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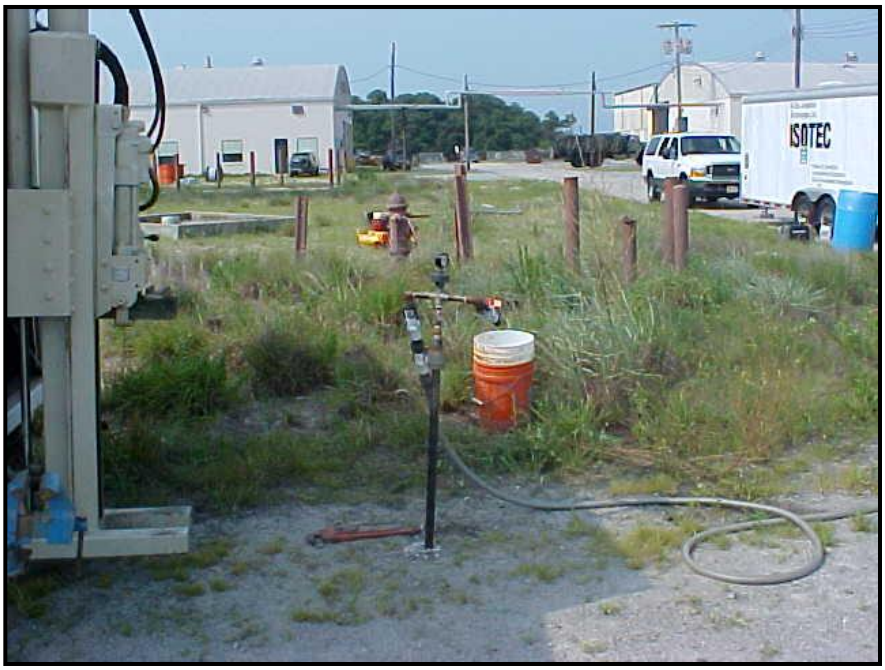
FINAL DECISION DOCUMENT LARC 60 MAINTENANCE AREA SITE NAB LITTLE CREEK VA

10/1/2008

U S ARMY CORPS OF ENGINEERS

FINAL

DECISION DOCUMENT
LARC 60 Maintenance Area Site



Installation Restoration Program
Fort Story, Virginia

U. S. Army Garrison
Fort Eustis, Virginia

And

U.S. Army Corps of Engineers
Baltimore District

October 2008

0285-943

MALCOLM PIRNIE
INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS

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October 22, 2008

Ms. Joanna Bateman
Remedial Project Manager
U.S. Army Garrison
Building 1407, ATZF-PWE
Fort Eustis, Virginia 23604-5332

Re: Final Decision Document
LARC 60 Maintenance Area Site
Fort Story, Virginia

Dear Ms. Bateman:

Malcolm Pirnie is pleased to provide to Fort Eustis this **Final Decision Document** for the **Lighterage Amphibious Resupply Cargo (LARC) 60 Maintenance Area site**. We have enclosed three hard copies of this report for your information. Additional copies have been submitted to the Virginia Department of Environmental Quality for their records.

It has been a pleasure to provide this document to Fort Eustis. We look forward to further discussions relative to this project.

Very truly yours,

MALCOLM PIRNIE, INC.

Anthony K. Pace
Project Manager

akp
0285-943

Enclosures

C: W. Smith, VDEQ, w/encl (2 copies)

FINAL

DECISION DOCUMENT
LARC 60 Maintenance Area

INSTALLATION RESTORATION PROGRAM
FORT STORY, VIRGINIA

PREPARED FOR:

U.S. ARMY CORPS OF ENGINEERS
BALTIMORE DISTRICT
BALTIMORE, MARYLAND

AND

U.S. ARMY GARRISON
FORT EUSTIS, VIRGINIA

CONTRACT DACA31-00-D-0043
DELIVERY ORDER NO. 41

OCTOBER 2008

MALCOLM PIRNIE, INC.
701 Town Center Drive, Suite 600
Newport News, Virginia 23606

Page

LIST OF TABLES

LIST OF FIGURES

Figure No.	Description

This Decision Document (DD) has been modeled after the Environmental Protection Agency (EPA) Record of Decision format for CERCLA National Priorities List (NPL) sites. The EPA guidance document entitled *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, EPA 540-R-98-031, July 1999, has been utilized for preparation of this document.

1.1 SITE NAME AND LOCATION

This DD has been prepared for the Lighterage Amphibious Resupply Cargo (LARC) 60 Maintenance Area site (hereafter referred to as the LARC 60 site) at Fort Story, Virginia. The LARC 60 area, which is the maintenance and wash rack area for LARC 60 vehicles, is located in the sand flat area that lies between the coastal dune complex to the north and the central sand ridge to the south.

1.2 STATEMENT OF BASIS AND PURPOSE

This DD presents the Selected Remedy (Land Use Controls [LUCs] with Monitoring) for groundwater at the LARC 60 site on the U.S. Army installation designated as Fort Story, Virginia. The Selected Remedy (LUCs with Monitoring) was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The U.S. Army, as owner/operator and the “Lead Agency” (terms that are defined in the NCP) prepared this decision in consultation with the Virginia Department of Environmental Quality (VDEQ) as a ”Support Agency”. The Army selects the remedy in accordance with CERCLA in consultation with and concurrence by VDEQ.

1.3 ASSESSMENT OF THE SITE

The Lead Agency has determined that LUCs with Monitoring are necessary to protect public health and welfare or the environment because various volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals have previously been detected above either EPA Maximum Contaminant Levels (MCLs) or risk-based concentrations (RBCs) for tap water. The LUCs apply only to potential future groundwater use at the site as a drinking water source.

Two additional semiannual groundwater monitoring events involving the collection of samples from seven wells (MW-115 [upgradient well], MW-117, 6MW-3S, 6MW-5S, 6MW-7, 6MW-9, and 6MW-8 or 6MW-11) will be conducted to evaluate these contaminants in comparison to the MCLs. The upgradient well, MW-115, is included in the sampling program for continued

assessment of the area upgradient of the former source area to ensure that any additional contaminants detected in site wells are not related to an additional upgradient source. Additionally, every effort will be made during the sampling events to locate and sample well 6MW-8, which is located downgradient of the former VOC-impacted area of the site. If it is not located, well 6MW-11 will be sampled in its place. All VOCs and SVOCs were below the MCLs as noted in a May 2007 groundwater monitoring event.

1.4 DESCRIPTION OF SELECTED REMEDY

LUCs with Monitoring are necessary at the LARC 60 site because select VOCs, SVOCs, and metals have exceeded either EPA MCLs or EPA RBCs for tap water. However, based on the limited contamination detected at the site, the trends indicate that contaminants of concern (COCs) concentrations in groundwater are decreasing due to numerous fate mechanisms, and the results of the baseline risk assessment that did not identify receptors and potentially exposed populations.

Two additional semiannual groundwater monitoring events with analysis for VOCs, SVOCs, and metals (total and dissolved) will be conducted to assess whether COC concentrations are below MCLs. If a site-related MCL exceedence occurs during either of the two sampling events, then the Army will implement the contingency of conducting two additional annual rounds of groundwater monitoring after completion of the original two events to confirm that a site-related concern exists or that the exceedence was an anomalous event. If the monitoring events indicate that COC concentrations exceed MCLs and the concentrations are not simply an anomalous event, then a re-assessment of potential risks and remedies will be warranted which may include additional groundwater monitoring events.

1.5 STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with federal and state requirements that are applicable and appropriate to the remedial action, is cost-effective, uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and satisfies the preference for treatment as a principal element of the remedy.

Based on the conclusions (as stated in Section 1.3 above) of the revised risk assessment provided in the *Final Remedial Investigation (RI) Addendum Report*, dated September 2007, prepared by Malcolm Pirnie, Inc., LUCs with Monitoring are necessary to ensure protection of human health and the environment in case of future use of site groundwater as a drinking water source. If MCL exceedences are noted in the subsequent sampling events at the site, a five-year review will be warranted because of the presence of hazardous substances, pollutants, or

contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure. If no MCL exceedences are noted, a five-year review will not be required.

AUTHORIZING SIGNATURE

31 OCT 08

Andrew W. Bowes
Colonel, U.S. Army
Garrison Commander

Date

2.1 SITE NAME, LOCATION, AND DESCRIPTION

This Decision Document (DD) presents the U.S. Army's selected remedy (LUCs with Monitoring) for the LARC 60 site at Fort Story, Virginia. The site is known as Site 06 (FTSTY-06) – LARC 60 Maintenance Area. The Fort Story EPA ID Number is VA6210020875 and the RCRA EPA ID Number is VA1213720815. The Defense Environmental Restoration Account (DERA) is the source for investigation and cleanup funds for this site.

Fort Story is located in southeastern Virginia within the city of Virginia Beach, Virginia. Fort Story occupies an area of approximately 1,451 acres and is situated on Cape Henry which roughly divides the waters of the Chesapeake Bay to the north and the Atlantic Ocean to the east.

Fort Story currently trains Army personnel in amphibious and Logistics Over-the-Shore (LOTS) operations. Fort Story is the only available facility that has the necessary natural terrain features and beaches, sand, surf, variable tide conditions (bay and ocean) and hinterlands, all of which are normally experienced by amphibious and LOTS operations. In addition, Fort Story contains beach training areas, tactical training areas and a series of trails throughout the installation. The deep water ship anchorage, off-road driving areas and soil of sufficient bearing strength for the heavy vehicles are indispensable in amphibious training, LOTS training and the testing of new equipment, doctrines and techniques. From 1914 until the present, activities at Fort Story have included the following:

- Utilization as a coastal artillery garrison
- Headquarters of the Harbor Defense Command
- Location of a convalescent hospital during World War II
- Amphibious operations training facility

The LARC 60 site, which is the maintenance and wash rack area for LARC 60 vehicles, is located in the sand flat area that lies between the coastal dune complex to the north and the central sand ridge to the south. The LARC 60 site includes Buildings 1081, 1082, 1083 and 1088. During the 1950s, the wash rack area was first used as the barge amphibious resupply cargo (BARC) motor pool and maintenance facility. In 1964, the BARC vehicle was phased out and the LARC 60 vehicle was prototyped. Presently, Fort Story is the only base on the East Coast available to the Army Transportation Corps for amphibious training. In 1982, the LARC 60 facility was modified with the construction of a concrete wash rack pad. Approximately 39 catch basins are located throughout the LARC 60 site, which are used for collection of storm and wash water. Heavy equipment is currently stored awaiting maintenance and operated on the concrete wash rack and Sandbox Area. A former 10,000-gallon underground storage tank (UST) was located at the north gate of the LARC 60 vehicle motor pool approximately 600 feet south of the

wash rack area. This UST was installed in 1983 and used for storing used oil and degreasers. The LARC 60 site is presented on **Figure 2-1**.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

This section summarizes the site history and site investigations. No federal or state enforcement activities have been undertaken at this site.

2.2.1 Site History

A former 10,000-gallon UST was located at the north gate of the LARC 60 vehicle motor pool approximately 600 feet south of the wash rack area. This UST, installed in 1983, was used for storing used oil and degreasers. Although James M. Montgomery, Inc.'s (JMM) April 1990 field visits to this area identified soil-stained zones around the UST, there are no reports of tanks failing or leaking documented. These soil-stained areas may have been caused by overfilling or spillage during use. In 1987, the U.S. Army Environmental Hygiene Agency sampled the UST and found it contained oil, water, 1,1,1-trichloroethane and chromium. In September 1992, the Environmental Restoration Company (ERC) removed the waste oil UST and excavated petroleum-stained soils an additional three feet from the sides and bottom of the excavation. The specific volume of soils removed is not known.

2.2.2 Previous Investigations

A summary of previous investigations conducted at the site is provided below.

PREVIOUS INVESTIGATIONS		
Investigation	**Description**	**Results**
U.S. Army Environmental Hygiene Agency Risk Assessment (June1987)	Health risk assessment of soil contamination.	No unacceptable human health threat exists to workers at the site.
James M. Montgomery PA/SI (January 1992)	PA/SI conducted to determine presence of contamination at site.	Total petroleum hydrocarbons (TPH) and metals detected in soils. TPH and VOCs detected in groundwater.
ERC Initial Abatement (September 1992)	UST Initial Abatement Measures Report prepared for UST and soils removal	10,000 gallon UST and associated petroleum-stained soils removed from excavation.
IT Corporation Removal Action (November 1994)	Removal action conducted to remediate soils.	Treated TPH contaminated soils on site via bioremediation.

PREVIOUS INVESTIGATIONS		
Investigation	**Description**	**Results**
Environmental Technology UST Investigation (February 1995)	UST investigation with soil and groundwater samples collected.	Numerous VOCs and TPH were detected in groundwater.
Earth Technology Soil Sampling Event (April 1995)	Collection of additional soils data in the former UST excavation area.	PID results indicated that petroleum contamination was present in the soil zone above the water table but below the former excavation depth.
Malcolm Pirnie Remedial Investigation (2002)	Performance of an RI including the collection of soil, groundwater, sediment, and surface water samples	Numerous VOCs, SVOCs, and metals detected in site media.
Malcolm Pirnie Groundwater Pilot Scale Study (2004)	Injection of sodium permanganate in the former source area to evaluate the effectiveness of destruction of groundwater contaminants	VOC and SVOC concentrations decreased in the injection area
Malcolm Pirnie RI Addendum (September 2007)	Re-evaluation of risk based on additional data collected in May 2007	All groundwater contaminants were detected below EPA drinking water standards and no human health or ecological risk identified

U.S. Army Environmental Hygiene Agency Risk Assessment

The U.S. Army Environmental Hygiene Agency (USAEHA) conducted a Health Risk Assessment in June 1987 at the LARC 60 Maintenance Area to determine if an unacceptable health threat exists to workers at the site. USAEHA detected grease, oil, lead and chromium in soil north of the wash rack (Sandbox Area). For the contaminants, the excess, upper bound, lifetime cancer risk estimate calculated was within the range considered acceptable to the EPA. In addition, the hazard index derived was less than one, indicating that non-carcinogenic health effects would not be expected. Based on the quantitative risk assessment, USAEHA concluded that an unacceptable human health threat does not exist to workers at the site.

James M. Montgomery, Inc. (JMM) Preliminary Assessment/Site Investigation

Preliminary Assessment/Site Investigation (PA/SI) activities were conducted in 1991 and 1992 by James M. Montgomery, Inc. (JMM, 1992). JMM conducted the PA/SI to determine the presence of significant contamination at eight sites including the LARC 60 Maintenance Area.

At the facility, several analytes were detected in the soil at levels above the trigger levels (i.e., Virginia UST standards for TPH, Toxic Substance Control Act [TSCA] standards for polychlorinated biphenyls [PCBs], and background concentrations for all other contaminants). The site has two main areas of possible environmental concern: the wash rack area, which has an oil/water separator (OWS), and the former UST area. Total fuel hydrocarbons, copper, zinc, and lead were detected above trigger levels at the site.

As with soil samples, numerous analytes were detected in groundwater above trigger levels at the wash rack and UST areas. Benzene, vinyl chloride, total fuel hydrocarbons, and 1,1-DCE were detected above trigger levels. A Remedial Investigation/Feasibility Study (RI/FS) was recommended at the LARC 60 Maintenance Area and three other sites.

ERC Initial Abatement Measures Study

On September 28, 1992, ERC removed one 10,000 gallon UST that contained used oil from Building 1081. Based on the report, the removal of the UST resulted in an excavation depth of approximately 12.5 feet below land surface (BLS). The initial excavation was reported to be to a depth of 9.5 feet BLS with an additional three feet of petroleum-contaminated soil removed from the sides and bottom of the excavation. According to the report, the stained soils were placed back into the excavation.

Three grab samples were collected by ERC personnel from the bottom of the excavation while one composite soil sample was collected from the staged soils. These soil samples were analyzed for total petroleum hydrocarbons (TPH) by EPA Method 418.1. TPH concentrations in the samples from the bottom of the excavation ranged from 36,353 to 62,823 milligrams per kilogram (mg/kg) while the composite samples from the staged soil pile had a TPH concentration of 12,173 mg/kg.

IT Corporation Removal Action

IT Corporation (IT, 1994) conducted several rapid response removal actions at Fort Story in 1994, including the LARC 60 Maintenance Area. IT Corporation reported that the following activities were performed at the site:

- Disposal off-site of two piles of soil believed to contain F-listed solvents.
- Designed and installed an in-situ bioremediation system for the treatment of TPH-contaminated soils.
- Excavated and treated approximately 14,600 cubic yards of soil within the LARC 60

Sandbox Area to a TPH level of less than 50 parts per million (ppm). The soils were transferred to the bioremediation system for treatment.

- Placed remediated soils back in the excavated area. However, due to the presence of heavy oils and greases in the soils, the 50 ppm treatment goal could not be reached with the bioremediation process. TPH concentrations remaining in treated soils ranged from non-detect to 4,800 ppm with an average concentration of 229 ppm (by Method 8015) and 751 ppm (by USEPA Method 418.1) remaining in soils.

Environmental Technology of North America, Inc., UST Investigation

In February 1995, Environmental Technology of North America, Inc. (ETI) through a USACE, Norfolk District contract, collected soil and groundwater samples by direct push technology (DPT) from the former UST pit at the southern end of the site to determine groundwater quality in that location. TPH, toluene, ethylbenzene and xylene were detected in soils from the pit and from stockpiled soils. Numerous chlorinated organics were detected in the groundwater sample including TPH (180 mg/l), tetrachloroethene (2,700 micrograms per liter (µg/l)), trichloroethene (8,800 µg/l), and cis 1,2-dichloroethene (5,200 µg/l).

Earth Technology Soil Sampling Event

Based on continuing issues with the data provided in the ERC Initial Abatement Measures study report, the VDEQ requested additional information and clarification. The ERC report indicated that an excavation 9.5 feet BLS was observed after the tank removal followed by an additional three feet of petroleum-stained soils removed from the bottom and the sides of the excavation. According to ERC's report, the excavation was then backfilled with the contaminated soil. Based on this information, the VDEQ requested sampling of the backfill soils. Upon mobilization to the site and performance of the field activities, Earth Tech made the following observations:

- The excavated pit had been backfilled with clean sand, lithologically different from the native material.

- The depth of the excavation did not extend beyond 9.5 feet BLS.

- Soil from the original excavation activities were stockpiled adjacent to the excavation and not placed back into the excavation.

In April 1985, Earth Tech collected soil samples from the backfill material and the native soils underlying the backfilled soils. Field observations of the underlying soil material indicated higher photoionization detector (PID) readings than those in the backfill material, but showed no

evidence of fuel-saturated soils or free product. Based on the data collection effort, no additional excavation of material was warranted from the former UST excavation area.

Malcolm Pirnie Remedial Investigation

Malcolm Pirnie completed a RI in 2002 with submission of the Final RI report in December 2002. A summary of the nature and extent of contaminant and the risk assessment will be presented in Section 2.5 and Section 2.7, respectively.

Malcolm Pirnie Groundwater Pilot Scale Study

Malcolm Pirnie contracted with In-Situ Oxidative Technologies, Inc. (ISOTEC) to perform sodium permanganate ($NaMnO_4$) injections throughout the course of the Pilot Study. Liquid concentrate was used for both injection events at the site. ISOTEC used a recirculating mixer assembly to mix the $NaMnO_4$ with potable water obtained from a nearby fire hydrant. One hundred and ten pounds (lbs) (approximate 1% solution) of $NaMnO_4$ solution per point for both injection events was planned. However, due to the need for a higher dose for the second event (based on groundwater data after the 1st injection, which indicated that the initial injection with a lower dose was not adequate to reduce the VOC concentrations), approximately 550 lbs (8% solution) per point was injected during the 2nd event.

The zone of treatment included an interval from 10 feet to 30 feet below land surface (bls) with the groundwater table present at a depth of approximately 10 feet bls. Five injection points located upgradient of monitoring well MW-117 (well with highest contaminant concentrations on-site) were utilized for delivery of the permanganate. Based on the thickness of the treatment zone (20 feet), each injection point was divided into five 4-foot intervals (10 to 14 feet bls, 14 to 18 feet bls, 18 to 22 feet bls, 22 to 26 feet bls, and 26 to 30 feet bls), with each interval receiving permanganate. The study consisted of the injection of approximately 85 gallons of reagents into each injection point interval. Oxidants were delivered into the subsurface under a constant low-pressure (20 to 30 psi) system in an effort to distribute materials in a homogeneous fashion through the injection interval. A flow rate of 4 to 5 gallons per minute was utilized for delivery of the oxidant into the subsurface.

During the 1st injection event of the Pilot Study, approximately 2,125 gallons of a 1% solution of $NaMnO_4$ were injected at five injection points (425 gallons per point) on August 12 and 13, 2003. A volume of 2,125 gallons of the 1% $NaMnO_4$ solution equals approximately 550 lbs of permanganate delivered to the subsurface during the 1st injection event. The zone of treatment for the 2nd injection event was the same as the zone described for the 1st injection event. The 2nd injection event consisted of the injection of approximately 55 gallons of reagents into each injection point interval. During the 2nd injection event of the Pilot Study, approximately 1,375 gallons of an 8% solution of $NaMnO_4$ were injected at five injection points (275 gallons per point)

on May 13, 2004. The volume of 1,375 gallons of the 8% $NaMnO_4$ solution equals approximately 2,750 lbs of permanganate delivered to the subsurface during the 2nd injection event.

