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NCBC GULFPORT  
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FINAL DECISION DOCUMENT FOR SITE 3 NORTHWEST LANDFILL WITH TRANSMITTAL  
LETTER NCBC GULFPORT MS  
9/9/2013  
TETRA TECH



Document Tracking Number 13JAX0121

September 9, 2013

Project Number 112G01310

Naval Facilities Engineering Command Southeast  
ATTN: Robert Fisher, P.G. (EV3)  
Remedial Project Manager  
Room 231, Building 135N  
Ajax Street  
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Reference: CLEAN IV Contract Number N62467-04-D-0055  
Contract Task Order Number 0106

Subject: Final Decision Document for Site 3 (Northwest Landfill)  
Naval Construction Battalion Center Gulfport, Mississippi

Dear Mr. Fisher:

Tetra Tech is pleased to submit the final Decision Document for Site 3 (Northwest Landfill) at Naval Construction Battalion Center (NCBC) Gulfport along with the living compact disc (CD) for CTO 0106.

If you have any questions with regard to this submittal, please contact me via e-mail at [Gregory.Roof@TetraTech.com](mailto:Gregory.Roof@TetraTech.com) or by phone at (904) 730-4669, extension 215.

Sincerely,

A handwritten signature in black ink, appearing to read 'Gregory S. Roof'.

Gregory S. Roof, P.E.  
Task Order Manager

GSR/lc

c: Gordon Crane, NCBC Gulfport (2 hardcopies, 1 CD)  
Bob Merrill, MDEQ (1 hardcopy, 1 CD)  
Mike Jaynes, Tetra Tech (1 hardcopy)  
Jon Overholtzer, CH2M Hill (1 hardcopy, 1 CD)  
Debbie Humbert, Tetra Tech (1 unbound, 1 CD)  
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## 1.0 DECLARATION

### 1.1 SITE NAME AND LOCATION

Site 3 – Northwest Landfill at Naval Construction Battalion Center (NCBC) Gulfport, Gulfport, Mississippi.

### 1.2 STATEMENT OF BASIS AND PURPOSE

This Decision Document (DD) presents the selected remedy for previously land filled wastes and associated contaminated soils and groundwater at Site 3 – Northwest Landfill (see Figure 1-1) chosen by the U. S. Department of the Navy in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). As further detailed below, the selected remedy includes landfill soil cover construction; monitored natural attenuation of site groundwater; and the application of land use controls to preclude cover disturbance, incompatible land uses, or exposure to site groundwater until applicable groundwater cleanup levels have been achieved. This DD documents the final remedial action for this site and does not include or affect any of the other sites at NCBC Gulfport. This decision is based on information contained in the Administrative Record for the site. Information not specifically summarized in this DD or its references but contained in the Administrative Record has been considered and is relevant to the selection of the remedy; thus, the DD is based upon and relies upon the entire Administrative Record file for the site in making the decision. As a supporting agency under CERCLA, the Mississippi Department of Environmental Quality (MDEQ), acting on behalf of the State of Mississippi, has reviewed this document and concurs in the remedy selected herein.

### 1.3 ASSESSMENT OF SITE

The response action selected in this DD is necessary to protect the public health and welfare and the environment from actual or threatened releases of hazardous substances into the environment. A CERCLA action is required because the contents of the landfill, concentrations of polynuclear aromatic hydrocarbons (PAHs) and metals in soil, and concentrations of volatile organic compounds (VOCs) in groundwater pose unacceptable risk to human health under current and hypothetical future land use scenarios.

### 1.4 DESCRIPTION OF SELECTED REMEDY

The remedy selected for the Site 3 landfill is based in large part upon established U. S. Environmental Protection Agency (USEPA) “presumptive remedy” guidance for the selection of appropriate CERCLA remedies at closed military landfill sites. That guidance entitled “Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills (December 1996)” relies upon previously conducted scientific and engineering evaluations of remedy performance data at municipal landfill sites nationwide by the USEPA. It encourages the use of certain preferred technologies for qualifying historical landfill sites. This allows for an increased consistency in the timely investigation and implementation, where needed, of protective yet cost effective remedies for such sites. The Navy, with MDEQ concurrence, has determined that the tailored presumptive remedy selected is the best remedial approach for Site 3, based upon the age and location of that landfill, characteristics of the materials previously disposed in the landfill (primarily household, commercial, and industrial solid wastes), and sampling data evidencing a lack of significant methane gas emissions and low concentrations of contaminants in the surficial aquifer beneath the facility.



FIGURE 1-1. NCBC GULFPORT SITES

The specific components of the selected remedy for Site 3 include the following:

- Construction of a soil cover to preclude direct contact with buried waste and prevent future migration of impacted soils (compacted soils to be added where needed to achieve 2-foot minimum cover across the site);
- Land Use Controls (LUCs) to prohibit other than recreational uses, to prohibit landfill cover disturbance, and prevent the future use of groundwater.
- Monitored Natural Attenuation (MNA) of site groundwater to reduce contaminant concentrations in groundwater over time and detect potential off-site migration of contaminants.

The selected remedy is expected to achieve substantial long-term risk reduction and allow the property to be used for its current and reasonably anticipated future land use, which is recreational. This DD documents the final remedial action for Site 3 and does not include or affect any other sites at the facility. Implementation of this remedy will allow reuse of the site that does not disturb the landfill cover, which is consistent with current use and the overall cleanup strategy for NCBC Gulfport of restoring sites to support base operations where possible.

## 1.5 STATUTORY DETERMINATIONS

The selected remedy will be protective of human health and the environment, comply with federal and state requirements that are applicable or relevant and appropriate to the remedial action, be cost-effective, and utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The selected remedy will not satisfy CERCLA's preference for remedies utilizing treatment as a principal element to permanently and significantly reduce the toxicity, volume or mobility of hazardous substances. However, as expressed in the above referenced USEPA guidance, the USEPA generally expects the use of waste containment as the presumptive remedy for landfills of this type, where the wastes present pose relatively low long-term threat. (See also the NCP at 40 Code of Federal Regulations [CFR] Section 300.430(a)(iii)(B) ).

To fulfill the requirements of CERCLA Section 121 and the NCP, reliance upon a suitably tailored application of the USEPA's complete presumptive remedy for the Site 3 landfill is appropriate for the following reasons:

- Risks are low level except for hot spots. Soil, groundwater, surface water, and sediment data collected during the remedial investigation (RI) in 2008 indicated that concentrations of most analytes were less than MDEQ target remediation goals (TRGs) except for the groundwater plume and areas of landfill surface soil not covered following land fill closure.
- Treatment of wastes is usually impractical due to the volume and heterogeneity of the waste. The majority of the material identified at Site 3 was non-hazardous debris and household-type wastes, which were incinerated during landfill operations. Treatment options include excavation and incineration or relocation to another landfill, neither of which provides more protectiveness than allowing the waste to remain in place.
- Waste types include household, commercial, nonhazardous sludge, and industrial waste solids. The Initial Assessment Study (IAS) reported that 16,000 tons of non-hazardous solids and debris were disposed in cells across the site, and that the waste was generated from on-site operations.
- Lesser quantities of hazardous wastes are present as compared to municipal wastes. The hot spots at the site represent a very small volume of the total waste. Additionally, based upon analytical data collected to date, the majority of the waste is unlikely to exhibit hazardous waste characteristics.

- > Land application units, surface impoundments, injection wells, and waste piles are not included.  
There is no reported history or any visual evidence of these at Site 3.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site in excess of levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years after initiation of the remedial action in conjunction with the remainder of the sites at NCBC Gulfport. The five-year reviews will continue until the site is returned to a condition allowing unrestricted use and unrestricted exposure.

**1.6 DD DATA CERTIFICATION CHECKLIST**

The locations in Section 2.0, Decision Summary, of the information required to be included in the DD are summarized in Table 1-1. Additional information can be found in the Administrative Record file for NCBC Gulfport.

| TABLE 1-1. DECISION DOCUMENT DATA CERTIFICATION CHECKLIST   |                               |
|---|-------------------------------|
| DATA  | LOCATION IN DECISION DOCUMENT |
| Constituents of concern (COCs) and their respective concentrations  | Sections 2.5 and 2.7          |
| Baseline risk represented by the COCs   | Section 2.7                   |
| Cleanup levels established for COCs and the basis for these levels  | Sections 2.7 and 2.8          |
| How source materials constituting principal threats are addressed   | Section 2.11                  |
| Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the risk assessment                | Section 2.6                   |
| Potential land and groundwater uses that will be available at the site as a result of the selected remedy   | Section 2.12.3                |
| Estimated capital, operating and maintenance (O&M), and total net present worth (NPW) costs; discount rate; and number of years over which the remedy costs are projected | Appendix A                    |
| Key factors that led to the selection of the remedy   | Section 2.12.1                |

If contamination posing an unacceptable risk to human health or the environment is discovered after execution of this DD and is shown to be a result of Navy activities, the Navy will undertake the necessary actions to ensure continued protection of human health and the environment.

