Table 3 tabulates distributions of RPDs for the full set of pairs, then tabulates distributions partitioned into subgroups, by qualifiers [DD, UU and DU/UD subgroups], analytical classes [FMETAL, METAL, P/PCB, SVOA and VOA subgroups], well stations [LBG-MW02/05/10 and LS10-MW09 subgroups] and sampling event [JAN2000, JUN2001, and OCT2001 subgroups].

Figure 3 displays boxplots of the partitions of well location, analytical class and events. To facilitate interpretation of the displays, the calculated value RPD has been converted to absolute RPD. That transformation allows differentiation as to the magnitude of differences among RPD calculated values [as opposed to the raw difference value]. The displays in Figure 3 are found on two sheets. Each of the four possible qualifier groups [pooled, UDDU, DD and UU] have been displayed with respect to stations, analytical class and event [from top to bottom, respectively]. They are plotted as sequential columns, starting on the left side of page 1, proceeding through the UU plots found in the right hand column of page 2.

The tabular and graphical displays suggest the following conclusions as to comparability of duplicate results in terms of absolute RPD:

- Pooled results [column 1 of page 1 of the plots and first line of the table] indicate wide variability in absolute RPD across stations, parameter classes and events. However, the centers of the boxes overlap to a large extent, suggesting no strong differences among duplicate reproducibility across the partitions.

- Looking at the 63 DD pairs separately, analytical classes are comparable. Elevated RPDs apparent in LBG-MW10 and the JUN2001 sampling event are confounded in space and time. That is, results from the well are limited to the single event and the event is represented by the single well. Consequently, apparent differences in results cannot be clearly attributed to the location or the season of the event.

- For UU pairs, a similar pattern is apparent. Analytical class RPDs are comparable across the set of 590 UU results. However, significant differences are apparent between wells, with LBG-MW02 and LBG-MW05 comparatively elevated with respect to samples from the other two wells with duplicate measures. Consequently, the source of differences [spatial location or time of year] cannot be distinguished.

- In comparison to the DD and UU pairs, RPDs for UD/DU pairs are comparatively elevated. However, given the comparatively smaller sample size [23 pairs], differences are not statistically significant.

Table 4 lists the entire set of 677 paired results:

Records include station, analysis, date, parameter and reporting units, followed by the paired results [D1 and D2], paired reported qualifiers [Q1 and Q2] and RPD. The table has been sorted by qualifier combinations [DD, UU and UD/DU], then by analytical class and RPD [increasing]. The majority [96.5 percent] of RPDs are within the range of +/- 50 percent. In the cases of the remaining 24 pairs, discrepancies are summarized, as follows:

- Absolute values of RPD exceeding 50 percent have occurred in five pairs where qualifiers are reported as detects. Three of the five cases [dissolved chromium, dissolved zinc and total iron] have been highlighted in the table, given the substantive differences between reported concentrations; i.e., 1.5D *versus* 52.1D; 24.9D *versus* 188D; and 3640D *versus* 6960D, respectively.

- RPDs from UU duplicates exceed an absolute value of 50 percent in 10 records. Duplicate measures of iron, reported as nondetects [UU] from LBG-MW05 [45.6U *versus* 136U] are considered substantive and have been highlighted in the table.

- The remaining nine RPDs exceed an absolute value of 50 percent represent a more difficult set of results due to discrepant reported qualifiers [in addition to a comparatively high RPD between the reported concentrations]. While all nine cases are troublesome on a theoretical level, only four differ substantively in terms of the concentrations involved. These include: 0.9U *versus* 8.3D dissolved copper; 6U *versus*

26.6D dissolved nickel; 12.5U *versus* 44.4D total aluminum; and 12.9U *versus* 45.3D total zinc. These have also been highlighted in the table.

Treatment of duplicate results, beyond examination of the RPDs and qualifier discrepancies, requires some handling to integrate the two values into a single value for statistical analysis. It would be inappropriate to utilize both sets of results when summarizing location information because the replicated locations would be weighted more heavily than the remaining locations in any population evaluations or estimates. There are several ways to treat duplicates, including: calculation of a mean concentration; selection of the maximum or minimum of the pair; random selection of either one or the other of duplicate measures. Here, the latter option [random selection of either the first or second pair of dupes] has been applied, with the result that the original sample [without duplicate designation 'P'] was used in subsequent parameter summaries, well and event comparisons and distribution testing.

### 3.0 Chemical Summary and Comparison to Critical Values

Criteria which are potentially applicable to groundwater from the Little Creek facility include maximum contaminant levels [MCLs], maximum contaminant level guidelines [MCLGs], risk-based criteria applicable to drinking water [RBCtap] and Virginia groundwater standards [VA GW STDs]. The four sets of criteria are derived using different methods. They differ with respect to the parameters for which critical values have been identified as well as to the concentration specified as 'critical.' Some are risk-based while others are 'policy-based. ' For example, some MCLGs are 'policy-based' specifying that no concentration of some compounds is acceptable. Unfortunately, these are translated to critical values of 0 for those parameters; a value which is analytically impossible to demonstrate or document.

Critical values for the 187 parameters quantified in at least one of the background groundwater samples include: 169 RBC parameter-specific criteria, 74 MCLs, 28 MCLGs and 46 VA GW STD [Table 2]. A subset of 25 parameters which have critical values specified for MCL, VA GW STD and RBCtap criteria has been listed in Table 5 to demonstrate the relative concentrations specified. Parameters in-common are predominantly dissolved and total metals with eight and nine parameters, respectively, accounting for 17 of the 25. The remaining eight parameters include seven pesticides and the semivolatile pentachlorophenol. When comparing the relative concentration of critical values, the VA GW STD is more conservative than either the MCL or the RBCtap. In 20 of the 25 parameters which have critical values for the three criteria, the VA GW STD critical values are lower than either of the other two criteria. In three different parameters, the RBC tap is lower than either the MCL or the VA GW STD. In two cases, the RBCtap concentrations are identical with the MCL [and lower than the VA GW STD]. The MCL is not uniquely the lowest concentration in any of the 25 parameters for which the three have critical values in common.

Summary statistics and critical values provide a useful context in preliminary evaluation of reported laboratory results. Tables 6 and 7 summarize results from the 3,681 individual results from the background monitoring network sampling over all events and stations.

Table 6 documents for each parameter quantified: sample count, the frequency of reported detections ['FD,' which the ratio of reported detects to the total sample count], the range [minimum and maximum] of reported nondetects ['UMIN' and 'UMAX'] and reported detects ['DMIN' and 'DMAX'], the mean and median concentrations and the coefficient of variation ['CV,' the standard deviation of the values, normalized by the mean value]. The 12 parameters for which only one or two quantifications have been made are in **bold** face. The table has been sorted by analytical class [which is followed by the count of analytes within that class] and by FD [decreasing].

Table 7 documents the value of any applicable criterion, followed by the count of reported detected and undetected concentrations which exceeded the indicated criterion. Column headings include parameter name, reporting units, FD then the three columns [critical value, followed by the counts of reported detects 'D>' and reported non-detects 'U>'] for the RBCtap, MCL, MCLG and VA GW STD criteria. The tables have been sorted by chemical class and FD. As in the companion table, the highlighted rows correspond to the 12 parameters which were quantified in only one or two of the 21 samples.

Analytical-class specific results summarized from the two tables are, as follows:

**Dissolved Metals**
Of the 23 dissolved metals quantified, only mercury was not detected in any of the samples analyzed. FDs of the remaining parameters range between 5 percent [beryllium, lead and silver] and 100 percent [magnesium, manganese and sodium]. Critical values exist for 20 of the 23 dissolved metals quantified, excluding calcium, magnesium and potassium. Reported detect concentrations for ten of the 22 parameters detected exceed one or more critical values, including: antimony, arsenic, cadmium, iron, lead, manganese, selenium, sodium, thallium and zinc. Sample counts exceeding the criteria range between 1 and 18 of the 21 individual well/event samples. Reported detection limits [non-detect concentrations] for four parameters [antimony, arsenic, cadmium and thallium] exceed critical values for one or more of the three criteria [exclusive of 0-value MCLGs].

**Total Metals**
Of the 24 total metals quantified, only antimony was not detected in any of the samples analyzed. FDs of the remaining parameters range between 5 percent [silver and copper] and 100 percent [manganese]. Critical values exist for 20 of the total metal analytes quantified, excluding calcium, magnesium, potassium and sodium. Reported detections for eleven of the 23 parameters detected exceed one or more critical values. Nine parameters in the suite of 11 parameters exceeding criteria are the same as the dissolved metals exceeding criteria, including: arsenic, cadmium, iron, lead, manganese, selenium, sodium, thallium and zinc. The additional parameters exceeding total metals criteria [but not dissolved] are cyanide [not quantified in the dissolved fraction] and mercury. The metal with levels in the dissolved fraction which exceed the dissolved criterion [but not the total fraction] is antimony. Reported detection limits in quantification of the total metals exceed one or more non-zero valued criteria in six parameters: arsenic, cadmium, cyanide, lead, mercury and zinc.

**P/PCB**

Of the 29 P/PCB analytes quantified, eight were detected. FDs range from 5 percent [representing six of the eight, including: 44DDD, deltaBHC, endosulfan sulfate, endrin, endrin aldehyde and endrin ketone] to 14 percent [lindane]. Twenty-seven analytes within the class and seven within the set of detected parameters have one or more critical values. Criteria for four parameters [dieldrin, lindane, endrin aldehyde and endrin ketone] are exceeded by reported detected concentrations in one or two of the 21 samples analyzed. Reported non-detect levels in 16 of the 29 parameters quantified exceed critical values of one or more of the criteria. In most cases, the reporting limits for all samples [19 - 21 of the 21 analyzed] which have been reported as non-detects exceed applicable critical values.

**Semivolatile Organic**

Of the 54 semivolatile organic compounds quantified, six were detected in one or more samples. FDs range between 5 percent [phenol, fluorene, di-n-butylphthalate and 24-dinitro toluene] and 19 percent [bis-2-ethyl-hexyl phthalate]. Of the 54 parameters quantified, all but nine have one or more critical values. Of the six parameters detected, only two, phenol and bis-2-ethyl hexyl phthalate, have critical values. One of the phenol detected values exceeds the VA GW STD which is the only applicable criterion for phenol. Bis-2-ethyl hexyl phthalate concentrations reported as detections in one sample exceeds the RBCtap and four detections exceed the zero-value MCLG. However, virtually all reported nondetects [17] exceed the VA GW STD criterion for phenol. Parameters in which reported detection limits are sufficiently low to demonstrate that critical values have not been exceeded are limited. Twenty-four parameters which have not been detected were reported at detection levels which exceed one or more critical values in 17 - 21 of the samples quantified.

**Volatile Organic**

Of the 44 volatiles quantified, nine were detected in one or samples. FDs ranged between 5 percent [2-butanone; chloroform; cis-1,2-dichloroethene; trichloroethene; tetrachloroethene and vinyl chloride] and 10 percent [1,2-dichloropropane; acetone and chloromethane]. One or more criteria exist for all but two of the volatile organics quantified [bromo chloro methane and m-/p-Xylene]. Detected concentrations exceed RBCtap criteria for four parameters [1,2-dichloropropane; chloroform; tri- and tetra-chloroethene] in either one or two of the 21 samples quantified. Reporting limits for approximately 20 parameters exceed either the RBCtap or VA GW STD [or both] in 20 - 21 of the samples quantified.

## 4.0 Well - Season Comparisons

The underlying structure of data collected from the background groundwater monitoring well network at the Little Creek facility is not balanced. For various reasons, different wells have been sampled at different points in time. Consequently, attempts to compare different wells involves comparisons between events. Similarly, trying to compare different events means comparing results from different sets of wells. This situation arises when different wells are sampled at different sampling events and results in the 'confounding' of primary factors of location and event. Therefore, differences within parameters levels cannot be definitively attributed to either spatial location or temporal differences because factor levels have not been fixed.

Confounding primary factors increases the complexity of statistical analysis. A simple comparison using results from any/all wells and events maximizes the number of results used. However, when events and wells are confounded, conclusions as to differences or lack of differences are suspect. For example, if the wells sampled in one event are actually elevated with respect to those sampled in the other event, statistical 'differences' attributed to the event could, in fact, simply be the result of differences among wells sampled in the events. Alternatively, while limiting the primary factors to fixed cases [the subset of wells which have been quantified in a subset of common events] supports more valid comparisons, excluding results from the unbalanced design limits sample size and, potentially, the range of values which could fairly considered as background. In either case, conclusions are less than optimal.

Given the constraints to available Little Creek groundwater background data, two sets of well-event comparisons were performed. In the first well-event comparison, all results have been used. In the second comparison, data have been limited to the subset of wells which were sampled in both winter and summer events. In both cases, parameters have been limited to the 17 parameters which were detected 50 percent or more of available observations. In order to maximize the number of observations per well and event, rank per parameter have been substituted for absolute value, meaning that each well event combination had 17 measures. Results are summarized, as follows:

*All-available Results Comparisons*

- When all data are used, statistically significant differences among both wells and events are observed.

- Pooled across all wells [when different wells were sampled in the events], winter results are generally higher than summer/fall results.

- When data are then partitioned into event-specific subsets, differences among wells are not consistent across parameters within event or across events within parameters.

*Fixed Comparisons*

- When results are limited to the set of wells which were sampled during both events, differences between events are not statistically significant.

- Well-specific differences, pooled across the 17 parameters, indicate statistically significant differences with LBG-MW02, LBG-MW08 and LBG-MW11 elevated in comparison to remaining wells, including LB-MW04 which was slightly elevated to the final three: LS10-MW05, LBG-MW10 and LBG-MW05.

These results indicate that for most of the network, differences in analytical results between the two events at the same locations are not substantive. This conclusion would support either the continued application of the previously estimated background levels or recalculation using the expanded data set, limited to the same subset of wells; i.e., excluding the same two wells originally excluded, LBG-MW02 and LS07-MW03.

However, the broader conclusion which is derived from analyses from both events is that differences among wells designated 'background' are substantive. Additionally, rather than being a straight-forward situation of consistent elevation across all parameters [as observed in wells LBG-MW02 and LS07-MW03], for at least some parameters, substantive differences are well-specific, suggestive of localized impacts of specific parameters. These results argue for a more detailed review of the performance of the originally specified UTLs, focusing particularly on the subsequent measures from wells which dominated in the calculations. The parameters of particular interest are those which were identified in discussion of the original UTL estimates as potentially anomalously high. Maxima for these parameters did not co-occur in a single well; rather, the maxima were found in three different wells: LS10-MW05, LBG-MW11 and LBG-MW08. The parameters include: AS, BA, FE and NA [total and dissolved fractions] and total AL and K, each of which is discussed below:

- The quantification and/or distribution of AL in the groundwater within the monitoring network is the most complex and seemingly most volatile. There are not only wide differences among wells, but also, within wells, and differences across season. [This variability is exhibited in the coefficient of variation, CV, of 3.0 for the full set of 21 aluminum observations. The next highest CV was that of CO, at 2.4.] The maximum detection of AL [excluding LS07-MW03] occurred in summer in LBG-MW11 at 2740 ug/L. The winter sample from the same well is 12.5 ug/L as ND. The next highest results, 954 and 713 ug/L, are from the summer sample at LB-MW05 and the winter sample from LS10-MW05, respectively. The 'other event' for these two wells are markedly lower. Mid-lying wells such as LBG-MW10, LBG-MW-06_12 and LBG-MW04 are comparatively more consistent across season. The original UTL, 713 ug/L, occurred winter in LS10-MW05, northeast of Desert Cove. The subsequent summer sample was a reported non-detect, suggesting that the limit is not inappropriately high and could be representative of unimpacted conditions in the area.

- Total and dissolved fractions of AS are positively correlated, meaning that maximum dissolved and total concentrations coincide in the same sample. The originally specified UTLs were based upon the measures from LBG-MW11. Second round results corroborate the original measures [in all wells], indicating that the maximum is not likely to be representative of the upper limit of background, but, more likely, an indication of localized AS contamination. A more conservative UTL, for both total and dissolved AS, calculated with LBG-MW11, LS10-MW08_09, LS07-MW03 and LBG-MW02 results excluded, is on the order of 4 ug/L, a level which is approached by most reported non-detects.

- Total and dissolved BA levels also parallel, with atypically high levels occurring in both events in LBG-MW08 and LBG-MW02. The next highest results occur in the two samples from LS10-MW08_09 and do not diverge substantively from the next ranked measures. An alternative UTL on the order of 55 ug/L total and 28 ug/L dissolved BA are more conservative estimates of conditions which could be considered representative of background levels.

- The relationship between total and dissolved FE is inconsistent. In some cases, high or low total FE concentrations correspond to high or low dissolved concentrations but in other cases, high total is associated with mid or low-range dissolved FE [LS10-MW05 winter measurement] or low total with high dissolved. The original UTL, based upon results from LS10-MW05 and LBG-MW11, are elevated and levels in LBG-MW11 are consistently high in samples from both events. A more conservative UTL would be on the order of 15-20K ug/L for total and dissolved FE.

- The UTL for K was based upon the winter sample from LBG-MW08. Summer levels exceed the original measure, suggesting localized elevations may have resulted from site activities. The alternative measure from LS10-MW08_09 collected summer is 16600 ug/L, a concentration which is more consistent with other results and would function as a reasonable upper bound of what might be expected to represent conservative upper limits on background concentrations.

- Dissolved and total NA levels are consistent across wells and seasons. Elevated levels are observed from samples collected in both seasons in LBG-MW02 [1,860,000 – 2,240,000 ug/L], LBG-MW08 [337,000 – 411,000 ug/L] as well as LBG-MW04 [64,800 - 80,600 ug/L]. The remaining 14 measures available are more consistent and range between 7,570 and 64,400 ug/L.

Review of the remaining UTLs, within the context of current data, indicate:

- The UTLs for total and dissolved CA are potentially affected by localized impacts around LS10-MW08_09.
- Total and dissolved fractions of CO from LS07-MW03, LS10-MW08_09 and LBG-MW06_12 summer 2001 samples exceed the CO background upper limits established with winter 2000 sampling.
- The MG total UTL was exceeded in summer samples from the same well where the winter maximum occurred [LBG-MW08]. A more conservative value would be based upon the two results from LS10_MW08_09, on the order of 25,000 ug/L.
- Total and dissolved MN UTLs were exceeded by results from LBG-MW11, a further indication that the observed elevated AS in the well represent localized facility impacts.