Details of the Groundwater Pilot Scale Study can be found in the RI Addendum, dated September 2007.

Malcolm Pirnie RI Addendum

To address a revised risk assessment and to summarize groundwater monitoring data collected in May 2007, Malcolm Pirnie completed a RI Addendum in September 2007. A summary of the groundwater results and the revised risk assessment conclusions are presented in Section 2.5 and Section 2.7, respectively.

2.3 COMMUNITY PARTICIPATION

The Malcolm Pirnie Final Remedial Investigation (RI) report (dated December 2002), Final RI Addendum Report (dated September 2007), Proposed Plan (dated September 2007), and this Decision Document for the LARC 60 site at Fort Story, Virginia are available to the public at the Fort Eustis Environmental and Natural Resource Division office, the Fort Story Library, and the City of Virginia Beach Oceanfront Area Library.

The National Contingency Plan (NCP) requires public participation in the selection of a remedy for a site. The notice for public comment to the Proposed Plan was placed in the Virginia Pilot on September 7, 2007 and in The Wheel on September 13, 2007 with the 30-day public comment period ending on October 7, 2007. A public meeting was held at the Virginia Beach Oceanfront Area Library on September 24, 2007.

2.4 SCOPE AND ROLE OF RESPONSE ACTION

Except for two additional groundwater monitoring events to confirm that residual contaminant concentrations remain below EPA MCLs, no additional response action is warranted at this site.

However, if (as a result of either of the two rounds of sampling) a site-related COC MCL exceedence occurs, then the Army will implement the contingency of conducting two additional rounds of groundwater sampling (beyond the two already agreed upon) to confirm that a site-related concern exists or that the exceedence was an anomalous event. If it is a site-related concern, then the Army will reevaluate appropriate response actions.

2.5 SITE CHARACTERISTICS

The following section provides an overview of the site's physical characteristics, such as geology, and describes the nature and extent of site contamination.

2.5.1 Physical Site Characteristics

Surface Topography and Hydrology

The LARC 60 site is located in the sand flat area that lies between the coastal dune complex to the north and the central sand ridge to the south. The majority of the site is a paved maintenance area with no significant topographic relief. Surface runoff and wash water from the majority of the site is controlled by a storm drain system. A system of 39 catch basins and an oil/water separator is used to collect storm and wash water from the site. The water flows into a drainage outfall line and then into the Chesapeake Bay at Outfall 001. This point is monitored through a National Pollution Discharge Elimination System (NPDES) permit by the Virginia Department of Environmental Quality (DEQ), Water Division. Surface runoff from the Sandbox Area drains into a drainage ditch located along the northern boundary of the Sandbox Area. The ditch is a storm water collection area with no discharge point.

Geology and Hydrogeology

The site lithology was established based on borings conducted during the PA/SI and RI field activities. Borehole logs provided lithologic data for five permanent monitoring wells and two piezocone borings from the current investigation. The sediments underlying the LARC area consist of sand deposits of the Kennon and Columbia Group that are of Holocene and Pleistocene Age respectfully. Drilling penetrated the upper forty feet of sediments and these were described with respect to lithology and sedimentary features by the site geologist. The following table provides a summary of the lithologic units:

DEPTH (BLS)	USCS SOIL TYPE	DESCRIPTION
0 – 2	SP	Asphalt. Fine sand, well sorted, with heavy minerals, moderately sorted.
2 – 18	SM	Medium to fine sand, with heavy minerals, moderately sorted.
18 – 35	SW	Coarse to medium sand, subrounded, with lenses of gravel and medium sand of heavy minerals; with layers of fine to medium sand and sand of heavy minerals.

DEPTH (BLS)	USCS SOIL TYPE	DESCRIPTION
35 – 46	SC	Fine sand, with heavy minerals, with lenses of cohesive, plastic clay.

The measured depth to groundwater at the site ranged from 2.80 to 9.91 feet BLS. Water level data from on-site wells indicates that the water table elevation ranges from approximately 4.81 to 6.33 National Geodetic Vertical Datum (NGVD). Though locally variable in magnitude and direction, the prevailing hydraulic gradient for the site is in a northward direction toward the coastline as presented on **Figure 2-2**. Estimated hydraulic conductivity values range from 1.99 x 10^{-3} to 1.84 x 10^{-2} centimeters per second (cm/sec) with an average value of 7.42 x 10^{-2} cm/sec as established by the PA/SI.

To evaluate possible tidal influence on water table elevations, water levels for monitoring wells 6MW-3S, 6MW-4, and MW-118 were recorded by a data logger from May 17 through May 19, 1995. No measurable amount of precipitation was recorded by the rain gauge, though the inside of the gauge was moist. Over the test period, groundwater levels varied no more than 0.19 feet. Data indicate a generally lowering water table, but do not indicate any trends in groundwater elevation that are attributable to tidal influence.

Archaeological and Historical Information

In April 2003, the Secretary of the Interior determined that Fort Story was a historic district based on the installation's Cold War and World War II significance. All structures built prior to 1978 and associated archaeological deposits are components of this district.

2.5.2 Remedial Investigation Sampling Activities

The following sections outline the specific RI field activities performed at the LARC 60 site at Fort Story. Initial specific activities, which were conducted in February and April 1995, were based on the Scopes of Services for the project dated 17 August 1994. Additional groundwater samples were collected in 2003, 2004, and 2007 for additional site characterization and evaluation of the performance of the Groundwater Pilot Scale Study conducted in 2004.

2.5.3 Nature and Extent of Contamination

Analytical data for the field investigations are presented in **Tables 2-1 through 2-7**.

Soil

A summary of the nature and extent of soil contamination is provided as follows:

Former UST Area

- Acetone, tetrachloroethene (PCE), and toluene were detected in several surface and subsurface soil samples collected in the Former UST Area of the site. Concentrations of the VOCs varied from surface to deeper depths with no apparent trends. The lateral extent of surficial VOC contamination is limited to a relatively small area around the former UST excavation.

- TPH as Heavy Oils was detected in two surface soil samples collected in the vicinity of the former UST pit. The presence of TPH in the surface soils and not in the subsurface soils in the vicinity of the UST pit is probably due to transport of sediment from the soil pile or from the deposition of some TPH-contaminated soil in this area during excavation activities. The lateral extent of surficial contamination is limited to a small area around the former UST excavation.

- Numerous metals were detected in soils in this area with concentrations typically decreased with depth. The lateral extent of metal contamination was not defined, however, metal concentrations, except for arsenic at SB-01, and was at least one order of magnitude lower than the EPA screening criteria.

OWS Area

- Acetone, methylene chloride, methyl ethyl ketone (MEK), and toluene were detected in several surface and subsurface soil samples collected in the OWS area of the site. PCE and trichloroethene (TCE) were only detected in one soil boring located in the concrete pad near the Sandbox Area.

- TPH as Heavy Oils was detected in the majority of surface and subsurface soil samples collected in this area. TPH concentrations decreased with depth in all borings sampled in the OWS Area. TPH as Heavy Oils was also detected at three sample depths in soil boring #4 which is located upgradient of the OWS. The source of the TPH in this area is unknown.

- Various metals were detected in at least one of the four samples collected from the two borings. Metal concentrations typically decreased with depth. The lateral extent of metal contamination was not defined. Their concentrations were lower than the risk screening criteria.

Sandbox Area

- Methylene chloride, MEK, styrene, PCE, toluene and TCE were detected in numerous surface and subsurface soil samples collected in and downgradient of the Sandbox Area. Concentrations of the VOCs varied from surface to deeper depths with no apparent trends. No patterns were indicated in the lateral distribution of VOCs within the Sandbox Area.

- Numerous metals were detected in soil samples collected. However, their concentrations were at least one order of magnitude lower than the EPA screening criteria.

- TPH as Heavy Oils was detected in the majority of surface and subsurface soil samples collected in this area. The source of the TPH in this area is probably from past wash rack, operations and maintenance activities in this area and from current LARC vehicle operation and storage activities (i.e., leaks from heavy equipment).

- Numerous metals were detected in soil samples collected. However, except for arsenic at SB-20, their concentrations were at least one order of magnitude lower than the EPA screening criteria.

- The bioremediation activities conducted by IT Corporation in 1994 significantly reduced the concentration of TPH in the Sandbox Area soils especially the lighter end hydrocarbons and probably PAH compounds typically associated with petroleum products, however, as confirmed during IT's post-remediation sampling, TPH as Heavy Oils is still present in the majority of the soils within the Sandbox Area with concentrations ranging from 77 to 1,500 *mg/kg*. However, only low concentrations of VOCs and no PAHs were detected in surface and subsurface soils in the Sandbox Area indicating that the bioremediation was effective in reducing or eliminating the source of the hazardous constituents typically associated with petroleum hydrocarbons.

Exceedences of the EPA screening criteria for the site soils are presented on **Figure 2-3**.

Groundwater

A summary of the nature and extent of groundwater contamination is provided as follows:

Former UST Area

- Numerous sampling locations within and downgradient of the former UST contained TPH, BTEX, PCE and/or one or more of its degradation products (TCE and cis 1,2-DCE).

- Based on the assumption that the former UST was the source of the release, the lateral distribution of these contaminants implies these compounds have migrated with groundwater from the former UST location downgradient to the northeast with the leading

edge located at DPT #11 and trailing edge at the former UST pit.

- No FFP was detected in the groundwater in the Former UST Area.

- The vertical extent of contamination was delineated through the collection of samples from one deep DPT point (DPT #17) and several deep wells (6MW-3D and 6MW-2 which are screened from 30 to 40 feet below grade. The vertical extent of contamination is limited to above 39.5 feet below grade.

- The concentration for total and dissolved arsenic, iron, and manganese exceeded the EPA RBCs for tap water at Well MW-117. No other sampling locations in the Former UST Area detected concentrations of total or dissolved metals above the screening criteria.

OWS Area

- Although detected in total samples in 1995, dissolved arsenic was not detected which indicates that arsenic is associated with the sediment in the groundwater sample. Neither total nor dissolved arsenic was detected in 6MW-3S from the 2000 sampling event.

- Various total and dissolved metals including antimony, iron, and manganese were detected throughout the OWS area above the EPA RBCs for tap water.

Sandbox Area

- Total aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, vanadium, and zinc were detected in DPT samples in the Sandbox area at concentrations greater than EPA RBCs for tap water. Since no dissolved metals analysis is available for these two locations, no conclusions can be made with regard to whether the detected concentrations are associated with sediments in the groundwater sample or in a dissolved state in groundwater. All concentrations of total and dissolved metals were from two locations; therefore, no trends could be discerned with respect to vertical and lateral distribution.

Site Wide Assessment

Groundwater samples have been collected from monitoring wells across the site in numerous monitoring events since 1995. The locations of these wells are presented on **Figure 2-2**. As shown in **Table 2-7**, numerous VOCs, as well as two PAHs (naphthalene and 2-methylnaphthalene), have been detected in wells at the site over the 12-year monitoring period. However, historically VOCs have only exceeded the MCL (or RBC when an MCL was not available) in four wells (MW-117, 6MW-3S, 6MW-7, and 6MW-9) at the site. It should be noted that the 2003 6MW-9 exceedence (1 µg/L for 1,4-dichlorobenzene) appears to be the result of

cross-contamination since it also was detected in the associated method blank for that sample. Additionally, dissolved arsenic exceeded the MCL during the 1995 RI field investigation in only one well, MW-117. A summary of the MCL exceedences by sampling event is presented in the following table:

Compound	MCL Exceedences by Sampling Event				
	1995	**2000**	**2003**	**2004**	**2007**
Arsenic	MW-117: 14 µg/L	Not sampled (NS)	NS	NS	NS
Cis 1,2-DCE		MW-117: 1,900 µg/L		6MW-3S: 100 µg/L	None
PCE	MW-117: 8.5 µg/L		6MW-7: 11 µg/L	6MW-3S: 62 µg/L	None
TCE	MW-117: 18 µg/L			6MW-3S: 140 µg/L	None
Vinyl chloride		MW-117: 8.6 µg/L 6MW-3S: 3.1 µg/L		6MW-3S: 9.7 µg/L	None

The effects of the sodium permanganate injections on groundwater quality in the former source area is evident by the continued decrease in VOC concentrations in MW-117, which is located directly downgradient of the former source area where the injections took place. It should be noted that there was a downward trend in VOC concentrations in MW-117 prior to the injections as noted in the 2003 groundwater data from MW-117. From the 1995 to 2000 to 2003 monitoring events, concentrations of cis 1,2-DCE, ethylbenzene, PCE, toluene, TCE, xylenes and vinyl chloride decreased. The post-injection data for MW-117 (2004 to 2007) suggests a continued downward trend with cis 1,2-DCE concentrations decreasing from 24 to 2 µg/L, PCE from 0.67 µg/L to non-detect, and xylenes from 65 to 13 µg/L.

Historically, the most impacted downgradient well has been 6MW-3S with cis 1,2-DCE, PCE, TCE, and vinyl chloride exceeding the MCLs in the 2004 monitoring data. Although still detected in 2007, none of these compounds exceed their respective MCL. Monitoring well 6MW-9 is located directly downgradient of 6MW-3S but none of these compounds were detected in 2007.

Due to the noted presence of naphthalene and 2-methylnaphthalene above the EPA RBCs for tap water during the RI sampling event, PAHs were analyzed as well during the May 2007 monitoring event. Naphthalene and 2-methylnaphthalene were only detected in one well (MW-117) during this monitoring event at concentrations of 5.1 and 5.3 µg/L, respectively. Although no EPA MCL has been established for these two compounds, their concentrations are below the EPA RBCs for tap water of 24 µg/L for 2-methylnaphthalene and 6.5 µg/L for naphthalene. The naphthalene detect of 5.3 µg/L is also less than the EPA lifetime health advisory of 100 µg/L. No such advisory has been established for 2-methylnaphthalene.

There are several reasons for the decreasing trends downgradient including: (1) impact of the sodium permanganate injections upgradient have greatly decreased the concentrations of these VOCs at the source area thereby reducing the mass of VOCs present that can continually leach

into groundwater or be transported downgradient, (2) with the reduction of source mass concentrations, infiltration which is high because of the sandy soils and shallow groundwater present reduces concentrations throughout the site, and (3) albeit slow because of the relatively flat groundwater gradient, dispersion of contaminants will have somewhat of an affect on VOC concentrations.

Sediment

A summary of the nature and extent of sediment contamination is provided as follows:

- TPH as Heavy Oils is present in the ditch north of the Sandbox Area due to surface transport of soil from the Sandbox Area during heavy precipitation events. Due to stagnant conditions, an accumulation of TPH-contaminated sediment occurs in the ditch with no transport occurring.

- Metals are present in sediment in the ditch but as previously discussed, with concentrations lower than EPA screening criteria.

Exceedences of the EPA screening criteria for the site sediment from the drainage ditch north of the Sandbox Area are presented on **Figure 2-3**.

Surface Water

A summary of the nature and extent of surface water contamination is provided as follows:

- Based on vertical elevations established for the two surface water locations in the ditch, the ditch intersects the shallow water table. The elevations were consistent with the groundwater elevations in that area.

- During dry weather conditions, the water (if any) present in the drainage ditch will be groundwater that has seeped into the ditch. Surface water results were also consistent with contaminant concentrations detected in DPT points in the Sandbox Area and in monitoring well 6MW-3S. Acetone and total metals are present in the ditch but, as previously discussed, with the exception of manganese which was greater than the EPA RBC for tap water, with concentrations lower than EPA screening criteria.

Exceedences of the EPA screening criteria for the site surface water from the drainage ditch north of the Sandbox Area are presented on **Figure 2-3**.

2.5.4 Fate and Transport of Contaminants

A summary of the fate and transport for compounds at the LARC 60 site is provided below:

- The chlorinated hydrocarbons detected in groundwater are believed to be also associated with a release from the former UST as confirmed by groundwater sampling in February 1995 by Environmental Technology and Malcolm Pirnie during the current investigation.

- TPH as Heavy Oils would be expected to be transported along with the soil/sediment to which it is adsorbed. This is probably occurring as storm runoff as well as by runoff during equipment maintenance activities at the wash rack immediately north of the oil/water separator.

- No groundwater samples contained TPH as Heavy Oils as expected since the aqueous solubility of the compound is very low and concentrations in soils were not significant.

- The presence of TPH - Light Ends and chlorinated hydrocarbons in groundwater underlying the oil/water separator and Sandbox Areas is most likely the result of migration of these compounds from the former UST area.

- As presented in the previous section, due to natural processes and the sodium permanganate injection pilot scale study, VOC and SVOC concentrations have continued to decrease at the site with current concentrations ranging from non-detect to less than EPA drinking water standards.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

This section provides a characterization of current and future site uses, and identifies the potentially exposed populations at or near the site with regard to the current situation and potential future conditions.

Current Situation

The site is currently used as an equipment maintenance area. Because the site is fenced and locked after 5 p.m. daily, potential exposures to the general public and/or trespassers would not be significant because their presence on the site would be expected to be for only a short time, and not routine. Additionally, site soil concentrations did not exceed industrial soil RBC standards, which are the current use for the site.

Groundwater is not used in the vicinity of the site for drinking, process, or production purposes. The chief potable water supply in the region is the surface water reservoir system operated by the City of Norfolk. The system includes in-town lakes located near the Norfolk International Airport and other reservoirs (Lake Prince, Western Branch and Burnt Mills) located in Suffolk, Virginia. The in-town lakes are located over 5 miles from Fort Story while the Suffolk lakes are located over 20 miles from the facility. Several housing communities located within 1 mile of

Fort Story are developing drinking water wells in the shallow aquifer; however, none of these communities are located downgradient of the site. Migration potential is minimal due to the very low vertical gradient present across the site. VOC concentrations have decreased substantially due to numerous natural subsurface mechanisms such as biodegradation, volatilization, and dispersion and implementation of the Groundwater Pilot Scale Study, which injected sodium permanganate into the former source area. Therefore, exposures to groundwater, under current conditions will not exceed regulatory standards since there are no current uses of the groundwater and that MCLs were not exceeded in the last groundwater monitoring event conducted in May 2007.

Future Land Use

Although construction or excavation activities could be conducted in the future, neither surface nor subsurface soil contaminant concentrations exceeded industrial screening criteria. Therefore, no significant exposures during these activities would be expected because these activities are typically very short term and contaminant concentrations were below screening criteria.

Based on master planning issues for Fort Story which does not include base closure (most recent Base Realignment and Closure (BRAC) did not include Fort Story as a potential candidate), as well as its unique location and subsequent training environs, the facility is expected to remain government property. The potential for future development of the land as commercial, residential, or recreational properties is not expected as the installation will remain open and the area will continued to be identified as industrial usage; therefore, the future land use will be the same as the current land use. If land use conditions change in the future, possible exposure scenarios (e.g., residential exposure to groundwater if residential development was planned) will be re-evaluated. This conclusion is a revision from the text provided in the baseline human health risk assessment presented in the Final RI Report for the site. Based on guidance provided by the U.S. Army Environmental Command (USAEC), unless residential development is expected or planned in the future for an installation, the residential land use scenario will not be evaluated for future land use conditions.

2.7 SUMMARY OF SITE RISKS

Human Health Risk Assessment

Identification of Chemicals of Potential Concern (COPCs)

As shown in **Tables 2-8 through 2-12**, COPCs identified during the hazard identification of the LARC 60 site media because of their exceedences of EPA screening criteria (e.g., MCLs or RBCs) include the following:

Media	*COPC*
Surface and Subsurface Soils	Arsenic
Groundwater	cis 1,2-DCE, MIBK, toluene, vinyl chloride, 2-methylnaphthalene, naphthalene, antimony, arsenic, iron, and manganese
Surface Water	Iron and manganese

Exposure Assessment

This section describes the complete exposure pathways by which the potential receptors may be exposed to the COPCs in the soil, surface water, and groundwater via a specific exposure route.

Because no contaminants in soils or sediment exceeded EPA RBCs for industrial soils, and because groundwater is not utilized at the site, no risk-based limits would be exceeded for the current situation.

In the original RI Report, the potential exposure pathways for future land use at the LARC 60 site included:

- Residential exposure (adults and children) to **contaminated groundwater** through ingestion of drinking water, dermal contact with and inhalation of volatilized chemicals while bathing or showering.

- Residential exposure (adults and children) to **contaminated soil** through ingestion of and dermal contact with chemicals.

Unless residential development is expected or planned in the future for an installation, the residential land use scenario will not be evaluated for future land use conditions; therefore, there is no potential identified human health risk for the current or anticipated future land use at the site. It should also be noted that groundwater contaminant (VOCs and SVOCs) concentrations, based on the May 2007 monitoring event, are below the EPA drinking water standards.

Although initially identified as the only COPC in soil due to its exceedence of the residential soil RBC value, arsenic was detected in site soils at concentrations consistent with the background soils; therefore, the risk associated with it is not related to site-specific activities such as spills, leaks, or industrial activities; therefore, no land use issues (industrial or residential) as they relate to human health risk would be associated with site soils.