**1.7 AUTHORIZING SIGNATURE**



P. J. Odenthal  
CAPT, CEC, USN  
Commanding Officer, NCBC

6 SEP 13

Date

## 2.0 DECISION SUMMARY

### 2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

NCBC Gulfport is located on the western side of the City of Gulfport in Harrison County, Mississippi, and is a shore activity under the Commander in Chief, United States Atlantic Fleet, with a mission to support operating units of the Naval Construction Force including Naval Mobile Construction Battalions (NMCBs) One, Eleven, Seventy-four, and One Thirty-Three, the Naval Construction Group Two, Naval Construction Training Center (NCTC), and other smaller tenant activities. The mission of the facility is to prepare for and support all facets of the mobilization of Naval construction forces including reserve units. NCBC Gulfport is also responsible for preservation and storage of war reserves including construction equipment and materials.

Site 3 is an approximately 2.6-acre former landfill located in the northwestern portion of NCBC Gulfport within the study area shown on Figure 2-1. The landfill area is located northwest of the intersection of 8<sup>th</sup> Street and Colby Avenue and is adjacent to the western bank of Canal No. 1, a storm water ditch that drains the western part of the facility. Site 3 was operated as a landfill from 1948 to the mid-1960s during which time nearly all of the solid waste and some of the liquid/chemical waste generated at NCBC Gulfport were disposed at the site. The solid waste generated by base activities was placed in trenches and burned on a daily basis prior to backfilling. From 1997 until 2010, Site 3 was part of the 16<sup>th</sup> fairway and 18<sup>th</sup> tee of the Pine Bayou Golf Course operated by NCBC Gulfport Morale, Welfare, and Recreation. The area currently is not in use and is potentially planned for future use as a recreational (e.g., soccer) field for base personnel.

NCBC Gulfport is an active facility, and environmental investigations and remediation at the facility are funded under the Environmental Restoration, Navy program. Consistent with the NCP including 40 CFR Part 300.5, the Navy serves as lead agency for CERCLA activities at the facility and MDEQ, on behalf of the State of Mississippi, serves as a support agency.

### 2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Table 2-1 provides brief summaries of previous investigations at Site 3. Results of these investigations indicated potential risk to human receptors from elevated concentrations of PAHs and metals in soil and VOCs in groundwater at the site.

There have been no cited violations under federal or state environmental law or any past or pending enforcement actions pertaining to the cleanup of Site 3.

### 2.3 COMMUNITY PARTICIPATION

The Navy performs public participation activities in accordance with CERCLA and the NCP throughout the site cleanup process at NCBC Gulfport. The Navy has a comprehensive community relations program for NCBC Gulfport, and community relations activities are conducted in accordance with the NCBC Gulfport Community Involvement Plan. These activities include regular technical and Restoration Advisory Board (RAB) meetings and the establishment of an Information Repository at the local library for dissemination of information to the community.

The Navy organized the RAB in October 1994 to review and discuss NCBC Gulfport environmental issues with local community officials and concerned citizens. The RAB consists of representatives of the Navy, MDEQ, and members of the community. The RAB has met frequently since its inception and now meets quarterly. Site 3 investigation activities, results, and associated remedial decisions have been discussed at RAB meetings.



FIGURE 2-1. SITE LOCATION

| <b>TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION</b>           |             |  |
|--|-------------|--|
| <b>INVESTIGATION</b>   | <b>DATE</b> | <b>ACTIVITIES</b>  |
| <b>IAS</b>   | 1985        | Included a records search, on-site survey, site ranking, and an outline for the confirmation study. Nine potentially contaminated sites were identified, and six sites were recommended for confirmation study.  |
| <b>Verification Report (Confirmation Study)</b>                            | 1987        | Included a geophysical survey to identify landfill boundaries and installation of three monitoring wells for Site 3. Surface water and sediment samples were collected from one location in the drainage ditch adjacent to 8 <sup>th</sup> Street and analyzed for VOCs, semivolatile organic compounds (SVOCs), pesticides, herbicides, and metals. No significant contamination was detected in the groundwater, surface water, or sediment; however, only one of the monitoring wells was located downgradient of the waste disposal area.  |
| <b>Base-Wide Groundwater, Surface Water, and Sediment Sampling Program</b> | 1995        | Investigated groundwater conditions at the six sites identified in the IAS and surface water and sediment quality in the NCBC Gulfport drainage systems. The samples were analyzed for VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs), chlorinated herbicides, petroleum hydrocarbons, and dioxins/furans. Lead and thallium in groundwater exceeded screening values. Surface water and sediment sample results were less than screening values for Site 3.  |
| <b>Groundwater Monitoring Investigation</b>                                | 1999        | Included installation and sampling of two downgradient monitoring wells at Site 3. Groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, chlorinated herbicides, and dioxins/furans. The results suggested that no significant levels of contamination were migrating off site via groundwater.   |
| <b>Investigation to Support Housing Environmental Assessment</b>           | 2006        | Investigation to identify potential effects of Site 3 on base construction projects. The investigation included a geophysical survey to identify waste disposal cells and a passive soil gas survey to identify VOC hot spots. Eighty groundwater samples were collected from 23 locations and analyzed for VOCs at a mobile laboratory. A VOC plume was delineated in the waste disposal area. Sixteen surface water and sediment samples were collected from drainage features on and adjacent to Site 3 and analyzed for VOCs, SVOCs, pesticides, PCBs, chlorinated herbicides, and metals. Data from this investigation were incorporated into the RI. |
| <b>Final RI</b>  | 2011        | Included surface and subsurface soil samples from 10 locations. An area of PAH contamination was detected near the southeastern corner of the site. Twenty-four monitoring wells were installed and sampled for VOCs, SVOCs, pesticides, PCBs, chlorinated herbicides, and metals. The VOC plume at the site was delineated. Staff gauges were installed at the site to investigate groundwater/surface water interaction. RI data were used to conduct a quantitative Human Health Risk Assessment (HHRA) and Screening-Level Ecological Risk Assessment (SLERA).   |
| <b>Landfill Cover Assessment</b>   | 2009        | Included preliminary screening of landfill gas generation under current site conditions and measurement of existing cover material properties including vertical hydraulic conductivity and grain size.  |
| <b>Draft-Final Feasibility Study (FS)</b>                                  | 2010        | Included identification of Remedial Action Objectives (RAOs) and the development and evaluation of remedial alternatives. Established the suitability of the presumptive remedy including waste containment, LUCs, and long-term monitoring (LTM).   |
| <b>Proposed Plan</b>   | 2010        | Presented the Navy's initial proposed waste containment presumptive remedy consistent with Section 117 (a) of CERCLA and Section 300.430(f)(2) of the NCP to involve the community in the site remedy decision-making process. It reflected the Navy's contemplated inclusion of a low permeability cap and gas venting system, which has since been determined not to be necessary.   |

The NCBC Gulfport Information Repository is located at the Gulfport Public Library, 1708 25<sup>th</sup> Avenue, Gulfport, Mississippi 39501. Documents and other relevant information relied on in the remedy selection process are available for public review at the Information Repository, which includes a copy of the

Administrative Record. For access to the Administrative Record or additional information about the Environmental Restoration (ER) Program at NCBC Gulfport, contact Gordon Crane, Restoration Manager, Naval Construction Battalion Center, 2401 Upper Nixon Avenue, Gulfport, Mississippi 39501, (228) 229-0446.

In accordance with Sections 113 and 117 of CERCLA, the Navy provided a public comment period from July 15 to August 16, 2010, for the proposed remedial action described in the Proposed Plan for Site 3. A public meeting to present the Proposed Plan was held on July 15, 2010, at the Isiah Fredericks Community Center. Public notice of the meeting and availability of documents were published in the Gulfport Sun-Herald on July 11, 2010.