Remaining exceedance of previously derived UTLs occurred mostly commonly in measures reported from LS07-MW03 and LBG-MW02 [as expected]. No other additional parameter UTLs are inconsistent with current results and/or suggest the estimates are based upon anomalously high values.

## 5.0 Conclusions - Recommendations

Groundwater data from the Little Creek monitoring network proposed as representing background conditions consist of a complex set of results. Major features of the data are summarized, as follows:

- Comparisons with critical values indicate numerous parameters exceed regulatory criteria in groundwater under the Little Creek facility. The wide ranges in terms of critical values established by the multiple criteria makes a simple summary of relevant conclusions difficult.

- Analytical reporting limits pose additional problems. Most detection limits for organics [as well as many inorganics] are higher than critical values making it difficult to assess relative impacts.

- Inconsistency with respect to individual wells sampled in the two rounds of sampling of potential background wells limits the strength of conclusions.

- That said, it does not appear as though most parameter well combinations differ much between sampling events. Occasional, substantive differences observed have been described in parameter-specific discussions above.

- The primary factor evident from the two sampling events is the wide divergence of analytical results across the site. Spatial differences and, in particular, parameter-specific differences in concentrations at different locations suggests that the potential background monitoring network consists of wells which have been impacted by site activities in adjacent areas.

- Evaluation of the 'performance' of the UTLs, which were based upon the single winter event against the second round, indicates that six of the original limits would be more conservatively re-estimated by excluding elevated parameter well results. Five of the parameters had potentially elevated estimates as identified in the original estimates. These five and the proposed alternative UTL are: AS [4 ug/L]; BA [total 55 and dissolved 28 ug/L]; FE [17.1 and 11.2 mg/L, for total and dissolved, respectively]; K [16.6 mg/L]; and NA [65 mg/L].

- The UTL for MG, while not particularly anomalous, was exceeded by second round results from the same well [LBD-MW08] suggesting the levels may represent localized impacts.

- Similar exceedances [of CO, and MN] further emphasize the spatial heterogeneity of site groundwater represented in the network.

Should the NAVY continue attempts to characterize groundwater constituent levels representative of background conditions at the Little Creek facility, the following suggestions could assist in clarifying interpretation of future results. The suggestions focus on three factors: analytical detection limits, source characterization, and network expansion.

**Reporting Limits.** Analytical reporting limits in available data for both inorganic and organic compounds often exceed critical values. Functionally, this means that a reported non-detection cannot be interpreted as a clear statement of 'no problem.' Plans to extend the groundwater network database should include resolution of what criteria are considered most relevant to site decision making. Those criteria then should form the basis for the laboratory Standard Operating Procedure (SAP) in order to assure that quantitation limits can support such a conclusion at levels considered relevant. Those performance specifications should then be applied consistently in future groundwater sample analyses. If applicable, selection of a single criterion [per parameter] would simplify comparisons to criteria and interpretation and summary of criteria exceedances.

**Source Characterization.** Facility characterization at Little Creek is an on-going process. However, the seeming complexity of results from the purported 'background' monitoring network might be mitigated by a paper study which characterizes each of the wells in the potential background network with respect to local activities and/or SWMUs which could already have impacted groundwater in the area. Cross reference to the parameter-specific elevated concentrations could result in a much more clear picture of what is happening with site groundwater.

**Network Expansion.** The monitoring network originally designated a background network is, functionally speaking, a 'perimeter' network but not necessarily a network which encompasses unimpacted groundwater. Correlating adjacent potential contaminants with currently available data would be useful in identifying areas where spatial coverage is not sufficient to clearly differentiate the extent of localized impacts in order to focus network expansion.

# Tables

**Table 1**
Little Creek Background Groundwater Parameter Subset: Incomplete Quantification
*NAB Little Creek, Virginia Beach, Virginia*

| Station | Date | Class | Parameter | Value | Units | Qualifier |
|---|---|---|---|---|---|---|
| LBG-MW12 | 10/29/2001 | PEST/PCB | beta-Chlordane | 0.0093 | UG/L | ND |
| LS10-MW09 | 10/29/2001 | PEST/PCB | beta-Chlordane | 0.01 | UG/L | ND |
| LS10-MW09 | 10/29/2001 | PEST/PCB | beta-Chlordane | 0.0093 | UG/L | ND |
| LBG-MW08 | 06/02/2000 | SVOA | 1,2,4-Trichlorobenzene | 10 | UG/L | ND |
| LBG-MW08 | 06/02/2000 | SVOA | 1,2-Dichlorobenzene | 10 | UG/L | ND |
| LBG-MW08 | 06/02/2000 | SVOA | 1,3-Dichlorobenzene | 10 | UG/L | ND |
| LBG-MW08 | 06/02/2000 | SVOA | 1,4-Dichlorobenzene | 10 | UG/L | ND |
| LBG-MW08 | 06/02/2000 | SVOA | Carbazole | 10 | UG/L | ND |
| LBG-MW08 | 06/02/2000 | VOA | 1,2-Dichloroethene (total) | 10 | UG/L | ND |
| LBG-MW08 | 06/02/2000 | VOA | m- and p-Xylene | 10 | UG/L | ND |
| LBG-MW08 | 06/02/2000 | VOA | o-Xylene | 10 | UG/L | ND |
| LS10-MW05 | 01/11/2000 | WCHEM | Bicarbonate | 180 | MG/L | D |
| LS10-MW08 | 01/11/2000 | WCHEM | Bicarbonate | 480 | MG/L | D |
| LS10-MW05 | 01/11/2000 | WCHEM | Chloride | 19.5 | MG/L | D |
| LS10-MW08 | 01/11/2000 | WCHEM | Chloride | 24.8 | MG/L | D |
| LS10-MW05 | 01/11/2000 | WCHEM | Sulfate | 54.3 | MG/L | D |
| LS10-MW08 | 01/11/2000 | WCHEM | Sulfate | 45.4 | MG/L | D |

**Table 2**
Parameter List and Critical Values
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | CAS | Units | RBCtap | MCL | MCLG | VA GW |
|---|---|---|---|---|---|---|
| *DISSOLVED METAL* | | | | | | |
| Aluminum | 7429-90-5 | UG/L | 37000 | | | |
| Antimony | 7440-36-0 | UG/L | 15 | 6 | | |
| Arsenic | 7440-38-2 | UG/L | 0.045 | 10 | 0 | 50 |
| Barium | 7440-39-3 | UG/L | 2600 | 2000 | | 1000 |
| Beryllium | 7440-41-7 | UG/L | 73 | 4 | | |
| Cadmium | 7440-43-9 | UG/L | 18 | 5 | | 0.4 |
| Calcium | 7440-70-2 | UG/L | | | | |
| Chromium | 7440-47-3 | UG/L | 110 | 100 | | 50 |
| Cobalt | 7440-48-4 | UG/L | 730 | | | |
| Copper | 7440-50-8 | UG/L | 1500 | 1300 | | 1000 |
| Iron | 7439-89-6 | UG/L | 11000 | | | 300 |
| Lead | 7439-92-1 | UG/L | 15 | 15 | 0 | 50 |
| Magnesium | 7439-95-4 | UG/L | | | | |
| Manganese | 7439-96-5 | UG/L | 730 | | | 50 |
| Mercury | 7439-97-6 | UG/L | 11 | 2 | | 0.05 |
| Nickel | 7440-02-0 | UG/L | 730 | | | |
| Potassium | 7440-09-7 | UG/L | | | | |
| Selenium | 7782-49-2 | UG/L | 180 | 50 | | 10 |
| Silver | 7440-22-4 | UG/L | 180 | | | |
| Sodium | 7440-23-5 | UG/L | | | | 100000 |
| Thallium | 7440-28-0 | UG/L | 2.6 | 2 | 0.5 | |
| Vanadium | 7440-62-2 | UG/L | 260 | | | |
| Zinc | 7440-66-6 | UG/L | 11000 | | | 50 |
| *METAL* | | | | | | |
| Aluminum | 7429-90-5 | UG/L | 37000 | | | |
| Antimony | 7440-36-0 | UG/L | 15 | 6 | | |
| Arsenic | 7440-38-2 | UG/L | 0.045 | 10 | 0 | 50 |
| Barium | 7440-39-3 | UG/L | 2600 | 2000 | | 1000 |
| Beryllium | 7440-41-7 | UG/L | 73 | 4 | | |
| Cadmium | 7440-43-9 | UG/L | 18 | 5 | | 0.4 |
| Calcium | 7440-70-2 | UG/L | | | | |
| Chromium | 7440-47-3 | UG/L | 110 | 100 | | 50 |
| Cobalt | 7440-48-4 | UG/L | 730 | | | |
| Copper | 7440-50-8 | UG/L | 1500 | 1300 | | 1000 |
| Cyanide | 57-12-5 | UG/L | 730 | 200 | | 5 |
| Iron | 7439-89-6 | UG/L | 11000 | | | 300 |
| Lead | 7439-92-1 | UG/L | 15 | 15 | 0 | 50 |
| Magnesium | 7439-95-4 | UG/L | | | | |
| Manganese | 7439-96-5 | UG/L | 730 | | | 50 |
| Mercury | 7439-97-6 | UG/L | 11 | 2 | | 0.05 |
| Nickel | 7440-02-0 | UG/L | 730 | | | |
| Potassium | 7440-09-7 | UG/L | | | | |
| Selenium | 7782-49-2 | UG/L | 180 | 50 | | 10 |
| Silver | 7440-22-4 | UG/L | 180 | | | |
| Sodium | 7440-23-5 | UG/L | | | | 100000 |
| Thallium | 7440-28-0 | UG/L | 2.6 | 2 | 0.5 | |

**Table 2**
Parameter List and Critical Values
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | CAS | Units | RBCtap | MCL | MCLG | VA GW |
|---|---|---|---|---|---|---|
| Vanadium | 7440-62-2 | UG/L | 260 | | | |
| Zinc | 7440-66-6 | UG/L | 11000 | | | 50 |
| *PESTICIDE/PCB* | | | | | | |
| 4,4'-DDD | 72-54-8 | UG/L | 0.28 | | | |
| 4,4'-DDE | 72-55-9 | UG/L | 0.2 | | | |
| 4,4'-DDT | 50-29-3 | UG/L | 0.2 | | | 0.001 |
| Aldrin | 309-00-2 | UG/L | 0.0039 | | | 0.003 |
| alpha-BHC | 319-84-6 | UG/L | 0.011 | | | |
| alpha-Chlordane | 5103-71-9 | UG/L | 0.19 | | | |
| Aroclor-1016 | 12674-11-2 | UG/L | 0.96 | 0.5 | | |
| Aroclor-1221 | 11104-28-2 | UG/L | 0.033 | 0.5 | | |
| Aroclor-1232 | 11141-16-5 | UG/L | 0.033 | 0.5 | | |
| Aroclor-1242 | 53469-21-9 | UG/L | 0.033 | 0.5 | | |
| Aroclor-1248 | 12672-29-6 | UG/L | 0.033 | 0.5 | | |
| Aroclor-1254 | 11097-69-1 | UG/L | 0.033 | 0.5 | | |
| Aroclor-1260 | 11096-82-5 | UG/L | 0.033 | 0.5 | | |
| beta-BHC | 319-85-7 | UG/L | 0.037 | | | |
| beta-Chlordane | 5103-74-2 | UG/L | | | | |
| delta-BHC | 319-86-8 | UG/L | | | | |
| Dieldrin | 60-57-1 | UG/L | 0.0042 | | | 0.003 |
| Endosulfan I | 959-98-8 | UG/L | 220 | | | |
| Endosulfan II | 33213-65-9 | UG/L | 220 | | | |
| Endosulfan sulfate | 1031-07-8 | UG/L | 220 | | | |
| Endrin | 72-20-8 | UG/L | 11 | 2 | | 0.004 |
| Endrin aldehyde | 7421-93-4 | UG/L | 11 | 2 | | 0.004 |
| Endrin ketone | 53494-70-5 | UG/L | 11 | 2 | | 0.004 |
| gamma-BHC (Lindane) | 58-89-9 | UG/L | 0.052 | 0.2 | | 0.01 |
| gamma-Chlordane | 12789-03-6 | UG/L | 0.19 | | | |
| Heptachlor | 76-44-8 | UG/L | 0.015 | 0.4 | 0 | 0.001 |
| Heptachlor epoxide | 1024-57-3 | UG/L | 0.0074 | 0.2 | 0 | 0.001 |
| Methoxychlor | 72-43-5 | UG/L | 180 | 40 | | 0.03 |
| Toxaphene | 8001-35-2 | UG/L | 0.061 | 3 | 0 | |
| *SEMIVOLATILE ORGANIC* | | | | | | |
| 1,2,4-Trichlorobenzene | 120-82-1 | UG/L | 190 | 70 | | |
| 1,2-Dichlorobenzene | 95-50-1 | UG/L | 270 | 600 | | |
| 1,3-Dichlorobenzene | 541-73-1 | UG/L | 180 | | | |
| 1,4-Dichlorobenzene | 106-46-7 | UG/L | 0.47 | 75 | | |
| 2,2'-Oxybis(1-chloropropane) | 108-60-1 | UG/L | 0.26 | | | |
| 2,4,5-Trichlorophenol | 95-95-4 | UG/L | 3700 | | | 1 |
| 2,4,6-Trichlorophenol | 88-06-2 | UG/L | 6.1 | | | 1 |
| 2,4-Dichlorophenol | 120-83-2 | UG/L | 110 | | | 1 |
| 2,4-Dimethylphenol | 105-67-9 | UG/L | 730 | | | 1 |
| 2,4-Dinitrophenol | 51-28-5 | UG/L | 73 | | | 1 |
| 2,4-Dinitrotoluene | 121-14-2 | UG/L | 73 | | | |
| 2,6-Dinitrotoluene | 606-20-2 | UG/L | 37 | | | |
| 2-Chloronaphthalene | 91-58-7 | UG/L | 490 | | | |
| 2-Chlorophenol | 95-57-8 | UG/L | 30 | | | 1 |

**Table 2**
Parameter List and Critical Values
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | CAS | Units | RBCtap | MCL | MCLG | VA GW |
|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | 91-57-6 | UG/L | 120 | | | |
| 2-Methylphenol | 95-48-7 | UG/L | 1800 | | | 1 |
| 2-Nitroaniline | 88-74-4 | UG/L | | | | |
| 2-Nitrophenol | 88-75-5 | UG/L | | | | |
| 3,3'-Dichlorobenzidine | 91-94-1 | UG/L | 0.15 | | | |
| 3-Nitroaniline | 99-09-2 | UG/L | | | | |
| 4,6-Dinitro-2-methylphenol | 534-52-1 | UG/L | 37 | | | 1 |
| 4-Bromophenyl-phenylether | 101-55-3 | UG/L | | | | |
| 4-Chloro-3-methylphenol | 59-50-7 | UG/L | | | | |
| 4-Chloroaniline | 106-47-8 | UG/L | 150 | | | |
| 4-Chlorophenyl-phenylether | 7005-72-3 | UG/L | | | | |
| 4-Methylphenol | 106-44-5 | UG/L | 180 | | | 1 |
| 4-Nitroaniline | 100-01-6 | UG/L | | | | |
| 4-Nitrophenol | 100-02-7 | UG/L | 290 | | | |
| Acenaphthene | 83-32-9 | UG/L | 370 | | | |
| Acenaphthylene | 208-96-8 | UG/L | | | | |
| Anthracene | 120-12-7 | UG/L | 1800 | | | |
| Benzo(a)anthracene | 56-55-3 | UG/L | 0.092 | | | |
| Benzo(a)pyrene | 50-32-8 | UG/L | 0.0092 | 0.2 | 0 | |
| Benzo(b)fluoranthene | 205-99-2 | UG/L | 0.092 | | | |
| Benzo(g,h,i)perylene | 191-24-2 | UG/L | 180 | | | |
| Benzo(k)fluoranthene | 207-08-9 | UG/L | 0.92 | | | |
| bis(2-Chloroethoxy)methane | 111-91-1 | UG/L | | | | |
| bis(2-Chloroethyl)ether | 111-44-4 | UG/L | 0.0096 | | | |
| bis(2-Ethylhexyl)phthalate | 117-81-7 | UG/L | 4.8 | 6 | 0 | |
| Butylbenzylphthalate | 85-68-7 | UG/L | 7300 | | | |
| Carbazole | 86-74-8 | UG/L | 3.3 | | | |
| Chrysene | 218-01-9 | UG/L | 9.2 | | | |
| Dibenz(a,h)anthracene | 53-70-3 | UG/L | 0.0092 | | | |
| Dibenzofuran | 132-64-9 | UG/L | 24 | | | |
| Diethylphthalate | 84-66-2 | UG/L | 29000 | | | |
| Dimethyl phthalate | 131-11-3 | UG/L | 370000 | | | |
| Di-n-butylphthalate | 84-74-2 | UG/L | 3700 | | | |
| Di-n-octylphthalate | 117-84-0 | UG/L | 730 | | | |
| Fluoranthene | 206-44-0 | UG/L | 1500 | | | |
| Fluorene | 86-73-7 | UG/L | 240 | | | |
| Hexachlorobenzene | 118-74-1 | UG/L | 0.042 | 1 | 0 | |
| Hexachlorobutadiene | 87-68-3 | UG/L | 0.86 | | | |
| Hexachlorocyclopentadiene | 77-47-4 | UG/L | 220 | 50 | | |
| Hexachloroethane | 67-72-1 | UG/L | 4.8 | | | |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | UG/L | 0.092 | | | |
| Isophorone | 78-59-1 | UG/L | 70 | | | |
| Naphthalene | 91-20-3 | UG/L | 6.5 | | | |
| Nitrobenzene | 98-95-3 | UG/L | 3.5 | | | |
| n-Nitroso-di-n-propylamine | 621-64-7 | UG/L | 0.0096 | | | |
| n-Nitrosodiphenylamine | 86-30-6 | UG/L | 14 | | | |
| Pentachlorophenol | 87-86-5 | UG/L | 0.56 | 1 | 0 | 1 |