Ecological Risk Assessment (ERA)

Identification of COPCs

This section presents lists of chemicals detected in the site surface soil and sediment samples that are considered COPCs. Groundwater was not addressed in this assessment, as it does not have a complete exposure pathway at the site. The compounds identified as COPCs are considered to be those with the greatest potential significance to aquatic and wildlife receptors.

Soil

Table 2-13 presents a comparison of soils data to EPA screening criteria. Acetone was detected in one sample and lacked screening criteria; however, due to the low frequency and the low level at which it was detected, it was not considered to be of concern. Total TPH was detected in 19 of the 22 samples. These samples were taken from the former UST area, the wash rack, the Sandbox Area and the adjacent wooded area. However, no PAHs were measured above detection limits. Total TPH was not retained as a COPC, since the more toxic components of TPH were not detected.

Several metals were detected with high frequency at concentrations that exceeded EPA Region III BTAG screening criteria. Chromium, iron, and lead concentrations exceeded screening criteria. In addition, aluminum, arsenic, copper, and zinc lacked faunal screening criteria. Of these compounds, aluminum, arsenic, iron and vanadium concentrations fell within site specific and USGS regional background concentrations; therefore, these compounds were not considered to be potentially of concern. Chromium, lead, and zinc concentrations fell within regional background but exceeded measured site-specific concentrations; therefore, these compounds were retained as COPCs for surface soils. Copper concentrations exceeded both site-specific and regional background concentrations and were retained as a COPC.

Sediment

Table 2-14 presents a comparison of sediment data to EPA screening criteria. A total of 2 sediment samples were taken from the small drainage ditch adjacent to the site and analyzed for VOCs, SVOCs, TPH and metal concentrations. VOC and SVOCs were not detected in the samples. Total TPH was detected in both samples. Because PAHs were not detected in the samples, TPH was not considered to be of potential concern. No metals detected exceeded EPA Region III BTAG screening criteria. Several metals detected lacked screening criteria. No background values were available for sediment. All contaminants that lacked screening criteria were retained as COPCs.

Surface Water

Table 2-15 presents a comparison of surface water data to EPA screening criteria. Two surface water samples were taken from the adjacent drainage ditch. Acetone was detected in both samples at levels below screening criteria. SVOCs and TPHs were not detected in either sample. No metals were detected at levels that exceeded available screening criteria. Calcium, magnesium, manganese, potassium, and sodium do not have screening criteria. These constituents are naturally occurring in water and were found at low levels in the samples taken; therefore, they were not considered to be of concern. No COPCs were selected for surface water at the LARC 60 Site.

COPC Summary

The COPCs for the LARC 60 site include the following:

- **Surface Soil** - chromium, copper, lead, and zinc
- **Sediment** - aluminum, barium, iron, manganese, and vanadium
- **Surface Water** - none

Exposure Assessment

The following summarizes the ecological setting, target receptors, and potential exposure pathways.

Ecological Setting and Species Summary

Following is a brief description of the habitat requirements and diet of the terrestrial endpoint species selected for the LARC 60 site. In addition, the reasons for selection of these species are discussed.

- **Herbaceous Vegetation.** Plants that occur in pine/oak woodland and disturbed areas of the northeastern United States are likely to occur at the Site. These plants include herbaceous species that serve as an important food source for songbirds, small mammals, and larger herbivores. The measurement endpoints for terrestrial vegetation are published phytotoxicity reference values for each contaminant.

- **Soil/Sediment Invertebrates.** Invertebrates that are common in sandy soils in Southeastern Virginia are likely to occur within and adjacent to the site. In addition, sediment invertebrates that favor intermittent streams and pools or damp soils are likely to occur within the drainage area adjacent to the site. These invertebrates are an important food source for ground gleaning birds and small mammals. The measurement

endpoints for soil/sediment invertebrates are published toxicity reference values for each contaminant.

- **White-footed Mouse**. This common small mammal occurs throughout Virginia and occupies home ranges from 0.054 to 0.072 hectares. It is found in a variety of habitats including interiors and edges of deciduous and coniferous forests, scrub areas, clearings, pastures, stream-side thickets, and buildings. The White-footed Mouse consumes arthropods, seeds, and other vegetation. It is active throughout the year and usually nests off the ground.

  The White-footed Mouse has been selected to represent the small mammal community at the LARC 60 site. As a receptor with an omnivorous diet, the mouse is representative of herbivorous and insectivorous small mammals present within the boundaries of the site. Due to the scarcity of vegetation on the site itself, larger herbivores such as rabbits are unlikely to make significant use of the area.

  Measurement endpoints for the White-footed Mouse are derived from rodent toxicity data taken from published dose-response studies that relate contaminant exposure or uptake to effects on individual organisms.

- **Northern Bobwhite (*Coilnus virginianus*).** Bobwhite Quail are ground-dwelling birds that occupy a number of habitats in Virginia. They are poor fliers, seldom leave the ground and do not migrate. Their range may encompass several hectares and they prefer grasslands, idle fields and pastures during breeding season while concentrating in wooded areas with an understory adjacent to open fields during winter seasons. Bobwhites forage in areas with open vegetation, some bare ground and light litter. Nearby dry powdery soils are important for dust bathing. Seeds from weeds, woody plants, insects and invertebrates and grasses comprise the majority of the bobwhite's diet throughout the year. In the winter, green vegetation can dominate the diet. Quail consume little grit.

  The Northern Bobwhite was selected to represent the ground-gleaning avian community at the site. Their habit of dustbathing makes them a more likely candidate for exposure to contaminants in the Sandbox Area, in addition to exposure realized through habits such as foraging and nesting.

  Measurement endpoints for the Northern Bobwhite are derived from avian toxicity data taken from published dose-response studies that relate contaminant exposure or uptake to effects on individual organisms.

- **Gray Fox (*Urocyon cinereoargenteus*).** Gray Foxes are present throughout the United States, except in the northwest and northern prairies. Foxes are secretive and nocturnal, and will often climb trees to evade predators. Gray foxes prey on small mammals but will also eat insects, fruits, acorns, birds, and eggs. The home range of this species varies from 57 and 855 hectares (USEPA, 1993). This species is similar in size and habits of the Red Fox (*Vulpes vulpes*). The Gray Fox has been selected to represent the terrestrial carnivore community at the Site. Although the Merlin and Red-tailed Hawk may also represent other potential endpoint species in the carnivore category, their home ranges are typically much larger than that of the fox, and their use of the LARC 60 site is likely to be restricted.

  Measurement endpoints for the fox are derived from mammalian toxicity data taken from published dose-response studies that relate contaminant exposure or uptake to effects on individual organisms.

Exposure Pathways

Several ecologically relevant migration pathways for contaminants exist at the site. Wildlife may have incidental contact with or ingestion of contaminants while foraging, nesting, or engaging in other activities in the site. Chemical contaminants can also adversely affect plants and animals in surrounding habitats via the food chain.

Upon their release, some site contaminants are persistent and may be transformed to more bioavailable forms and mobilized in the food chain. Mobilization of contaminants in the terrestrial food chain could occur through the following pathways:

- Root uptake from contaminated soil by herbaceous plants,
- Bioaccumulation from vegetation or animal prey at the base of the food chain by wildlife.
- Contact and absorption, incidental ingestion, and feeding on contaminated food by invertebrates, and
- Drinking of contaminated surface water by wildlife

Based on these pathways, the following general classes of ecological receptors potentially might be exposed to contaminants at the LARC 60 site.

- Terrestrial plants growing within and adjacent to the sites,
- Terrestrial invertebrates likely to occur in surface soils and benthic invertebrates occurring within the sediments,
- Birds that forage or nest within the areas,
- Small mammals that reside and/or feed in the vicinity of the areas, and

- Other higher trophic level wildlife species (e.g., carnivores) that feed within the vicinity of the sites.

Ecological Effects Assessment

Ecological Effects Summaries

Toxicity profiles summarizing the potential adverse ecological effects of each COPC were derived from the literature, and are included as Appendix K of the Final RI Report. The profiles provide discussions of the acute and chronic toxicity of the COPCs to plants and animals. Effects on growth, reproduction, and survival of terrestrial species are given, where available. Also included are significant fate and transport characteristics of the chemicals. These summaries, in addition to established criteria, were used to identify the critical effects of COPCs.

Toxicity Reference Values

Toxicity reference values (TRVs) were derived for plants, soil/sediment invertebrates and other wildlife as described below.

Terrestrial Plants and Invertebrates - The TRVs used to evaluate the toxicity of a given COPC to terrestrial plants and soil invertebrates were derived from the available literature. Values were applied to both soil and sediment since toxicity values for sediment were unavailable. Phytotoxic values represent the lowest values from toxicity studies conducted in the field or in greenhouse and growth chamber settings. Soil TRVs based on microbial heterotroph and earthworm toxicity represent data provided by toxicity studies in the field or in laboratory settings.

Wildlife - TRVs for mammals and birds chosen as receptor species were derived based on methodology presented by Opresko et al. This general method is based on USEPA methodology for deriving human toxicity values from animal data. In this method, experimentally derived No Observed Adverse Effect Levels (NOAELs) or Lowest Observed Adverse Effect Levels (LOAELs) are used to estimate NOAELs for wildlife by adjusting the dose according to differences in body size. NOAELs for laboratory species, obtained from the literature, were converted to receptor species NOAELs as follows:

$$NOAEL_r = NOAEL_t \, (bw_t / bw_r)^{1/3}$$

Where: $NOAEL_r$ = receptor species NOAEL

$NOAEL_t$ = test species NOAEL

bw_r = receptor body weight

bw_t = test species body weight

The test species and receptor species NOAELs for the LARC 60 site are provided for each of the COPCs in **Table 2-16.**

Ecological Risk Characterization

Hazard Quotients

The levels of chromium in the soil and aluminum and vanadium in sediment were found to exceed phytotoxicity values. The levels of aluminum and iron in the sediment were found to exceed invertebrate toxicity values. Phytotoxicity values were not available for iron.

Results of the exposure calculations show that the levels of zinc resulted in an HQ of 1 for the Northern Bobwhite. The levels of aluminum resulted in HQs greater than 1 for the White-footed Mouse and the Gray Fox. These contaminants detected at the site may pose a risk to the species examined. The other contaminants are unlikely to pose a risk to the species examined. Avian and mammalian toxicity values were unavailable for iron. Therefore, the potential risk of this contaminant could not be estimated.

A summary of the exposure estimates and HQs for the LARC 60 site is presented in **Table 2-17.**

Summary of Risks

At the LARC 60 site, the potential risks of exposure to zinc for avian species and aluminum for small mammals and terrestrial carnivores were identified. The potential risk of exposure to chromium in the soil and aluminum and vanadium in sediment were identified for plants. Lastly, potential risks of exposure to aluminum and iron in the sediment were identified for sediment invertebrates. These risks of adverse effects were identified for the maximum exposure scenario.

Uncertainties

Areas of uncertainty for the LARC 60 site include the following:

- Uncertainty associated with environmental sampling is generally related to the limitations of the sampling program in terms of the number and distribution of samples, while uncertainty associated with the analysis of the samples is generally related to systematic or random errors.

- The principal uncertainties in the exposure assessment have to do with quantitative estimates of exposure parameters such as BAFs. These parameters typically are

chemical, species, and site specific. Generally, the reasonable worst case was assumed to provide a conservative estimate.

- Another point of uncertainty lies in the assumption that each of the wildlife receptor species feeds only upon food items found in the study areas.

- The assumption that soil and sediment invertebrate uptake of compounds would be equal to published Earthworm Uptake Factors may also result in an over- or underestimation of potential risk.

- Uncertainty arises when using any published toxicity results as TRVs.

In general, the risk assessment is likely to overestimate rather than underestimate the risks of adverse ecological effects at the sites, because of the conservative nature of the assumptions used. Overall, a generally conservative approach was taken in the evaluation to minimize the possibility of actual risk being greater than that predicted. Conservative steps taken include:

- The selection of COPCs based on exceedance or lack of EPA Region III BTAG criteria and exceedence of site-specific and regional background data.

- The comparison of maximum chemical concentrations in site media with maximum background concentrations

- The use of maximum chemical concentrations, where appropriate.

- The use of average body weights and feeding rates and minimum home ranges for the endpoint species.

Ecological Significance

The LARC 60 site is a potential source of environmental contamination in soil and sediments. These potential effects are considered to have minimal ecological significance for the following reasons:

- In many cases, wildlife risks were identified for the maximum exposure case. The average concentrations are more representative of exposure for mobile species of wildlife, such as the White-footed Mouse.

- The LARC 60 site is currently disturbed by military activities occurring on the base. Therefore, the site can support only a few individuals, and the potential impacts to plant or animal populations as a whole are minimal.

- The ecosystems in the general vicinity of the site do not appear to be impacted or stressed due to chemical contamination.

- Apex predators and wildlife with large home ranges are not likely to be adversely affected due to the comparatively limited extent of contamination.

2.8 DOCUMENTATION OF SIGNIFICANT CHANGES

No significant changes have occurred since finalization of the Remedial Investigation Addendum Report that included the conclusions of the baseline risk assessment that provides the basis for the LUCs with Monitoring remedy required at the LARC 60 site.

This section details significant Public and State comments, subsequent responses, as well as resolutions regarding general concerns about the site.

3.1 VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY COMMENTS

The only significant comments (e.g., those that change the course of action or remedy) received from VDEQ on this Decision Document was the inclusion of the additional groundwater monitoring events to confirm that MCLs are not exceeded in site groundwater and to modify the preferred remedy from "No Further Action" to "Land Use Controls with Monitoring" for groundwater because of past exceedance of the MCL by arsenic.

3.2 PUBLIC COMMENTS

No public comments were received or noted.

The following terms are presented in the DD.

BARC	Barge Amphibious Resupply Cargo
BLS	Below Land Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
DCE	Dichloroethene
DD	Decision Document
DERA	Defense Environmental Restoration Account
EEQ	Environmental Effects Quotient
EPA	Environmental Protection Agency
ERC	Environmental Restoration Company
FS	Feasibility Study
FTSTY	Fort Story
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
ISOTEC	In-Situ Oxidative Technologies
JMM	James M. Montgomery
LARC	Lighterage Amphibious Resupply Cargo
LOTS	Logistics Over-the-Shore
MCLs	Maximum Contaminant Levels
MEK	Methyl Ethyl Ketone
Mg/L	Milligrams per Liter
µg/L	Micrograms per Liter
$NaMnO_4$	Sodium Permanganate
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAEL	No Observed Effects Level
NPL	National Priorities List
OWS	Oil/Water Separator
PAHs	Polynuclear Aromatic Hydrocarbons
PA/SI	Preliminary Assessment/Site Investigation
PCE	Tetrachloroethene
PID	Photoionization Detector
PPM	Parts Per Million
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SVOCs	Semivolatile Organic Compounds
TCE	Trichloroethene
TPH	Total Petroleum Hydrocarbon
USAEC	United States Army Environmental Command
USAEHA	United States Army Environmental Hygiene Agency
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
VDEQ	Virginia Department of Environmental Quality

Decision Document
LARC 60 Maintenance Area Site
Fort Story, Virginia

TABLE 2-1
SOIL RESULTS (March/April 1995 Sampling Event) - LARC 60 SITE

Parameters	SB06-001			SB06-002			SB06-003		EPA Risk
	0 to 1 ft	5 to 7 ft	10 to 12 ft	0 to 1 ft	4 to 5 ft	8 to 9 ft	0 to 1 ft	5 to 7 ft	Criteria(1)
VOCs (ug/kg)									
Acetone	<26	<26	<27	<25	200	62	<26	<26	20,000,000/780,000
sec-Butyl benzene	NA	NA	NA	NA	NA	NA	< 1.4	NA	8,200,000/310,000
Ethylbenzene	<5.3	<5.2	<5.4	<5.0	<5.2	<5.7	<5.2	<5.2	20,000,000/780,000
Isopropyl benzene	NA	NA	NA	NA	NA	NA	< 1.5	NA	---
p-Isopropyl toluene	NA	NA	NA	NA	NA	NA	< 1.4	NA	---
Methylene Chloride	<5.3	<5.2	<5.4	<5.0	<5.2	<5.7	<5.2	<5.2	760,000/85,000
Methyl ethyl ketone	<26	<26	<27	<25	<26	<28	<26	<26	120,000,000/4,700,000
n-Propyl benzene	NA	NA	NA	NA	NA	NA	< 1.4	NA	820,000/310,000
Styrene	<5.3	<5.2	<5.4	<5.0	<5.2	<5.7	<5.2	<5.2	41,000,000/1,600,000
Tetrachloroethene	<5.3	<5.2	<5.4	<5.0	<5.2	<5.7	<5.2	10	110,000/12,000
Toluene	12	<5.2	<5.4	<5.0	<5.2	<5.7	<5.2	8.2	41,000,000/1,600,000
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	NA	< 2.3	NA	---
Trichloroethene	<5.3	<5.2	<5.4	<5.0	<5.2	<5.7	<5.2	<5.2	520,000/58,000
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	< 1.4	NA	10,000,000/390,000
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	< 1.5	NA	10,000,000/390,000
Xylenes	<5.3	<5.2	<5.4	<5.0	<5.2	<5.7	<5.2	<5.2	41,000,000/1,400,000
SVOCs (ug/kg)									
Benzo(a)anthracene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(b)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(k)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	78,000/8,700
Benzo(g,h,i)perylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---
Benzo(a)pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780/87
Bis(2-EH)phthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	51 JB	410,000/46,000
Chrysene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780,000/87,000
Di-n-butylphthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	59 J	20,000,000/780,000
Fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	8,200,000/310,000
Naphthalene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4,100,000/160,000
Pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	6,100,000/230,000
TPH (mg/kg)									
TPH as Gasoline	<.26	<.26	<.27	<.25	<.26	<.28	<.26	<.26	100 (4)
TPH as Kerosene	<10	<10	<11	<10	<10	<11	<10	NT	100
TPH as Diesel Fuel	<10	<10	<11	<10	<10	<11	<10	NT	100
TPH as Heavy Oils	100	<34	<36	42	<34	<38	<34	NT	100
TPH as Fuel Oil	<34	<34	<36	<33	<34	<38	<34	NT	100
Total Metals (mg/kg)									
Aluminum	2,700 J	280J	250J	NT	NT	NT	NT	NT	100,000/7,800
Arsenic	**1.1**	**1.1**	<1.1	NT	NT	NT	NT	NT	3.8/0.43
Barium	19J	2.3J	2.1J	NT	NT	NT	NT	NT	14,000/550
Cadmium	BDL	BDL	BDL	NT	NT	NT	NT	NT	100/0.39
Calcium	980	<52	<54	NT	NT	NT	NT	NT	-
Chromium	4.3	1.9	3.1	NT	NT	NT	NT	NT	610/23
Cobalt	2.3	<1.0	<1.1	NT	NT	NT	NT	NT	4,100/160
Copper	9.1	<2.6	<2.7	NT	NT	NT	NT	NT	8,200/310
Iron	510	900	870	NT	NT	NT	NT	NT	120,000/4,700
Lead	7.6J	1.3J	1.4J	NT	NT	NT	NT	NT	1,200/400
Magnesium	1400	<52	<54	NT	NT	NT	NT	NT	-
Manganese	120	8.6	6.9	NT	NT	NT	NT	NT	4,100/160
Mercury	BDL	BDL	BDL	NT	NT	NT	NT	NT	-
Nickel	BDL	BDL	BDL	NT	NT	NT	NT	NT	4,100/160
Potassium	1200	<100	<110	NT	NT	NT	NT	NT	-
Silver	BDL	BDL	BDL	NT	NT	NT	NT	NT	1,000/39
Sodium	<53	<52	<54	NT	NT	NT	NT	NT	-
Vanadium	9.2	1.4	<1.3	NT	NT	NT	NT	NT	1,400/55
Zinc	26	3.1	3	NT	NT	NT	NT	NT	61,000/2,300

Notes:
(1) EPA Region III RBCs for Industrial/Residential Soils (Sept 2001)
(2) BDL - Below detection limit
(3) NT - Not tested
(4) Virginia DEQ Petroleum Program Reporting Level
Shaded/bolded text identifies compounds with concentrations greater than the EPA risk screening criteria

NA - Not analyzed. Parameter detected by USACE NED Lab via use of SW-846 Method 8260.
J - Estimated value
K - Reported value may be biased high
L - Reported value may be biased low