## 2.4 SCOPE AND ROLE OF THE ACTION

Site 3 is part of a comprehensive environmental investigation and cleanup program currently being performed at NCBC Gulfport. ER Program cleanup activities are being performed under CERCLA guidance. Ten ER sites have been identified at NCBC Gulfport including five former landfills. Remedial actions have been completed at four sites (Sites 5, 6, 8, and 10), and LTM activities are being conducted. The remedial action for Site 4 has been implemented, the remedial investigation for Site 1 has been completed, and investigations are underway for two sites (Sites 2 and 7). Site 9 was initially included in the ER program but was later determined not to warrant further investigation.

Investigations at Site 3 indicated the presence of waste material, soil and groundwater contamination from past operating practices that may pose unacceptable risk to current and potential future human receptors. Previous actions taken in response to the contamination at Site 3 are summarized in Table 2-1. The remedy documented in this DD will achieve the RAOs for Site 3 as listed in Section 2.8. Implementation of this remedy will allow non-residential reuse of the site, which is consistent with current and reasonably anticipated future use and the overall cleanup strategy for NCBC Gulfport of restoring sites to support base operations.

## 2.5 SITE CHARACTERISTICS

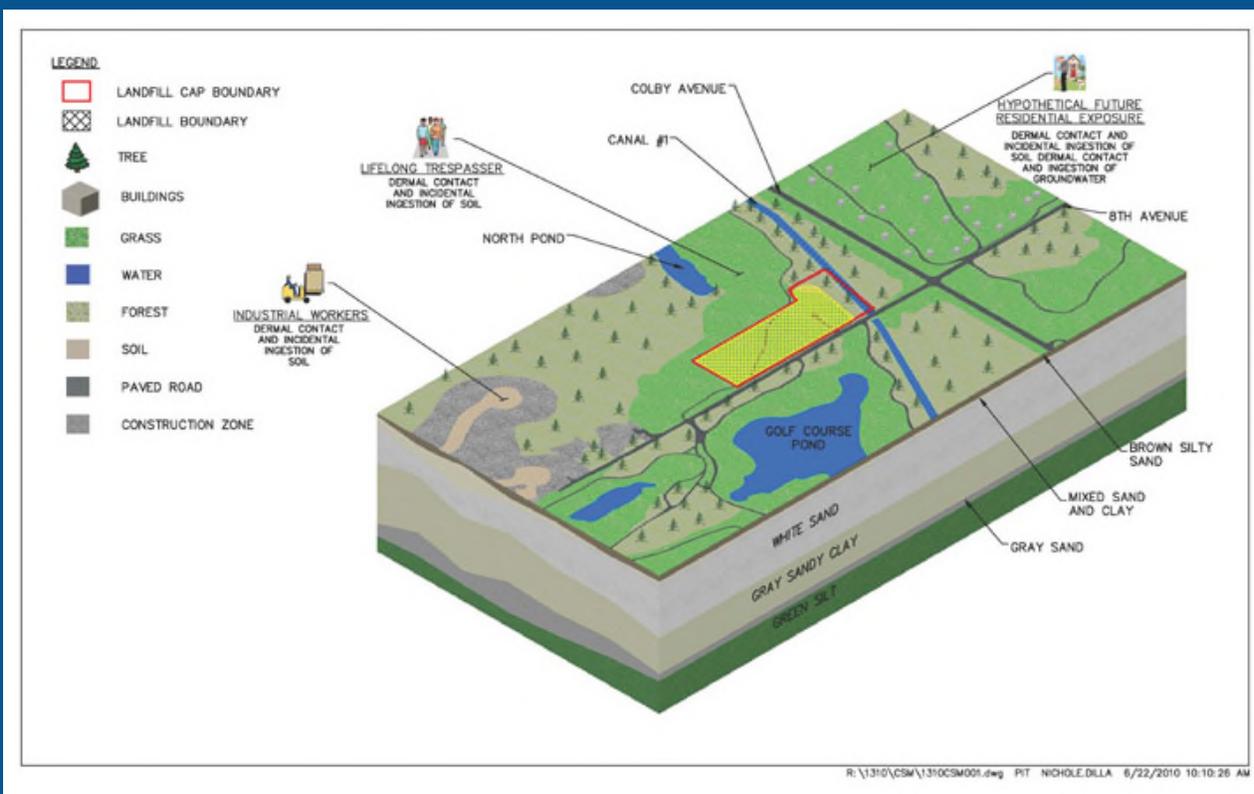
Figure 2-2 presents the Site 3 Conceptual Site Model (CSM), which identifies the waste disposal area, media of concern, and receptors under current and future land use scenarios. At Site 3, the waste disposal boundary was established based on the results of a geophysical survey, which indicated an approximately rectangular landfill including smaller disposal cells or trenches (see Figure 2-3). Within the landfill area, significantly more buried material was detected in the southwestern portion of the site.

Visual observations of the drilling spoils at 45 locations further aided the definition of the waste disposal area. Some of the material and the soil matrix showed indications of burning. These findings are consistent with the reported disposal activities at Site 3.

The presence of chlorinated VOCs (CVOCs) in groundwater is consistent with waste disposal practices and base operations that have included the use of solvents in degreasing activities, particularly degreasing of new military equipment from manufacturers. Although no definitive source of VOC contamination in groundwater was identified, it is suspected that chemical wastes disposed in the landfill were the likely sources of Site 3 contamination, and leaching to groundwater and downgradient flow are the transport mechanisms.

Chemicals (PAHs and arsenic) detected in surface soil at Site 3 appear to have resulted from typical golf course maintenance activities and the addition of fill from an unknown source during golf course construction. Buried waste in the landfill cells was considered the primary source for contaminants at the site. Surface soil was considered a secondary source of contaminants because it is fill material of unknown origin emplaced after landfill operations had ceased and may have been affected by normal golf course activities not related to the landfill operation. Soil arsenic concentrations, however, are in the range of that expected for this area of Mississippi.