**Table 2**
Parameter List and Critical Values
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | CAS | Units | RBCtap | MCL | MCLG | VA GW |
|---|---|---|---|---|---|---|
| Phenanthrene | 85-01-8 | UG/L | 180 | | | |
| Phenol | 108-95-2 | UG/L | 22000 | | | 1 |
| Pyrene | 129-00-0 | UG/L | 180 | | | |
| *VOLATILE ORGANIC* | | | | | | |
| 1,1,1-Trichloroethane | 71-55-6 | UG/L | 3200 | 200 | | |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | UG/L | 0.053 | | | |
| 1,1,2-Trichloroethane | 79-00-5 | UG/L | 0.19 | 5 | 3 | |
| 1,1-Dichloroethane | 75-34-3 | UG/L | 800 | | | |
| 1,1-Dichloroethene | 75-35-4 | UG/L | 0.044 | 7 | | |
| 1,2,4-Trichlorobenzene | 120-82-1 | UG/L | 190 | 70 | | |
| 1,2-Dibromo-3-chloropropane | 96-12-8 | UG/L | 0.047 | 0.2 | 0 | |
| 1,2-Dibromoethane | 106-93-4 | UG/L | 0.00075 | 0.05 | 0 | |
| 1,2-Dichlorobenzene | 95-50-1 | UG/L | 270 | 600 | | |
| 1,2-Dichloroethane | 107-06-2 | UG/L | 0.12 | 5 | 0 | |
| 1,2-Dichloroethene (total) | 540-59-0 | UG/L | 55 | 70 | | |
| 1,2-Dichloropropane | 78-87-5 | UG/L | 0.16 | 5 | 0 | |
| 1,3-Dichlorobenzene | 541-73-1 | UG/L | 180 | | | |
| 1,4-Dichlorobenzene | 106-46-7 | UG/L | 0.47 | 75 | | |
| 2-Butanone | 78-93-3 | UG/L | 1900 | | | |
| 2-Hexanone | 591-78-6 | UG/L | 1500 | | | |
| 4-Methyl-2-pentanone | 108-10-1 | UG/L | 140 | | | |
| Acetone | 67-64-1 | UG/L | 610 | | | |
| Benzene | 71-43-2 | UG/L | 0.32 | 5 | 0 | |
| Bromochloromethane | 74-97-5 | UG/L | | | | |
| Bromodichloromethane | 75-27-4 | UG/L | 0.17 | 80 | 0 | |
| Bromoform | 75-25-2 | UG/L | 8.5 | 80 | 0 | |
| Bromomethane | 74-83-9 | UG/L | 8.5 | | | |
| Carbon disulfide | 75-15-0 | UG/L | 1000 | | | |
| Carbon tetrachloride | 56-23-5 | UG/L | 0.16 | 5 | 0 | |
| Chlorobenzene | 108-90-7 | UG/L | 110 | 100 | | |
| Chloroethane | 75-00-3 | UG/L | 3.6 | | | |
| Chloroform | 67-66-3 | UG/L | 0.15 | 80 | 0 | |
| Chloromethane | 74-87-3 | UG/L | 2.1 | | | |
| cis-1,2-Dichloroethene | 156-59-2 | UG/L | 61 | 70 | | |
| cis-1,3-Dichloropropene | 10061-01-5 | UG/L | 0.44 | | | |
| Dibromochloromethane | 124-48-1 | UG/L | 0.13 | 80 | 60 | |
| Ethylbenzene | 100-41-4 | UG/L | 3.3 | 700 | | |
| m- and p-Xylene | m&pXYLENE | UG/L | | | | |
| Methylene chloride | 75-09-2 | UG/L | 4.1 | 5 | 0 | |
| o-Xylene | 95-47-6 | UG/L | 12000 | | | |
| Styrene | 100-42-5 | UG/L | 1600 | 100 | | |
| Tetrachloroethene | 127-18-4 | UG/L | 0.63 | 5 | 0 | |
| Toluene | 108-88-3 | UG/L | 750 | 1000 | | |
| trans-1,2-Dichloroethene | 156-60-5 | UG/L | 120 | 100 | | |
| trans-1,3-Dichloropropene | 10061-02-6 | UG/L | 0.44 | | | |
| Trichloroethene | 79-01-6 | UG/L | 0.026 | 5 | 0 | |
| Vinyl chloride | 75-01-4 | UG/L | 0.015 | 2 | 0 | |

**Table 2**
Parameter List and Critical Values
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | CAS | Units | RBCtap | MCL | MCLG | VA GW |
|---|---|---|---|---|---|---|
| Xylene, total | 1330-20-7 | UG/L | 12000 | 10000 | | |
| *WATER QUALITY* | | | | | | |
| Bicarbonate | 71-52-3 | MG/L | | | | |
| Chloride | 16887-00-6 | MG/L | | | | |
| Sulfate | 14808-79-8 | MG/L | | | | |

**Table 3**
Little Creek Background Groundwater Summary: Relative Difference Partitions
*NAB Little Creek, Virginia Beach, Virginia*