TABLE 2-1
SOIL RESULTS (March/April 1995 Sampling Event) - LARC 60 SITE

Parameters	SB06-004			SB06-005		SB06-006			EPA Risk Criteria(1)
	0 to 1 ft	3 to 5 ft	7 to 9 ft	0 to 1 ft	5 to 7 ft	7 to 9 ft	0 to 1 ft	4 to 5 ft	
VOCs (ug/kg)									
Acetone	<25	<26	<27	<25	<26	<27	<26	<30	20,000,000/780,000
sec-Butyl benzene	NA	NA	< 1.4	NA	NA	NA	NA	NA	8,200,000/310,000
Ethylbenzene	<5.0	<5.2	<5.5	<5.0	<5.2	<5.4	<5.2	<6.0	20,000,000/780,000
Isopropyl benzene	NA	NA	< 1.5	NA	NA	NA	NA	NA	---
p-Isopropyl toluene	NA	NA	< 1.4	NA	NA	NA	NA	NA	---
Methylene Chloride	<5.0	<5.2	7 B	<5.0	<5.2	<5.4	<5.2	17	760,000/85,000
Methyl ethyl ketone	<25	<26	<27	<25	<26	<27	<26	31	120,000,000/4,700,000
n-Propyl benzene	NA	NA	< 1.4	NA	NA	NA	NA	NA	820,000/310,000
Styrene	<5.0	<5.2	<5.5	<5.0	<5.2	<5.4	<5.2	<6.0	41,000,000/1,600,000
Tetrachloroethene	<5.0	<5.2	<5.5	<5.0	<5.2	<5.4	<5.2	<6.0	110,000/12,000
Toluene	<5.0	6.1	<5.5	<5.0	<5.2	<5.4	<5.2	<6.0	41,000,000/1,600,000
1,2,3-Trichlorobenzene	NA	NA	2.7 JB	NA	NA	NA	NA	NA	---
Trichloroethene	<5.0	<5.2	<5.5	<5.0	<5.2	<5.4	<5.2	<6.0	520,000/58,000
1,2,4-Trimethylbenzene	NA	NA	< 1.4	NA	NA	NA	NA	NA	10,000,000/390,000
1,3,5-Trimethylbenzene	NA	NA	< 1.5	NA	NA	NA	NA	NA	10,000,000/390,000
Xylenes	<5.0	<5.2	<5.5	<5.0	<5.2	<5.4	<5.2	<6.0	41,000,000/1,400,000
SVOCs (ug/kg)									
Benzo(a)anthracene	BDL	BDL	27 J	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(b)fluoranthene	BDL	BDL	36 J	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(k)fluoranthene	BDL	BDL	47 J	BDL	BDL	BDL	BDL	BDL	78,000/8,700
Benzo(g,h,i)perylene	BDL	BDL	24 J	BDL	BDL	BDL	BDL	BDL	---
Benzo(a)pyrene	BDL	BDL	35 J	BDL	BDL	BDL	BDL	BDL	780/87
Bis(2-EH)phthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	410,000/46,000
Chrysene	BDL	BDL	33 J	BDL	BDL	BDL	BDL	BDL	780,000/87,000
Di-n-butylphthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	20,000,000/780,000
Fluoranthene	BDL	BDL	55 J	BDL	BDL	BDL	BDL	BDL	8,200,000/310,000
Naphthalene	BDL	BDL	4 J	BDL	BDL	BDL	BDL	BDL	4,100,000/160,000
Pyrene	BDL	BDL	50 J	BDL	BDL	BDL	BDL	BDL	6,100,000/230,000
TPH (mg/kg)									
TPH as Gasoline	<.25	<.26	<.27	<.25	<.26	<.27	<.26	<.30	100 (4)
TPH as Kerosene	<20	<10	<11	<10	<21	<11	<10	<12	100
TPH as Diesel Fuel	<20	<10	<11	<10	<21	<11	<10	<12	100
TPH as Heavy Oils	**260**	**240**	**150**	**220**	**270**	**110**	**290**	<39	100
TPH as Fuel Oil	<67	<34	<36	<33	<69	<36	<34	<39	100
Total Metals (mg/kg)									
Aluminum	NT	NT	NT	310J	NT	310K	NT	NT	100,000/7,800
Arsenic	NT	NT	NT	<1.0	NT	<1.1	NT	NT	3.8/0.43
Barium	NT	NT	NT	3.9J	NT	3.5	NT	NT	14,000/550
Cadmium	NT	NT	NT	BDL	NT	BDL	NT	NT	100/0.39
Calcium	NT	NT	NT	160	NT	94	NT	NT	-
Chromium	NT	NT	NT	2.4	NT	2.3	NT	NT	610/23
Cobalt	NT	NT	NT	<1.0	NT	<1.1	NT	NT	4,100/160
Copper	NT	NT	NT	41	NT	3.2	NT	NT	8,200/310
Iron	NT	NT	NT	1000	NT	670L	NT	NT	120,000/4,700
Lead	NT	NT	NT	11J	NT	5.6	NT	NT	1,200/400
Magnesium	NT	NT	NT	94	NT	74	NT	NT	-
Manganese	NT	NT	NT	12	NT	6	NT	NT	4,100/160
Mercury	NT	NT	NT	BDL	NT	BDL	NT	NT	-
Nickel	NT	NT	NT	BDL	NT	BDL	NT	NT	4,100/160
Potassium	NT	NT	NT	<100	NT	<110	NT	NT	-
Silver	NT	NT	NT	BDL	NT	BDL	NT	NT	1,000/39
Sodium	NT	NT	NT	<51	NT	<54	NT	NT	-
Vanadium	NT	NT	NT	1.6	NT	1.6	NT	NT	1,400/55
Zinc	NT	NT	NT	33	NT	8.6	NT	NT	61,000/2,300

Notes:
(1) EPA Region III RBCs for Industrial/Residential Soils (Sept 2001)
(2) BDL - Below detection limit
(3) NT - Not tested
(4) Virginia DEQ Petroleum Program Reporting Level
Shaded/bolded text identifies compounds with concentrations greater than the EPA risk screening criteria

NA - Not analyzed. Parameter detected by USACE NED Lab via use of SW-846 Method 8260.
J - Estimated value
K - Reported value may be biased high
L - Reported value may be biased low

TABLE 2-1
SOIL RESULTS (March/April 1995 Sampling Event) - LARC 60 SITE

Parameters	SB06-007	SB06-008		SB06-009		SB06-010		EPA Risk
	4 to 5 ft	0 to 1 ft	4 to 5 ft	0 to 1 ft	4 to 5 ft	0 to 1 ft	4 to 5 ft	Criteria(1)
VOCs (ug/kg)								
Acetone	<27	<26	<26	36	51	<26	65	20,000,000/780,000
sec-Butyl benzene	2.6 J	NA	NA	NA	NA	NA	NA	8,200,000/310,000
Ethylbenzene	2.3 J	<5.2	<5.2	<5.2	<5.2	<5.2	<5.5	20,000,000/780,000
Isopropyl benzene	1.8 J	NA	NA	NA	NA	NA	NA	---
p-Isopropyl toluene	9.1	NA	NA	NA	NA	NA	NA	---
Methylene Chloride	32	8.9	11	<5.2	<5.2	12	150	760,000/85,000
Methyl ethyl ketone	<27	<26	<26	<26	<26	<26	41	120,000,000/4,700,000
n-Propyl benzene	4.3 J	NA	NA	NA	NA	NA	NA	820,000/310,000
Styrene	1.8 J	<5.2	<5.2	<5.2	<5.2	<5.2	<5.5	41,000,000/1,600,000
Tetrachloroethene	<5.4	<5.2	<5.2	<5.2	<5.2	<5.2	8.8	110,000/12,000
Toluene	<5.4	<5.2	<5.2	<5.2	<5.2	<5.2	6.7	41,000,000/1,600,000
1,2,3-Trichlorobenzene	< 2.6	NA	NA	NA	NA	NA	NA	---
Trichloroethene	<5.4	<5.2	<5.2	<5.2	<5.2	<5.2	8.8	520,000/58,000
1,2,4-Trimethylbenzene	29	NA	NA	NA	NA	NA	NA	10,000,000/390,000
1,3,5-Trimethylbenzene	26	NA	NA	NA	NA	NA	NA	10,000,000/390,000
Xylenes	11	<5.2	<5.2	<5.2	<5.2	<5.2	<5.5	41,000,000/1,400,000
SVOCs (ug/kg)								
Benzo(a)anthracene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(b)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(k)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	78,000/8,700
Benzo(g,h,i)perylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---
Benzo(a)pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780/87
Bis(2-EH)phthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	410,000/46,000
Chrysene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780,000/87,000
Di-n-butylphthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	20,000,000/780,000
Fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	8,200,000/310,000
Naphthalene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4,100,000/160,000
Pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	6,100,000/230,000
TPH (mg/kg)								
TPH as Gasoline	<.27	<.26	<.26	<.26	<.26	<.26	<.27	100 (4)
TPH as Kerosene	<110	<10	<10	<10	<10	<10	<11	100
TPH as Diesel Fuel	<110	<10	<10	<10	<10	<10	<11	100
TPH as Heavy Oils	**880**	<34	<34	<34	<34	**170**	**110**	100
TPH as Fuel Oil	<360	<34	<34	<34	<34	<34	<36	100
Total Metals (mg/kg)								
Aluminum	NT	NT	NT	NT	NT	440	300	100,000/7,800
Arsenic	NT	NT	NT	NT	NT	<1.0	<1.1	3.8/0.43
Barium	NT	NT	NT	NT	NT	3.7	2.9	14,000/550
Cadmium	NT	NT	NT	NT	NT	BDL	BDL	100/0.39
Calcium	NT	NT	NT	NT	NT	110	300	-
Chromium	NT	NT	NT	NT	NT	2.3	1.8	610/23
Cobalt	NT	NT	NT	NT	NT	<1.0	<1.1	4,100/160
Copper	NT	NT	NT	NT	NT	<2.6	<2.7	8,200/310
Iron	NT	NT	NT	NT	NT	1100L	770L	120,000/4,700
Lead	NT	NT	NT	NT	NT	6.4L	4.7L	1,200/400
Magnesium	NT	NT	NT	NT	NT	110	59	-
Manganese	NT	NT	NT	NT	NT	7.2	13	4,100/160
Mercury	NT	NT	NT	NT	NT	BDL	BDL	-
Nickel	NT	NT	NT	NT	NT	BDL	BDL	4,100/160
Potassium	NT	NT	NT	NT	NT	<100	<110	-
Silver	NT	NT	NT	NT	NT	BDL	BDL	1,000/39
Sodium	NT	NT	NT	NT	NT	<52	<55	-
Vanadium	NT	NT	NT	NT	NT	1.9	1.7	1,400/55
Zinc	NT	NT	NT	NT	NT	6.4	5.2	61,000/2,300

Notes:
(1) EPA Region III RBCs for Industrial/Residential Soils (Sept 2001)
(2) BDL - Below detection limit
(3) NT - Not tested
(4) Virginia DEQ Petroleum Program Reporting Level
Shaded/bolded text identifies compounds with concentrations greater than the EPA risk screening criteria

NA - Not analyzed. Parameter detected by USACE NED Lab via use of SW-846 Method 8260.
J - Estimated value
K - Reported value may be biased high
L - Reported value may be biased low

TABLE 2-1
SOIL RESULTS (March/April 1995 Sampling Event) - LARC 60 SITE

Parameters	SB06-011		SB06-012		SB06-013		SB06-014		EPA Risk Criteria(1)
	0 to 1 ft	4 to 5 ft	0 to 1 ft	4 to 5 ft	0 to 1 ft	4 to 5 ft	0 to 1 ft	4 to 5 ft	
VOCs (ug/kg)									
Acetone	<25	<27	<34	<27	<25	<27	<25	<26	20,000,000/780,000
sec-Butyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	8,200,000/310,000
Ethylbenzene	<5.0	<5.5	<6.8	<5.5	<5.0	<5.5	<5.0	<5.2	20,000,000/780,000
Isopropyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	---
p-Isopropyl toluene	NA	NA	NA	NA	NA	NA	NA	NA	---
Methylene Chloride	<5.0	220	<6.8	91	<5.0	19	<5.0	5.4	760,000/85,000
Methyl ethyl ketone	<25	36	<34	44	<25	<27	<25	<26	120,000,000/4,700,000
n-Propyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	820,000/310,000
Styrene	<5.0	9.2	<6.8	7.3	<5.0	<5.5	<5.0	<5.2	41,000,000/1,600,000
Tetrachloroethene	<5.0	<5.5	<6.8	<5.5	<5.0	<5.5	<5.0	<5.2	110,000/12,000
Toluene	<5.0	13	<6.8	11	<5.0	<5.5	<5.0	<5.2	41,000,000/1,600,000
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	---
Trichloroethene	<5.0	16	<6.8	9.3	<5.0	<5.5	<5.0	<5.2	520,000/58,000
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	10,000,000/390,000
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	10,000,000/390,000
Xylenes	<5.0	<5.5	<6.8	<5.5	<5.0	<5.5	<5.0	<5.2	41,000,000/1,400,000
SVOCs (ug/kg)									
Benzo(a)anthracene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(b)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(k)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	78,000/8,700
Benzo(g,h,i)perylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---
Benzo(a)pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780/87
Bis(2-EH)phthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	410,000/46,000
Chrysene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780,000/87,000
Di-n-butylphthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	20,000,000/780,000
Fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	8,200,000/310,000
Naphthalene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4,100,000/160,000
Pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	6,100,000/230,000
TPH (mg/kg)									
TPH as Gasoline	<.25	<.27	<.34	<.27	<.25	<.27	<.25	<.26	100 (4)
TPH as Kerosene	<10	<110	<14	<55	<10	<110	<20	<52	100
TPH as Diesel Fuel	<10	<110	<14	<55	<10	<110	<20	<52	100
TPH as Heavy Oils	**170**	**1,200**	**160**	**550**	**290**	**1,400**	**310**	**680**	100
TPH as Fuel Oil	<33	<360	<44	<180	<33	<360	<66	<170	100
Total Metals (mg/kg)									
Aluminum	NT	NT	NT	NT	NT	NT	NT	NT	100,000/7,800
Arsenic	NT	NT	NT	NT	NT	NT	NT	NT	3.8/0.43
Barium	NT	NT	NT	NT	NT	NT	NT	NT	14,000/550
Cadmium	NT	NT	NT	NT	NT	NT	NT	NT	100/0.39
Calcium	NT	NT	NT	NT	NT	NT	NT	NT	-
Chromium	NT	NT	NT	NT	NT	NT	NT	NT	610/23
Cobalt	NT	NT	NT	NT	NT	NT	NT	NT	4,100/160
Copper	NT	NT	NT	NT	NT	NT	NT	NT	8,200/310
Iron	NT	NT	NT	NT	NT	NT	NT	NT	120,000/4,700
Lead	NT	NT	NT	NT	NT	NT	NT	NT	1,200/400
Magnesium	NT	NT	NT	NT	NT	NT	NT	NT	-
Manganese	NT	NT	NT	NT	NT	NT	NT	NT	4,100/160
Mercury	NT	NT	NT	NT	NT	NT	NT	NT	-
Nickel	NT	NT	NT	NT	NT	NT	NT	NT	4,100/160
Potassium	NT	NT	NT	NT	NT	NT	NT	NT	-
Silver	NT	NT	NT	NT	NT	NT	NT	NT	1,000/39
Sodium	NT	NT	NT	NT	NT	NT	NT	NT	-
Vanadium	NT	NT	NT	NT	NT	NT	NT	NT	1,400/55
Zinc	NT	NT	NT	NT	NT	NT	NT	NT	61,000/2,300

Notes:
(1) EPA Region III RBCs for Industrial/Residential Soils (Sept 2001)
(2) BDL - Below detection limit
(3) NT - Not tested
(4) Virginia DEQ Petroleum Program Reporting Level
Shaded/bolded text identifies compounds with concentrations greater than the EPA risk screening criteria

NA - Not analyzed. Parameter detected by USACE NED Lab via use of SW-846 Method 8260.
J - Estimated value
K - Reported value may be biased high
L - Reported value may be biased low

TABLE 2-1
SOIL RESULTS (March/April 1995 Sampling Event) - LARC 60 SITE

Parameters	SB06-015		SB06-016		SB06-017		SB06-018		EPA Risk
	0 to 1 ft	4 to 5 ft	0 to 1 ft	4 to 5 ft	0 to 1 ft	4 to 5 ft	0 to 1 ft	4 to 5 ft	Criteria(1)
VOCs (ug/kg)									
Acetone	<25	<26	<25	<29	<25	<26	<25	<26	20,000,000/780,000
sec-Butyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	8,200,000/310,000
Ethylbenzene	<5.0	<5.2	<5.0	<5.9	<5.0	<5.2	<5.0	<5.2	20,000,000/780,000
Isopropyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	---
p-Isopropyl toluene	NA	NA	NA	NA	NA	NA	NA	NA	---
Methylene Chloride	<5.0	<5.2	<5.0	11	5.5	<5.2	5.2	<5.2	760,000/85,000
Methyl ethyl ketone	<25	<26	<25	<29	<25	<26	<25	<26	120,000,000/4,700,000
n-Propyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	820,000/310,000
Styrene	<5.0	<5.2	<5.0	<5.9	<5.0	<5.2	<5.0	<5.2	41,000,000/1,600,000
Tetrachloroethene	<5.0	<5.2	<5.0	<5.9	<5.0	<5.2	<5.0	<5.2	110,000/12,000
Toluene	<5.0	<5.2	<5.0	<5.9	5.1	<5.2	7.1	<5.2	41,000,000/1,600,000
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	---
Trichloroethene	<5.0	<5.2	<5.0	<5.9	<5.0	<5.2	<5.0	<5.2	520,000/58,000
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	10,000,000/390,000
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	10,000,000/390,000
Xylenes	<5.0	<5.2	<5.0	<5.9	<5.0	<5.2	<5.0	<5.2	41,000,000/1,400,000
SVOCs (ug/kg)									
Benzo(a)anthracene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(b)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(k)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	78,000/8,700
Benzo(g,h,i)perylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---
Benzo(a)pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780/87
Bis(2-EH)phthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	410,000/46,000
Chrysene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780,000/87,000
Di-n-butylphthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	20,000,000/780,000
Fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	8,200,000/310,000
Naphthalene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4,100,000/160,000
Pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	6,100,000/230,000
TPH (mg/kg)									
TPH as Gasoline	<.25	<.26	<.25	<.29	<.25	<.26	<.25	<.26	100 (4)
TPH as Kerosene	<10	<52	<10	<59	<10	<10	<50	<10	100
TPH as Diesel Fuel	<10	<52	<10	<59	<10	<10	<50	<10	100
TPH as Heavy Oils	77	**520**	**190**	**240**	**250**	<34	**800**	<34	100
TPH as Fuel Oil	<33	<170	<33	<190	<33	<34	<10	<34	100
Total Metals (mg/kg)									
Aluminum	250K	360K	NT	NT	NT	NT	NT	NT	100,000/7,800
Arsenic	<1	<1	NT	NT	NT	NT	NT	NT	3.8/0.43
Barium	1.8	5.3	NT	NT	NT	NT	NT	NT	14,000/550
Cadmium	BDL	BDL	NT	NT	NT	NT	NT	NT	100/0.39
Calcium	<51	66	NT	NT	NT	NT	NT	NT	-
Chromium	1.7	3.6	NT	NT	NT	NT	NT	NT	610/23
Cobalt	<1	<1	NT	NT	NT	NT	NT	NT	4,100/160
Copper	2.5	6.9	NT	NT	NT	NT	NT	NT	8,200/310
Iron	400L	780	NT	NT	NT	NT	NT	NT	120,000/4,700
Lead	3.1	17L	NT	NT	NT	NT	NT	NT	1,200/400
Magnesium	<51	79J	NT	NT	NT	NT	NT	NT	-
Manganese	2.4	4.6	NT	NT	NT	NT	NT	NT	4,100/160
Mercury	BDL	BDL	NT	NT	NT	NT	NT	NT	-
Nickel	BDL	BDL	NT	NT	NT	NT	NT	NT	4,100/160
Potassium	<100	<100	NT	NT	NT	NT	NT	NT	-
Silver	BDL	BDL	NT	NT	NT	NT	NT	NT	1,000/39
Sodium	<51	<52	NT	NT	NT	NT	NT	NT	-
Vanadium	1.2	1.5	NT	NT	NT	NT	NT	NT	1,400/55
Zinc	3.8	17	NT	NT	NT	NT	NT	NT	61,000/2,300

Notes:
(1) EPA Region III RBCs for Industrial/Residential Soils (Sept 2001)
(2) BDL - Below detection limit
(3) NT - Not tested
(4) Virginia DEQ Petroleum Program Reporting Level
Shaded/bolded text identifies compounds with concentrations greater than the EPA risk screening criteria

NA - Not analyzed. Parameter detected by USACE NED Lab via use of SW-846 Method 8260.
J - Estimated value
K - Reported value may be biased high
L - Reported value may be biased low