FIGURE 2-2. CONCEPTUAL SITE MODEL

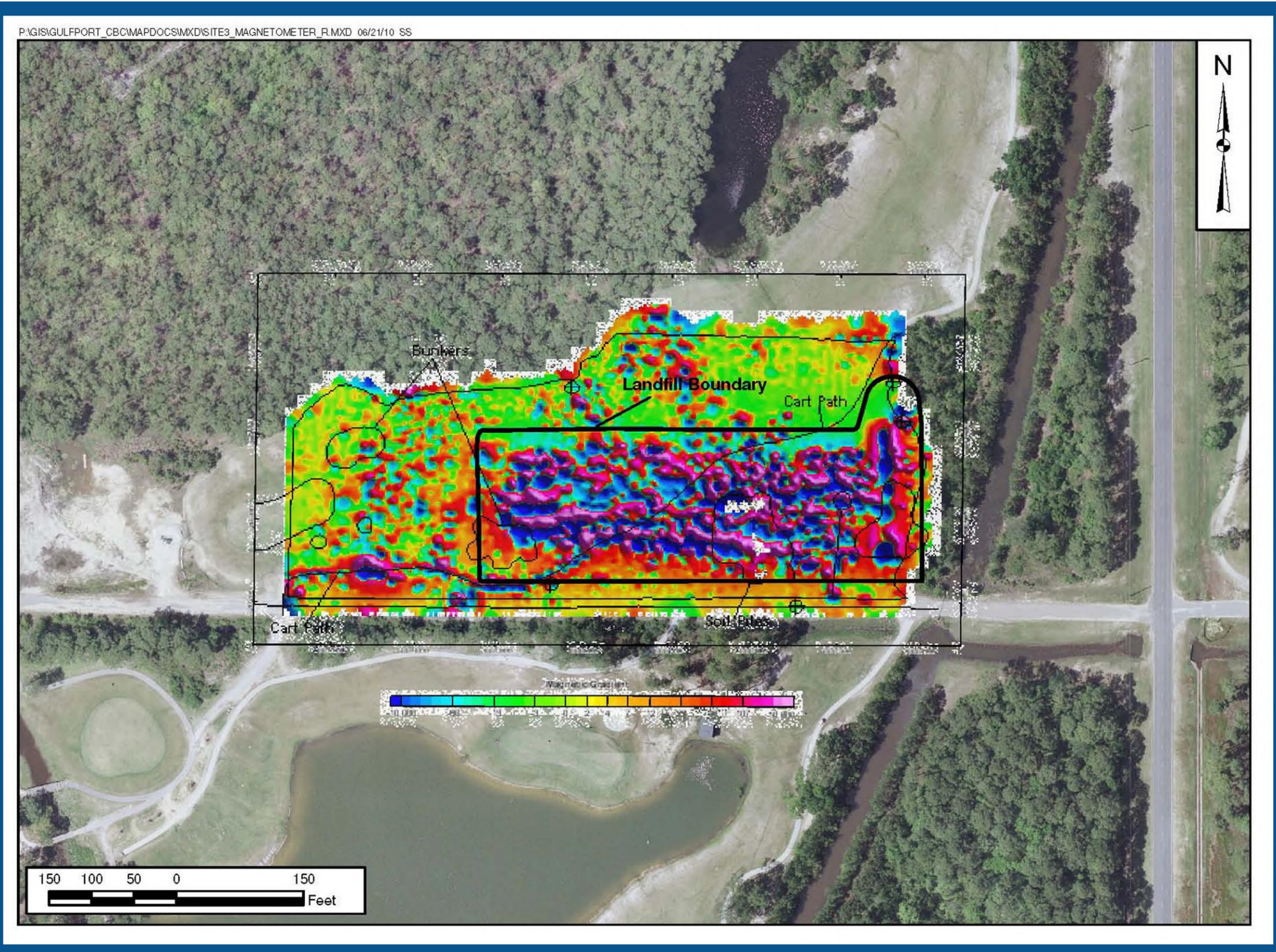


The former disposal area at Site 3 is located on the 16<sup>th</sup> and 18<sup>th</sup> holes of the former Pine Bayou Golf Course. The majority of the site is located on the former fairway of the 16<sup>th</sup> hole, and the eastern end of the disposal area is adjacent to the former tee box of the 18<sup>th</sup> hole. The site is bordered on all sides by facilities of the former Pine Bayou Golf Course. Large trees are present on the eastern side of the disposal area adjacent to Canal No. 1. The site topography is relatively flat on both sides of 8<sup>th</sup> Street, with elevations of approximately 20 to 24 feet above mean sea level (msl) on the northern side and approximately 23 feet msl on the southern side.

Canal No. 1, the primary drainage feature that drains the western part of the station, is approximately 50 feet east of the disposal area. At Site 3, Canal No. 1 is approximately 4 feet deep and 35 feet wide. On the southern side of disposal area, 8<sup>th</sup> Street and the associated drainage swale act as a drainage barrier for surface water runoff, separating the areas north and south of the road. The ditches and shallow swales along both sides of the road direct surface water flow to Canal No. 1 to the east.

Surface and shallow subsurface soils in the Site 3 area are primarily gray and brown sand to sandy clay with varying amounts of gravel and minor clay horizons. The uppermost 2 feet in most areas is fill material used in the construction of the golf course over the landfill. Landfill material and black soil horizons were observed from 4 to 8 feet below land surface (bls) at soil boring locations advanced in the landfill area. Below the landfill material, typical lithologies are light brown and gray fine sands and silty fine sands. These strata are typical of Pleistocene and Recent terrace and stream valley deposits. Some horizons contain stringers of fine, subrounded, quartz gravel, or shell fragments to depths of up to 20 feet.

FIGURE 2-3. GEOPHYSICAL INVESTIGATION RESULTS



The top of a gray silty clay and clay unit is encountered at depths of approximately 15 to 20 feet, depending on site topography. This clay-rich layer is persistent across the site with thicknesses ranging from 15 to 20 feet. Below the gray clayey sand layer, gray silty sand and sand lithologies are present at depths ranging from 35 to 40 feet. This sand unit is 5 to 10 feet thick over most of the site but pinches out and is absent at the eastern end of the site.

At approximately 45 feet bls, a much more plastic green-gray clayey silt layer was encountered. This layer is persistent across the site and, based on other sites investigated at NCBC Gulfport, ranges from 10 to 150 feet thick. At the eastern end of the site, where the gray sand unit pinches out, the green-gray silt layer was found at a depth of 35 feet and was in direct contact with the overlying gray clayey sand unit. This layer may represent an aquitard that separates the shallow surficial aquifer from deeper water bearing units of the Citronelle Formation and Graham Ferry Formation, which typically occur at depths greater than 200 feet.

Three surface water bodies adjacent to Site 3 (Canal No. 1, Golf Course Pond, and North Pond) receive or have the potential to receive surface water runoff from the site and have an influence on the hydrology of the surficial aquifer. The Golf Course Pond and the North Pond were excavated after 1972 after landfill operations (1948 to mid-1960s) ceased at Site 3. Canal No. 1 is the primary drainage ditch for the western portion of NCBC Gulfport. As part of the Turkey Creek drainage basin, Canal No. 1 is a year round stream that flows north past Site 3 and exits the base at Outfall 1. Canal No. 1 continues north from the base along Canal Road until it joins Turkey Creek. From there, surface water is conveyed to the east until it enters Gulfport Lake and the Back Bay of Biloxi.

### **2.5.2 Nature and Extent and Fate and Transport of Contamination**

A dissolved CVOC groundwater plume of approximately 90,000 square feet was delineated at Site 3 within which concentrations of vinyl chloride, cis-1,2-dichloroethene (DCE), trans-1,2-DCE, and trichloroethene (TCE) exceeded MDEQ Tier 1 TRGs (see Figures 2-4 and 2-5). Comparison of analytical data from shallow and deep well pairs indicate that the CVOC plume is limited to the uppermost sand zone of the shallow surficial aquifer, to a depth of approximately 24 feet, and has not migrated vertically beyond the shallow surficial aquifer.

Arsenic concentrations were detected in nine wells in the southern part of the site. Because elevated arsenic concentrations occur upgradient of the landfill and do not increase appreciably in the downgradient direction beyond the landfill, arsenic does not appear to be related to waste disposal activities. Elevated iron concentrations were also observed in the majority of the wells containing elevated arsenic concentrations. Both of these metals are commonly found in soil and groundwater in this portion of the United States and are believed to be anthropogenic or background values.

PAH concentrations exceeding screening criteria were limited to three surface soil sample locations (see Figure 2-6). Vinyl chloride was detected in one subsurface soil sample at a concentration greater than the soil screening level for soil to groundwater.

Analytical results for surface water and sediment samples collected in the northwestern corner of the base from water bodies not directly associated with Site 3 indicated the presence of the same contaminants detected at Site 3 at concentrations similar to those found at Site 3. These results suggest that the contaminant levels reported in Site 3 surface water and sediment samples reflect base-wide conditions and do not result from releases from the landfill at Site 3.