| Data Partition | Number of Pairs | Minimum | Maximum | Median | Mean | STD DEV | CV |
|---|---|---|---|---|---|---|---|
| *NONE* | 677 | -188.8 | 157.1 | 0.0 | -0.9 | 22.9 | -25.4 |
| *QUALIFIER CONSISTENCY* | | | | | | | |
| DDUU | 653 | -188.8 | 157.1 | 0.0 | 0.2 | 18.6 | 87.2 |
| DD | 63 | -188.8 | 102.0 | -2.0 | -7.0 | 37.1 | 5.3 |
| UU | 590 | -170.0 | 157.1 | 0.0 | 1.0 | 15.3 | 15.3 |
| DUUD | 24 | -170.4 | 53.7 | -12.7 | -31.2 | 67.7 | -2.2 |
| *ANALYTICAL CLASS* | | | | | | | |
| FMETAL | 69 | -188.8 | 53.7 | 0.0 | -10.2 | 43.0 | -4.2 |
| METAL | 96 | -112.1 | 129.5 | 0.0 | -1.4 | 33.3 | -23.3 |
| PEST/PCB | 112 | -2.0 | 35.3 | 1.0 | 2.9 | 5.0 | 1.7 |
| SVOA | 236 | -170.4 | 157.1 | 0.0 | 0.6 | 17.9 | 28.3 |
| VOA | 164 | -170.4 | 46.2 | 0.0 | -1.5 | 14.9 | -9.9 |
| *STATION* | | | | | | | |
| LBG-MW02 | 152 | -112.1 | 101.6 | 0.0 | 0.2 | 16.4 | 76.3 |
| LBG-MW05 | 175 | -99.6 | 129.5 | 0.0 | 1.7 | 15.3 | 9.2 |
| LBG-MW10 | 175 | -188.8 | 46.2 | 0.0 | -7.0 | 32.0 | -4.6 |
| LS10-MW09 | 175 | -170.4 | 157.1 | 0.0 | 1.7 | 22.1 | 13.2 |
| *SAMPLING EVENT* | | | | | | | |
| 00_01 | 327 | -112.1 | 129.5 | 0.0 | 1.0 | 15.8 | 16.0 |
| 01_06 | 175 | -188.8 | 46.2 | 0.0 | -7.0 | 32.0 | -4.6 |
| 01_10 | 175 | -170.4 | 157.1 | 0.0 | 1.7 | 22.1 | 13.2 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| *CONSISTENT QUALIFIERS: DETECT \| DETECT [63 PAIRS]* | | | | | | | | | |
| **LBG-MW10** | **FMETAL** | 01_06 | **Chromium** | **UG/L** | **1.5** | **D** | **52.1** | **D** | **-189** |
| **LBG-MW10** | **FMETAL** | 01_06 | **Iron** | **UG/L** | **24.9** | **D** | **188** | **D** | **-153** |
| LS10-MW09 | METAL | 01_10 | Cyanide | UG/L | 0.8 | D | 2 | D | -86 |
| **LBG-MW02** | **METAL** | 00_01 | **Iron** | **UG/L** | **3650** | **D** | **6960** | **D** | **-62** |
| LBG-MW10 | FMETAL | 01_06 | Zinc | UG/L | 24.1 | D | 41.3 | D | -53 |
| LBG-MW02 | METAL | 00_01 | Thallium | UG/L | 4.4 | D | 5.7 | D | -26 |
| LBG-MW10 | METAL | 01_06 | Nickel | UG/L | 5.8 | D | 7.4 | D | -24 |
| LBG-MW05 | FMETAL | 00_01 | Potassium | UG/L | 1340 | D | 1620 | D | -19 |
| LBG-MW10 | FMETAL | 01_06 | Calcium | UG/L | 13100 | D | 14700 | D | -12 |
| LBG-MW10 | FMETAL | 01_06 | Magnesium | UG/L | 7720 | D | 8530 | D | -10 |
| LBG-MW10 | FMETAL | 01_06 | Sodium | UG/L | 12400 | D | 13500 | D | -8 |
| LS10-MW09 | FMETAL | 01_10 | Arsenic | UG/L | 7.4 | D | 8 | D | -8 |
| LBG-MW10 | FMETAL | 01_06 | Barium | UG/L | 29.5 | D | 31.6 | D | -7 |
| LBG-MW10 | METAL | 01_06 | Manganese | UG/L | 30.5 | D | 31.9 | D | -4 |
| LS10-MW09 | METAL | 01_10 | Nickel | UG/L | 2.8 | D | 2.9 | D | -4 |
| LBG-MW10 | FMETAL | 01_06 | Potassium | UG/L | 7160 | D | 7410 | D | -3 |
| LBG-MW10 | FMETAL | 01_06 | Manganese | UG/L | 27 | D | 27.6 | D | -2 |
| LBG-MW02 | METAL | 00_01 | Manganese | UG/L | 602 | D | 613 | D | -2 |
| LBG-MW02 | METAL | 00_01 | Sodium | UG/L | 2220000 | D | 2250000 | D | -1 |
| LBG-MW02 | METAL | 00_01 | Calcium | UG/L | 115000 | D | 116000 | D | -1 |
| LBG-MW10 | METAL | 01_06 | Calcium | UG/L | 15000 | D | 15100 | D | -1 |
| LBG-MW02 | METAL | 00_01 | Magnesium | UG/L | 180000 | D | 181000 | D | -1 |
| LBG-MW05 | METAL | 00_01 | Aluminum | UG/L | 66.9 | D | 67.2 | D | 0 |
| LBG-MW05 | FMETAL | 00_01 | Cobalt | UG/L | 1.9 | D | 1.9 | D | 0 |
| LS10-MW09 | FMETAL | 01_10 | Iron | UG/L | 2980 | D | 2980 | D | 0 |
| LBG-MW10 | METAL | 01_06 | Sodium | UG/L | 13700 | D | 13700 | D | 0 |
| LS10-MW09 | FMETAL | 01_10 | Barium | UG/L | 52.6 | D | 52.3 | D | 1 |
| LS10-MW09 | METAL | 01_10 | Calcium | UG/L | 168000 | D | 167000 | D | 1 |
| LS10-MW09 | FMETAL | 01_10 | Calcium | UG/L | 162000 | D | 161000 | D | 1 |
| LS10-MW09 | FMETAL | 01_10 | Potassium | UG/L | 15800 | D | 15700 | D | 1 |
| LS10-MW09 | METAL | 01_10 | Manganese | UG/L | 1540 | D | 1530 | D | 1 |
| LS10-MW09 | METAL | 01_10 | Magnesium | UG/L | 28400 | D | 28200 | D | 1 |
| LS10-MW09 | FMETAL | 01_10 | Magnesium | UG/L | 27500 | D | 27300 | D | 1 |
| LS10-MW09 | FMETAL | 01_10 | Sodium | UG/L | 22500 | D | 22300 | D | 1 |
| LS10-MW09 | METAL | 01_10 | Potassium | UG/L | 16600 | D | 16400 | D | 1 |
| LS10-MW09 | METAL | 01_10 | Barium | UG/L | 56.4 | D | 55.7 | D | 1 |
| LS10-MW09 | METAL | 01_10 | Sodium | UG/L | 23400 | D | 23100 | D | 1 |
| LS10-MW09 | FMETAL | 01_10 | Manganese | UG/L | 1510 | D | 1490 | D | 1 |
| LBG-MW05 | METAL | 00_01 | Manganese | UG/L | 143 | D | 141 | D | 1 |
| LBG-MW05 | METAL | 00_01 | Magnesium | UG/L | 5170 | D | 5090 | D | 2 |
| LBG-MW05 | FMETAL | 00_01 | Calcium | UG/L | 10300 | D | 10100 | D | 2 |
| LBG-MW05 | FMETAL | 00_01 | Magnesium | UG/L | 5060 | D | 4960 | D | 2 |
| LBG-MW10 | METAL | 01_06 | Vanadium | UG/L | 0.92 | D | 0.9 | D | 2 |
| LBG-MW05 | PEST/PCB | 00_01 | Dieldrin | UG/L | 0.135 | D | 0.132 | D | 2 |
| LBG-MW05 | FMETAL | 00_01 | Sodium | UG/L | 7570 | D | 7380 | D | 3 |
| LBG-MW05 | METAL | 00_01 | Calcium | UG/L | 10700 | D | 10400 | D | 3 |
| LBG-MW05 | METAL | 00_01 | Sodium | UG/L | 7940 | D | 7690 | D | 3 |
| LS10-MW09 | METAL | 01_10 | Iron | UG/L | 4120 | D | 3980 | D | 3 |
| LS10-MW09 | METAL | 01_10 | Arsenic | UG/L | 8.8 | D | 8.5 | D | 3 |
| LBG-MW10 | METAL | 01_06 | Barium | UG/L | 34.4 | D | 33.2 | D | 4 |
| LBG-MW02 | METAL | 00_01 | Potassium | UG/L | 84500 | D | 81500 | D | 4 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW05 | FMETAL | 00_01 | Manganese | UG/L | 140 | D | 134 | D | 4 |
| LBG-MW05 | FMETAL | 00_01 | Aluminum | UG/L | 57.6 | D | 54.6 | D | 5 |
| LBG-MW10 | METAL | 01_06 | Potassium | UG/L | 7920 | D | 7440 | D | 6 |
| LS10-MW09 | METAL | 01_10 | Vanadium | UG/L | 4.8 | D | 4.5 | D | 6 |
| LBG-MW10 | METAL | 01_06 | Lead | UG/L | 1.4 | D | 1.3 | D | 7 |
| LBG-MW10 | METAL | 01_06 | Magnesium | UG/L | 8580 | D | 7960 | D | 7 |
| LBG-MW10 | METAL | 01_06 | Iron | UG/L | 584 | D | 535 | D | 9 |
| LS10-MW09 | METAL | 01_10 | Aluminum | UG/L | 627 | D | 570 | D | 10 |
| LBG-MW05 | METAL | 00_01 | Cobalt | UG/L | 2.6 | D | 2.3 | D | 12 |
| LS10-MW09 | FMETAL | 01_10 | Nickel | UG/L | 3.6 | D | 3 | D | 18 |
| LBG-MW10 | METAL | 01_06 | Aluminum | UG/L | 566 | D | 452 | D | 22 |
| LBG-MW02 | METAL | 00_01 | Selenium | UG/L | 14.4 | D | 4.7 | D | 102 |
| LS10-MW09 | SVOA | 01_10 | Di-n-butylphthalate | UG/L | 0.4 | D | 5 | ND | -170 |
| LBG-MW10 | VOA | 01_06 | 2-Butanone | UG/L | 3 | D | 5 | ND | -50 |
| LS10-MW09 | VOA | 01_10 | Acetone | UG/L | 3 | D | 5 | ND | -50 |
| LBG-MW05 | FMETAL | 00_01 | Zinc | UG/L | 9.9 | D | 11.7 | ND | -17 |
| LS10-MW09 | FMETAL | 01_10 | Vanadium | UG/L | 1.8 | D | 1.8 | ND | 0 |
| LS10-MW09 | FMETAL | 01_10 | Chromium | UG/L | 2.1 | D | 1.7 | ND | 21 |
| LBG-MW05 | METAL | 00_01 | Cadmium | UG/L | 0.64 | D | 0.5 | ND | 25 |
| LBG-MW10 | FMETAL | 01_06 | Aluminum | UG/L | 51.5 | D | 39.1 | ND | 27 |
| LS10-MW09 | PEST/PCB | 01_10 | Endrin aldehyde | UG/L | 0.026 | D | 0.019 | ND | 31 |
| LBG-MW05 | METAL | 00_01 | Silver | UG/L | 1.9 | D | 1.2 | ND | 45 |
| LS10-MW09 | FMETAL | 01_10 | Selenium | UG/L | 3.2 | D | 1.9 | ND | 51 |
| LBG-MW05 | FMETAL | 00_01 | Antimony | UG/L | 8.5 | D | 4.9 | ND | 54 |
| *DISCREPANT QUALIFIERS [24 PAIRS]* | | | | | | | | | |
| **LBG-MW10** | **FMETAL** | **01_06** | **Copper** | **UG/L** | **0.9** | **ND** | **8.3** | **D** | **-161** |
| **LBG-MW10** | **FMETAL** | **01_06** | **Nickel** | **UG/L** | **6** | **ND** | **26.6** | **D** | **-126** |
| **LBG-MW02** | **METAL** | **00_01** | **Aluminum** | **UG/L** | **12.5** | **ND** | **44.4** | **D** | **-112** |
| **LBG-MW10** | **METAL** | **01_06** | **Zinc** | **UG/L** | **12.9** | **ND** | **45.3** | **D** | **-111** |
| LBG-MW10 | FMETAL | 01_06 | Antimony | UG/L | 1.6 | ND | 4.6 | D | -97 |
| LBG-MW10 | FMETAL | 01_06 | Lead | UG/L | 0.9 | ND | 1.9 | D | -71 |
| LS10-MW09 | METAL | 01_10 | Selenium | UG/L | 1.9 | ND | 2.7 | D | -35 |
| LBG-MW02 | METAL | 00_01 | Cobalt | UG/L | 1.2 | ND | 1.4 | D | -15 |
| LBG-MW02 | METAL | 00_01 | Arsenic | UG/L | 3.8 | ND | 4.2 | D | -10 |
| LBG-MW10 | METAL | 01_06 | Cadmium | UG/L | 0.3 | ND | 0.33 | D | -10 |
| LBG-MW10 | PEST/PCB | 01_06 | Endosulfan I | UG/L | 0.0098 | ND | 0.011 | D | -2 |
| LBG-MW10 | PEST/PCB | 01_06 | Endosulfan sulfate | UG/L | 0.02 | ND | 0.014 | D | 35 |
| LBG-MW10 | VOA | 01_06 | Carbon disulfide | UG/L | 0.08 | ND | 1 | ND | -170 |
| LBG-MW10 | METAL | 01_06 | Copper | UG/L | 2.1 | ND | 7.3 | ND | -111 |
| *CONSISTENT QUALIFIERS: NON-DETECT \| NON-DETECT [590 PAIRS]* | | | | | | | | | |
| **LBG-MW05** | **METAL** | 00_01 | **Iron** | **UG/L** | **45.6** | **ND** | **136** | **ND** | **-100** |
| LBG-MW10 | FMETAL | 01_06 | Cobalt | UG/L | 0.3 | ND | 0.59 | ND | -65 |
| LBG-MW10 | METAL | 01_06 | Chromium | UG/L | 2.5 | ND | 3.7 | ND | -39 |
| LBG-MW10 | VOA | 01_06 | Acetone | UG/L | 4 | ND | 5 | ND | -22 |
| LBG-MW05 | METAL | 00_01 | Potassium | UG/L | 2520 | ND | 2830 | ND | -12 |
| LS10-MW09 | SVOA | 01_10 | 2,4,5-Trichlorophenol | UG/L | 18 | ND | 19 | ND | -5 |
| LS10-MW09 | SVOA | 01_10 | 2,4-Dinitrophenol | UG/L | 18 | ND | 19 | ND | -5 |
| LS10-MW09 | SVOA | 01_10 | 2-Nitroaniline | UG/L | 18 | ND | 19 | ND | -5 |
| LS10-MW09 | SVOA | 01_10 | 3-Nitroaniline | UG/L | 18 | ND | 19 | ND | -5 |
| LS10-MW09 | SVOA | 01_10 | 4,6-Dinitro-2-methylphenol | UG/L | 18 | ND | 19 | ND | -5 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LS10-MW09 | SVOA | 01_10 | 4-Nitroaniline | UG/L | 18 | ND | 19 | ND | -5 |
| LS10-MW09 | SVOA | 01_10 | 4-Nitrophenol | UG/L | 18 | ND | 19 | ND | -5 |
| LS10-MW09 | SVOA | 01_10 | Pentachlorophenol | UG/L | 18 | ND | 19 | ND | -5 |
| LBG-MW02 | METAL | 00_01 | Barium | UG/L | 88.8 | ND | 93.1 | ND | -5 |
| LS10-MW09 | METAL | 01_10 | Cobalt | UG/L | 10.6 | ND | 10.9 | ND | -3 |
| LBG-MW05 | FMETAL | 00_01 | Arsenic | UG/L | 3.8 | ND | 3.8 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Beryllium | UG/L | 0.4 | ND | 0.4 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Cadmium | UG/L | 0.5 | ND | 0.5 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Chromium | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Iron | UG/L | 23.1 | ND | 23.1 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Lead | UG/L | 2.4 | ND | 2.4 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Mercury | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Nickel | UG/L | 3 | ND | 3 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Selenium | UG/L | 4.5 | ND | 4.5 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Silver | UG/L | 1.2 | ND | 1.2 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Thallium | UG/L | 2.5 | ND | 2.5 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Vanadium | UG/L | 0.9 | ND | 0.9 | ND | 0 |
| LBG-MW10 | FMETAL | 01_06 | Arsenic | UG/L | 2.1 | ND | 2.1 | ND | 0 |
| LBG-MW10 | FMETAL | 01_06 | Beryllium | UG/L | 0.4 | ND | 0.4 | ND | 0 |
| LBG-MW10 | FMETAL | 01_06 | Cadmium | UG/L | 0.3 | ND | 0.3 | ND | 0 |
| LBG-MW10 | FMETAL | 01_06 | Mercury | UG/L | 0.1 | ND | 0.1 | ND | 0 |
| LBG-MW10 | FMETAL | 01_06 | Selenium | UG/L | 2.3 | ND | 2.3 | ND | 0 |
| LBG-MW10 | FMETAL | 01_06 | Silver | UG/L | 0.7 | ND | 0.7 | ND | 0 |
| LBG-MW10 | FMETAL | 01_06 | Thallium | UG/L | 3.5 | ND | 3.5 | ND | 0 |
| LBG-MW10 | FMETAL | 01_06 | Vanadium | UG/L | 0.3 | ND | 0.3 | ND | 0 |
| LS10-MW09 | FMETAL | 01_10 | Antimony | UG/L | 2.3 | ND | 2.3 | ND | 0 |
| LS10-MW09 | FMETAL | 01_10 | Cadmium | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LS10-MW09 | FMETAL | 01_10 | Copper | UG/L | 0.8 | ND | 0.8 | ND | 0 |
| LS10-MW09 | FMETAL | 01_10 | Lead | UG/L | 1.2 | ND | 1.2 | ND | 0 |
| LS10-MW09 | FMETAL | 01_10 | Mercury | UG/L | 0.1 | ND | 0.1 | ND | 0 |
| LS10-MW09 | FMETAL | 01_10 | Silver | UG/L | 0.7 | ND | 0.7 | ND | 0 |
| LS10-MW09 | FMETAL | 01_10 | Thallium | UG/L | 3.4 | ND | 3.4 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Beryllium | UG/L | 0.4 | ND | 0.4 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Cadmium | UG/L | 0.5 | ND | 0.5 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Chromium | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Cyanide | UG/L | 2 | ND | 2 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Lead | UG/L | 2.4 | ND | 2.4 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Mercury | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Nickel | UG/L | 3 | ND | 3 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Silver | UG/L | 1.2 | ND | 1.2 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Vanadium | UG/L | 0.9 | ND | 0.9 | ND | 0 |
| LBG-MW02 | METAL | 00_01 | Zinc | UG/L | 4.4 | ND | 4.4 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Arsenic | UG/L | 3.8 | ND | 3.8 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Beryllium | UG/L | 0.4 | ND | 0.4 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Chromium | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Cyanide | UG/L | 2 | ND | 2 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Lead | UG/L | 2.4 | ND | 2.4 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Mercury | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Nickel | UG/L | 3 | ND | 3 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Selenium | UG/L | 4.5 | ND | 4.5 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Thallium | UG/L | 2.5 | ND | 2.5 | ND | 0 |
| LBG-MW05 | METAL | 00_01 | Vanadium | UG/L | 0.9 | ND | 0.9 | ND | 0 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW10 | METAL | 01_06 | Antimony | UG/L | 1.6 | ND | 1.6 | ND | 0 |
| LBG-MW10 | METAL | 01_06 | Arsenic | UG/L | 2.1 | ND | 2.1 | ND | 0 |
| LBG-MW10 | METAL | 01_06 | Cobalt | UG/L | 0.3 | ND | 0.3 | ND | 0 |
| LBG-MW10 | METAL | 01_06 | Cyanide | UG/L | 0.9 | ND | 0.9 | ND | 0 |
| LBG-MW10 | METAL | 01_06 | Mercury | UG/L | 0.1 | ND | 0.1 | ND | 0 |
| LBG-MW10 | METAL | 01_06 | Selenium | UG/L | 2.3 | ND | 2.3 | ND | 0 |
| LBG-MW10 | METAL | 01_06 | Silver | UG/L | 0.7 | ND | 0.7 | ND | 0 |
| LBG-MW10 | METAL | 01_06 | Thallium | UG/L | 3.5 | ND | 3.5 | ND | 0 |
| LS10-MW09 | METAL | 01_10 | Antimony | UG/L | 2.3 | ND | 2.3 | ND | 0 |
| LS10-MW09 | METAL | 01_10 | Cadmium | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LS10-MW09 | METAL | 01_10 | Copper | UG/L | 0.8 | ND | 0.8 | ND | 0 |
| LS10-MW09 | METAL | 01_10 | Lead | UG/L | 1.2 | ND | 1.2 | ND | 0 |
| LS10-MW09 | METAL | 01_10 | Mercury | UG/L | 0.1 | ND | 0.1 | ND | 0 |
| LS10-MW09 | METAL | 01_10 | Silver | UG/L | 0.7 | ND | 0.7 | ND | 0 |
| LS10-MW09 | METAL | 01_10 | Thallium | UG/L | 3.4 | ND | 3.4 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | 4,4'-DDD | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | 4,4'-DDE | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | 4,4'-DDT | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Aldrin | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | alpha-BHC | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | alpha-Chlordane | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Aroclor-1016 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Aroclor-1221 | UG/L | 0.4 | ND | 0.4 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Aroclor-1232 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Aroclor-1242 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Aroclor-1248 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Aroclor-1254 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Aroclor-1260 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | beta-BHC | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | delta-BHC | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Dieldrin | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Endosulfan I | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Endosulfan II | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Endosulfan sulfate | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Endrin | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Endrin aldehyde | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Endrin ketone | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | gamma-BHC (Lindane) | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | gamma-Chlordane | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Heptachlor | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Heptachlor epoxide | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Methoxychlor | UG/L | 0.1 | ND | 0.1 | ND | 0 |
| LBG-MW02 | PEST/PCB | 00_01 | Toxaphene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | 4,4'-DDD | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | 4,4'-DDE | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | 4,4'-DDT | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Aldrin | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | alpha-BHC | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | alpha-Chlordane | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Aroclor-1016 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Aroclor-1221 | UG/L | 0.4 | ND | 0.4 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Aroclor-1232 | UG/L | 0.2 | ND | 0.2 | ND | 0 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW05 | PEST/PCB | 00_01 | Aroclor-1242 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Aroclor-1248 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Aroclor-1254 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Aroclor-1260 | UG/L | 0.2 | ND | 0.2 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | beta-BHC | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | delta-BHC | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Endosulfan I | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Endosulfan II | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Endosulfan sulfate | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Endrin | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Endrin aldehyde | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Endrin ketone | UG/L | 0.02 | ND | 0.02 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | gamma-BHC (Lindane) | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | gamma-Chlordane | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Heptachlor | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Heptachlor epoxide | UG/L | 0.01 | ND | 0.01 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Methoxychlor | UG/L | 0.1 | ND | 0.1 | ND | 0 |
| LBG-MW05 | PEST/PCB | 00_01 | Toxaphene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2,2'-Oxybis(1-chloropropane) | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2,4,5-Trichlorophenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2,4,6-Trichlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2,4-Dichlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2,4-Dimethylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2,4-Dinitrophenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2,4-Dinitrotoluene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2,6-Dinitrotoluene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2-Chloronaphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2-Chlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2-Methylnaphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2-Methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2-Nitroaniline | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 2-Nitrophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 3,3'-Dichlorobenzidine | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 3-Nitroaniline | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 4,6-Dinitro-2-methylphenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 4-Bromophenyl-phenylether | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 4-Chloro-3-methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 4-Chloroaniline | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 4-Chlorophenyl-phenylether | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 4-Methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 4-Nitroaniline | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | 4-Nitrophenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Acenaphthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Acenaphthylene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Benzo(a)anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Benzo(a)pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Benzo(b)fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Benzo(g,h,i)perylene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Benzo(k)fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | bis(2-Chloroethoxy)methane | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | bis(2-Chloroethyl)ether | UG/L | 5 | ND | 5 | ND | 0 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW02 | SVOA | 00_01 | bis(2-Ethylhexyl)phthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Butylbenzylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Chrysene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Di-n-octylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Dibenz(a,h)anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Dibenzofuran | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Diethylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Dimethyl phthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Fluorene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Hexachlorobenzene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Hexachlorobutadiene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Hexachlorocyclopentadiene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Hexachloroethane | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Indeno(1,2,3-cd)pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Isophorone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | n-Nitroso-di-n-propylamine | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | n-Nitrosodiphenylamine | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Naphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Nitrobenzene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Pentachlorophenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Phenanthrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Phenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | SVOA | 00_01 | Pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2,2'-Oxybis(1-chloropropane) | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2,4,5-Trichlorophenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2,4,6-Trichlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2,4-Dichlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2,4-Dimethylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2,4-Dinitrophenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2,4-Dinitrotoluene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2,6-Dinitrotoluene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2-Chloronaphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2-Chlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2-Methylnaphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2-Methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2-Nitroaniline | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 2-Nitrophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 3,3'-Dichlorobenzidine | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 3-Nitroaniline | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 4,6-Dinitro-2-methylphenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 4-Bromophenyl-phenylether | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 4-Chloro-3-methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 4-Chloroaniline | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 4-Chlorophenyl-phenylether | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 4-Methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 4-Nitroaniline | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | 4-Nitrophenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Acenaphthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Acenaphthylene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Benzo(a)anthracene | UG/L | 5 | ND | 5 | ND | 0 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW05 | SVOA | 00_01 | Benzo(a)pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Benzo(b)fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Benzo(g,h,i)perylene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Benzo(k)fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | bis(2-Chloroethoxy)methane | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | bis(2-Chloroethyl)ether | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | bis(2-Ethylhexyl)phthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Butylbenzylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Chrysene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Di-n-butylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Di-n-octylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Dibenz(a,h)anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Dibenzofuran | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Diethylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Dimethyl phthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Fluorene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Hexachlorobenzene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Hexachlorobutadiene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Hexachlorocyclopentadiene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Hexachloroethane | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Indeno(1,2,3-cd)pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Isophorone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | n-Nitroso-di-n-propylamine | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | n-Nitrosodiphenylamine | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Naphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Nitrobenzene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Pentachlorophenol | UG/L | 20 | ND | 20 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Phenanthrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Phenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | SVOA | 00_01 | Pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2,2'-Oxybis(1-chloropropane) | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2,4,5-Trichlorophenol | UG/L | 19 | ND | 19 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2,4,6-Trichlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2,4-Dichlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2,4-Dimethylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2,4-Dinitrophenol | UG/L | 19 | ND | 19 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2,4-Dinitrotoluene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2,6-Dinitrotoluene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2-Chloronaphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2-Chlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2-Methylnaphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2-Methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2-Nitroaniline | UG/L | 19 | ND | 19 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 2-Nitrophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 3,3'-Dichlorobenzidine | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 3-Nitroaniline | UG/L | 19 | ND | 19 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 4,6-Dinitro-2-methylphenol | UG/L | 19 | ND | 19 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 4-Bromophenyl-phenylether | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 4-Chloro-3-methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 4-Chloroaniline | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 4-Chlorophenyl-phenylether | UG/L | 5 | ND | 5 | ND | 0 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW10 | SVOA | 01_06 | 4-Methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 4-Nitroaniline | UG/L | 19 | ND | 19 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | 4-Nitrophenol | UG/L | 19 | ND | 19 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Acenaphthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Acenaphthylene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Benzo(a)anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Benzo(a)pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Benzo(b)fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Benzo(g,h,i)perylene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Benzo(k)fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | bis(2-Chloroethoxy)methane | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | bis(2-Chloroethyl)ether | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | bis(2-Ethylhexyl)phthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Butylbenzylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Chrysene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Di-n-butylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Di-n-octylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Dibenz(a,h)anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Dibenzofuran | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Diethylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Dimethyl phthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Fluorene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Hexachlorobenzene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Hexachlorobutadiene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Hexachlorocyclopentadiene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Hexachloroethane | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Indeno(1,2,3-cd)pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Isophorone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | n-Nitroso-di-n-propylamine | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | n-Nitrosodiphenylamine | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Naphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Nitrobenzene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Pentachlorophenol | UG/L | 19 | ND | 19 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Phenanthrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Phenol | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | SVOA | 01_06 | Pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2,2'-Oxybis(1-chloropropane) | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2,4,6-Trichlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2,4-Dichlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2,4-Dimethylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2,4-Dinitrotoluene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2,6-Dinitrotoluene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2-Chloronaphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2-Chlorophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2-Methylnaphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2-Methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 2-Nitrophenol | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 3,3'-Dichlorobenzidine | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 4-Bromophenyl-phenylether | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 4-Chloro-3-methylphenol | UG/L | 5 | ND | 5 | ND | 0 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LS10-MW09 | SVOA | 01_10 | 4-Chloroaniline | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 4-Chlorophenyl-phenylether | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | 4-Methylphenol | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Acenaphthene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Acenaphthylene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Benzo(a)anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Benzo(a)pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Benzo(b)fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Benzo(g,h,i)perylene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Benzo(k)fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | bis(2-Chloroethoxy)methane | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | bis(2-Chloroethyl)ether | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Butylbenzylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Chrysene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Di-n-octylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Dibenz(a,h)anthracene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Dibenzofuran | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Diethylphthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Dimethyl phthalate | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Fluoranthene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Fluorene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Hexachlorobenzene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Hexachlorobutadiene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Hexachlorocyclopentadiene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Hexachloroethane | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Indeno(1,2,3-cd)pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Isophorone | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | n-Nitroso-di-n-propylamine | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | n-Nitrosodiphenylamine | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Naphthalene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Nitrobenzene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Phenanthrene | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | SVOA | 01_10 | Pyrene | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,1,1-Trichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,1,2,2-Tetrachloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,1,2-Trichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,1-Dichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,1-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,2,4-Trichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,2-Dibromo-3-chloropropane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,2-Dibromoethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,2-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,2-Dichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,2-Dichloropropane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,3-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 1,4-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 2-Butanone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 2-Hexanone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | 4-Methyl-2-pentanone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Acetone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Benzene | UG/L | 1 | ND | 1 | ND | 0 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW02 | VOA | 00_01 | Bromochloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Bromodichloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Bromoform | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Bromomethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Carbon disulfide | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Carbon tetrachloride | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Chlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Chloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Chloroform | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Chloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | cis-1,2-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | cis-1,3-Dichloropropene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Dibromochloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Ethylbenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Methylene chloride | UG/L | 2 | ND | 2 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Styrene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Tetrachloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Toluene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | trans-1,2-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | trans-1,3-Dichloropropene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Trichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Vinyl chloride | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW02 | VOA | 00_01 | Xylene, total | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,1,1-Trichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,1,2,2-Tetrachloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,1,2-Trichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,1-Dichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,1-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,2,4-Trichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,2-Dibromo-3-chloropropane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,2-Dibromoethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,2-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,2-Dichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,2-Dichloropropane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,3-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 1,4-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 2-Butanone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 2-Hexanone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | 4-Methyl-2-pentanone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Acetone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Benzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Bromochloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Bromodichloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Bromoform | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Bromomethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Carbon disulfide | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Carbon tetrachloride | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Chlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Chloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Chloroform | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Chloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | cis-1,2-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW05 | VOA | 00_01 | cis-1,3-Dichloropropene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Dibromochloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Ethylbenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Methylene chloride | UG/L | 2 | ND | 2 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Styrene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Tetrachloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Toluene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | trans-1,2-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | trans-1,3-Dichloropropene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Trichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Vinyl chloride | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | VOA | 00_01 | Xylene, total | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,1,1-Trichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,1,2,2-Tetrachloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,1,2-Trichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,1-Dichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,1-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,2,4-Trichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,2-Dibromo-3-chloropropane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,2-Dibromoethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,2-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,2-Dichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,2-Dichloropropane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,3-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 1,4-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 2-Hexanone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | 4-Methyl-2-pentanone | UG/L | 5 | ND | 5 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Benzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Bromochloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Bromodichloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Bromoform | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Bromomethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Carbon tetrachloride | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Chlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Chloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Chloroform | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Chloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | cis-1,2-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | cis-1,3-Dichloropropene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Dibromochloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Ethylbenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Methylene chloride | UG/L | 2 | ND | 2 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Styrene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Tetrachloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | trans-1,2-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | trans-1,3-Dichloropropene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Trichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Vinyl chloride | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW10 | VOA | 01_06 | Xylene, total | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,1,1-Trichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,1,2,2-Tetrachloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,1,2-Trichloroethane | UG/L | 1 | ND | 1 | ND | 0 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LS10-MW09 | VOA | 01_10 | 1,1-Dichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,1-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,2,4-Trichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,2-Dibromo-3-chloropropane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,2-Dibromoethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,2-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,2-Dichloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,2-Dichloropropane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,3-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 1,4-Dichlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 2-Butanone | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 2-Hexanone | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | 4-Methyl-2-pentanone | UG/L | 5 | ND | 5 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Benzene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Bromochloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Bromodichloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Bromoform | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Bromomethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Carbon disulfide | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Carbon tetrachloride | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Chlorobenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Chloroethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Chloroform | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Chloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | cis-1,2-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | cis-1,3-Dichloropropene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Dibromochloromethane | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Ethylbenzene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Methylene chloride | UG/L | 2 | ND | 2 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Styrene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Tetrachloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Toluene | UG/L | 0.4 | ND | 0.4 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | trans-1,2-Dichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | trans-1,3-Dichloropropene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Trichloroethene | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Vinyl chloride | UG/L | 1 | ND | 1 | ND | 0 |
| LS10-MW09 | VOA | 01_10 | Xylene, total | UG/L | 1 | ND | 1 | ND | 0 |
| LBG-MW05 | FMETAL | 00_01 | Barium | UG/L | 35 | ND | 34.6 | ND | 1 |
| LBG-MW10 | PEST/PCB | 01_06 | Aldrin | UG/L | 0.0098 | ND | 0.0096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | alpha-BHC | UG/L | 0.0098 | ND | 0.0096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | alpha-Chlordane | UG/L | 0.0098 | ND | 0.0096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | beta-BHC | UG/L | 0.0098 | ND | 0.0096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | delta-BHC | UG/L | 0.0098 | ND | 0.0096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | gamma-BHC (Lindane) | UG/L | 0.0098 | ND | 0.0096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | gamma-Chlordane | UG/L | 0.0098 | ND | 0.0096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | Heptachlor | UG/L | 0.0098 | ND | 0.0096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | Heptachlor epoxide | UG/L | 0.0098 | ND | 0.0096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | Methoxychlor | UG/L | 0.098 | ND | 0.096 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | Toxaphene | UG/L | 0.98 | ND | 0.96 | ND | 2 |
| LBG-MW05 | METAL | 00_01 | Barium | UG/L | 36.3 | ND | 35.5 | ND | 2 |
| LBG-MW10 | PEST/PCB | 01_06 | Aroclor-1221 | UG/L | 0.39 | ND | 0.38 | ND | 3 |
| LS10-MW09 | METAL | 01_10 | Beryllium | UG/L | 0.23 | ND | 0.22 | ND | 4 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW10 | PEST/PCB | 01_06 | Aroclor-1016 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Aroclor-1232 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Aroclor-1242 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Aroclor-1248 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Aroclor-1254 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Aroclor-1260 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Aroclor-1016 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Aroclor-1232 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Aroclor-1242 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Aroclor-1248 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Aroclor-1254 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Aroclor-1260 | UG/L | 0.2 | ND | 0.19 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | 4,4'-DDD | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | 4,4'-DDE | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | 4,4'-DDT | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Dieldrin | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Endosulfan II | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Endrin | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Endrin aldehyde | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LBG-MW10 | PEST/PCB | 01_06 | Endrin ketone | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | 4,4'-DDD | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | 4,4'-DDE | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | 4,4'-DDT | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Dieldrin | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Endosulfan II | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Endosulfan sulfate | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Endrin | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LS10-MW09 | PEST/PCB | 01_10 | Endrin ketone | UG/L | 0.02 | ND | 0.019 | ND | 5 |
| LBG-MW02 | METAL | 00_01 | Antimony | UG/L | 13 | ND | 12.2 | ND | 6 |
| LS10-MW09 | METAL | 01_10 | Zinc | UG/L | 6.3 | ND | 5.9 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | Aldrin | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | alpha-BHC | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | alpha-Chlordane | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | beta-BHC | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | beta-Chlordane | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | delta-BHC | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | Endosulfan I | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | gamma-BHC (Lindane) | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | Heptachlor | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | Heptachlor epoxide | UG/L | 0.01 | ND | 0.0093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | Toxaphene | UG/L | 1 | ND | 0.93 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | Methoxychlor | UG/L | 0.1 | ND | 0.093 | ND | 7 |
| LS10-MW09 | PEST/PCB | 01_10 | Aroclor-1221 | UG/L | 0.4 | ND | 0.37 | ND | 8 |
| LS10-MW09 | FMETAL | 01_10 | Aluminum | UG/L | 27.7 | ND | 25.5 | ND | 8 |
| LS10-MW09 | METAL | 01_10 | Chromium | UG/L | 3.2 | ND | 2.9 | ND | 10 |
| LBG-MW10 | METAL | 01_06 | Beryllium | UG/L | 0.46 | ND | 0.4 | ND | 14 |
| LS10-MW09 | FMETAL | 01_10 | Zinc | UG/L | 5 | ND | 4.2 | ND | 17 |
| LS10-MW09 | FMETAL | 01_10 | Beryllium | UG/L | 0.18 | ND | 0.15 | ND | 18 |
| LBG-MW05 | FMETAL | 00_01 | Copper | UG/L | 9.3 | ND | 7.5 | ND | 21 |
| LS10-MW09 | FMETAL | 01_10 | Cobalt | UG/L | 31.2 | ND | 21.5 | ND | 37 |
| LBG-MW10 | VOA | 01_06 | Toluene | UG/L | 0.8 | ND | 0.5 | ND | 46 |
| LBG-MW05 | METAL | 00_01 | Zinc | UG/L | 27.3 | ND | 16.9 | ND | 47 |