TABLE 2-1
SOIL RESULTS (March/April 1995 Sampling Event) - LARC 60 SITE

Parameters	SB06-019		SB06-020		SB06-021		SB06-022		SB06-023		EPA Risk
	0-1 ft	4-5 ft	0-1 ft	4-5 ft	0-1 ft	3-4 ft	0-1 ft	4-5 ft	0-1 ft	2-3 ft	Criteria(1)
VOCs (ug/kg)											
Acetone	<25	<26	<25	<26	<26	<29	<28	<29	<27	<29	20,000,000/780,000
sec-Butyl benzene	NA	NA	NA	< 1.4	NA	NA	NA	NA	NA	NA	8,200,000/310,000
Ethylbenzene	<5.0	<5.3	<5.0	<5.3	<5.2	<5.8	<5.6	<5.9	<5.4	<5.8	20,000,000/780,000
Isopropyl benzene	NA	NA	NA	< 1.5	NA	NA	NA	NA	NA	NA	---
p-Isopropyl toluene	NA	NA	NA	< 1.4	NA	NA	NA	NA	NA	NA	---
Methylene Chloride	<5.0	<5.3	<5.0	43	34	70	160	<5.9	62	<5.8	760,000/85,000
Methyl ethyl ketone	<25	<26	<25	<26	<26	36	<28	<29	<27	<29	120,000,000/4,700,000
n-Propyl benzene	NA	NA	NA	< 1.4	NA	NA	NA	NA	NA	NA	820,000/310,000
Styrene	<5.0	<5.3	<5.0	<5.3	<5.2	<5.8	<5.6	<5.9	<5.4	<5.8	41,000,000/1,600,000
Tetrachloroethene	<5.0	<5.3	<5.0	71	<5.2	<5.8	<5.6	<5.9	<5.4	<5.8	110,000/12,000
Toluene	<5.0	<5.3	<5.0	<5.3	<5.2	<5.8	<5.6	<5.9	<5.4	<5.8	41,000,000/1,600,000
1,2,3-Trichlorobenzene	NA	NA	NA	< 2.4	NA	NA	NA	NA	NA	NA	---
Trichloroethene	<5.0	<5.3	<5.0	<5.3	<5.2	<5.8	6.4	<5.9	5.9	<5.8	520,000/58,000
1,2,4-Trimethylbenzene	NA	NA	NA	< 1.4	NA	NA	NA	NA	NA	NA	10,000,000/390,000
1,3,5-Trimethylbenzene	NA	NA	NA	< 1.5	NA	NA	NA	NA	NA	NA	10,000,000/390,000
Xylenes	<5.0	<5.3	<5.0	<5.3	<5.2	<5.8	<5.6	<5.9	<5.4	<5.8	41,000,000/1,400,000
SVOCs (ug/kg)											
Benzo(a)anthracene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(b)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7,800/870
Benzo(k)fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	78,000/8,700
Benzo(g,h,i)perylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	---
Benzo(a)pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780/87
Bis(2-EH)phthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	410,000/46,000
Chrysene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	780,000/87,000
Di-n-butylphthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	20,000,000/780,000
Fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	8,200,000/310,000
Naphthalene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4,100,000/160,000
Pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	6,100,000/230,000
TPH (mg/kg)											
TPH as Gasoline	<.25	<.26	<.25	<.26	<.26	<.29	<.28	<.29	<.27	<.29	100 (4)
TPH as Kerosene	<50	<10	<100	<11	<21	<12	<22	<12	<22	<12	100
TPH as Diesel Fuel	<50	<10	<100	<11	<21	<12	<22	<12	<22	<12	100
TPH as Heavy Oils	**660**	<35	**1,500**	<35	**500**	<38	**140**	<39	**250**	<38	100
TPH as Fuel Oil	<170	<35	<330	<35	<69	<98	<74	<39	<71	<38	100
Total Metals (mg/kg)											
Aluminum	NT	NT	370K	380	NT	NT	NT	NT	NT	NT	100,000/7,800
Arsenic	NT	NT	<1	**0.86**	NT	NT	NT	NT	NT	NT	3.8/0.43
Barium	NT	NT	5.9	2.5	NT	NT	NT	NT	NT	NT	14,000/550
Cadmium	NT	NT	BDL	0.18 J	NT	NT	NT	NT	NT	NT	100/0.39
Calcium	NT	NT	56	43	NT	NT	NT	NT	NT	NT	-
Chromium	NT	NT	3.2	1.5	NT	NT	NT	NT	NT	NT	610/23
Cobalt	NT	NT	<1	0.79	NT	NT	NT	NT	NT	NT	4,100/160
Copper	NT	NT	12	5.5	NT	NT	NT	NT	NT	NT	8,200/310
Iron	NT	NT	840L	770	NT	NT	NT	NT	NT	NT	120,000/4,700
Lead	NT	NT	12	3.2L	NT	NT	NT	NT	NT	NT	1,200/400
Magnesium	NT	NT	77	56	NT	NT	NT	NT	NT	NT	-
Manganese	NT	NT	5.6	4.2	NT	NT	NT	NT	NT	NT	4,100/160
Mercury	NT	NT	BDL	4.6	NT	NT	NT	NT	NT	NT	-
Nickel	NT	NT	BDL	0.81	NT	NT	NT	NT	NT	NT	4,100/160
Potassium	NT	NT	<100	37 J	NT	NT	NT	NT	NT	NT	-
Silver	NT	NT	BDL	0.51 J	NT	NT	NT	NT	NT	NT	1,000/39
Sodium	NT	NT	<50	11	NT	NT	NT	NT	NT	NT	-
Vanadium	NT	NT	1.8	1.7	NT	NT	NT	NT	NT	NT	1,400/55
Zinc	NT	NT	12	7.9	NT	NT	NT	NT	NT	NT	61,000/2,300

Notes:
(1) EPA Region III RBCs for Industrial/Residential Soils (Sept 2001)
(2) BDL - Below detection limit
(3) NT - Not tested
(4) Virginia DEQ Petroleum Program Reporting Level
Shaded/bolded text identifies compounds with concentrations greater than the EPA risk screening c

NA - Not analyzed. Parameter detected by USACE NED Lab via use of SW-846 Method 8260.
J - Estimated value
K - Reported value may be biased high
L - Reported value may be biased low

TABLE 2-2

SOIL RESULTS (April 2000 Sampling Event) - LARC 60 SITE

Parameters	SS1 0 to 6 in.	SS2 0 to 6 in.	SS3 0 to 6 in.	SS4 0 to 6 in.	SS5 0 to 6 in.	SS6 0 to 6 in.	SS7 0 to 6 in.	SS8 0 to 6 in.	EPA RBC Criteria(1)
PCBs (ug/kg)									
Aroclor-1016	< 34	< 33	< 33	< 34	< 34	< 35	< 33	< 34	82,000/5,500
Aroclor-1221	< 68	< 66	< 67	< 69	< 69	< 71	< 67	< 69	2,900/320
Aroclor-1232	< 34	< 33	< 33	< 34	< 34	< 35	< 33	< 34	2,900/320
Aroclor-1242	< 34	< 33	< 33	< 34	< 34	< 35	< 33	< 34	2,900/320
Aroclor-1248	< 34	< 33	< 33	< 34	< 34	< 35	< 33	< 34	2,900/320
Aroclor-1254	< 34	< 33	< 33	< 34	< 34	< 35	< 33	< 34	2,900/320
Aroclor-1260	< 34	< 33	< 33	< 34	< 34	< 35	< 33	< 34	2,900/320
Pesticides (ug/kg)									
Aldrin	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8	< 9	< 1.7	< 1.7	340/38
alpha-BHC	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8	< 9	< 1.7	< 1.7	910/100
beta-BHC	< 1.7	1.6 JP	< 1.7	< 1.7	< 1.8	< 9	< 1.7	< 1.7	3,200/350
delta-BHC	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8	< 9	< 1.7	< 1.7	-
gamma-BHC (Lindane)	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8	< 9	< 1.7	< 1.7	4,400/490
alpha-Chlordane	< 1.7	< 1.7	0.51 JP	< 1.7	< 1.8	< 9	< 1.7	< 1.7	16,000/1,800
gamma-Chlordane	< 1.7	< 1.7	0.63 J	< 1.7	< 1.8	< 9	0.49 J	< 1.7	16,000/1,800
DDD	< 3.3	< 3.3	1.6 J	1.2 J	< 3.6	4.3 J	2.1 J	< 3.3	24,000/2,700
DDE	< 3.3	< 3.3	0.30 J	< 3.3	1.7 J	13 J	1.0 J	< 3.3	17,000/1,900
DDT	< 3.3	0.55 J	1.8 J	1.3 J	7.1	39	5.2 P	1.6 J	17,000/1,900
Dieldrin	< 3.3	< 3.3	< 3.3	< 3.3	< 3.6	< 18	0.47 JP	< 3.3	360/40
Endosulfan I	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8	< 9	< 1.7	< 1.7	1,200,000/47,000
Endosulfan II	< 3.3	< 3.3	< 3.3	< 3.3	< 3.6	< 18	< 3.3	< 3.3	1,200,000/47,000
Endosulfan sulfate	< 3.3	< 3.3	< 3.3	< 3.3	< 3.6	< 18	< 3.3	< 3.3	-
Endrin	< 3.3	< 3.3	< 3.3	< 3.3	< 3.6	< 18	< 3.3	< 3.3	61,000/2,300
Endrin aldehyde	< 3.3	< 3.3	< 3.3	< 3.3	< 3.6	< 18	< 3.3	< 3.3	-
Endrin ketone	< 3.3	< 3.3	< 3.3	< 3.3	< 3.6	< 18	< 3.3	< 3.3	-
Heptachlor	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8	< 9	< 1.7	< 1.7	1,300/140
Heptachlor epoxide	< 1.7	< 1.7	< 1.7	< 1.7	< 1.8	< 9	< 1.7	< 1.7	630/70
Methoxyclor	< 17	< 17	< 17	< 17	< 18	< 90	< 17	< 17	1,000,000/39,000
Toxaphene	< 170	< 170	< 170	< 170	< 180	< 900	< 170	< 170	5,200/580

Notes:

(1) EPA Region III RBCs for Industrial/Residential Soils (Sept 2001)

Shaded/bolded text identifies compounds with concentrations greater than EPA risk screening criteria

J - Estimated concentration

P - Greater than 25% difference for detected levels in two GC columns

TABLE 2-3
SEDIMENT RESULTS (March/April 1995 Sampling Event)
LARC 60 SITE

Parameters	Sample ID and Results		EPA RBC Criteria(1)
	SD06-001	SD06-002	
VOCs (ug/kg)	BDL(2)	BDL	
SVOCs (ug/kg)	BDL	BDL	
TPH (mg/kg)			
TPH as Gasoline	< 0.32	< 0.32	100(3)
TPH-H as Heavy Oils	**2,700**	**530**	100
Total Metals (mg/kg)			
Aluminum	310 J	650 J	100,000 / 7,800
Barium	1.4 J	2.7 J	14,000 / 550
Calcium	53	210	-
Chromium	1.6	2.5	610 / 23
Copper	3.8	9.0	8,200 / 310
Iron	410	940	120,000 / 4,700
Lead	8.2 J	14 J	1,200 / 400
Magnesium	110	250	-
Manganese	3.4	6.9	4,100 / 160
Sodium	< 64	70	-
Vanadium	1.3	2.7	1,400 / 55
Zinc	11	30	61,000 / 2,300

Notes:
(1) EPA Region III RBC for Industrial/Residential Soils (Sept 2001)
(2) BDL - Below detection limit
(3) Virginia DEQ Petroleum Program Reporting Level
Shaded/bolded text identifies compounds with concentrations greater than the EPA risk screening criteria
J - Estimated value

TABLE 2-4
SURFACE WATER RESULTS (March/April 1995 Sampling Event)
LARC 60 SITE

Parameters	Sample ID and Results		EPA RBC Criteria(1)
	SW06-001	SW06-002	
VOCs (ug/l)			
Acetone	30	35	61
SVOCs (ug/l)	BDL(2)	BDL	
TPH (mg/l)	BDL	BDL	
Total Metals (ug/l)			
Aluminum	390	420	3,700
Calcium	12,000	11,000	-
Iron	840	1,400	2,200
Lead	7.8	9	15 (3)
Magnesium	15,000	17,000	-
Manganese	**83**	**140**	73
Potassium	9,100	9,400	-
Sodium	120,000	71,000	-
Zinc	40	62	1,100

Notes:

(1) EPA Region III Risk-based Concentration Criteria for Tap Water (Sept 2001)

(2) BDL - Below detection limit

(3) USEPA action level for drinking water

Shaded/bolded text identifies compounds with concentrations greater than the EPA risk screening criteria

TABLE 2-5
MONITORING WELL GROUNDWATER RESULTS (March and April 1995/April 2000 Sampling Events)
LARC 60 SITE

Parameters	Well ID and Results								EPA RBC Criteria(1)
	6MW-1	6MW-2	6MW-3S	6MW-3D	6MW-4	MW-115	MW-117	MW-118	
VOCs (ug/l)									
cis 1,2-DCE	<5 / <5	<5	<5 / 2 J	<5	<5 / <5	<5 / <5	**20 / 1,900**	<5 / <5	6.1
Ethylbenzene	<5 / <5	<5	<5 / <5	<5	<5 / <5	<5 / <5	66 / 76	<5 / <5	130
MIBK	<5 / **50**	<5	<5 / **44**	<5	<5 / **19**	<5 / <5	<5 / <250	<5 / <5	14
Tetrachloroethene	<5 / <5	<5	<5 / <5	<5	<5 / <5	<5 / <5	**8.5** / <50	<5 / <5	1.1
Toluene	<5 / <5	<5	<5 / <5	<5	<5 / <5	<5 / <5	68 **/ 310**	<5 / <5	75
Trichloroethene	<5 / <5	<5	<5 / 1.3 J	<5	<5 / <5	<5 / <5	**18** / <50	<5 / <5	1.6
Vinyl chloride	<10 / <10	<10	<10 / **3.1 J**	<10	<10 / <10	<10 / <10	<10 / **8.6 J**	<10 / <10	0.015
Xylenes	<5 / <10	<5	<5 / <10	<5	<5 / <10	<5 / <10	290 / 450	<5 / <10	1,200
SVOCs (ug/l)									
2-Methylnaphthalene	<10	<10	**20**	<10	<10	<10	<10	<10	12
Naphthalene	<10	<10	<10	<10	<10	<10	**32**	<10	0.65
Pest/PCBs	BDL	NT (3)	BDL	NT	BDL	BDL	BDL	BDL	
TPH (mg/l)									
TPH as Gasoline	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**3.0**	<0.05	1.0(2)
TPH as Diesel Fuel	<0.30	<0.30	**2.7**	<0.30	<0.30	<0.30	**3.3**	<0.30	1.0(2)
TPH as Heavy Oils	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0(2)
TPH as Fuel Oil	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0(2)
TPH as Kerosene	<0.30	<0.30	<1.5	<0.30	<0.30	<0.30	<0.30	<0.30	1.0(2)
Miscellaneous (mg/l)									
TSS	NT / < 5	NT	NT / < 5	NT	NT / < 5	NT / < 5	NT / 6.0	NT / < 5	-
TDS	NT / 74	NT	NT / 130	NT	NT / 280	NT / 110	NT / 65	NT / 160	-

TABLE 2-5
MONITORING WELL GROUNDWATER RESULTS (March and April 1995/April 2000 Sampling Events)
LARC 60 SITE

Parameters	Well ID and Results								EPA RBC Criteria(1)
	6MW-1	6MW-2	6MW-3S	6MW-3D	6MW-4	MW-115	MW-117	MW-118	
Total Metals (ug/l)									
Aluminum	NT / < 6	590 K	3,700 K / < 6	NT	NT / 260	NT / < 6	1,100 K / 210	3,700 K / < 6	3,700
Antimony	NT / < 2.7	< 50	< 50 / < 2.7	NT	NT / < 2.7	NT / < 2.7	< 50 / < 2.7	< 50 / < 2.7	1.5
Arsenic	NT / < 3	< 10	**14** / < 3	NT	NT / < 3	NT / < 3	**91 / 21**	< 10 / < 3	0.045
Barium	NT / 5.5 B	14	120 / 22	NT	NT / 17	NT / 16	28 / 19	35 / 5.3 B	260
Beryllium	NT / < 0.10	< 5	< 5 / < 0.10	NT	NT / < 0.10	NT / < 0.10	< 5 / < 0.10	< 5 / < 0.10	7.3
Cadmium	NT / < 0.50	< 5	< 5 / < 0.50	NT	NT / < 0.50	NT / < 0.50	< 5 / < 0.50	< 5 / < 0.50	1.8
Calcium	NT / 6,700	6,400	39,000 / 17,000	NT	NT / 13,000	NT / 18,000	18,000 / 20,000	15,000 / 9,100	-
Chromium	NT / < 0.70	< 10	< 10 / 1.1 B	NT	NT / 2.4 B	NT / < 0.70	< 10 / 2.9 B	< 10 / < 0.70	110
Cobalt	NT / < 0.90	< 10	< 10 / < 0.90	NT	NT / < 0.90	NT / < 0.90	< 10 / < 0.90	< 10 / < 0.90	73
Copper	NT / 1.4 B	< 25	< 25 / 2.1 B	NT	NT / 2.9 B	NT / 14 B	< 25 / 3.4 B	< 25 / 2.4 B	140
Iron	NT / **4,600**	**12,000**	**16,000 / 2,700**	NT	NT / 1,300	NT / **6,900**	**14,000 / 17,000**	**3,500** / 270	2,200
Lead	NT / 2.8 B	< 5	8.9 / < 2.4	NT	NT / 2.6 B	NT / 4.7 B	< 5 / 4.1 B	6.7 / < 2.4	15 (4)
Magnesium	NT / 2,700	4,200	5,900 / 2,100	NT	NT / 9,100	NT / 1,500	5,200 / 3,100	6,400 / 2,800	-
Manganese	NT / 44	**100**	**640 / 140**	NT	NT / 76	NT / **290**	**95 / 110**	25 / 4.2 B	73
Mercury	NT / < 0.10	< 0.20	< 0.20 / < 0.10	NT	NT / < 0.10	NT / < 0.10	< 0.20 / < 0.10	< 0.20 / < 0.10	-
Nickel	NT / < 1.1	< 40	< 40 / < 1.1	NT	NT / < 1.1	NT / < 1.1	< 40 / < 1.1	< 40 / < 1.1	73
Potassium	NT / 2,400	1,800	12,000 / 3,700	NT	NT / 4,400	NT / 5,000	4,300 / 6,400	6,600 / 3,600	-
Selenium	NT / < 3.4	< 10	< 10 / < 3.4	NT	NT / < 3.4	NT / < 3.4	< 10 / < 3.4	< 10 / < 3.4	18
Silver	NT / < 0.50	< 10	< 10 / < 0.50	NT	NT / < 0.50	NT / < 0.50	< 10 / < 0.50	< 10 / < 0.50	18
Sodium	NT / 8,000	25,000	30,000 / 16,000	NT	NT / 69,000	NT / 9,300	8,100 / 8,500	9,300 / 5,300	270,000
Thallium	NT / < 4.3	< 10	< 10 / < 4.3	NT	NT / < 4.3	NT / < 4.3	< 10 / < 4.3	< 10 / < 4.3	0.26
Vanadium	NT / < 0.70	< 10	11 / 1.9 B	NT	NT / 9.5 B	NT / 1.5 B	< 10 / 5.2 B	< 10 / < 0.70	26
Zinc	NT / 3.3 B	33	42 / 4.9 B	NT	NT / 5.4 B	NT / 29	22 / 5.3 B	24 / 3.6 B	1,100

TABLE 2-5
MONITORING WELL GROUNDWATER RESULTS (March and April 1995/April 2000 Sampling Events)
LARC 60 SITE

Parameters	Well ID and Results								EPA RBC Criteria(1)
	6MW-1	6MW-2	6MW-3S	6MW-3D	6MW-4	MW-115	MW-117	MW-118	
Dissolved Metals (ug/l)									
Aluminum	NT / < 6	< 200	< 200 / 14 BE	NT	NT / 300 E	NT / < 6	< 200 / 79 BE	< 200 / < 6	3,700
Antimony	NT / < 2.7	< 50	< 50 / **5.4 B**	NT	NT / **2.8 B**	NT / < 2.7	< 50 / < 2.7	< 50 / < 2.7	1.5
Arsenic	NT / < 3	< 10	< 10 / < 3	NT	NT / < 3	NT / < 3	**40 / 14**	< 10 / < 3	0.045
Barium	NT / 5.3 B	12	70 / 21	NT	NT / 17	NT / 16	21 / 17	40 / 5 B	260
Beryllium	NT / < 0.10	< 5	< 5 / < 0.10	NT	NT / < 0.10	NT / < 0.10	< 5 < 0.10	< 5 / < 0.10	7.3
Cadmium	NT / < 0.50	< 5	< 5 / < 0.50	NT	NT / < 0.50	NT / < 0.50	< 5 / < 0.50	< 5 / < 0.50	1.8
Calcium	NT / 6,300	6,300	36,000 / 16,000	NT	NT / 12,000	NT / 17,000	18,000 / 18,000	17,000 / 8,400	-
Chromium	NT / 0.75 B	< 10	< 10 / 1.1 B	NT	NT / 2.6 B	NT / 1.2 B	< 10 / 2.7 B	< 10 / < 0.70	110
Cobalt	NT / < 0.90	< 10	< 10 / < 0.90	NT	NT / < 0.90	NT / < 0.90	< 10 / < 0.90	< 10 / < 0.90	73
Copper	NT / < 0.90	< 25	< 25 / < 0.90	NT	NT / 30	NT / < 0.90	< 25 / < 0.90	< 25 / < 0.90	140
Iron	NT / **3,700**	**9,000**	**6,900 / 2,500**	NT	NT / 1,200	NT / **3,600**	**5,800 / 15,000**	< 50 / 70	2,200
Lead	NT / 3.8 B	< 10	< 10 / 4.7 B	NT	NT / 4.5 B	NT / < 2.4	< 10 / 4.1 B	< 10 / 3.2 B	15 (4)
Magnesium	NT / 2,500	4,000	5,100 / 2,000	NT	NT / 8,700	NT / 1,400	4,900 / 2,800	6,300 / 2,600	-
Manganese	NT / 38	**95**	**530 / 130**	NT	NT / 72	NT / **270**	**84 / 96**	< 10 / 3.8 B	73
Mercury	NT / < 0.10	< 0.20	< 0.20 / < 0.10	NT	NT / < 0.10	NT / < 0.10	< 0.20 / < 0.10	< 0.20 / < 0.10	-
Nickel	NT / < 1.1	< 40	< 40 / < 1.1	NT	NT / < 1.1	NT / < 1.1	< 40 / < 1.1	< 40 / < 1.1	73
Potassium	NT / 2,400	1,700	11,000 / 3,700	NT	NT / 4,500	NT / 5,000	3,800 / 6,200	6,400 / 3,500	-
Selenium	NT / < 3.4	< 10	< 10 / < 3.4	NT	NT / < 3.4	NT / < 3.4	< 10 / < 3.4	< 10 / < 3.4	18
Silver	NT < 0.50	< 10	< 10 / < 0.50	NT	NT / < 0.50	NT / < 0.50	< 10 / < 0.50	< 10 / < 0.50	18
Sodium	NT / 7,300	24,000	33,000 / 15,000	NT	NT / 66,000	NT / 8,800	10,000 / 7,800	9,800 / 4,800	270,000
Thallium	NT / < 4.3	< 10	< 10 / < 4.3	NT	NT / < 4.3	NT / < 4.3	< 10 / < 4.3	< 10 / < 4.3	0.26
Vanadium	NT / < 0.70	< 10	< 10 / 2.1 B	NT	NT / 9.6 B	NT / 1.1 B	< 10 / 4.3 B	< 10 / < 0.70	26
Zinc	NT / 3.4 B	< 20	< 20 / 4 B	NT	NT / 20 B	NT / 4.5 B	< 20 / 46	26 / 4.3 B	1,100

Notes:

(1) EPA Region III Risk-based Concentration Criteria for Tap Water (9/2001)

(2) Virginia Groundwater Standard for Petroleum Hydrocarbons

(3) NT - Not tested

(4) USEPA Action Level for Lead in Drinking Water

K - Reported value may be biased high

J - Estimated concentration (result between MDL and PQL for organics)

B - Estimated concentration (result between MDL and PQL for inorganics)

E - Reported value is estimated because interference detected

Result / Result = March/April 1995 sampling result / April 2000 sampling result (select wells for VOCs and metals only)

Organics detected are bolded and italicized.