P:\GIS\GULFPORT\_CBC\MAPDOCS\APRISITES3 APR. DPT GW LAYOUT 6/21/10 SS

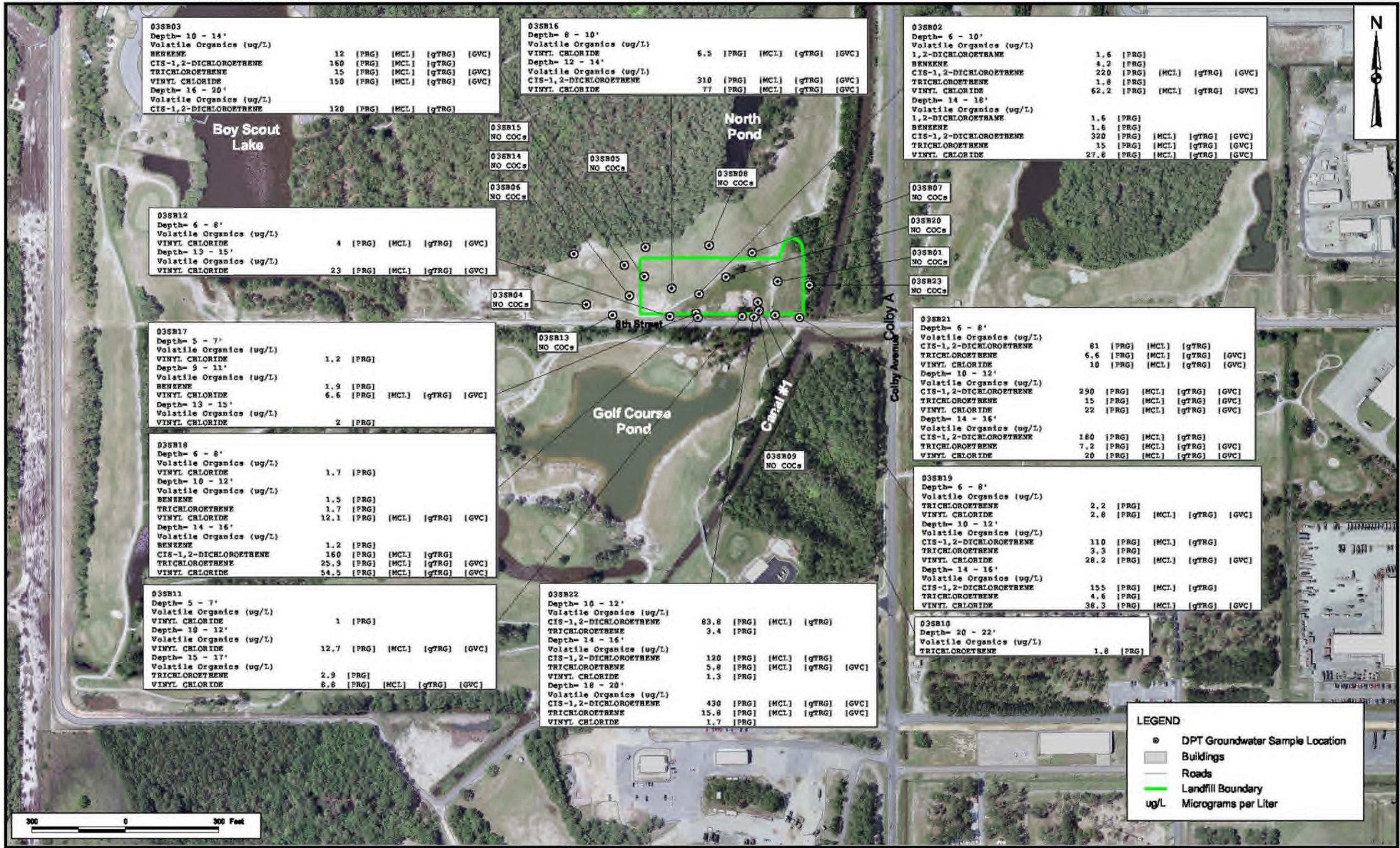


FIGURE 2-4. DPT GROUNDWATER INVESTIGATION RESULTS

FIGURE 2-5. MONITORING WELL GROUNDWATER RESULTS



P:\GIS\GULFPORT\_CBC\MAPDOCS\SITE03.APR SURFACE LAYOUT 02/1/10 SS

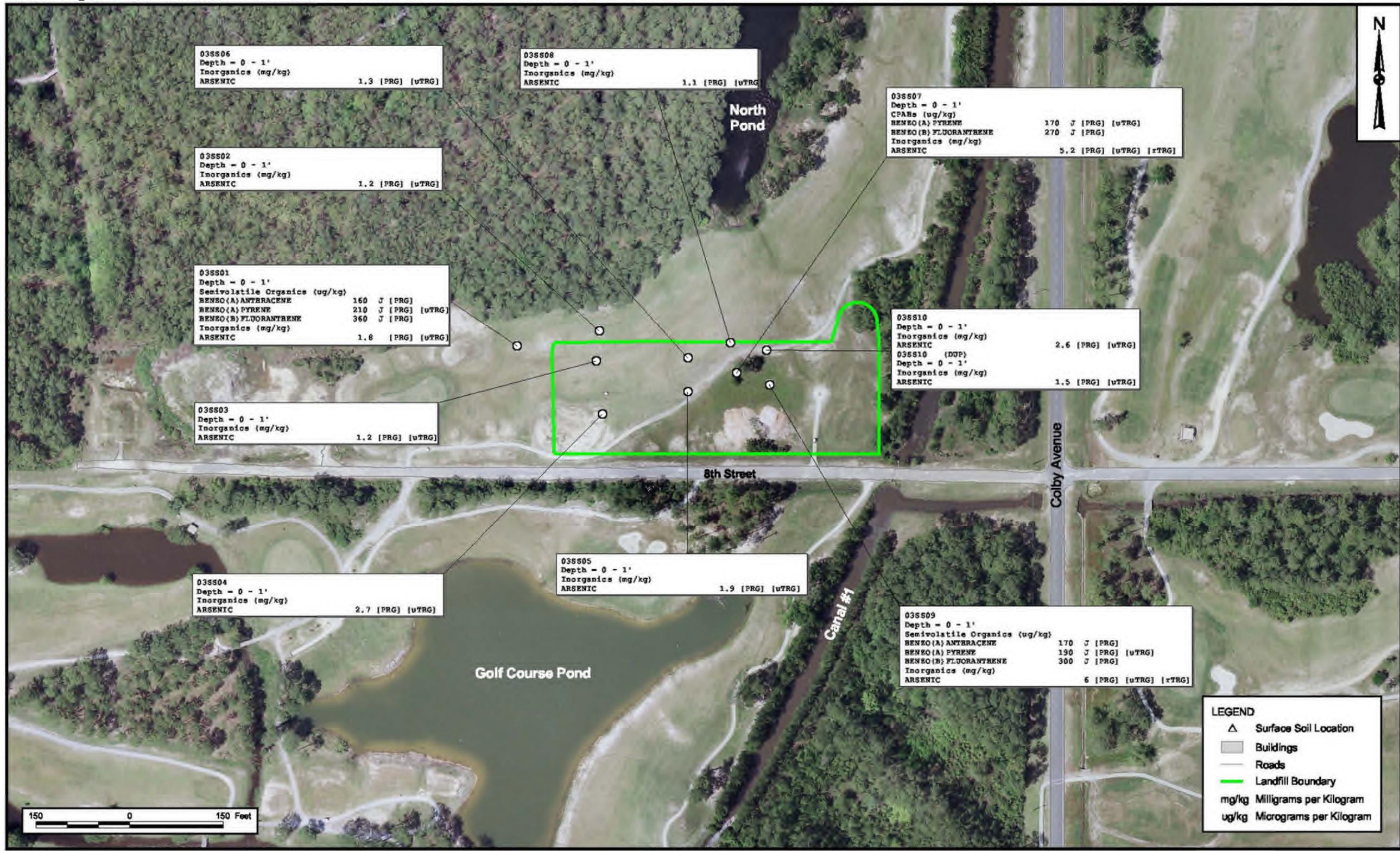


FIGURE 2-6. SOIL CONTAMINANTS

Based on the evaluation of existing conditions at Site 3, the following potential contaminant transport pathways may exist at the site:

- Leaching of buried waste material and soil contaminants to groundwater
- Surface migration of soil contaminants to surface water or sediment
- Migration of groundwater contaminants and discharge to surface water or sediment
- Volatilization from groundwater and volatilization or particulate migration from surface soil to the atmosphere

## 2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

NCBC Gulfport is an active military facility and is expected to remain active for the near future. Tenant activities, including the NMCBs and NCTC, provide training, supply, and logistics support to the Naval Construction Force and other military units. Land use in the areas surrounding NCBC Gulfport varies. To the north along 28<sup>th</sup> Street, there are light industrial, commercial, and residential areas. The land to the east and southeast is primarily residential with some commercial areas. Residential areas are located west of NCBC Gulfport. Site 3 was part of the Pine Bayou Golf Course, which has been closed. It is expected that the area will remain recreational for the foreseeable future.

Surface waters near Site 3 include Canal No. 1, the Golf Course Pond, and the North Pond. Surface water from the Golf Course Pond was used for irrigation of the golf course; however, with closure of the golf course, this use is not expected to continue. Surface water is not extracted from Canal No. 1 or the North Pond for consumption or irrigation.

Shallow groundwater underlying NCBC Gulfport is not used for drinking water and is not expected to be used in the future. Water is available in the shallow surficial aquifer, but mineral content is high. The shallow surficial aquifer at NCBC Gulfport is underlain by a green clayey silt unit that limits deeper vertical migration of contaminants. Drinking water for NCBC Gulfport is obtained from three potable on-site wells, which are screened at approximately 700 feet bls. The station is permitted as a Small community Water supply. Most of the residents of the Gulfport area are supplied from municipal systems drawing water from aquifers including the Citronelle Formation and Graham Ferry Formation (Pliocene) and Pascagoula, Hattiesburg, and Catahoula Formations (Miocene). Boundaries between the aquifers are vaguely defined, if at all. These aquifers are composed of sands and discontinuous clays.

## 2.7 SUMMARY OF SITE RISKS

The baseline risk assessment estimates what risks the site poses if no action was taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. A HHRA and SLERA were conducted as part of the Site 3 RI.

### 2.7.1 Summary of Human Health Risk

The quantitative HHRA was conducted using chemical concentrations detected in soil, groundwater, surface water, and sediment samples. Key steps in the risk assessment process included identification of contaminants of potential concern (COPCs), exposure assessment, toxicity assessment, and risk characterization.