**Table 4**
Little Creek Background Groundwater Duplicate Comparisons: Relative Percent Difference
*NAB Little Creek, Virginia Beach, VA*

| STATION | ANALYSIS | DATE | PARAMETER | UNITS | D1 | Q1 | D2 | Q2 | RPD |
|---|---|---|---|---|---|---|---|---|---|
| LBG-MW02 | METAL | 00_01 | Copper | UG/L | 4.9 | ND | 2.6 | ND | 61 |
| LBG-MW05 | METAL | 00_01 | Copper | UG/L | 19.1 | ND | 9 | ND | 72 |
| LBG-MW02 | SVOA | 00_01 | Di-n-butylphthalate | UG/L | 14 | ND | 5 | ND | 95 |
| LS10-MW09 | SVOA | 01_10 | bis(2-Ethylhexyl)phthalate | UG/L | 14 | ND | 4 | ND | 111 |
| LBG-MW05 | METAL | 00_01 | Antimony | UG/L | 22.9 | ND | 4.9 | ND | 129 |
| LS10-MW09 | SVOA | 01_10 | Phenol | UG/L | 5 | ND | 0.6 | ND | 157 |
| *INCOMPLETE REPLICATE PARAMETERS [23 SINGLE RESULTS]* | | | | | | | | | |
| LBG-MW02 | FMETAL | 00_01 | Antimony | UG/L | 31.6 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Barium | UG/L | 102 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Calcium | UG/L | 115000 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Cobalt | UG/L | 1.2 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Iron | UG/L | 10100 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Magnesium | UG/L | 184000 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Manganese | UG/L | 598 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Potassium | UG/L | 91200 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Selenium | UG/L | 12.9 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Sodium | UG/L | 2240000 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Thallium | UG/L | 4.4 | D | | | |
| LBG-MW02 | FMETAL | 00_01 | Aluminum | UG/L | 12.5 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Arsenic | UG/L | 3.8 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Beryllium | UG/L | 0.4 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Cadmium | UG/L | 0.5 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Chromium | UG/L | 1 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Copper | UG/L | 4.2 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Lead | UG/L | 2.4 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Mercury | UG/L | 0.2 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Nickel | UG/L | 3 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Silver | UG/L | 1.2 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Vanadium | UG/L | 0.9 | ND | | | |
| LBG-MW02 | FMETAL | 00_01 | Zinc | UG/L | 3.1 | ND | | | |

**Table 5**
Liittle Creek Background Groundwater Evaluation: Critical Values
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | RBC-Tap | MCL-Groundwater | VA Groundwater Standards |
|---|---|---|---|
| Arsenic | 0.045 | 10 | 50 |
| Barium | 2600 | 2000 | 1000 |
| Cadmium | 18 | 5 | 0.4 |
| Chromium | 110 | 100 | 50 |
| Copper | 1500 | 1300 | 1000 |
| Lead | 15 | 15 | 50 |
| Mercury | 11 | 2 | 0.05 |
| Selenium | 180 | 50 | 10 |
| Arsenic | 0.045 | 10 | 50 |
| Barium | 2600 | 2000 | 1000 |
| Cadmium | 18 | 5 | 0.4 |
| Chromium | 110 | 100 | 50 |
| Copper | 1500 | 1300 | 1000 |
| Cyanide | 730 | 200 | 5 |
| Lead | 15 | 15 | 50 |
| Mercury | 11 | 2 | 0.05 |
| Selenium | 180 | 50 | 10 |
| Endrin | 11 | 2 | 0.004 |
| Endrin aldehyde | 11 | 2 | 0.004 |
| Endrin ketone | 11 | 2 | 0.004 |
| gamma-BHC (Lindane) | 0.052 | 0.2 | 0.01 |
| Heptachlor | 0.015 | 0.4 | 0.001 |
| Heptachlor epoxide | 0.0074 | 0.2 | 0.001 |
| Methoxychlor | 180 | 40 | 0.03 |
| Pentachlorophenol | 0.56 | 1 | 1 |

**Table 6**
Little Creek Background Groundwater Monitoring Sample Summary
Primary Sample Distributions [N=3681]
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | Units | Count | FD | UMIN | UMAX | DMIN | DMAX | Mean | Median | CV |
|---|---|---|---|---|---|---|---|---|---|---|
| *DISSOLVED METAL [23 Analytes]* | | | | | | | | | | |
| Magnesium | UG/L | 21 | **1.00** | | | 3760 | 184000 | 33709.0 | 13500.0 | 1.5 |
| Manganese | UG/L | 21 | **1.00** | | | 17.2 | 1930 | 521.3 | 261.0 | 1.1 |
| Sodium | UG/L | 21 | **1.00** | | | 7570 | 2240000 | 277155.7 | 23700.0 | 2.2 |
| Calcium | UG/L | 21 | **0.95** | 34300 | 34300 | 10300 | 162000 | 51126.2 | 42300.0 | 0.9 |
| Potassium | UG/L | 21 | **0.86** | 1170 | 10500 | 1340 | 138000 | 21615.7 | 8290.0 | 1.6 |
| Iron | UG/L | 21 | **0.81** | 23.1 | 51.4 | 24.9 | 43600 | 8530.7 | 4780.0 | 1.3 |
| Barium | UG/L | 21 | **0.71** | 7.7 | 39.1 | 6 | 136 | 42.9 | 29.7 | 0.9 |
| Chromium | UG/L | 21 | **0.48** | 0.6 | 8.4 | 1.3 | 2.2 | 1.2 | 1.3 | 0.8 |
| Nickel | UG/L | 21 | **0.48** | 2.2 | 7.7 | 2.1 | 11.5 | 4.0 | 3.6 | 0.8 |
| Zinc | UG/L | 21 | **0.43** | 1 | 41.7 | 1.6 | 157 | 20.6 | 11.4 | 1.9 |
| Cobalt | UG/L | 21 | **0.38** | 0.3 | 31.2 | 1.2 | 55.9 | 5.2 | 1.2 | 2.4 |
| Antimony | UG/L | 21 | **0.33** | 1.6 | 13.3 | 2.7 | 31.6 | 7.7 | 2.7 | 1.4 |
| Aluminum | UG/L | 21 | **0.29** | 12.5 | 113 | 35.8 | 88.5 | 29.0 | 39.1 | 0.8 |
| Arsenic | UG/L | 21 | **0.29** | 2.1 | 3.8 | 5.4 | 78 | 9.6 | 3.8 | 2.2 |
| Thallium | UG/L | 21 | **0.29** | 2.1 | 3.5 | 3 | 9.7 | 2.4 | 3.4 | 0.8 |
| Selenium | UG/L | 21 | **0.24** | 1.9 | 4.5 | 3.2 | 12.9 | 3.0 | 3.3 | 1.0 |
| Vanadium | UG/L | 21 | **0.24** | 0.3 | 4.4 | 0.6 | 2 | 0.7 | 0.9 | 0.9 |
| Copper | UG/L | 21 | **0.14** | 0.8 | 15.5 | 0.99 | 3.8 | 1.9 | 1.7 | 1.0 |
| Cadmium | UG/L | 21 | **0.10** | 0.2 | 1 | 0.46 | 0.48 | 0.2 | 0.5 | 0.4 |
| Beryllium | UG/L | 21 | **0.05** | 0.1 | 0.6 | 0.55 | 0.55 | 0.2 | 0.4 | 0.4 |
| Lead | UG/L | 21 | **0.05** | 0.9 | 2.4 | 1.3 | 1.3 | 0.9 | 2.1 | 0.4 |
| Silver | UG/L | 21 | **0.05** | 0.7 | 5.7 | 4.2 | 4.2 | 0.8 | 1.2 | 1.3 |
| Mercury | UG/L | 21 | **0.00** | 0.1 | 0.2 | | | 0.1 | 0.1 | 0.3 |
| *TOTAL METAL [24 Analytes]* | | | | | | | | | | |
| Manganese | UG/L | 21 | **1.00** | | | 16.3 | 1910 | 529.2 | 265.0 | 1.1 |
| Calcium | UG/L | 21 | **0.95** | 32200 | 32200 | 10700 | 168000 | 51571.4 | 42400.0 | 0.9 |
| Magnesium | UG/L | 21 | **0.95** | 4840 | 4840 | 3770 | 180000 | 33251.4 | 13600.0 | 1.5 |
| Iron | UG/L | 21 | **0.90** | 27.5 | 45.6 | 303 | 70800 | 13980.6 | 7750.0 | 1.3 |
| Sodium | UG/L | 21 | **0.90** | 18900 | 20500 | 7940 | 2220000 | 276978.1 | 23400.0 | 2.2 |
| Potassium | UG/L | 21 | **0.71** | 1500 | 12700 | 2070 | 132000 | 21582.6 | 9440.0 | 1.5 |
| Aluminum | UG/L | 21 | **0.67** | 12.5 | 246 | 32 | 13500 | 989.7 | 133.0 | 3.0 |
| Barium | UG/L | 21 | **0.62** | 8.1 | 88.8 | 6.2 | 130 | 43.8 | 43.8 | 0.8 |
| Nickel | UG/L | 21 | **0.57** | 0.7 | 9.4 | 1.1 | 22.4 | 5.4 | 3.0 | 1.1 |
| Vanadium | UG/L | 21 | **0.57** | 0.3 | 4.4 | 0.64 | 26.3 | 2.8 | 0.9 | 2.0 |
| Cobalt | UG/L | 21 | **0.48** | 0.3 | 21.3 | 0.95 | 21.5 | 3.2 | 1.2 | 1.6 |
| Cadmium | UG/L | 21 | **0.43** | 0.2 | 0.54 | 0.4 | 4.2 | 0.7 | 0.5 | 1.4 |
| Chromium | UG/L | 21 | **0.43** | 0.7 | 3.8 | 1.1 | 18.9 | 2.8 | 1.5 | 1.7 |
| Arsenic | UG/L | 21 | **0.38** | 2.1 | 3.8 | 3.9 | 105 | 13.1 | 3.8 | 2.1 |
| Zinc | UG/L | 21 | **0.38** | 1 | 59 | 4.3 | 397 | 38.0 | 18.3 | 2.3 |
| Lead | UG/L | 21 | **0.29** | 0.9 | 2.4 | 1.4 | 7 | 1.8 | 2.4 | 1.0 |
| Mercury | UG/L | 21 | **0.19** | 0.1 | 0.2 | 0.11 | 0.33 | 0.1 | 0.2 | 0.7 |
| Selenium | UG/L | 21 | **0.19** | 1.9 | 4.5 | 2.7 | 14.4 | 2.8 | 2.7 | 1.1 |
| Thallium | UG/L | 21 | **0.19** | 2.1 | 3.5 | 4.4 | 18.4 | 2.7 | 3.4 | 1.4 |
| Cyanide | UG/L | 20 | **0.15** | 0.9 | 6.1 | 0.71 | 6.8 | 1.3 | 2.0 | 1.1 |
| Beryllium | UG/L | 21 | **0.14** | 0.1 | 0.6 | 0.54 | 0.89 | 0.3 | 0.4 | 0.7 |
| Copper | UG/L | 21 | **0.05** | 0.8 | 19.1 | 17.4 | 17.4 | 3.0 | 3.4 | 1.4 |
| Silver | UG/L | 21 | **0.05** | 0.7 | 5.7 | 1.9 | 1.9 | 0.7 | 1.2 | 0.9 |
| Antimony | UG/L | 21 | **0.00** | 1.6 | 61 | | | 4.8 | 2.7 | 1.5 |
| *PESTICIDE/PCB [28 + 1 Analytes]* | | | | | | | | | | |
| gamma-BHC (Lindane) | UG/L | 21 | **0.14** | 0.0093 | 0.05 | 0.004 | 0.028 | 0.0 | 0.0 | 0.9 |
| Dieldrin | UG/L | 21 | **0.10** | 0.0098 | 0.1 | 0.135 | 0.16 | 0.0 | 0.0 | 1.7 |
| 4,4'-DDD | UG/L | 21 | **0.05** | 0.019 | 0.1 | 0.012 | 0.012 | 0.0 | 0.0 | 0.7 |
| delta-BHC | UG/L | 21 | **0.05** | 0.0093 | 0.05 | 0.013 | 0.013 | 0.0 | 0.0 | 0.7 |
| Endosulfan sulfate | UG/L | 21 | **0.05** | 0.019 | 0.1 | 0.0053 | 0.0053 | 0.0 | 0.0 | 0.8 |
| Endrin | UG/L | 21 | **0.05** | 0.019 | 0.1 | 0.0013 | 0.0013 | 0.0 | 0.0 | 0.8 |
| Endrin aldehyde | UG/L | 21 | **0.05** | 0.019 | 0.1 | 0.026 | 0.026 | 0.0 | 0.0 | 0.7 |
| Endrin ketone | UG/L | 21 | **0.05** | 0.019 | 0.1 | 0.0081 | 0.0081 | 0.0 | 0.0 | 0.7 |
| 4,4'-DDE | UG/L | 21 | **0.00** | 0.019 | 0.1 | | | 0.0 | 0.0 | 0.7 |