Concentrations above EPA Region III RBCs for tap water are bolded and shaded.

TABLE 2-6
DPT GROUNDWATER RESULTS (March/April 1995 Sampling Event)
LARC 60 SITE

Parameters	Sample ID and Results									EPA RBC Criteria(1)
	GW06-001	GW06-002	GW06-003	GW06-004	GW06-005	GW06-006	GW06-007	GW06-008	GW06-009	
VOCs (ug/l)										
Acetone	<25	<25	<25	<25	<25	<25	<25	<25	30	61
Benzene	<5 / <5(2)	<50 / <25	<5 / <5	<5	<5 / <5	<5 / <10	<5 / <5	<5 / <5	<5 / <10	0.32
cis 1,2-DCE	<5 / <5	**<50 / 150**	**20 / 13**	<5	<5 / <5	<5 / <10	<5 / <5	<5 / <5	<5 / <10	6.1
Ethylbenzene	<5	**530**	<5	<5	<5	<5	<5	<5	<5	130
Tetrachloroethene	<5 / <5	<50 / <25	**170 / 160**	<5	<5 / <5	<5 / <10	<5 / <5	<5 / <5	<5 / <10	1.1
Toluene	<5	**2,200 D**	<5	<5	<5	<5	<5	<5	6.4	75
Trichloroethene	<5 / <5	**<50 / 47**	**260 D / 180**	<5	<5 / <5	<5 / <10	<5 / <5	<5 / <5	<5 / <10	1.6
Vinyl acetate	<10	**220 J**	<10	<10	<10	<10	<10	<10	<10	41
Vinyl chloride	<10 / <5	<100 / <25	<10 / <5	<10	<10 / <10	<10 / 60R	<10 / <5	<10 / 21R	<10 / 85R	0.015
Xylenes	<5	**2,900**	<5	<5	<5	<5	<5	<5	<5	1,200
SVOCs (ug/l)										
m&p-cresol	<10	12	<10	<10	<10	<10	<10	<10	<10	-
2-Methylnaphthalene	<10	**57**	<10	<10	<10	<10	<10	12	<10	12
Naphthalene	<10	**81**	<10	<10	<10	<10	<10	<10	<10	0.65
TPH (mg/l)										
TPH as Gasoline	<0.05 / <0.5	**12 / 8**	<0.05 / <0.5	<0.05	<0.05 / <0.5	<0.05 / <0.5	<0.05 / <0.5	<0.05 / <0.5	0.18 / <0.5	1.0(3)
TPH as Diesel Fuel	<0.30	**21**	<0.30	<0.30	<0.30	<3.0	<0.30	<0.30	<3.0	1.0(3)
TPH as Heavy Oils	<1.0	<20	<1.0	<1.0	<1.0	<10	<1.0	<1.0	<10	1.0(3)
TPH as Fuel Oil	<1.0	<20	<1.0	<1.0	<1.0	<10	<1.0	<1.0	<1.0	1.0(3)
TPH as Kerosene	<0.30	<6.0	<0.30	<0.30	<0.30	<3.0	<0.30	<0.30	<3.0	1.0(3)
Total Metals (ug/l)										
Aluminum	NT(4)	NT	NT	860	NT	NT	**7,300**	NT	**9,900**	3,700
Arsenic	NT	NT	NT	< 10	NT	NT	**20**	NT	**54**	0.045
Barium	NT	NT	NT	14	NT	NT	74	NT	**330**	260
Cadmium	NT	NT	NT	< 5	NT	NT	< 5	NT	**6.8**	1.8
Calcium	NT	NT	NT	6,400	NT	NT	10,000	NT	70,000	-
Chromium	NT	NT	NT	19	NT	NT	**200**	NT	100	110
Cobalt	NT	NT	NT	< 10	NT	NT	< 10	NT	30	73
Copper	NT	NT	NT	< 25	NT	NT	63	NT	**250**	140
Iron	NT	NT	NT	**3,600 L**	NT	NT	**19,000 L**	NT	**52,000**	2,200
Lead	NT	NT	NT	< 5	NT	NT	**54**	NT	**460**	15 (5)
Magnesium	NT	NT	NT	1,300	NT	NT	3,400	NT	19,000	-
Manganese	NT	NT	NT	63	NT	NT	**160**	NT	**1,700**	73
Nickel	NT	NT	NT	< 40	NT	NT	< 40	NT	52	73
Potassium	NT	NT	NT	1,500	NT	NT	3,000	NT	9,800	-
Sodium	NT	NT	NT	4,100	NT	NT	7,300	NT	18,000	-
Vanadium	NT	NT	NT	10	NT	NT	26	NT	**33**	26
Zinc	NT	NT	NT	60	NT	NT	**1,200**	NT	**2,700**	1,100

Notes:

(1) EPA Region III Risk-based Concentration Criteria for Tap Water (Sept 2001)

(2) <20 / <10 = Savannah Lab result / Earth Tech on-site GC result

(3) BDL - Below detection limit

(4) NT - Not tested

(5) USEPA Action Level for Drinking Water

Concentrations above EPA Region III RBCs for tap water are bolded and shaded.

R - rejected value, on-site GC results for vinyl chloride not confirmed by Savannah Lab GC/MS analysis

D - Concentration from secondary dilution

L - Reported value may be biased low

TABLE 2-6
DPT GROUNDWATER RESULTS (March/April 1995 Sampling Event)

Parameters	Sample ID and Results								EPA RBC Criteria(1)
	GW06-010	GW06-011	GW06-012	GW06-013	GW06-014	GW06-015	GW06-016	GW06-017	
VOCs (ug/l)									
Benzene	<5 / <5(2)	<5	<5	<5	<5	<5	<5	<5	0.32
Chloroform	<5	**4.6 J**	<5	<5	<5	<5	<5	<5	0.15
cis 1,2-DCE	<5 / <5	3.5 J	<5	<5	<5	<5	<5	<5	6.1
Ethylbenzene	<5	6.6 J	<5	9.3 J	<5	<5	<5	<5	130
p-Isopropyl toluene	NA	2.3 J	NA	NA	NA	NA	NA	NA	--
Methylene chloride	<5	2.7 JB	<5	<5	<5	<5	<5	<5	4.1
MIBK	<25	<25	<25	<25	<25	<25	**54**	<25	14
Tetrachloroethene	<5 / <5	**16**	<5	<5	<5	<5	<5	<5	1.1
Trichloroethene	<5 / <5	**62 J**	<5	<5	<5	<5	<5	<5	1.6
1,2,4-Trimethylbenzene	NA	**5.6**	NA	NA	NA	NA	NA	NA	1.2
1,3,5-Trimethylbenzene	NA	**4.3 J**	NA	NA	NA	NA	NA	NA	1.2
Vinyl chloride	<10 / 200 R	<10	<10	<10	<10	<10	<10	<10	0.015
Xylenes	<5	37 J	<5	<5	<5	<5	<5	<5	1,200
SVOCs (ug/l)									
Acenaphthene	BDL	1 J	BDL	BDL	BDL	BDL	BDL	BDL	37
Bis(2-EH)phthalate	BDL	2 J	BDL	BDL	BDL	BDL	BDL	BDL	4.8
Di-n-butylphthalate	BDL	2 J	BDL	BDL	BDL	BDL	BDL	BDL	370
Fluorene	BDL	1 J	BDL	BDL	BDL	BDL	BDL	BDL	24
2-Methylnaphthalene	BDL	3 J	BDL	BDL	BDL	BDL	BDL	BDL	12
Naphthalene	BDL	**2.8 J**	BDL	BDL	BDL	BDL	BDL	BDL	0.65
Phenanthrene	BDL	2 J	BDL	BDL	BDL	BDL	BDL	BDL	--
TPH (mg/l)									
TPH as Gasoline	<0.05/<0.5	0.40	<0.05	0.25	<0.05	<0.05	<0.05	<0.05	1.0(4)
TPH as Diesel Fuel	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	1.0(4)
TPH as Heavy Oils	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0(4)
TPH as Fuel Oil	<1.0	**2.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0(4)
TPH as Kerosene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	1.0(4)
Total Metals (mg/l)	NT	NT	NT	NT	NT	NT	NT	NT	

Notes:

(1) EPA Region III Risk-based Concentration Criteria for Tap Water (Sept 2001)

(2) <5 / <5 = Savannah Lab result / Earth Tech on-site GC result

(3) BDL - Below detection limit

(4) Virginia Groundwater Standard for Petroleum Hydrocarbons

(5) NT - Not tested

Concentrations above EPA Region III RBCs for tap water are bolded and shaded.

NA - Not analyzed. Samples not analyzed by 8260 method like USACE NED lab did for QA split sample for GW06-011.

R - rejected value, on-site GC results for vinyl chloride not confirmed by Savannah Lab GC/MS analysis

J - Estimated value

TABLE 2-6
DPT GROUNDWATER RESULTS (March/April 1995 Sampling Event)
LARC 60 SITE

Parameters	Sample ID and Results								EPA RBC Criteria1)
	GW06-018	**GW06-019**	**GW06-020**	**GW06-021**	**GW06-022**	**GW06-023**	**GW06-024**	**GW06-025**	
VOCs (ug/l)									
Benzene	<5 / <5(2)	NT (3) / <5	NT / <5	<5 / <5	<5 / <5	NT / <5	NT / <5	<5	0.32
Carbon disulfide	10	NT	NT	<5	<5	NT	NT	<5	100
cis 1,2-DCE	<5 / <5	NT / <5	NT / <5	<5 / <5	<5 / <5	NT / <5	NT / <5	<5	6.1
MIBK	<25	<25	<25	<25	<25	<25	<25	**50**	14
Tetrachloroethene	<5 / <5	NT / <5	NT / <5	<5 / <5	<5 / <5	NT / <5	NT / <5	<5	1.1
Trichloroethane	<5 / <5	NT / <5	NT / <5	<5 / <5	<5 / <5	NT / <5	NT / <5	<5	1.6
Vinyl chloride	<10 / 110R	NT / 11R	NT / 24R	<10 / 56R	<10 / 18R	NT / 13R	NT / 24R	<10	0.015
SVOCs (ug/l)	NT	NT	NT	NT	NT	NT	NT	NT	
TPH (mg/l)									
TPH as Gasoline	<0.05 / <0.5	NT / <0.5	NT / <0.5	<0.05 / <0.5	<0.05 / <0.5	NT / <0.5	NT / <0.5	NT	1.0(4)
TPH as Diesel Fuel	NT	NT	NT	NT	NT	NT	NT	NT	1.0(4)
TPH as Heavy Oils	NT	NT	NT	NT	NT	NT	NT	NT	1.0(4)
TPH as Fuel Oil	NT	NT	NT	NT	NT	NT	NT	NT	1.0(4)
TPH as Kerosene	NT	NT	NT	NT	NT	NT	NT	NT	1.0(4)
Total Metals (mg/l)	NT	NT	NT	NT	NT	NT	NT	NT	

Notes:
(1) EPA Region III RBC Criteria for Tap Water (Sept 2001)
(2) < 5 / <5 = Savannah Lab result / Earch Tech on-site GC result
(3) NT - Not tested
(4) Virginia Groundwater Standard for Petroleum Hydrocarbons
Concentrations above EPA Region III RBCs for tap water are bolded and shaded.

R - rejected value, on-site GC results for vinyl chloride not confirmed by Savannah Lab GC/MS analysis

TABLE 2-7
VOC HISTORICAL MONITORING WELL GROUNDWATER RESULTS (1995 through 2004 Sampling Events)
LARC 60 SITE

Parameters	Well ID and Results (concentrations reported in ug/L)																	MCLs [1]	RBCs [2]
	6MW-1				6MW-2				6MW-3S					6MW-3D					
	1995	2000	2003	2004	1995	2000	2003	2004	1995	2000	2003	2004	2007	1995	2000	2003	2004		
Acetone	5 U	5 U	**4**	NT	5 U	NT	**5**	**270 D**	5 U	5 U	5 U	**17 J**	**3.8 B**	5 U	NT	5 U	**3.3**	---	550
Benzene	5 U	5 U	5 U	NT	5 U	NT	**0.1**	0.5 U	5 U	5 U	**0.6 J**	0.5 U	**0.2 JB**	5 U	NT	5 U	0.5 U	5	
Bromodichloromethane	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	80 [3]	
2-Butanone (MEK)	5 U	5 U	5 U	NT	5 U	NT	5 U	**21**	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	**2.5**	---	700
Carbon disulfide	5 U	5 U	5 U	NT	5 U	NT	5 U	**0.83**	5 U	5 U	5 U	0.5 U	**0.11 J**	5 U	NT	5 U	0.5 U	---	100
Chlorobenzene	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	100	
Chloroform	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	80 [3]	
Chloromethane	5 U	5 U	5 U	NT	5 U	NT	5 U	**0.23 JB**	5 U	5 U	5 U	**0.84 J**	0.5 U	5 U	NT	5 U	**0.21 J**	---	19
Cyclohexane	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	**0.21 JB**	5 U	NT	5 U	0.5 U	---	---
Dibromochloromethane	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	80 [3]	
1,2-Dichlorobenzene	5 U	5 U	NT	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	600	
1,3-Dichlorobenzene	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	75	
1,4-Dichlorobenzene	5 U	5 U	**0.3 J**	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	**0.3 JB**	0.5 U	---	0.47
Dichlorodifluoromethane	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	---	35
1,1-DCA	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	---	90
1,1-DCE	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	**1.3 J**	0.5 U	5 U	NT	5 U	0.5 U	7	
cis 1,2-DCE	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	**2 J**	**1 J**	**100**	**0.88**	5 U	NT	5 U	**0.33 J**	70	
trans 1,2-DCE	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	**0.87 J**	0.5 U	5 U	NT	5 U	0.5 U	100	
Ethylbenzene	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	700	
Isopropyl benzene	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	---	---
Methylcyclohexane	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	---	630
Methylene chloride	5 U	5 U	5 U	NT	5 U	NT	5 U	**0.52 B**	5 U	5 U	**0.3 J**	**3.3 JB**	0.5 U	5 U	NT	5 U	**0.47 JB**	5	
MIBK	5 U	**50**	5 U	NT	5 U	NT	5 U	2.5 U	5 U	**44**	13 U	2.5 U	2.5 U	5 U	NT	13 U	2.5 U	---	630
Styrene	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	100	
Tetrachloroethene	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 U	5 U	**0.4 J**	**62**	**0.33 J**	5 U	NT	5 U	0.5 U	5	
Toluene	5 U	5 U	**0.4 JB**	NT	5 U	NT	5 U	**0.29**	5 U	5 U	**0.8 J**	0.5 U	0.5 U	5 U	NT	**0.9 JB**	**0.42 J**	1,000	
1,2,4-Trichlorbenzene	5 U	5 U	**0.3 JB**	NT	5 U	NT	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	NT	5 U	0.5 U	70	
Trichloroethene	5 U	5 U	5 U	NT	5 U	NT	5 U	0.5 U	5 u	**1.3 J**	**1 J**	**140**	**1.9**	5 U	NT	5 U	0.5 U	5	
Vinyl chloride	5 U	10 U	5 U	NT	10 U	NT	5 U	0.5 U	10 U	**3.1 J**	**1 J**	**9.7**	0.5 U	10 U	NT	5 U	**0.2 J**	2	
Xylenes	5 U	10 U	5 U	NT	5 U	NT	5 U	1 U	5 U	10 U	5 U	1 U	1 U	5 U	NT	5 U	1 U	10,000	

Notes:

(1) USEPA MCLs - EPA Maximum Contaminant Levels for Drinking Water

(2) RBCs - EPA Risk-based Concentrations for Tap Water (April 2007)

(3) MCL is for Total Trihalomethanes

NT - Not tested

Qualifiers:

J - Estimated concentration (result between MDL and PQL for organics)

B - Detected in associated method blank

Organics detected are bolded and italicized.

62 Concentrations above MCLs or EPA Region III RBCs for tap water (if no MCL exists) are bolded and shaded.

TABLE 2-7
VOC HISTORICAL MONITORING WELL GROUNDWATER RESULTS (1995 through 2004 Sampling Events)
LARC 60 SITE

Parameters	Well ID and Results (concentrations reported in ug/L)																			MCLs [1]	RBCs [2]
	6MW-4				6MW-5S			6MW-5D		6MW-6		6MW-7			6MW-8		6MW-9				
	1995	2000	2003	2004	2003	2004	2007	2003	2004	2003	2004	2003	2004	2007	2003	2004	2003	2004	2007		
Acetone	5 U	5 U	5 U	NT	5 U	0.5 U	**4.5 B**	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	**2 JB**	5 U	0.5 U	**4 J**	0.5 U	**2.4 JB**	---	550
Benzene	5 U	5 U	5 U	NT	5 U	0.5 U	**0.15 JB**	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	**0.12 JB**	5 U	0.5 U	**0.2 J**	0.5 U	**0.24 JB**	5	
Bromodichloromethane	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	**0.83**	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	80 [3]	
2-Butanone (MEK)	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0. 5U	0. 5U	5 U	0. 5U	5 U	0. 5U	0. 5U	---	700
Carbon disulfide	5 U	5 U	5 U	NT	5 U	0.5 U	**0.11 J**	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	---	100
Chlorobenzene	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	**9**	0.5 U	0.5 U	100	
Chloroform	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	**3.3**	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	80 [3]	
Chloromethane	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	**0.18 J**	0.5 U	---	19
Cyclohexane	5 U	5 U	5 U	NT	5 U	0.5 U	**0.17 JB**	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	**0.17 JB**	5 U	0.5 U	5 U	0.5 U	**0.16 JB**	---	---
Dibromochloromethane	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	**0.12 J**	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	80 [3]	
1,2-Dichlorobenzene	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	**0.2 JB**	0.5 U	0.5 U	600	
1,3-Dichlorobenzene	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	**0.5 JB**	0.5 U	0.5 U	75	
1,4-Dichlorobenzene	5 U	5 U	**0.3 J**	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	**1 JB**	0.5 U	0.5 U	---	0.47
Dichlorodifluoromethane	5 U	5 U	5 U	NT	**0.3 J**	0.5 U	0.5 U	**0.3 J**	0.5 U	**0.3 J**	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	---	35
1,1-DCA	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	---	90
1,1-DCE	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	7	
cis 1,2-DCE	5 U	5 U	5 U	NT	5 U	**1.1**	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	**0.15 J**	5 U	0.5 U	0.5 U	70	
trans 1,2-DCE	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	100	
Ethylbenzene	5 U	5 U	5 U	NT	5 U	0. 5U	0. 5U	5 U	0.5 U	5 U	0. 5U	5 U	0. 5U	0. 5U	5 U	0. 5U	5 U	0.5 U	**0.11 J**	700	
Isopropyl benzene	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	---	---
Methylcyclohexane	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	---	630
Methylene chloride	5 U	5 U	5 U	NT	**0.25 J**	0.5 U	0.5 U	**0.3 J**	0.5 U	5 U	**0.2 J**	5 U	**0.15 J**	0.5 U	**0.3 J**	**0.14 J**	5 U	**0.44 JB**	0.5 U	5	
MIBK	5 U	**19**	13 U	NT	13 U	2.5 U	2.5 U	13 U	2.5 U	13 U	2.5 U	13 U	2.5 U	2.5 U	13 U	2.5 U	13 U	2.5 U	2.5 U	---	630
Styrene	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	100	
Tetrachloroethene	5 U	5 U	5 U	NT	5 U	**0.84**	0.5 U	5 U	0.5 U	5 U	0.5 U	**11**	**0.49 J**	**1.3**	5 U	0.5 U	5 U	0.5 U	0.5 U	5	
Toluene	5 U	5 U	**0.6 J**	NT	**1 JB**	0.5 U	0.5 U	**1 JB**	0.5 U	**1 JB**	0.5 U	**1 JB**	**0.1 J**	0.5 U	**0.7 J**	0.5 U	**0.5 JB**	**0.15 J**	0.5 U	1,000	
1,2,4-Trichlorbenzene	5 U	5 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	70	
Trichloroethene	5 U	5 U	5 U	NT	5 U	**1.7**	0.5 U	5 U	**0.10 JB**	5 U	0.5 U	5 U	0.5 U	0.5 U	**0.5 J**	**0.15 J**	5 U	0.5 U	0.5 U	5	
Vinyl chloride	10 U	10 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	2	
Xylenes	10 U	10 U	5 U	NT	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	10,000	

Notes:

(1) USEPA MCLs - EPA Maximum Contaminant Levels for Drinking Water

(2) RBCs - EPA Risk-based Concentrations for Tap Water (April 2007)

(3) MCL is for Total Trihalomethanes

NT - Not tested

Qualifiers:

J - Estimated concentration (result between MDL and PQL for organics)

B - Detected in associated method blank

Organics detected are bolded and italicized.