#### Identification of COCs

Table 6-11 from the RI (included in Appendix B) presents exposure point concentrations (EPCs) for the COCs identified at Site 3. EPCs are the concentrations used in the risk assessment to estimate exposure and risk from each COC. For each COC, information in the table includes the range of detected concentrations, frequency of detection (i.e., the number of times the contaminant was detected in samples collected at the site), EPCs, and how EPCs were derived. Based on the statistical distributions of the data and the results of preliminary calculations, maximum detected concentrations or 95 percent upper confidence limits on the mean were used as the EPCs for the Site 3 COCs.

### Exposure Assessment

During the exposure assessment, current and potential future exposure pathways through which humans might encounter the COPCs identified in the previous step were evaluated. The results of the exposure assessment for Site 3 were used to refine the CSM (see Figure 2-2), which identifies potential contaminant sources, contaminant release mechanisms, transport routes, and receptors under current and future land use scenarios. Surface soil and groundwater were identified as the media of concern for the COCs. Potential exposure routes for soil include incidental ingestion (swallowing small amounts of soil) and dermal contact (skin exposure). The HHRA considered receptor exposure under nonresidential land use (construction, maintenance, and industrial workers and trespassers) and future hypothetical residential land use. Current and hypothetical future exposure pathways at Site 3 are summarized in Table 2-2.

| TABLE 2-2. RECEPTORS AND EXPOSURE ROUTES EVALUATED IN THE HHRA        |  |
|---|--|
| RECEPTOR  | EXPOSURE ROUTE   |
| Maintenance Workers<br>(current and future land use)                  | Soil/sediment/surface water/groundwater dermal contact<br>Soil/sediment/surface water ingestion<br>Inhalation of soil<br>Inhalation of volatiles from groundwater  |
| Construction/Excavation Workers<br>(future land use)                  | Soil/sediment/surface water dermal contact<br>Soil/sediment/surface water ingestion<br>Inhalation of soil<br>Inhalation of volatiles from groundwater  |
| Trespassers (adult and adolescent)<br>(current and future land use)   | Soil/sediment/surface water dermal contact<br>Soil/sediment/surface water ingestion<br>Inhalation of soil  |
| On-Base Residents (adults/children)<br>(hypothetical future land use) | Soil/sediment/surface water/groundwater dermal contact<br>Soil/sediment/surface water/groundwater ingestion<br>Inhalation of soil<br>Inhalation of volatiles from groundwater<br>Groundwater vapor intrusion into indoor air |
| Industrial Workers<br>(current and future land use)                   | Soil/sediment/surface water dermal contact<br>Soil/sediment/surface water ingestion<br>Groundwater vapor intrusion into indoor air<br>Inhalation of soil   |

### Toxicity Assessment

Toxicity assessment involves identifying the types of adverse health effects caused by exposure to site COPCs and determining the relationship between the magnitude of exposure and the severity of adverse effects (i.e., dose-response relationship) for each COC. Based on the quantitative dose-response relationships determined, toxicity values for both cancer (cancer slope factor and non-cancer (reference dose [RfD]) effects were derived and used to estimate the potential for adverse effects. The toxicity data is summarized in Tables 6-14, 6-15, 6-15, and 6-16 from the RI (included in Appendix B).

### Risk Characterization

During the risk characterization, the outputs of the exposure and toxicity assessments were combined to characterize the baseline risk (cancer risks and non-cancer hazards) at the site if no action was taken to address the contamination. Potential cancer risks and non-cancer hazards were calculated based on reasonable maximum exposure (RME) and central tendency exposure (CTE) assumptions. The RME scenario assumed the maximum level of human exposure that could reasonably be expected to occur, and the CTE scenario assumed a median or average level of human exposure.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime because of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF}$$

where: risk = a unitless probability (e.g.,  $2 \times 10^{-5}$ ) of an individual developing cancer

CDI = chronic daily intake averaged over 70 years (in milligrams per kilogram per day [mg/kg-day])

SF = slope factor (in mg/kg-day<sup>-1</sup>)

These calculated risks are probabilities that are usually expressed in scientific notation (e.g.,  $1 \times 10^{-6}$ ). An excess lifetime cancer risk of  $1 \times 10^{-6}$  under an RME scenario indicates that an individual experiencing the reasonable maximum exposure estimate has an “excess lifetime cancer risk” because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three. MDEQ’s acceptable risk for site-related exposures is  $1 \times 10^{-6}$ . Tables 6-18 and 6-19 from the RI included in Appendix B present the CTE and RME risks for Site 3.

The carcinogenic risks calculated for the RME case compared incremental lifetime cancer risks (ILCRs) for MDEQ’s risk management benchmark ( $1 \times 10^{-6}$ ). Total ILCRs for hypothetical future residents (adult + child =  $1 \times 10^{-3}$ ), lifelong trespassers (adult + child =  $2 \times 10^{-6}$ ), and industrial workers ( $5 \times 10^{-6}$ ) exceeded the MDEQ goal for cumulative site risk. The elevated residential risk is primarily due to exposure to arsenic and volatiles (vinyl chloride; benzene; cis-1,2-DCE; and TCE) in groundwater. Arsenic in soil/sediment is the primary contributor to the ILCRs developed for trespassers and industrial workers. Total ILCRs for hypothetical future residents (adult + child =  $1 \times 10^{-4}$ ) exceeded the MDEQ target risk. The elevated residential risk is primarily due to exposure to arsenic and vinyl chloride in groundwater.

The potential for non-carcinogenic effects was evaluated by comparing an exposure level over a specified period (e.g., a lifetime) to an RfD derived for a similar exposure period. An RfD represents a level to which an individual may be exposed that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ less than 1 indicates that a receptor’s dose of a single contaminant is less than the RfD and that toxic non-carcinogenic effects from that chemical are unlikely. The hazard index (HI) is generated by adding the HQs for all chemicals that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may be reasonably exposed. An HI less than 1 indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health. The HQ is calculated as follows:

$$\text{Noncancer HQ} = \text{CDI} / \text{RfD}$$

where: CDI = chronic daily intake  
RfD = reference dose

CDIs and RfDs are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

Cumulative HIs for hypothetical future adult and child residents were 3 and 12, respectively. Major contributors to the residential HIs were cis-1,2-DCE; iron; and arsenic in groundwater. Risk estimates calculated for ingestion exceed those calculated for the dermal and inhalation routes of exposure. HIs for exposure to soil, surface water, and sediment were less than unity for all receptors.

Lead was identified as a COPC in groundwater. The maximum detected concentration of lead in groundwater was 19.4 micrograms per liter (µg/L), which exceeded the 15 µg/L federal action level promulgated under the Safe Drinking Water Act and the MDEQ TRG.

Hypothetical residential exposures to lead in groundwater were evaluated using the 1994 version of the Integrated Exposure Uptake Biokinetic (IEUBK) Lead Model. As recommended by the IEUBK Model, the average lead concentration in surface soil (18.4 milligram per kilogram [mg/kg]) and maximum lead concentration (19.4 µg/L) was used as EPCs. Default values were used for the remainder of the model input parameters. The lead concentrations of 18.4 mg/kg in surface soil and 19.4 µg/L in groundwater result in 0.5 percent of hypothetical child residents having a blood-lead level greater than 10 micrograms per deciliter (µg/dL) and result in a geometric mean blood-lead level of 2.9 µg/dL. These results are within the USEPA goal as described in the 1994 Office of Solid Waste and Emergency Response Directive of no more than 5 percent of children with blood-lead levels exceeding 10 µg/dL.

The carcinogenic risks calculated for the RME case indicated that ILCRs for construction/excavation workers, maintenance workers, adolescent trespassers, and adult trespassers were less than MDEQ's risk management benchmark ( $1 \times 10^{-6}$ ). ILCRs developed separately for adult and adolescent trespassers and medium-specific ILCRs for lifelong trespassers did not exceed the MDEQ target risk of  $1 \times 10^{-6}$ . The estimated carcinogenic risks for the CTE scenarios indicated ILCRs for construction/excavation workers, maintenance workers, industrial workers, and all trespassers (adult, child, and lifelong) were less than the MDEQ goal for cumulative site risk ( $1 \times 10^{-6}$ ).

Cumulative HIs for maintenance workers, industrial workers, construction/excavation workers, adult trespassers, and adolescent trespassers under the RME scenario were less than unity (1), indicating that no toxic effects are anticipated for these receptors under the defined exposure conditions. Target organ-specific HIs for construction/excavation workers, maintenance workers, industrial workers, adolescent trespassers, and adult trespassers under the CTE scenario were less than unity (1), indicating that no toxic effects are anticipated for these receptors under the CTE exposure conditions. In addition, for hypothetical future residents, all HIs for individual target organs are less than or equal to 1.