**Table 6**
Little Creek Background Groundwater Monitoring Sample Summary
Primary Sample Distributions [N=3681]
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | Units | Count | FD | UMIN | UMAX | DMIN | DMAX | Mean | Median | CV |
|---|---|---|---|---|---|---|---|---|---|---|
| 4,4'-DDT | UG/L | 21 | **0.00** | 0.019 | 0.1 | | | 0.0 | 0.0 | 0.7 |
| Aldrin | UG/L | 21 | **0.00** | 0.0093 | 0.05 | | | 0.0 | 0.0 | 0.7 |
| alpha-BHC | UG/L | 21 | **0.00** | 0.0093 | 0.05 | | | 0.0 | 0.0 | 0.7 |
| alpha-Chlordane | UG/L | 21 | **0.00** | 0.0093 | 0.05 | | | 0.0 | 0.0 | 0.7 |
| Aroclor-1016 | UG/L | 21 | **0.00** | 0.19 | 1 | | | 0.1 | 0.2 | 0.7 |
| Aroclor-1221 | UG/L | 21 | **0.00** | 0.37 | 2 | | | 0.2 | 0.4 | 0.7 |
| Aroclor-1232 | UG/L | 21 | **0.00** | 0.19 | 1 | | | 0.1 | 0.2 | 0.7 |
| Aroclor-1242 | UG/L | 21 | **0.00** | 0.19 | 1 | | | 0.1 | 0.2 | 0.7 |
| Aroclor-1248 | UG/L | 21 | **0.00** | 0.19 | 1 | | | 0.1 | 0.2 | 0.7 |
| Aroclor-1254 | UG/L | 21 | **0.00** | 0.19 | 1 | | | 0.1 | 0.2 | 0.7 |
| Aroclor-1260 | UG/L | 21 | **0.00** | 0.19 | 1 | | | 0.1 | 0.2 | 0.7 |
| beta-BHC | UG/L | 21 | **0.00** | 0.0093 | 0.05 | | | 0.0 | 0.0 | 0.7 |
| **beta-Chlordane** | **UG/L** | **2** | **0.00** | **0.0093** | **0.01** | | | **0.0** | **0.0** | **0.1** |
| Endosulfan I | UG/L | 21 | **0.00** | 0.0093 | 0.05 | | | 0.0 | 0.0 | 0.7 |
| Endosulfan II | UG/L | 21 | **0.00** | 0.019 | 0.1 | | | 0.0 | 0.0 | 0.7 |
| gamma-Chlordane | UG/L | 19 | **0.00** | 0.0093 | 0.05 | | | 0.0 | 0.0 | 0.8 |
| Heptachlor | UG/L | 21 | **0.00** | 0.0093 | 0.05 | | | 0.0 | 0.0 | 0.7 |
| Heptachlor epoxide | UG/L | 21 | **0.00** | 0.0093 | 0.05 | | | 0.0 | 0.0 | 0.7 |
| Methoxychlor | UG/L | 21 | **0.00** | 0.093 | 0.5 | | | 0.1 | 0.1 | 0.7 |
| Toxaphene | UG/L | 21 | **0.00** | 0.93 | 5 | | | 0.6 | 1.0 | 0.7 |
| | | | | | | | | | | |
| *SEMIVOLATILE ORGANIC [59 + 5 Analytes]* | | | | | | | | | | |
| bis(2-Ethylhexyl)phthalate | UG/L | 21 | **0.19** | 5 | 14 | 3 | 5 | 3.1 | 5.0 | 0.4 |
| 2,4-Dinitrotoluene | UG/L | 21 | **0.05** | 5 | 10 | 5 | 5 | 2.7 | 5.0 | 0.3 |
| Acenaphthene | UG/L | 21 | **0.05** | 5 | 10 | 0.6 | 0.6 | 2.5 | 5.0 | 0.3 |
| Di-n-butylphthalate | UG/L | 21 | **0.05** | 0.5 | 55 | 0.4 | 0.4 | 3.7 | 5.0 | 1.5 |
| Fluorene | UG/L | 21 | **0.05** | 5 | 10 | 0.7 | 0.7 | 2.5 | 5.0 | 0.3 |
| Phenol | UG/L | 21 | **0.05** | 0.6 | 10 | 5 | 5 | 2.4 | 5.0 | 0.5 |
| **1,2,4-Trichlorobenzene** | **UG/L** | **1** | **0.00** | 10 | 10 | | | 5.0 | 10.0 | |
| **1,2-Dichlorobenzene** | **UG/L** | **1** | **0.00** | 10 | 10 | | | 5.0 | 10.0 | |
| **1,3-Dichlorobenzene** | **UG/L** | **1** | **0.00** | 10 | 10 | | | 5.0 | 10.0 | |
| **1,4-Dichlorobenzene** | **UG/L** | **1** | **0.00** | 10 | 10 | | | 5.0 | 10.0 | |
| 2,2'-Oxybis(1-chloropropane) | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 2,4,5-Trichlorophenol | UG/L | 21 | **0.00** | 18 | 25 | | | 10.0 | 20.0 | 0.1 |
| 2,4,6-Trichlorophenol | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 2,4-Dichlorophenol | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 2,4-Dimethylphenol | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 2,4-Dinitrophenol | UG/L | 21 | **0.00** | 18 | 25 | | | 10.0 | 20.0 | 0.1 |
| 2,6-Dinitrotoluene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 2-Chloronaphthalene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 2-Chlorophenol | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 2-Methylnaphthalene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 2-Methylphenol | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 2-Nitroaniline | UG/L | 21 | **0.00** | 18 | 25 | | | 10.0 | 20.0 | 0.1 |
| 2-Nitrophenol | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 3,3'-Dichlorobenzidine | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 3-Nitroaniline | UG/L | 21 | **0.00** | 18 | 25 | | | 10.0 | 20.0 | 0.1 |
| 4,6-Dinitro-2-methylphenol | UG/L | 21 | **0.00** | 18 | 25 | | | 10.0 | 20.0 | 0.1 |
| 4-Bromophenyl-phenylether | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 4-Chloro-3-methylphenol | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 4-Chloroaniline | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 4-Chlorophenyl-phenylether | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 4-Methylphenol | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 4-Nitroaniline | UG/L | 21 | **0.00** | 18 | 25 | | | 10.0 | 20.0 | 0.1 |
| 4-Nitrophenol | UG/L | 21 | **0.00** | 18 | 25 | | | 10.0 | 20.0 | 0.1 |
| Acenaphthylene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Anthracene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Benzo(a)anthracene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Benzo(a)pyrene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Benzo(b)fluoranthene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Benzo(g,h,i)perylene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |

**Table 6**
Little Creek Background Groundwater Monitoring Sample Summary
Primary Sample Distributions [N=3681]
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | Units | Count | FD | UMIN | UMAX | DMIN | DMAX | Mean | Median | CV |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzo(k)fluoranthene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| bis(2-Chloroethoxy)methane | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| bis(2-Chloroethyl)ether | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Butylbenzylphthalate | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| **Carbazole** | **UG/L** | **1** | **0.00** | 10 | 10 | | | 5.0 | 10.0 | |
| Chrysene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Di-n-octylphthalate | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Dibenz(a,h)anthracene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Dibenzofuran | UG/L | 21 | **0.00** | 0.3 | 10 | | | 2.5 | 5.0 | 0.3 |
| Diethylphthalate | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Dimethyl phthalate | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Fluoranthene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Hexachlorobenzene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Hexachlorobutadiene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Hexachlorocyclopentadiene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Hexachloroethane | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Indeno(1,2,3-cd)pyrene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Isophorone | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| n-Nitroso-di-n-propylamine | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| n-Nitrosodiphenylamine | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Naphthalene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Nitrobenzene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Pentachlorophenol | UG/L | 21 | **0.00** | 18 | 25 | | | 10.0 | 20.0 | 0.1 |
| Phenanthrene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Pyrene | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| | | | | | | | | | | |
| *VOLATILE ORGANIC [41 + 3 Analytes]* | | | | | | | | | | |
| 1,2-Dichloropropane | UG/L | 21 | **0.10** | 1 | 10 | 1 | 1 | 0.8 | 1.0 | 1.3 |
| Acetone | UG/L | 21 | **0.10** | 3 | 14 | 3 | 4 | 3.0 | 5.0 | 0.4 |
| Chloromethane | UG/L | 21 | **0.10** | 1 | 10 | 0.1 | 0.1 | 0.7 | 1.0 | 1.5 |
| 2-Butanone | UG/L | 21 | **0.05** | 5 | 10 | 3 | 3 | 2.6 | 5.0 | 0.2 |
| Chloroform | UG/L | 21 | **0.05** | 0.3 | 10 | 0.4 | 0.4 | 0.7 | 1.0 | 1.4 |
| cis-1,2-Dichloroethene | UG/L | 21 | **0.05** | 1 | 10 | 0.1 | 0.1 | 0.7 | 1.0 | 1.4 |
| Tetrachloroethene | UG/L | 21 | **0.05** | 1 | 10 | 0.2 | 0.2 | 0.7 | 1.0 | 1.4 |
| Trichloroethene | UG/L | 21 | **0.05** | 1 | 10 | 0.5 | 0.5 | 0.7 | 1.0 | 1.4 |
| Vinyl chloride | UG/L | 21 | **0.05** | 1 | 10 | 0.1 | 0.1 | 0.7 | 1.0 | 1.4 |
| **1,1,1-Trichloroethane** | **UG/L** | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| 1,1,2,2-Tetrachloroethane | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| 1,1,2-Trichloroethane | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| 1,1-Dichloroethane | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| 1,1-Dichloroethene | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| 1,2,4-Trichlorobenzene | UG/L | 20 | **0.00** | 1 | 1 | | | 0.5 | 1.0 | |
| 1,2-Dibromo-3-chloropropane | UG/L | 20 | **0.00** | 1 | 1 | | | 0.5 | 1.0 | |
| 1,2-Dibromoethane | UG/L | 20 | **0.00** | 1 | 1 | | | 0.5 | 1.0 | |
| 1,2-Dichlorobenzene | UG/L | 20 | **0.00** | 1 | 1 | | | 0.5 | 1.0 | |
| 1,2-Dichloroethane | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| **1,2-Dichloroethene (total)** | **UG/L** | **1** | **0.00** | 10 | 10 | | | 5.0 | 10.0 | |
| 1,3-Dichlorobenzene | UG/L | 20 | **0.00** | 1 | 1 | | | 0.5 | 1.0 | |
| 1,4-Dichlorobenzene | UG/L | 20 | **0.00** | 1 | 1 | | | 0.5 | 1.0 | |
| 2-Hexanone | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| 4-Methyl-2-pentanone | UG/L | 21 | **0.00** | 5 | 10 | | | 2.6 | 5.0 | 0.2 |
| Benzene | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| Bromochloromethane | UG/L | 20 | **0.00** | 1 | 1 | | | 0.5 | 1.0 | |
| Bromodichloromethane | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| Bromoform | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| Bromomethane | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| Carbon disulfide | UG/L | 21 | **0.00** | 0.08 | 10 | | | 0.6 | 1.0 | 1.7 |
| Carbon tetrachloride | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| Chlorobenzene | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| Chloroethane | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| cis-1,3-Dichloropropene | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |

**Table 6**
Little Creek Background Groundwater Monitoring Sample Summary
Primary Sample Distributions [N=3681]
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | Units | Count | FD | UMIN | UMAX | DMIN | DMAX | Mean | Median | CV |
|---|---|---|---|---|---|---|---|---|---|---|
| Dibromochloromethane | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| Ethylbenzene | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| **m- and p-Xylene** | **UG/L** | **1** | **0.00** | **10** | **10** | | | **5.0** | **10.0** | |
| Methylene chloride | UG/L | 21 | **0.00** | 0.5 | 18 | | | 1.2 | 2.0 | 1.4 |
| **o-Xylene** | **UG/L** | **1** | **0.00** | **10** | **10** | | | **5.0** | **10.0** | |
| Styrene | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| Toluene | UG/L | 21 | **0.00** | 0.2 | 10 | | | 0.7 | 1.0 | 1.5 |
| trans-1,2-Dichloroethene | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| trans-1,3-Dichloropropene | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| Xylene, total | UG/L | 21 | **0.00** | 1 | 10 | | | 0.7 | 1.0 | 1.4 |
| *WATER CHEMISTRY [0+3 Analytes]* | | | | | | | | | | |
| **Bicarbonate** | **MG/L** | **2** | **1.00** | | | **180** | **480** | **330.0** | **330.0** | **0.6** |
| **Chloride** | **MG/L** | **2** | **1.00** | | | **19.5** | **24.8** | **22.2** | **22.2** | **0.2** |
| **Sulfate** | **MG/L** | **2** | **1.00** | | | **45.4** | **54.3** | **49.9** | **49.9** | **0.1** |

**Table 7**
Little Creek Background Groundwater Monitoring Sample Summary
Primary Sample Distributions [N=3681]
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | Units | FD | RBCtap Criteria | D> | U> | MCL Criteria | D> | U> | MCLG Criteria | D> | U> | VA GW STD Criteria | D> | U> |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *DISSOLVED METAL [23 Analytes]* | | | | | | | | | | | | | | |
| Magnesium | UG/L | 1.00 | | | | | | | | | | | | |
| Manganese | UG/L | 1.00 | 730 | 5 | | | | | | | | 50 | 18 | |
| Sodium | UG/L | 1.00 | | | | | | | | | | 100000 | 5 | |
| Calcium | UG/L | 0.95 | | | | | | | | | | | | |
| Potassium | UG/L | 0.86 | | | | | | | | | | | | |
| Iron | UG/L | 0.81 | 11000 | 6 | | | | | | | | 300 | 15 | |
| Barium | UG/L | 0.71 | 2600 | | | 2000 | | | | | | 1000 | | |
| Chromium | UG/L | 0.48 | 110 | | | 100 | | | | | | 50 | | |
| Nickel | UG/L | 0.48 | 730 | | | | | | | | | | | |
| Zinc | UG/L | 0.43 | 11000 | | | | | | | | | 50 | 2 | |
| Cobalt | UG/L | 0.38 | 730 | | | | | | | | | | | |
| Antimony | UG/L | 0.33 | 15 | 4 | | 6 | 6 | 3 | | | | | | |
| Aluminum | UG/L | 0.29 | 37000 | | | | | | | | | | | |
| Arsenic | UG/L | 0.29 | 0.045 | 6 | 15 | 10 | 3 | | 0 | 6 | 15 | 50 | 2 | |
| Thallium | UG/L | 0.29 | 2.6 | 6 | 7 | 2 | 6 | 15 | 0.5 | 6 | 15 | | | |
| Selenium | UG/L | 0.24 | 180 | | | 50 | | | | | | 10 | 1 | |
| Vanadium | UG/L | 0.24 | 260 | | | | | | | | | | | |
| Copper | UG/L | 0.14 | 1500 | | | 1300 | | | | | | 1000 | | |
| Cadmium | UG/L | 0.10 | 18 | | | 5 | | | | | | 0.4 | 2 | 12 |
| Beryllium | UG/L | 0.05 | 73 | | | 4 | | | | | | | | |
| Lead | UG/L | 0.05 | 15 | | | 15 | | | 0 | 1 | 20 | 50 | | |
| Silver | UG/L | 0.05 | 180 | | | | | | | | | | | |
| Mercury | UG/L | 0.00 | 11 | | | 2 | | | | | | 0.05 | | 21 |
| *TOTAL METAL [24 Analytes]* | | | | | | | | | | | | | | |
| Manganese | UG/L | 1.00 | 730 | 5 | | | | | | | | 50 | 18 | |
| Calcium | UG/L | 0.95 | | | | | | | | | | | | |
| Magnesium | UG/L | 0.95 | | | | | | | | | | | | |
| Iron | UG/L | 0.90 | 11000 | 9 | | | | | | | | 300 | 19 | |
| Sodium | UG/L | 0.90 | | | | | | | | | | 100000 | 5 | |
| Potassium | UG/L | 0.71 | | | | | | | | | | | | |
| Aluminum | UG/L | 0.67 | 37000 | | | | | | | | | | | |
| Barium | UG/L | 0.62 | 2600 | | | 2000 | | | | | | 1000 | | |
| Nickel | UG/L | 0.57 | 730 | | | | | | | | | | | |
| Vanadium | UG/L | 0.57 | 260 | | | | | | | | | | | |
| Cobalt | UG/L | 0.48 | 730 | | | | | | | | | | | |
| Cadmium | UG/L | 0.43 | 18 | | | 5 | | | | | | 0.4 | 8 | 6 |
| Chromium | UG/L | 0.43 | 110 | | | 100 | | | | | | 50 | | |
| Arsenic | UG/L | 0.38 | 0.045 | 8 | 13 | 10 | 4 | | 0 | 8 | 13 | 50 | 2 | |
| Zinc | UG/L | 0.38 | 11000 | | | | | | | | | 50 | 2 | 1 |