62 Concentrations above MCLs or EPA Region III RBCs for tap water (if no MCL exists) are bolded and shaded.

TABLE 2-7
VOC HISTORICAL MONITORING WELL GROUNDWATER RESULTS (1995 through 2004 Sampling Events)
LARC 60 SITE

Parameters	Well ID and Results (concentrations reported in ug/L)																MCLs (1)	RBCs (2)
	6MW-10	6MW-11		MW-115				MW-117					MW-118					
	2004	2004	2007	1995	2000	2003	2004	1995	2000	2003	2004	2007	1995	2000	2003	2004		
Acetone	**5.5**	0.5 U	**4.3 B**	5 U	5 U	5 U	**2.9**	5 U	5 U	**32**	0.5 U	**3.1 B**	5 U	5 U	5 U	**3**	---	550
Benzene	0.5 U	0.5 U	**0.18 JB**	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	**0.19 JB**	5 U	5 U	5 U	0.5 U	5	
Bromodichloromethane	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	80 (3)	
2-Butanone (MEK)	**4**	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	**1.5 J**	---	700
Carbon disulfide	**0.22 J**	0.5 U	**3.5**	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	**0.11 J**	5 U	5 U	5 U	0.5 U	---	100
Chlorobenzene	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	100	
Chloroform	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	80 (3)	
Chloromethane	**0.31 J**	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	**0.26 J**	---	19
Cyclohexane	0.5 U	0.5 U	**0.16 JB**	5 U	5 U	5 U	0.5 U	5 U	5 U	**15**	**2.7**	**0.51 B**	5 U	5 U	5 U	0.5 U	---	---
Dibromochloromethane	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	80 (3)	
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U	5 U5	5 U	**0.15 J**	**0.16 J**	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	600	
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	75	
1,4-Dichlorobenzene	0.5 U	0.5 U	0.5 U	5 U	5 U	**0.3 J**	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	---	0.47
Dichlorodifluoromethane	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	---	35
1,1-DCA	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	**0.34 J**	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	---	90
1,1-DCE	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	7	
cis 1,2-DCE	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	**0.3 J**	**20**	**1,900**	**22**	**24**	**2**	5 U	5 U	5 U	0.5 U	70	
trans 1,2-DCE	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	**0.25 J**	0.5 U	5 U	5 U	5 U	0.5 U	100	
Ethylbenzene	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	**66**	**76**	**29**	**6.8**	**1.4**	5 U	5 U	5 U	0.5 U	700	
Isopropyl benzene	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	**12**	**6.2**	0.5 U	5 U	5 U	5 U	0.5 U	---	---
Methylcyclohexane	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	**26**	**16**	**8.1**	5 U	5 U	5 U	0.5 U	---	630
Methylene chloride	**0.45 J**	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	0.5 U	**0.16 J**	5 U	5 U	5 U	**0.43 JB**	5	
MIBK	2.5 U	0.5 U	0.5 U	5 U	13 U	13 U	2.5 U	5 U	250 U	13 U	**4**	2.5 U	5 U	5 U	13 U	2.5 U	---	630
Styrene	**0.12 J**	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	50 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	100	
Tetrachloroethene	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	**8.5**	50 U	**2 J**	**0.67 J**	0.5 U	5 U	5 U	5 U	0.5 U	5	
Toluene	**0.36 J**	**0.17 J**	0.5 U	5 U	5 U	**0.7 J**	0.5 U	**68**	**310**	**1 JB**	**0.15 J**	0.5 U	5 U	5 U	**1 JB**	**0.27 J**	1,000	
1,2,4-Trichlorbenzene	**0.15 JB**	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5 U	50 U	5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	70	
Trichloroethene	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	**18**	50 U	**1 J**	0.5 U	0.5 U	5 U	5 U	5 U	0.5 U	5	
Vinyl chloride	0.5 U	0.5 U	0.5 U	10 U	10 U	5 U	0.5 U	10 U	**8.6 J**	5 U	0.5 U	0.5 U	10 U	10 U	5 U	0.5 U	2	
Xylenes	0.5 U	0.5 U	0.5 U	5 U	10 U	5 U	0.5 U	**290**	**450**	**130**	**65**	**13**	5 U	10 U	5 U	0.5 U	10,000	

Notes:

(1) USEPA MCLs - EPA Maximum Contaminant Levels for Drinking Water

(2) RBCs - EPA Risk-based Concentrations for Tap Water (April 2007)

(3) MCL is for Total Trihalomethanes

NT - Not tested

Qualifiers:

J - Estimated concentration (result between MDL and PQL for organics)

B - Detected in associated method blank

Organics detected are bolded and italicized.

62 Concentrations above MCLs or EPA Region III RBCs for tap water (if no MCL exists) are bolded and shaded.

TABLE 2-8

HAZARD ASSESSMENT FOR SURFACE SOILS - LARC 60 SITE

Parameter	Frequency of Detection	Range of Detection	TBC Criteria			EPA Carcinogen Class (3)	Potential Concern?
			Virginia Petroleum Program (1)	EPA RBC Criteria			
				Industrial Soils (2)	Residential Soils (2)		
VOCs (ug/kg)							
Acetone	1/22	36	-	20,000,000	780,000	D	
Methylene Chloride	7/22	5.2 - 160	-	760,000	85,000	B2	
Toluene	3/22	5.1 - 12	-	41,000,000	1,600,000	D	
Trichloroethene	2/22	5.9 - 6.4	-	520,000	58,000	B2	
SVOCs (ug/kg)	0/22	-					
TPH (mg/kg)							
Total TPH	19/22	42 - 1,500	100	-	-	-	
PCBs (ug/kg)							
Aroclors	0/8	-	-	2,900	320	B2	
Pesticides (ug/kg)							
BHC (beta)	1/8	1.6	-	3,200	350	B2	
Chlordane (alpha)	1/8	0.51	-	16,000	1,800	B2	
Chlordane (gamma)	2/8	0.49 - 0.63	-	16,000	1,800	B2	
DDD	4/8	1.2 - 4.3	-	24,000	2,700	B2	
DDE	4/8	0.3 - 13	-	17,000	1,900	B2	
DDT	7/8	0.55 - 39	-	17,000	1,900	B2	
Dieldrin	1/8	0.47	-	360	40	B2	

TABLE 2-8

HAZARD ASSESSMENT FOR SURFACE SOILS - LARC 60 SITE

Parameter	Frequency of Detection	Range of Detection	TBC Criteria			EPA Carcinogen Class (3)	Potential Concern?
			Virginia Petroleum Program (1)	EPA RBC Criteria			
				Industrial Soils (2)	Residential Soils (2)		
Total Metals (mg/kg)							
Aluminum	5/5	250 - 2,700	-	100,000	7,800	-	
Arsenic	1/5	1.1	-	3.8	0.43	A	**Yes**
Barium	5/5	1.8 - 19	-	14,000	550	-	
Calcium	4/5	56 - 980	-	-	-	-	
Chromium	5/5	1.7 - 4.3	-	610	23	-	
Cobalt	1/5	2.3	-	4,100	160	-	
Copper	4/5	2.5 - 41	-	8,200	310	D	
Iron	5/5	400 - 1,100	-	120,000	4,700	-	
Lead	5/5	3.1 - 12	-	1,200	400	B2	
Magnesium	4/5	77 - 1,400	-	-	-	-	
Manganese	5/5	2.4 - 120	-	4,100	160	D	
Potassium	1/5	1,200	-	-	-	-	
Vanadium	5/5	1.2 - 9.2	-	1,400	55	D	
Zinc	5/5	3.8 - 33	-	61,000	2,300	D	

Notes:

(1) Virginia Department of Environmental Quality Petroleum Program Manual (March 1995)

(2) EPA Region III RBC Criteria for Industrial/Residential Soils (Sept 2001)

(3) Weight of Evidence Classification:

A = Human carcinogen

B1 = Probable human carcinogen, limited human data

B2 = Probable human carcinogen, sufficient evidence in animals or no evidence in humans

C = Possible human carcinogen

D = Not classified as to carcinogenicity

TABLE 2-9
HAZARD ASSESSMENT FOR GROUNDWATER
LARC 60 SITE

Parameters	Frequency of Detection	Range of Detection	ARARs				TBC Criteria		EPA Carcinogen Class(7)	Potential Concern?
			EPA MCLs(1)	EPA Secondary MCLs(2)	Virginia GW Stds(3)	Va GW Protection Levels(4)	Virginia GW Criteria(5)	EPA RBC Criteria(6) Tap Water		
VOCs (ug/l)										
cis 1,2-DCE	2/6	2 - 1,900	70	-	-	-	-	6.1	D	**Yes**
Ethylbenzene	1/6	76	700	-	-	-	-	130	D	
MIBK	3/6	19 - 50	-	-	-	-	-	14	D	**Yes**
Toluene	1/6	310	1,000	-	-	1,000	-	75	D	**Yes**
TCE	1/6	1.3	5	-	-	5	-	1.6	B2	
Vinyl chloride	2/6	3.1 - 8.6	2	-	-	2	-	0.015	B2	**Yes**
Xylenes	1/6	450	10,000	-	-	-	-	1,200	D	
SVOCs (ug/l)										
2-Methylnaphthalene	1/8	20	-	-	-	-	-	12	D	**Yes**
Naphthalene	1/8	32	-	-	-	-	-	0.65	D	**Yes**
Pesticides/PCBs (ug/l)	0/6	-	-	-	-	-	-	-	-	
Total TPH (mg/l)	2/8	2.7 - 6.3	-	-	1	1	-	-	-	
Dissolved Metals (ug/l)										
Aluminum	3/6	14 - 300	-	50 - 200	-	-	-	3,700	-	
Antimony	2/6	2.8 - 5.4	6	-	-	-	-	1.5	-	**Yes**
Arsenic	1/6	14	50	-	-	-	-	0.045	B2	**Yes**
Barium	6/6	5 - 21	1,000	-	1,000	1,000	-	260	-	
Calcium	6/6	6,300 - 18,000	-	-	-	-	-	-	-	
Chromium	5/6	0.75 - 2.7	100	-	50	50	-	11	-	
Copper	1/6	30	1,300	-	1,000	1,000	-	140	D	
Iron	6/6	70 - 15,000	-	300	-	-	300	2,200	-	**Yes**
Lead	5/6	3.2 - 4.7	15	-	-	-	-	-	-	
Magnesium	6/6	1,400 - 8,700	-	-	-	-	-	-	-	
Manganese	6/6	3.8 - 270	-	50	-	-	50	73	D	**Yes**
Potassium	6/6	2,400 - 6,200	-	-	-	-	-	-	-	
Sodium	6/6	4,800 - 66,000	-	-	270,000	270,000	100,000	-	-	
Vanadium	4/6	1.1 - 9.6	-	-	-	-	-	26	-	
Zinc	6/6	3.4 - 46	-	5,000	50	50	-	1,100	D	

TABLE 2-9
HAZARD ASSESSMENT FOR GROUNDWATER
LARC 60 SITE

Parameters	Frequency of Detection	Range of Detection	ARARs				TBC Criteria		EPA Carcinogen Class(7)	Potential Concern?
			EPA MCLs(1)	EPA Secondary MCLs(2)	Virginia GW Stds(3)	Va GW Protection Levels(4)	Virginia GW Criteria(5)	EPA RBC Criteria(6) Tap Water		

Notes:

(1) U.S. EPA Maximum Contaminant Levels for Drinking Water (40 CFR 141)
(2) U.S. EPA Secondary Maximum Contaminant Levels for Drinking Water (40 CFR 143)
(3) Virginia Groundwater Quality Standards
(4) Virginia Groundwater Protection Levels from Solid Waste Regulations
(5) Virginia Water Quality Criteria for Groundwater
(6) EPA Region III Risk-based Concentration Table for Tap Water (Sept 2001)
(7) Weight-of-Evidence Classifications
A = Human carcinogen
B1 = Probable human carcinogen, limited human data
B1 = Probable human carcinogen, sufficient data in animals
C = Possible human carcinogen
D = Not classified as to carcinogenicity

TABLE 2-10
HAZARD ASSESSMENT FOR SEDIMENT
LARC 60 SITE

Parameter	Frequency of Detection	Range of Detection	TBC Criteria			EPA Carcinogen Class(3)	Potential Concern?
			Virginia Petroleum Program(1)	EPA Region III RBC Criteria			
				Industrial Soils(2)	Residential Soils(2)		
VOCs (ug/kg)	0/2	-					
SVOCs (ug/kg)	0/2	-					
TPH (mg/kg)							
Total TPH	2/2	530 - 2,700	100	-	-	-	
Total Metals (mg/kg)							
Aluminum	2/2	310 - 650	-	100,000	7,800	-	
Barium	2/2	1.4 - 2.7	-	14,000	550	-	
Calcium	2/2	53 - 210	-	-	-	-	
Chromium	2/2	1.6 - 2.5	-	610	23	-	
Copper	2/2	3.8 - 9.0	-	8,200	310	D	
Iron	2/2	310 - 940	-	120,000	4,700	-	
Lead	2/2	8.2 - 14	-	1,200	400	B2	
Magnesium	2/2	110 - 250	-	-	-	-	
Manganese	2/2	3.4 - 6.9	-	4,100	160	D	
Sodium	1/2	70	-	-	-	-	
Vanadium	2/2	1.3 - 2.7	-	1,400	55	D	
Zinc	2/2	11 - 30	-	61,000	2,300	D	

Notes:

(1) Virginia Department of Environmental Quality Petroleum Program Manual (March 1995)

(2) EPA Region III RBC Criteria for Industrial/Residential Soils (Sept 2001)

(3) Weight-of-Evidence Classification:
A = Human carcinogen
B1 = Probable human carcinogen, limited human data
B2 = Probable human carcinogen, sufficient evidence in animals or no evidence in humans
C = Possible human carcinogen
D = Not classified as to carcinogenicity

TABLE 2-11
HAZARD ASSESSMENT FOR SURFACE WATER
LARC 60 SITE

Parameters	Frequency of Detection	Range of Detection	ARARs				EPA RBC [3]	EPA Carcinogen Class [4]	Potential Concern?
			Virginia SW (Freshwater) Quality Standards[1]		Federal AWQC (Freshwater)[2]				
			Water/Fish	Fish Cons.	Water/Fish	Fish Cons.			
VOCs (ug/l)									
Acetone	2/2	30 - 35	-	-	-	-		D	
SVOCs (ug/l)	0/2	BDL							
Total TPH (mg/l)	0/2	BDL							
Total Metals (ug/l)									
Aluminum	2/2	390 - 420	-	-	-	-	3,700	-	
Calcium	2/2	11,000 - 12,000	-	-	-	-	-	-	
Iron	2/2	840 - 1,400	300	-	-	-	2,200	-	**Yes**
Lead	2/2	7.8 - 9.0	15	-	50	-	-	B2	
Magnesium	2/2	15,000 - 17,000	-	-	-	-	-	-	
Manganese	2/2	83 - 140	50	-	-	-	73	D	**Yes**
Potassium	2/2	9,100 - 9,400	-	-	-	-	-	-	
Sodium	1/2	120,000	-	-	-	-	-	-	
Zinc	2/2	40 - 62	5,000	-	-	-	1,100	D	

Notes:

(1) Virginia Surface Water Quality Standards

(2) Federal Ambient Water Quality Criteria (40 CFR 131)

(3) Weight of Evidence Classification:

A = Human carcinogen

B1 = Probable human carcinogen, limited human data

B2 = Probable human carcinogen

C = Possible human carcinogen

D = Not classified as to carcinogenicity

(4) EPA Region III Risk-based Concentration Table for Tap Water (Oct 2000)
Non-carcinogenic RBCs have been adjusted to a hazard quotient of 0.1

TABLE 2-12

HAZARD ASSESSMENT FOR SURFACE AND SUBSURFACE SOILS - LARC 60 SITE

Parameter	Frequency of Detection	Range of Detection	TBC Criteria			EPA Carcinogen Class (3)	Potential Concern?
			Virginia Petroleum Program (1)	EPA RBC Criteria			
				Industrial Soils (2)	Residential Soils (2)		
VOCs (ug/kg)							
Acetone	5/49	36 - 200	-	20,000,000	780,000	D	
sec-Butyl benzene	1/4	2.6	-	8,200,000	310,000	D	
Ethylbenzene	1/49	2.3	-	20,000,000	780,000	D	
Isopropyl benzene	1/4	1.8	-	-	-	D	
p-Isopropyl toluene	1/4	9.1	-	-	-	D	
Methylene Chloride	19/49	5.2 - 220	-	760,000	85,000	B2	
Methyl ethyl ketone	5/49	31 - 44	-	120,000,000	4,700,000	D	
n-Propyl benzene	1/4	4.3	-	820,000	310,000	D	
Styrene	3/49	1.8 - 9.2	-	41,000,000	1,600,000	D	
Tetrachloroethene	3/49	8.8 - 71	-	110,000	12,000	B2	
Toluene	8/49	5.1 - 13	-	41,000,000	1,600,000	D	
1,2,3-Trichloroethane	1/4	2.7	-	-	-	D	
Trichloroethene	5/49	5.9 - 16	-	520,000	58,000	B2	
1,2,4-Trimethylbenzene	1/4	29	-	10,000,000	390,000	D	
1,3,5-Trimethylbenzene	1/4	26	-	10,000,000	390,000	D	
Xylenes	1/49	11	-	41,000,000	1,600,000	D	
SVOCs (ug/kg)							
Benzo(a)anthracene	1/49	27	-	7,800	870	B2	
Benzo(b)fluoranthene	1/49	36	-	7,800	870	B2	
Benzo(k)fluoranthene	1/49	47	-	78,000	8,700	B2	
Benzo(g,h,I)perylene	1/49	24	-	-	-	D	
Benzo(a)pyrene	1/49	35	-	780	87	B2	
Bis(2-EH)phthalate	1/49	51	-	410,000	46,000	B2	
Chrysene	1/49	33	-	780,000	87,000	B2	
Di-n-butylphthalate	1/49	59	-	20,000,000	780,000	D	
Fluoranthene	1/49	55	-	8,200,000	310,000	D	
Naphthalene	1/49	4	-	4,100,000	160,000	D	
Pyrene	1/49	50	-	6,100,000	230,000	D	
TPH (mg/kg)	19/22	42 - 1,500	100	-	-	-	
PCBs (ug/kg)	0/8	-	-	2,900	320	B2	