No major sources of uncertainty, other than those typically associated with risk assessment estimates, were identified for the Site 3 HHRA.

Based on the results of the HHRA, RME risks were identified that require a response action, including unacceptable risks for site maintenance workers, construction/excavation workers, adult trespassers, and adolescent trespassers exposed to COPCs in site media. Although, cancer risk estimates developed for lifelong trespassers and industrial workers exposed to soil exceeded the MDEQ cumulative risk benchmark, the arsenic concentrations (which account for the highest percent of the risk estimates) are typical for Mississippi Coastal Plain Soils. The quantitative risk evaluation also indicated that potential adverse health effects may be associated with hypothetical future residential use of groundwater, and the cancer risk estimate for future residents exposed to soil exceeded the MDEQ cumulative cancer risk benchmark. The maximum detected concentrations of several VOCs and arsenic in groundwater exceeded USEPA Maximum Contaminant Levels and MDEQ TRGs. Residential risks estimated for other site media (subsurface soil, surface water, and sediment) did not exceed risk benchmarks.

## 2.7.2 Summary of Ecological Risk

Tables 7-1 to 7-9 from the RI (included in Appendix B) summarize the ecological risk evaluation for Site 3. Concentrations of various contaminants in Canal No. 1 sediment and surface water were elevated relative to conservative screening levels. The detected contaminants, although possibly associated with Site 3, may also have been transported from other areas of NCBC Gulfport via storm water runoff through ditches that connect to Canal No. 1. When conservative assumptions used in the screening process are re-evaluated; and factors that affect potential exposures, such as quality and size of the habitat and actual use of the site by modeled receptors are considered, the overall level of ecological risk associated with the cited COC concentrations in Canal No. 1 is considered minimal. Additionally, no link associating the COCs in Canal 1 to Site 3 was found during the remedial investigation.

## Risks to Soil Invertebrates and Plants

Several organochlorine insecticides were detected in surface soil samples. Concentrations tended to be low, and impacts to ecological receptors from these compounds are not expected. Dinoseb was detected

in 1 of 10 surface soil samples and was the only herbicide detected at the site. Surface soil toxicity thresholds have not been established for dinoseb, so there is uncertainty regarding its potential impacts. The zinc concentration in one sample poses potential risk to plants and invertebrates. Concentrations of other metals at Site 3 tended to be low and pose negligible potential risks to soil invertebrates and plants.

### Risks to Benthic Invertebrates and Aquatic Organisms

Acetone and carbon disulfide were the only VOCs detected in sediment, and acetone was the only VOC detected in surface water. Toxicity data were not available regarding acetone's effects on aquatic and benthic organisms, but acetone concentrations represent base-wide conditions and do not appear to be related to Site 3. The potential toxicity of carbon disulfide in sediment cannot be evaluated due to the absence of toxicity thresholds, but it was detected in only 1 of 10 sediment samples.

Several organochlorine insecticides and two PCB compounds were detected in sediment. Most of the pesticides detected at Site 3 pose negligible risks to benthic receptors. 4,4'-Dichlorodiphenyldichloroethylene; 4,4'-dichlorodiphenyltrichloroethane (DDT); total DDT; and Aroclors (PCBs) pose potential risks to benthic receptors. Maximum concentrations of these COPCs were detected in the upstream-most sample in Canal No. 1, indicating a source other than Site 3.

Total iron concentrations in surface water indicate potential risk to aquatic receptors; however, the iron concentrations appear to represent base-wide surface water conditions. Concentrations of other metals tended to be low and pose negligible potential risks to aquatic and benthic organisms, or do not appear to be related to former activities at the landfill.

### Risks to Piscivorous Birds and Mammals

Food-chain modeling was conducted to evaluate potential risks to representative piscivorous receptors. Based on maximum sediment and surface water concentrations and conservative assumptions, food-chain HQs slightly exceeded 1.0 for Aroclor-1254, Aroclor-1260, total Aroclors, arsenic, copper, and lead. In the average concentration scenario, all food-chain HQs were less than 1.0. Site-related impacts to piscivorous receptors from COPCs in surface water and sediment are not expected.

#### 2.7.3 Basis for Action

Unacceptable human health risks were estimated for hypothetical future residential exposure to soil and groundwater at Site 3 due to VOCs, PAHs, and metals, including cancer risks for hypothetical future child, adult, and lifelong residents and non-cancer hazards for hypothetical future child residents. Additionally, although not evaluated in the presumptive remedy scenario for landfills the landfilled waste is assumed to present a health risk requiring further action. Because risks were identified under the current land use scenario and for hypothetical future residential receptors, a response action is necessary to protect the public health or welfare from actual or threatened releases of hazardous substances into the environment that may present an imminent and substantial endangerment to public health or welfare.

## 2.8 REMEDIAL ACTION OBJECTIVES

RAOs are medium-specific goals that define the objective of conducting remedial actions to protect human health and the environment. RAOs specify the COCs, potential exposure routes and receptors, and acceptable concentrations (i.e., cleanup levels) for a site and provide a general description of what the cleanup will accomplish. RAOs typically serve as the design basis for the remedial alternatives described in Section 2.9. The COCs for groundwater are methylene chloride; cis-1,2-DCE; 1,2-dichloroethane (DCA); TCE; vinyl chloride; benzene; arsenic; and iron. The COCs for surface soil are benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene.

The RAOs for Site 3 consist of the following:

- **RAO 1:** Prevent direct contact with the landfilled waste and soil affected by the landfill, thereby precluding potential unacceptable human exposure(s) to those media.

- **RAO 2:** Prevent direct contact with groundwater until contaminant concentrations decrease to acceptable levels.

These RAOs are based on current and reasonably anticipated future recreational-type site uses.

Based on data from the RI, the area of contaminated waste and aerial extent of the landfill is approximately 100,000 square feet (ft<sup>2</sup>). The extent of the landfill is shown on Figure 2-7. The dissolved CVOC plume has an area of approximately 90,000 ft<sup>2</sup> and extends to a depth of approximately 24 feet; therefore, the estimated volume of the CVOC-contaminated groundwater is 24,000 cubic yards (179,520 gallons). The locations of monitoring wells for LTM are shown on Figure 2-7.

Based on discussions between the Navy and MDEQ, it was agreed that that remediation goals for the project would be based upon the State of Mississippi TRGs for soil and groundwater. As a result, the MDEQ TRGs will serve as the basis for remedial action. Those TRGs are based upon either (1) a  $1 \times 10^{-6}$  target incremental cancer risk level for each carcinogenic chemical, (2) an HI not to exceed 1.0 for each systemic toxicant, or (3) constituent TRG concentrations established through federal/state programs (e.g., the Safe Drinking Water Act). The State of Mississippi lists TRGs for both restricted (industrial) and unrestricted (residential) land use. Because of the planned future use of Site 3 as a public recreation area, unrestricted (residential) TRGs were deemed appropriate for consideration.

## 2.9 DESCRIPTION OF ALTERNATIVES

To address potential unacceptable human health risks associated with soil and groundwater at Site 3, a preliminary technology screening evaluation was conducted in the FS. While acknowledging that site specific circumstances must be taken into account, USEPA's presumptive remedy guidance contemplates as default remedial components, use of a landfill cap/cover; source area groundwater control to contain any plume; institutional controls to supplement engineering controls; etc. For Site 3, since groundwater plume data evidences that significant natural attenuation is ongoing, groundwater source control was not deemed necessary. Per the USEPA (*Data Requirements for Selecting Remedial Action Technology*, USEPA, 1987), the use of active gas collection/venting systems is appropriate only when vadose zone methane concentrations exceed either: (1) less than the 5% methane, or (2) 25% Lower Explosive Limit in or at onsite structures. A landfill gas evaluation conducted at Site 3 in 2008, determined that gas generation levels were less than instrument detection limits; thus, construction of an active collection/venting system was also not deemed necessary.