**Table 7**
Little Creek Background Groundwater Monitoring Sample Summary
Primary Sample Distributions [N=3681]
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | Units | FD | RBCtap Criteria | D> | U> | MCL Criteria | D> | U> | MCLG Criteria | D> | U> | VA GW STD Criteria | D> | U> |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead | UG/L | 0.29 | 15 | | | 15 | | | 0 | 6 | 15 | 50 | | |
| Mercury | UG/L | 0.19 | 11 | | | 2 | | | | | | 0.05 | 4 | 17 |
| Selenium | UG/L | 0.19 | 180 | | | 50 | | | | | | 10 | 1 | |
| Thallium | UG/L | 0.19 | 2.6 | 4 | 7 | 2 | 4 | 17 | 0.5 | 4 | 17 | | | |
| Cyanide | UG/L | 0.15 | 730 | | | 200 | | | | | | 5 | 1 | 1 |
| Beryllium | UG/L | 0.14 | 73 | | | 4 | | | | | | | | |
| Copper | UG/L | 0.05 | 1500 | | | 1300 | | | | | | 1000 | | |
| Silver | UG/L | 0.05 | 180 | | | | | | | | | | | |
| Antimony | UG/L | 0.00 | 15 | | 4 | 6 | | 7 | | | | | | |
| *PESTICIDE/PCB [28 + 1 Analytes]* | | | | | | | | | | | | | | |
| gamma-BHC (Lindane) | UG/L | 0.14 | 0.052 | | | 0.2 | | | | | | 0.01 | 1 | 1 |
| Dieldrin | UG/L | 0.10 | 0.0042 | 2 | 19 | | | | | | | 0.003 | 2 | 19 |
| 4,4'-DDD | UG/L | 0.05 | 0.28 | | | | | | | | | | | |
| delta-BHC | UG/L | 0.05 | | | | | | | | | | | | |
| Endosulfan sulfate | UG/L | 0.05 | 220 | | | | | | | | | | | |
| Endrin | UG/L | 0.05 | 11 | | | 2 | | | | | | 0.004 | | 20 |
| Endrin aldehyde | UG/L | 0.05 | 11 | | | 2 | | | | | | 0.004 | 1 | 20 |
| Endrin ketone | UG/L | 0.05 | 11 | | | 2 | | | | | | 0.004 | 1 | 20 |
| 4,4'-DDE | UG/L | 0.00 | 0.2 | | | | | | | | | | | |
| 4,4'-DDT | UG/L | 0.00 | 0.2 | | | | | | | | | 0.001 | | 21 |
| Aldrin | UG/L | 0.00 | 0.0039 | | 21 | | | | | | | 0.003 | | 21 |
| alpha-BHC | UG/L | 0.00 | 0.011 | | 1 | | | | | | | | | |
| alpha-Chlordane | UG/L | 0.00 | 0.19 | | | | | | | | | | | |
| Aroclor-1016 | UG/L | 0.00 | 0.96 | | 1 | 0.5 | | 1 | | | | | | |
| Aroclor-1221 | UG/L | 0.00 | 0.033 | | 21 | 0.5 | | 1 | | | | | | |
| Aroclor-1232 | UG/L | 0.00 | 0.033 | | 21 | 0.5 | | 1 | | | | | | |
| Aroclor-1242 | UG/L | 0.00 | 0.033 | | 21 | 0.5 | | 1 | | | | | | |
| Aroclor-1248 | UG/L | 0.00 | 0.033 | | 21 | 0.5 | | 1 | | | | | | |
| Aroclor-1254 | UG/L | 0.00 | 0.033 | | 21 | 0.5 | | 1 | | | | | | |
| Aroclor-1260 | UG/L | 0.00 | 0.033 | | 21 | 0.5 | | 1 | | | | | | |
| beta-BHC | UG/L | 0.00 | 0.037 | | 1 | | | | | | | | | |
| **beta-Chlordane** | **UG/L** | **0.00** | | | | | | | | | | | | |
| Endosulfan I | UG/L | 0.00 | 220 | | | | | | | | | | | |
| Endosulfan II | UG/L | 0.00 | 220 | | | | | | | | | | | |
| gamma-Chlordane | UG/L | 0.00 | 0.19 | | | | | | | | | | | |
| Heptachlor | UG/L | 0.00 | 0.015 | | 1 | 0.4 | | | 0 | | 21 | 0.001 | | 21 |
| Heptachlor epoxide | UG/L | 0.00 | 0.0074 | | 21 | 0.2 | | | 0 | | 21 | 0.001 | | 21 |
| Methoxychlor | UG/L | 0.00 | 180 | | | 40 | | | | | | 0.03 | | 21 |
| Toxaphene | UG/L | 0.00 | 0.061 | | 21 | 3 | | 1 | 0 | | 21 | | | |
| *SEMIVOLATILE ORGANIC [49 + 5 Analytes]* | | | | | | | | | | | | | | |

**Table 7**
Little Creek Background Groundwater Monitoring Sample Summary
Primary Sample Distributions [N=3681]
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | Units | FD | RBCtap Criteria | D> | U> | MCL Criteria | D> | U> | MCLG Criteria | D> | U> | VA GW STD Criteria | D> | U> |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bis(2-Ethylhexyl)phthalate | UG/L | 0.19 | 4.8 | 1 | 17 | 6 | | 2 | 0 | 4 | 17 | | | |
| 2,4-Dinitrotoluene | UG/L | 0.05 | 73 | | | | | | | | | | | |
| Acenaphthene | UG/L | 0.05 | 370 | | | | | | | | | | | |
| Di-n-butylphthalate | UG/L | 0.05 | 3700 | | | | | | | | | | | |
| Fluorene | UG/L | 0.05 | 240 | | | | | | | | | | | |
| Phenol | UG/L | 0.05 | 22000 | | | | | | | | | 1 | 1 | 17 |
| **1,2,4-Trichlorobenzene** | **UG/L** | **0.00** | 190 | | | 70 | | | | | | | | |
| **1,2-Dichlorobenzene** | **UG/L** | **0.00** | 270 | | | 600 | | | | | | | | |
| **1,3-Dichlorobenzene** | **UG/L** | **0.00** | 180 | | | | | | | | | | | |
| **1,4-Dichlorobenzene** | **UG/L** | **0.00** | 0.47 | | 1 | 75 | | | | | | | | |
| 2,2'-Oxybis(1-chloropropane) | UG/L | 0.00 | 0.26 | | 21 | | | | | | | | | |
| 2,4,5-Trichlorophenol | UG/L | 0.00 | 3700 | | | | | | | | | 1 | | 21 |
| 2,4,6-Trichlorophenol | UG/L | 0.00 | 6.1 | | 1 | | | | | | | 1 | | 21 |
| 2,4-Dichlorophenol | UG/L | 0.00 | 110 | | | | | | | | | 1 | | 21 |
| 2,4-Dimethylphenol | UG/L | 0.00 | 730 | | | | | | | | | 1 | | 21 |
| 2,4-Dinitrophenol | UG/L | 0.00 | 73 | | | | | | | | | 1 | | 21 |
| 2,6-Dinitrotoluene | UG/L | 0.00 | 37 | | | | | | | | | | | |
| 2-Chloronaphthalene | UG/L | 0.00 | 490 | | | | | | | | | | | |
| 2-Chlorophenol | UG/L | 0.00 | 30 | | | | | | | | | 1 | | 21 |
| 2-Methylnaphthalene | UG/L | 0.00 | 120 | | | | | | | | | | | |
| 2-Methylphenol | UG/L | 0.00 | 1800 | | | | | | | | | 1 | | 21 |
| 2-Nitroaniline | UG/L | 0.00 | | | | | | | | | | | | |
| 2-Nitrophenol | UG/L | 0.00 | | | | | | | | | | | | |
| 3,3'-Dichlorobenzidine | UG/L | 0.00 | 0.15 | | 21 | | | | | | | | | |
| 3-Nitroaniline | UG/L | 0.00 | | | | | | | | | | | | |
| 4,6-Dinitro-2-methylphenol | UG/L | 0.00 | 37 | | | | | | | | | 1 | | 21 |
| 4-Bromophenyl-phenylether | UG/L | 0.00 | | | | | | | | | | | | |
| 4-Chloro-3-methylphenol | UG/L | 0.00 | | | | | | | | | | | | |
| 4-Chloroaniline | UG/L | 0.00 | 150 | | | | | | | | | | | |
| 4-Chlorophenyl-phenylether | UG/L | 0.00 | | | | | | | | | | | | |
| 4-Methylphenol | UG/L | 0.00 | 180 | | | | | | | | | 1 | | 21 |
| 4-Nitroaniline | UG/L | 0.00 | | | | | | | | | | | | |
| 4-Nitrophenol | UG/L | 0.00 | 290 | | | | | | | | | | | |
| Acenaphthylene | UG/L | 0.00 | | | | | | | | | | | | |
| Anthracene | UG/L | 0.00 | 1800 | | | | | | | | | | | |
| Benzo(a)anthracene | UG/L | 0.00 | 0.092 | | 21 | | | | | | | | | |
| Benzo(a)pyrene | UG/L | 0.00 | 0.0092 | | 21 | 0.2 | | 21 | 0 | | 21 | | | |
| Benzo(b)fluoranthene | UG/L | 0.00 | 0.092 | | 21 | | | | | | | | | |
| Benzo(g,h,i)perylene | UG/L | 0.00 | 180 | | | | | | | | | | | |
| Benzo(k)fluoranthene | UG/L | 0.00 | 0.92 | | 21 | | | | | | | | | |

**Table 7**
Little Creek Background Groundwater Monitoring Sample Summary
Primary Sample Distributions [N=3681]
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | Units | FD | RBCtap Criteria | D> | U> | MCL Criteria | D> | U> | MCLG Criteria | D> | U> | VA GW STD Criteria | D> | U> |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bis(2-Chloroethoxy)methane | UG/L | 0.00 | | | | | | | | | | | | |
| bis(2-Chloroethyl)ether | UG/L | 0.00 | 0.0096 | | 21 | | | | | | | | | |
| Butylbenzylphthalate | UG/L | 0.00 | 7300 | | | | | | | | | | | |
| **Carbazole** | **UG/L** | **0.00** | 3.3 | | 1 | | | | | | | | | |
| Chrysene | UG/L | 0.00 | 9.2 | | 1 | | | | | | | | | |
| Di-n-octylphthalate | UG/L | 0.00 | 730 | | | | | | | | | | | |
| Dibenz(a,h)anthracene | UG/L | 0.00 | 0.0092 | | 21 | | | | | | | | | |
| Dibenzofuran | UG/L | 0.00 | 24 | | | | | | | | | | | |
| Diethylphthalate | UG/L | 0.00 | 29000 | | | | | | | | | | | |
| Dimethyl phthalate | UG/L | 0.00 | 370000 | | | | | | | | | | | |
| Fluoranthene | UG/L | 0.00 | 1500 | | | | | | | | | | | |
| Hexachlorobenzene | UG/L | 0.00 | 0.042 | | 21 | 1 | | 21 | 0 | | 21 | | | |
| Hexachlorobutadiene | UG/L | 0.00 | 0.86 | | 21 | | | | | | | | | |
| Hexachlorocyclopentadiene | UG/L | 0.00 | 220 | | | 50 | | | | | | | | |
| Hexachloroethane | UG/L | 0.00 | 4.8 | | 21 | | | | | | | | | |
| Indeno(1,2,3-cd)pyrene | UG/L | 0.00 | 0.092 | | 21 | | | | | | | | | |
| Isophorone | UG/L | 0.00 | 70 | | | | | | | | | | | |
| n-Nitroso-di-n-propylamine | UG/L | 0.00 | 0.0096 | | 21 | | | | | | | | | |
| n-Nitrosodiphenylamine | UG/L | 0.00 | 14 | | | | | | | | | | | |
| Naphthalene | UG/L | 0.00 | 6.5 | | 1 | | | | | | | | | |
| Nitrobenzene | UG/L | 0.00 | 3.5 | | 21 | | | | | | | | | |
| Pentachlorophenol | UG/L | 0.00 | 0.56 | | 21 | 1 | | 21 | 0 | | 21 | 1 | | 21 |
| Phenanthrene | UG/L | 0.00 | 180 | | | | | | | | | | | |
| Pyrene | UG/L | 0.00 | 180 | | | | | | | | | | | |
| *VOLATILE ORGANIC [41 + 3 Analytes]* | | | | | | | | | | | | | | |
| 1,2-Dichloropropane | UG/L | 0.10 | 0.16 | 2 | 19 | 5 | | 1 | 0 | 2 | 19 | | | |
| Acetone | UG/L | 0.10 | 610 | | | | | | | | | | | |
| Chloromethane | UG/L | 0.10 | 2.1 | | 1 | | | | | | | | | |
| 2-Butanone | UG/L | 0.05 | 1900 | | | | | | | | | | | |
| Chloroform | UG/L | 0.05 | 0.15 | 1 | 20 | 80 | | | 0 | 1 | 20 | | | |
| cis-1,2-Dichloroethene | UG/L | 0.05 | 61 | | | 70 | | | | | | | | |
| Tetrachloroethene | UG/L | 0.05 | 0.63 | | 20 | 5 | | 1 | 0 | 1 | 20 | | | |
| Trichloroethene | UG/L | 0.05 | 0.026 | 1 | 20 | 5 | | 1 | 0 | 1 | 20 | | | |
| Vinyl chloride | UG/L | 0.05 | 0.015 | 1 | 20 | 2 | | 1 | 0 | 1 | 20 | | | |
| 1,1,1-Trichloroethane | UG/L | 0.00 | 3200 | | | 200 | | | | | | | | |
| 1,1,2,2-Tetrachloroethane | UG/L | 0.00 | 0.053 | | 21 | | | | | | | | | |
| 1,1,2-Trichloroethane | UG/L | 0.00 | 0.19 | | 21 | 5 | | 1 | 3 | | 1 | | | |
| 1,1-Dichloroethane | UG/L | 0.00 | 800 | | | | | | | | | | | |
| 1,1-Dichloroethene | UG/L | 0.00 | 0.044 | | 21 | 7 | | 1 | | | | | | |
| 1,2,4-Trichlorobenzene | UG/L | 0.00 | 190 | | | 70 | | | | | | | | |

**Table 7**
Little Creek Background Groundwater Monitoring Sample Summary
Primary Sample Distributions [N=3681]
*NAB Little Creek, Virginia Beach, Virginia*

| Parameter | Units | FD | RBCtap Criteria | D> | U> | MCL Criteria | D> | U> | MCLG Criteria | D> | U> | VA GW STD Criteria | D> | U> |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dibromo-3-chloropropane | UG/L | 0.00 | 0.047 | | 20 | 0.2 | | 20 | 0 | | 20 | | | |
| 1,2-Dibromoethane | UG/L | 0.00 | 0.00075 | | 20 | 0.05 | | 20 | 0 | | 20 | | | |
| 1,2-Dichlorobenzene | UG/L | 0.00 | 270 | | | 600 | | | | | | | | |
| 1,2-Dichloroethane | UG/L | 0.00 | 0.12 | | 21 | 5 | | 1 | 0 | | 21 | | | |
| **1,2-Dichloroethene (total)** | **UG/L** | **0.00** | 55 | | | 70 | | | | | | | | |
| 1,3-Dichlorobenzene | UG/L | 0.00 | 180 | | | | | | | | | | | |
| 1,4-Dichlorobenzene | UG/L | 0.00 | 0.47 | | 20 | 75 | | | | | | | | |
| 2-Hexanone | UG/L | 0.00 | 1500 | | | | | | | | | | | |
| 4-Methyl-2-pentanone | UG/L | 0.00 | 140 | | | | | | | | | | | |
| Benzene | UG/L | 0.00 | 0.32 | | 21 | 5 | | 1 | 0 | | 21 | | | |
| Bromochloromethane | UG/L | 0.00 | | | | | | | | | | | | |
| Bromodichloromethane | UG/L | 0.00 | 0.17 | | 21 | 80 | | | 0 | | 21 | | | |
| Bromoform | UG/L | 0.00 | 8.5 | | 1 | 80 | | | 0 | | 21 | | | |
| Bromomethane | UG/L | 0.00 | 8.5 | | 1 | | | | | | | | | |
| Carbon disulfide | UG/L | 0.00 | 1000 | | | | | | | | | | | |
| Carbon tetrachloride | UG/L | 0.00 | 0.16 | | 21 | 5 | | 1 | 0 | | 21 | | | |
| Chlorobenzene | UG/L | 0.00 | 110 | | | 100 | | | | | | | | |
| Chloroethane | UG/L | 0.00 | 3.6 | | 1 | | | | | | | | | |
| cis-1,3-Dichloropropene | UG/L | 0.00 | 0.44 | | 21 | | | | | | | | | |
| Dibromochloromethane | UG/L | 0.00 | 0.13 | | 21 | 80 | | | 60 | | | | | |
| Ethylbenzene | UG/L | 0.00 | 3.3 | | 1 | 700 | | | | | | | | |
| **m- and p-Xylene** | **UG/L** | **0.00** | | | | | | | | | | | | |
| Methylene chloride | UG/L | 0.00 | 4.1 | | 1 | 5 | | 1 | 0 | | 21 | | | |
| **o-Xylene** | **UG/L** | **0.00** | 12000 | | | | | | | | | | | |
| Styrene | UG/L | 0.00 | 1600 | | | 100 | | | | | | | | |
| Toluene | UG/L | 0.00 | 750 | | | 1000 | | | | | | | | |
| trans-1,2-Dichloroethene | UG/L | 0.00 | 120 | | | 100 | | | | | | | | |
| trans-1,3-Dichloropropene | UG/L | 0.00 | 0.44 | | 21 | | | | | | | | | |
| Xylene, total | UG/L | 0.00 | 12000 | | | 10000 | | | | | | | | |
| *WATER CHEMISTRY [0 + 3 Analytes]* | | | | | | | | | | | | | | |
| **Bicarbonate** | **MG/L** | **1.00** | | | | | | | | | | | | |
| **Chloride** | **MG/L** | **1.00** | | | | | | | | | | | | |
| **Sulfate** | **MG/L** | **1.00** | | | | | | | | | | | | |