TABLE 2-12

HAZARD ASSESSMENT FOR SURFACE AND SUBSURFACE SOILS - LARC 60 SITE

Parameter	Frequency of Detection	Range of Detection	TBC Criteria			EPA Carcinogen Class (3)	Potential Concern?
			Virginia Petroleum Program (1)	EPA RBC Criteria			
				Industrial Soils (2)	Residential Soils (2)		
Pesticides (ug/kg)							
BHC (beta)	1/8	1.6	-	3,200	350	B2	
Chlordane (alpha)	1/8	0.51	-	16,000	1,800	B2	
Chlordane (gamma)	2/8	0.49 - 0.63	-	16,000	1,800	B2	
DDD	4/8	1.2 - 4.3	-	24,000	2,700	B2	
DDE	4/8	0.3 - 13	-	17,000	1,900	B2	
DDT	7/8	0.55 - 39	-	17,000	1,900	B2	
Dieldrin	1/8	0.47	-	360	40	B2	
Total Metals (mg/kg)							
Aluminum	11/11	250 - 2,700	-	100,000	7,800	-	
Arsenic	3/11	0.86 - 1.1	-	3.8	0.43	A	**Yes**
Barium	11/11	1.8 - 19	-	14,000	550	-	
Cadmium	1/11	0.18	-	100	0.39	D	
Calcium	11/11	43 - 980	-	-	-	-	
Chromium	11/11	1.5 - 4.3	-	610	23	-	
Cobalt	2/11	0.79 - 2.3	-	4,100	160	-	
Copper	7/11	2.5 - 41	-	8,200	310	D	
Iron	11/11	400 - 1,100	-	120,000	4,700	-	
Lead	11/11	1.3 - 17	-	1,200	400	B2	
Magnesium	8/11	56 - 1,400	-	-	-	-	
Manganese	11/11	2.4 - 120	-	4,100	160	D	
Mercury	1/11	4.6	-	-	-	D	
Nickel	1/11	0.81	-	4,100	160	D	
Potassium	2/11	37 - 1,200	-	-	-	-	
Silver	1/11	0.51	-	1,000	39	D	
Vanadium	10/11	1.2 - 9.2	-	1,400	55	D	
Zinc	11/11	3 - 33	-	61,000	2,300	D	

Notes:

(1) Virginia Department of Environmental Quality Petroleum Program Manual (March 1995)

(2) EPA Region III RBC Criteria for Industrial/Residential Soils (Sept 2001)

(3) Weight of Evidence Classification:

A = Human carcinogen

B1 = Probable human carcinogen, limited human data

B2 = Probable human carcinogen, sufficient evidence in animals or no evidence in humans

C = Possible human carcinogen

D = Not classified as to carcinogenicity

TABLE 2-13
ECOLOGICAL ASSESSMENT FOR SURFACE SOIL
LARC 60 SITE

Parameter	Frequency of Detection	Range of Detection	TBC Criteria: EPA Region III BTAG Screening Levels (1)		Exceed or Lacking Criteria?
			Flora	Fauna	
VOCs (ug/kg)					
Acetone	1/22	36	-	-	**Yes**
Methylene Chloride	7/22	5.2 - 160	-	<300.0	
Toluene	1/22	6.0	-	100.0	
Trichloroethene	2/22	5.9 - 6.4	-	<300.0	
SVOCs (ug/kg)	0/22	BDL			
TPH (mg/kg)					
Total TPH	19/22	42 - 1500	-	-	**Yes**
Metals (mg/kg)					
Aluminum	5/5	250 - 2,700	1.0	-	**Yes**
Arsenic	1/5	1.1	328.0	-	**Yes**
Barium	5/5	1.8 - 19	440.0	440.0	
Calcuim	4/5	56 - 980	-	-	
Chromium	5/5	1.7 - 4.3	0.02	0.0075	**Yes**
Cobalt	1/5	2.30	100.0	220.0	
Copper	4/5	2.5 - 41	15.0	-	**Yes**
Iron	5/5	400 - 1,100	3,260.0	12.0	**Yes**
Lead	5/5	3.1 - 12	2	0.01	**Yes**
Magnesium	4/5	77 - 1,400	-	-	
Manganese	5/5	2.4 - 120	330.0	330.0	
Potassium	1/5	1,200	-	-	
Vanadium	5/5	1.2 - 9.2	0.5	58.0	**Flora**
Zinc	5/5	3.8 - 33	10.0	-	**Yes**

Notes:

(1) EPA Region III BTAG Screening Levels for Ecological risks (Aug 1995)

(2) James M. Montgomery, Inc. 1992.

(3) Comor et al, 1975.

TABLE 2-14
ECOLOGICAL ASSESSMENT FOR SEDIMENT
LARC 60 SITE

Parameter	Frequency of Detection	Range of Detection	TBC Criteria: EPA Region III BTAG Screening Levels [1]		Exceed or Lacking Criteria?
			Flora	Fauna	
VOCs (ug/kg)	0/2	BDL			
SOCs (ug/kg)	0/2	BDL			
TPH (mg/kg)					
Total TPH	2/2	530 - 2700	-	-	**Yes**
Inorganics (mg/kg)					
Aluminum	2/2	310 - 650	-	-	**Yes**
Barium	2/2	1.4 - 2.7	-	-	**Yes**
Calcium	2/2	53 - 210	-	-	
Chromium	2/2	1.6 - 2.5	0.005	260	**Flora**
Copper	2/2	3.8 - 9.0	-	34	
Iron	2/2	310 - 940	-	-	**Yes**
Lead	2/2	8.2 - 14	-	46.7	
Magnesium	2/2	110 - 250	-	-	
Manganese	2/2	3.4 - 6.9	-	-	**Yes**
Sodium	1/2	70.00	-	-	
Vanadium	2/2	1.3 - 2.7	-	-	**Yes**
Zinc	2/2	11 - 30	-	150.0	

Notes:
(1) EPA Region III BTAG Screening Levels for Ecological Risks (August 1995)

TABLE 2-15
ECOLOGICAL ASSESSMENT FOR SURFACE WATER
LARC 60 SITE

Parameter	Frequency of Detection	Range of Detection	TBC Criteria		ARARs				Exceed or Lacking Criteria
			EPA Region III BTAG Screening (Freshwater) [1]		Virginia SW (Freshwater) Quality Standards[2]		Federal AWQC (Freshwater)[3]		
			Flora	Fauna	Acute	Chronic	Acute	Chronic	
VOCs (ug/l)									
Acetone	2/2	30 - 35	-	9,000,000	-	-	-	-	
SVOCs (ug/l)	0/2	BDL							
TPH (mg/l)									
Total TPH	0/2	BDL							
Total Metals (ug/l)									
Aluminum	2/2	0.39 - 0.42	460	25	-	-	-	-	
Calcium	2/2	11 - 12	-	-	-	-	-	-	
Iron	2/2	0.84 - 1.4	-	320	-	-	-	-	
Lead	2/2	0.0078 - 0.009	-	3.2	14	0.54	82	3.2	
Magnesium	2/2	15 - 17	-	-	-	-	-	-	
Manganese	2/2	0.083 - 0.14	-	14,500	-	-	-	-	
Potassium	2/2	9.1 - 9.4	-	-	-	-	-	-	
Sodium	1/2	120.0	-	-	-	-	-	-	
Zinc	2/2	0.04 - 0.062	30	110	-	-	120	110	

Notes:
(1) EPA Region III BTAG Screening Levels for Aquatics in Surface Water (Aug 1995)
(2) Virginia Surface Water Quality Standards (VR 680-21-01.14)
(3) Federal Ambient Water Quality Criteria (40 CFR 131)

TABLE 2-17
SUMMARY OF EXPOSURE ESTIMATES AND HAZARD QUOTIENTS
LARC 60 SITE

Chemical (mg/kg)	Northern Bobwhite			White-footed Mouse			Gray Fox		
	EE_{total}	NOAEL	HQ	EE_{total}	NOAEL	HQ	EE_{total}	NOAEL	HQ
	mg/kg BW-day			mg/kg BW-day			mg/kg BW-day		
Aluminum	1.46E+01	1.07E+02	1.37E-01	7.74E+01	2.12E+00	3.65E+01	1.42E+00	3.63E-01	3.92E+00
Barium	8.71E-02	1.87E+01	4.66E-03	3.54E-01	1.27E+01	2.78E-02	6.64E-03	2.18E+00	3.05E-03
Copper	2.64E+00	5.89E+01	4.49E-02	1.29E+01	4.15E+01	3.11E-01	2.41E-01	7.09E+00	3.40E-02
Iron	2.11E+01	NA	NA	1.12E+02	NA	NA	2.06E+00	NA	NA
Lead	2.96E-01	3.45E+00	8.58E-02	1.40E+00	1.99E+01	7.02E-02	2.59E-02	3.44E+00	7.54E-03
Manganese	2.69E-01	9.90E+02	2.71E-04	9.64E-01	2.20E+02	4.39E-03	1.82E-02	3.76E+01	4.86E-04
Vanadium	6.10E-02	2.18E+01	2.80E-03	3.22E-01	5.20E-01	6.19E-01	5.92E-03	9.00E-02	6.58E-02
Zinc	5.76E+00	5.74E+00	1.00E+00	2.61E+01	3.99E+02	6.53E-02	4.92E-01	6.83E+01	7.20E-03

Notes:

BW = Body Weight

NA = Not Available

EE_{total} = Total Estimated Exposure from Media and Food

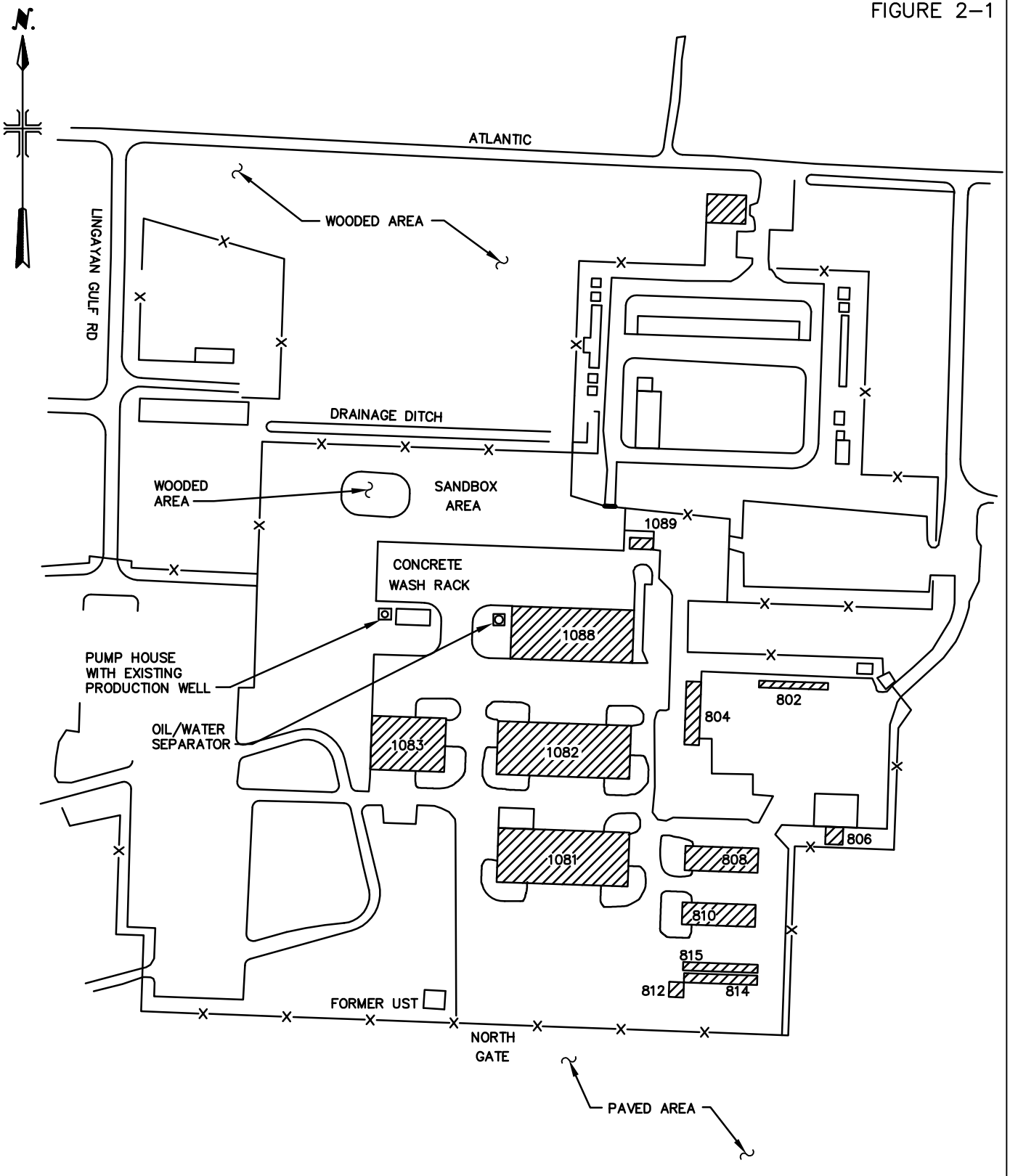
NOAEL = No Observed Adverse Effects Level

HQ = Hazard Quotient

Shading indicates Hazard Quotients greater than 1

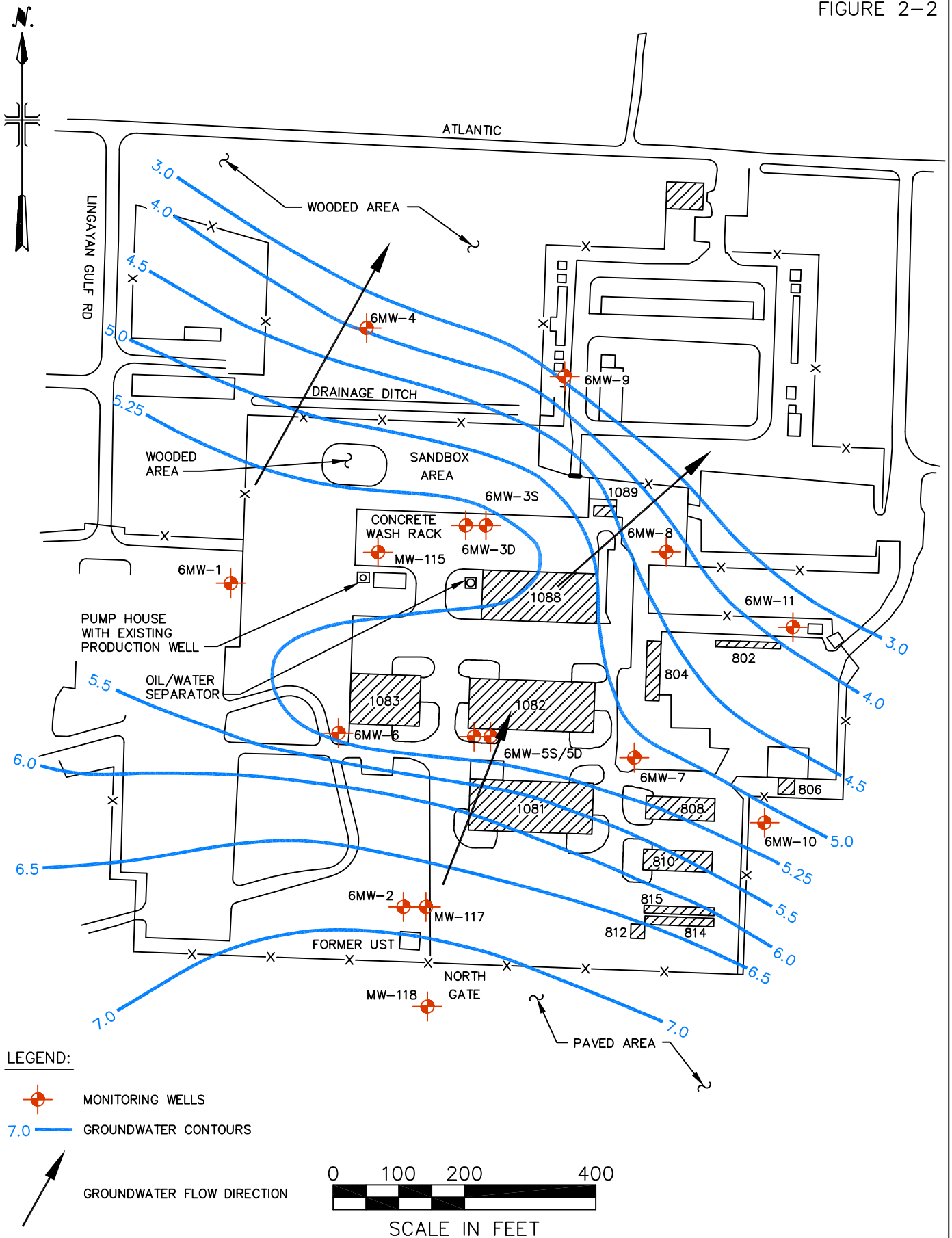
Decision Document
LARC 60 Maintenance Area Site
Fort Story, Virginia

FIGURE 2–1



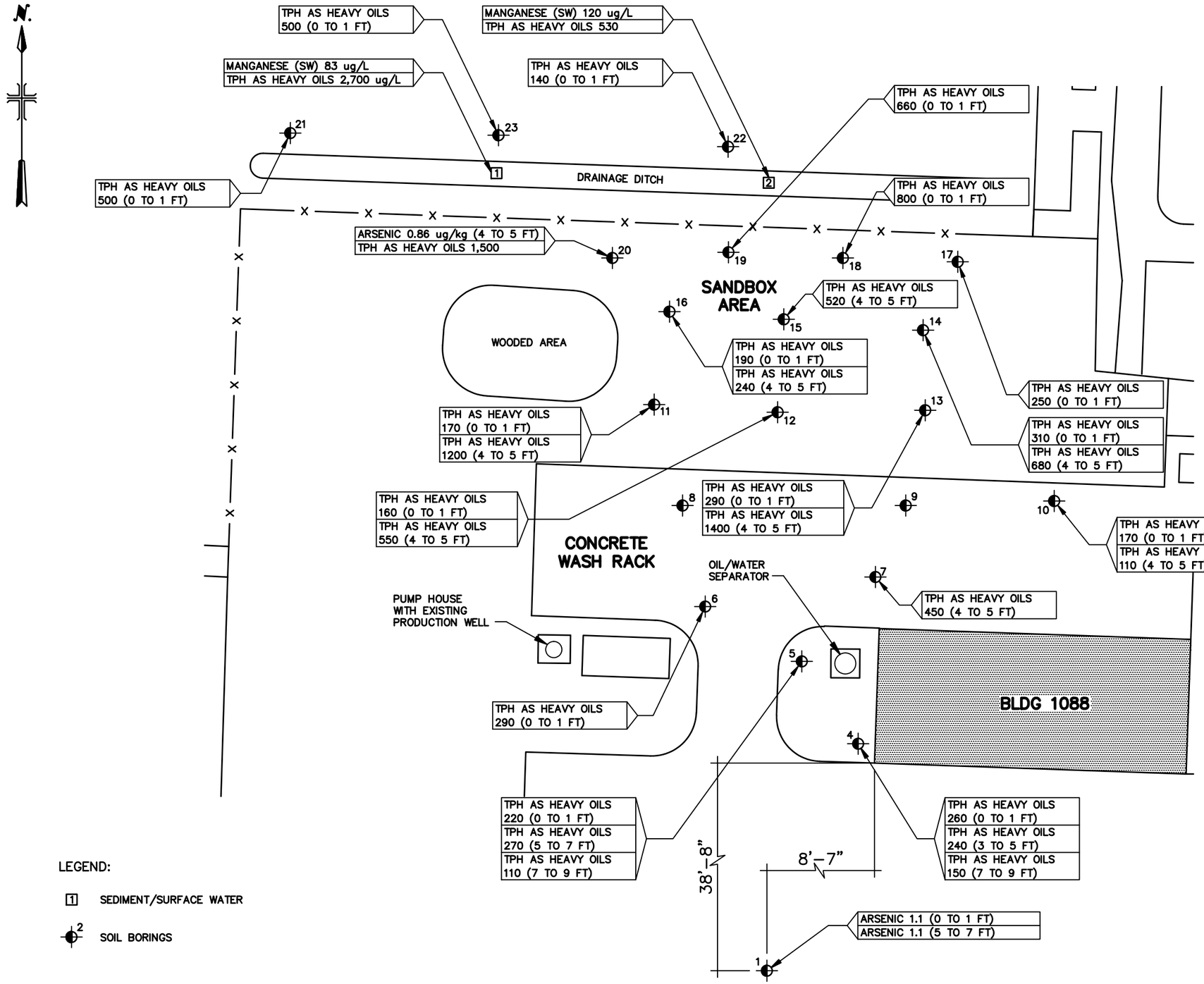
MALCOLM PIRNIE	FORT STORY, VIRGINIA DECISION DOCUMENT LARC 60 MAINTENANCE AREA SITE MAP	MALCOLM PIRNIE, INC. SEPTEMBER 2008

FIGURE 2-2



MALCOLM PIRNIE	FORT STORY, VIRGINIA DECISION DOCUMENT LARC 60 MAINTENANCE AREA GROUNDWATER CONTOUR MAP	MALCOLM PIRNIE, INC. SEPTEMBER 2008

FIGURE 2-3



LEGEND:

[1] SEDIMENT/SURFACE WATER

2 SOIL BORINGS

NOTE:
CONCENTRATIONS IN mg/kg UNLESS OTHERWISE NOTED.

0 30 60 120

SCALE IN FEET

MALCOLM PIRNIE

FORT STORY, VIRGINIA

DECISION DOCUMENT

LARC 60 SOIL, SEDIMENT AND SURFACE WATER CONCENTRATIONS ABOVE EPA SCREENING CRITERIA

MALCOLM PIRNIE, INC.

SEPTEMBER 2008