# Figures

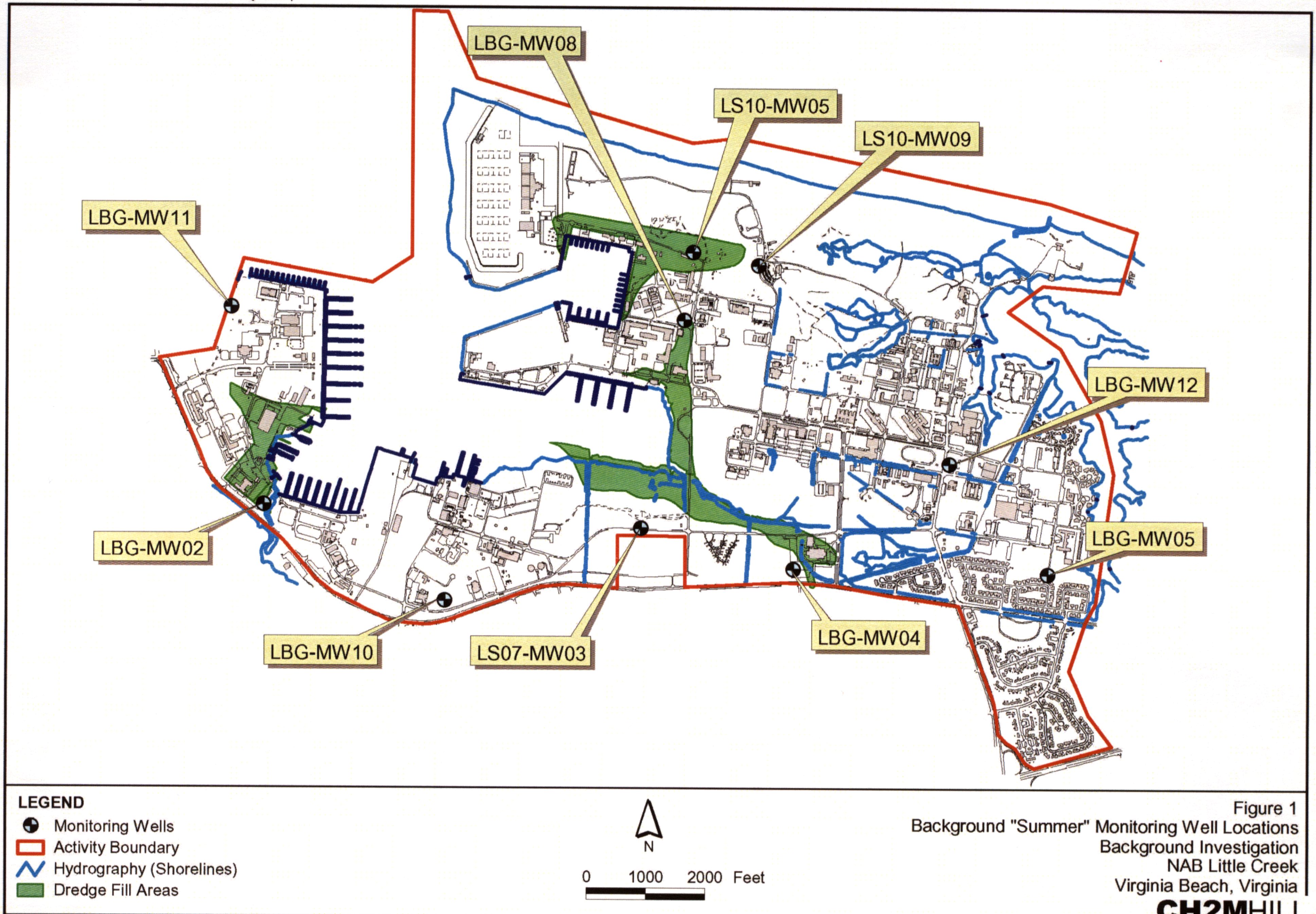
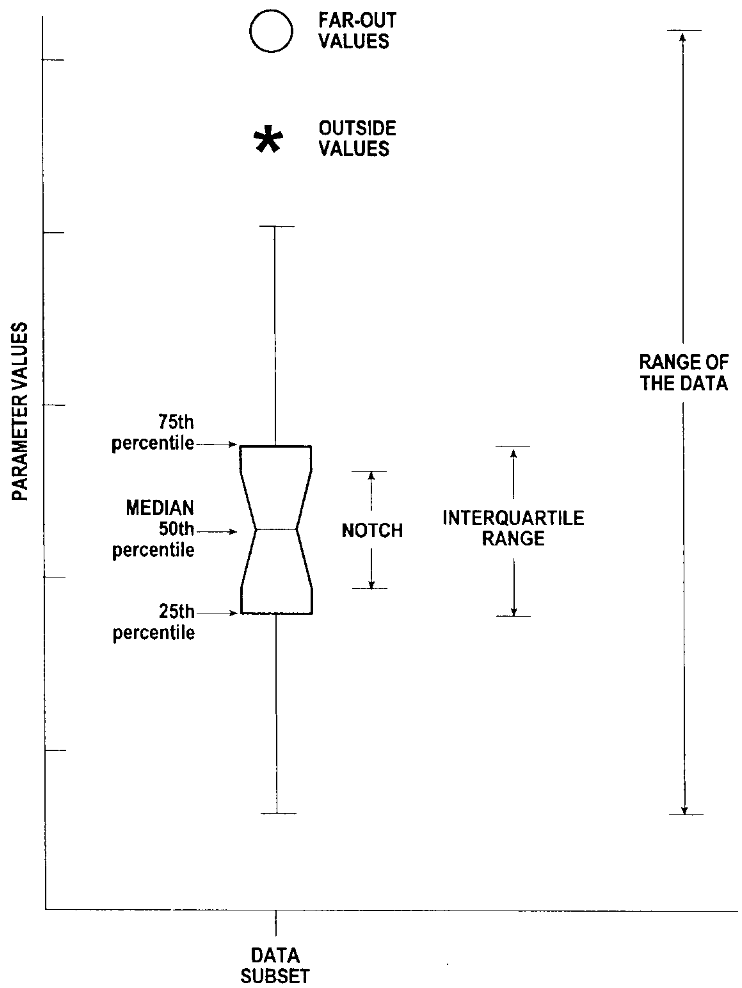



Figure 1
Background "Summer" Monitoring Well Locations
Background Investigation
NAB Little Creek
Virginia Beach, Virginia

CH2MHILL

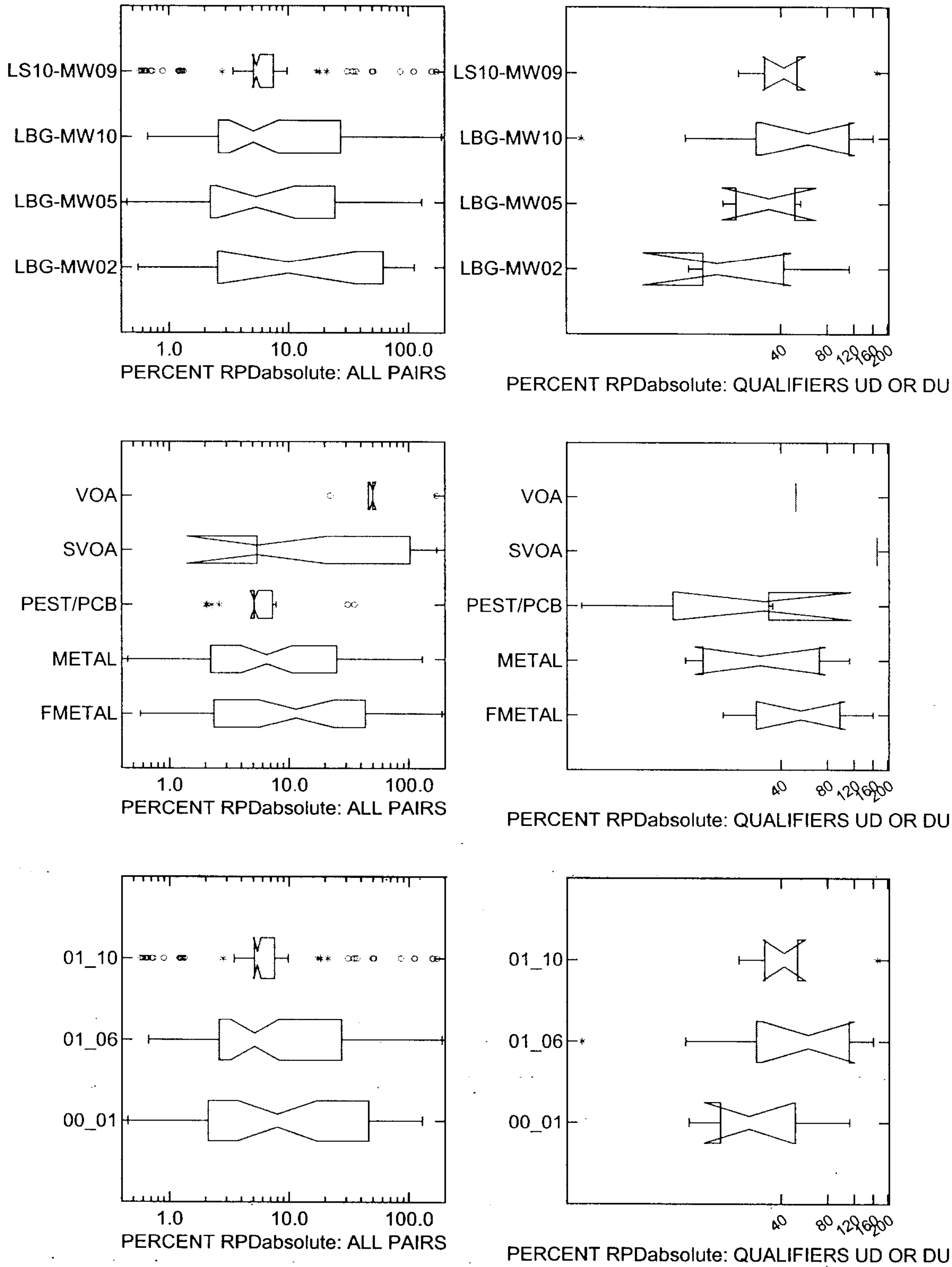



**Components.** A **BOX PLOT** identifies the **MEDIAN**, (50th percentile), the lower and upper quartiles **(25th and 75th PERCENTILES)**, and the **RANGE** (extreme spread of the data). The edges of the box demarcate the 25th and 75th percentiles, and so represent the middle 50 percent **(INTERQUARTILE RANGE)** of the parameter values for the data subset. The line inside the box is the **MEDIAN**. The lines, or whiskers, extend outward from the box through the range of data, excluding outliers. Two outliers are defined, based on their distance from the nearest edge of the box, relative to the range of the box. **OUTSIDE VALUES** lie 1.5 to 3 interquartile ranges away from the nearest box edge, and **FAR-OUT VALUES** lie three or more interquartile ranges away form the nearest box edge. The **NOTCH** represents the approximate 95 percent confidence interval around the median.

**Interpretation.** If notches from different subsets of data overlap completely, one can conclude with 95% confidence that the groups have been sampled from a common population. If notches do not overlap at all, one can conclude (with 95% confidence) that the groups represent different populations. Cases of partial overlap require explicit tests (e.g., t-Test, ANOVA, Mann-Whitney, or Kruskal-Wallis) to specify significance of differences among groups.

**Generic Box Plot**

**Figure 2**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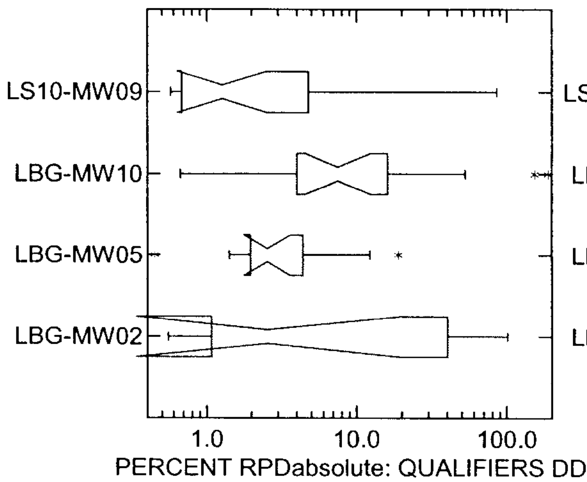
LBG-MW10
LBG-MW05
LBG-MW02
1.0
10.0
100.0
PERCENT RPDabsolute: ALL PAIRS
LS10-MW09
LBG-MW10
LBG-MW05
LBG-MW02
40
80
120
160
200
PERCENT RPDabsolute: QUALIFIERS UD OR DU
VOA
SVOA
PEST/PCB
METAL
FMETAL
1.0
10.0
100.0
PERCENT RPDabsolute: ALL PAIRS
VOA
SVOA
PEST/PCB
METAL
FMETAL
40
80
120
160
200
PERCENT RPDabsolute: QUALIFIERS UD OR DU
01_10
01_06
00_01
1.0
10.0
100.0
PERCENT RPDabsolute: ALL PAIRS
01_10
01_06
00_01
40
80
120
160
200
PERCENT RPDabsolute: QUALIFIERS UD OR DU

**Figure 3**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LBG-MW10
LBG-MW05
LBG-MW02
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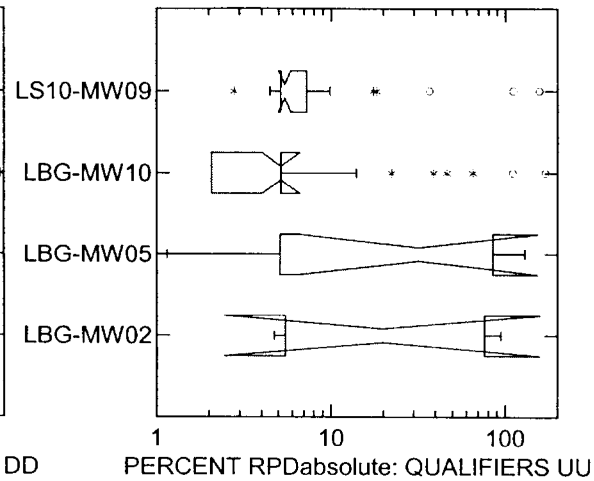
10.0
100.0
PERCENT RPDabsolute: QUALIFIERS DD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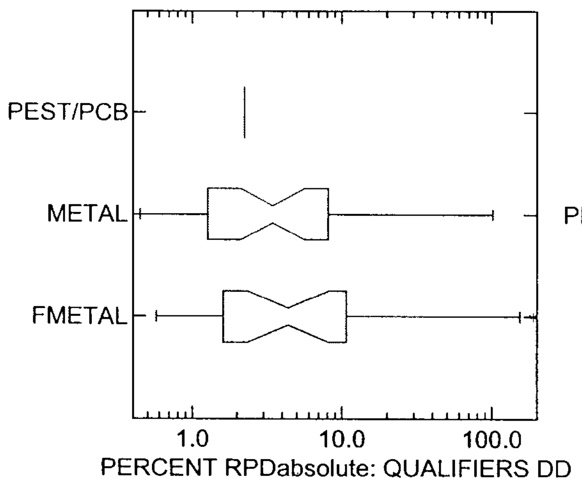
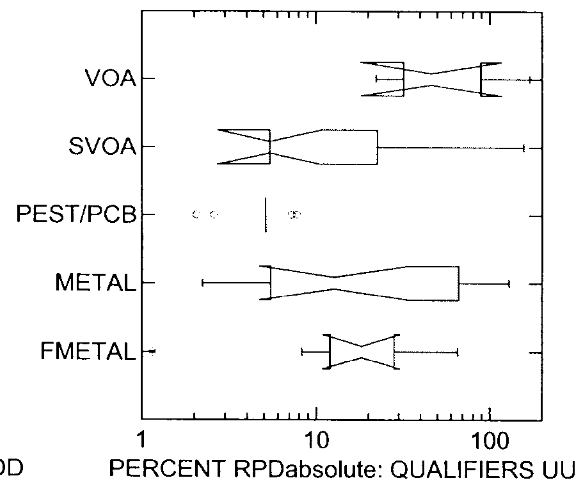
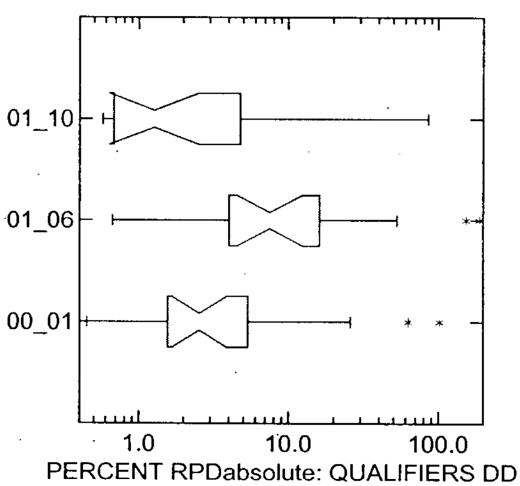
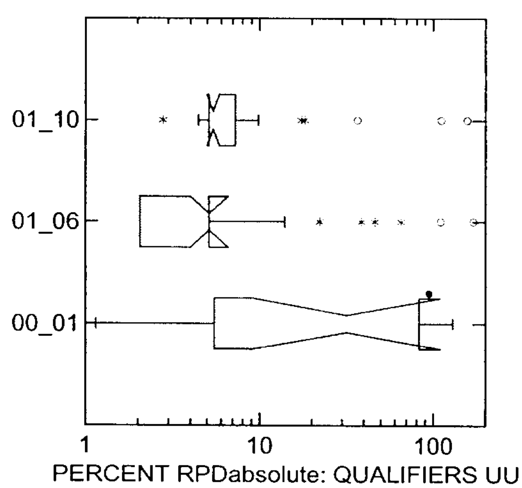
LBG-MW10
LBG-MW05
LBG-MW02
1
10
100
PERCENT RPDabsolute: QUALIFIERS UU


PEST/PCB
METAL
FMETAL
1.0
10.0
100.0
PERCENT RPDabsolute: QUALIFIERS DD


VOA
SVOA
PEST/PCB
METAL
FMETAL
1
10
100
PERCENT RPDabsolute: QUALIFIERS UU


01_10
01_06
00_01
1.0
10.0
100.0
PERCENT RPDabsolute: QUALIFIERS DD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