The initial general response actions are presented in Table 2-3. In-situ treatment options were not considered based on the type and volume of contamination (e.g., buried waste material) at Site 3. The initial efforts evaluated in the FS included installing a low permeability cap with a landfill gas venting system. During the decision-making process, however, discussions amongst the NCBC Gulfport Partnering Team ensued about the landfill trenches being located within or near a flood plain. The result of the discussions included the understanding that a low permeability cover and gas venting system was not necessary. The Navy and MDEQ determined that a minimum 2-foot vegetative cover would sufficiently prevent human and ecological exposure and would not result in landfill gas accumulation, thus negating the need for landfill gas monitoring.

| TABLE 2-3. GENERAL RESPONSE ACTIONS |                      |   |
|-------------------------------------|----------------------|---|
| GENERAL RESPONSE ACTION             | TECHNOLOGY           | PROCESS OPTIONS   |
| No Action                           | None                 | Not applicable  |
| Limited Action                      | LUCs                 | Administrative controls: deeds and site use restrictions. Maintenance of existing cover |
| Containment                         | Cap/Cover            | Composite barrier cover system  |
| Monitoring                          | Engineering controls | Long-term groundwater monitoring, MNA, landfill gas monitoring                          |

FIGURE 2-7. SITE 3 SELECTED REMEDY



Since the Site 3 landfill qualifies for application of the USEPA’s presumptive remedy guidance for military landfills, technology screening was not utilized prior to developing site remedial alternatives and the presumptive remedy was only compared to the USEPA’s required “No Action” Alternative. Consistent with the NCP, the no action alternative was evaluated as a baseline. Table 2-4 describes the revised major components of the selected remedy. The estimated costs for the remedial alternative evaluated for Site 3 were based upon the alternative as described in the FS.

| TABLE 2-4. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED   |  |  |  |
|---|--|--|--|
| ALTERNATIVE   | COMPONENTS   | DETAILS  | COST   |
| <b>No Action</b><br><i>No action to address contaminated soil and groundwater and no use restrictions</i>   | None   | No action.   | No cost  |
| <b>Presumptive Remedy (Comprehensive Action)</b><br><br><i>Source containment and site use controls to preclude exposure to buried wastes, contaminated soil and groundwater along with future site monitoring.</i> | Waste containment  | Soil /Vegetative Cover to contain waste and minimize exposure.   | <b>Capital:</b><br>\$880,751<br><b>Annual O&amp;M Cost:</b><br>\$809,831<br><b>30-Year NPW:</b><br>\$1,690,582<br><b>Time Frame:</b><br>30 years |
|   | LUCs   | Restrictions to prevent residential land use. Prohibition on the use of groundwater or excavation of soil. Requirement to maintain integrity of soil/vegetative cover. |  |
|   | Long-term groundwater monitoring and Natural Attenuation | Collect and analyze groundwater samples from eight monitoring wells for COCs and MNA parameters until COCs meet TRG, through natural processes (estimated @ 30 years). |  |

## 2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 2-5 and subsequent text in this section summarize the comparison of the remedial alternatives with respect to the nine CERCLA remedy selection criteria outlined in the NCP at 40 CFR 300.430(e)(9)(iii) and which are categorized as either threshold, primary balancing or modifying. Further information on the detailed comparison of remedial alternatives is presented in the Site 3 FS.

### Threshold Criteria

**Overall Protection of Human Health and the Environment.** The “No Action” alternative would not achieve the RAOs and, therefore, does not protect human health and the environment. The comprehensive action alternative would prohibit future use associated with unacceptable human health risk.

**Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).** ARARs include any federal or state standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate to the site or remedial action. The no action alternative would not meet any ARARs. The comprehensive action alternative would meet all chemical-, location-, and action-specific ARARs to the extent they exist.

### Primary Balancing Criteria

**Long-term Effectiveness and Permanence.** The “No Action” alternative would not have long-term effectiveness or permanence. The comprehensive action alternative would have long-term effectiveness and permanence because it would cap the waste with a low permeability barrier that would prevent direct exposure and limit future migration of contaminants. LUCs would prevent disturbance of the landfill cover and use of groundwater. LTM would detect migration of contaminants from the site.

| TABLE 2-5. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES    |           |   |
|---|-----------|---|
| CERCLA CRITERION  | NO ACTION | PRESUMPTIVE REMEDY WITH LANDFILL COVER, LTM, AND LUCS |
| Overall Protection of Human Health and the Environment        | ○         | ●   |
| Compliance with ARARs   | ○         | ●   |
| Long-term Effectiveness and Permanence                        | ○         | ●   |
| Reduction of Toxicity, Mobility, and Volume through Treatment | ○         | ○   |
| Short-term Effectiveness                                      | ○         | ◐   |
| Implementability  | ●         | ●   |
| Total Cost (NPW)  | No cost   | \$1,690,582   |
| State Acceptance  | ○         | ●   |
| Community Acceptance  | ○         | ●   |

● - High.      ◐ - Medium.      ○ - Low.

**Reduction in Toxicity, Mobility, or Volume through Treatment.** Neither alternative would utilize direct treatment to reduce the toxicity, mobility, or volume of hazardous substances. Because of the type of contamination at Site 3 and its relatively low long-term risk based on current and anticipated future site use, direct treatment was deemed impracticable. Ongoing natural attenuation of CVOCs in groundwater will be monitored under the MNA component. Ongoing reductive dechlorination is likely occurring as evidenced by both the relatively low TCE concentrations and the detection of related daughter products, cis-1,2-DCE and vinyl chloride.

**Short-term Effectiveness.** The “No Action” alternative would not pose any risks to on-site workers or result in short-term adverse impact to the local community and the environment. Excavation and handling of impacted soil under the comprehensive action alternative would pose short-term risks because on-site activities would involve a greater opportunity for exposure of remediation workers to contaminated soil. The use of personal protective equipment, monitoring equipment, and observance of Occupational Safety and Health Administration guidelines would address these concerns. Dust, stormwater and erosion, noise abatement, and other construction-related issues would be addressed and control measures implemented during construction activities. The time to complete the excavation alternative and meet the RAOs is estimated to be approximately one year.

**Implementability.** The “No Action” alternative would be readily implementable. The technical feasibility criteria, including constructability, operability, and reliability, are not applicable. Implementability of administrative measures is not applicable because no such measures would be taken.

The comprehensive action alternative is implementable. Excavation and earthmoving equipment considered under this alternative is typical in the construction industry and readily available from several local sources. Off-site borrow locations for clean soil can be identified. Establishment of LUCs would require negotiation and agreement on the specifics of the procedures between the Navy and regulatory agencies.

**Cost.** There would be no costs associated with the “No Action” alternative. The estimated present-worth cost to implement the comprehensive action alternative is \$1,690,582.

## Modifying Criteria

**State Acceptance.** State involvement has taken place throughout the CERCLA remedy development process. This included multiple discussions during NCBC Gulfport Partnering Team Meetings. During the meeting held on April 10 and 11, 2012, the Partnering Team further discussed the presumptive remedy alternative as presented in the FS given the presence of the landfill in, or very near, a flood plain. The end result of that discussion was to eliminate the need for the low impermeability cap and any landfill gas venting system as components of the final presumptive remedy. As further described in Section 2.12.2 below, the revised action was changed to use a 2-foot soil/vegetative cover to protect human health. Evaluating the revised approach with respect to the Threshold and Primary Balancing Criteria yields similar results to using the low impermeability cap. The most significant change was in the cost criteria. Since the design is not complete, it is not possible to determine the exact cost reduction associated with the change; however, it is anticipated to reduce the costs of the overall remediation effort by 30 to 40%. Based upon prior discussions, the State of Mississippi as represented by the MDEQ fully concurs with the selected remedy for Site 3.

**Community Acceptance.** No written questions were received during the formal public comment period for the Proposed Plan. The questions raised at the public meeting on July 15, 2010, were general inquiries for informational purposes only; no objections to the proposed alternative were voiced. These questions and the Navy’s responses thereto are discussed in Section 3.0.

## 2.11 PRINCIPAL THREAT WASTE

The NCP at 40 CFR 300.430(a)(1)(iii)(A) establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable. Principal threat wastes are those source materials considered highly toxic, highly mobile that generally cannot be reliably contained, or that would present a significant risk to human health or the environment should exposure occur. A source material is a material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. At Site 3, the contaminant concentrations are not highly toxic nor highly mobile; therefore, principal threat wastes are not considered to be present at the site.

## 2.12 SELECTED REMEDY

### 2.12.1 Rationale for Selected Remedy

The presumptive remedy for waste containment at military landfills was selected for Site 3 because the site meets the appropriate qualifying criteria under applicable USEPA guidance and because once implemented, the remedy will achieve the identified RAOs.

The principal factors in the selection of this remedy included the following:

- Implementation will preclude unacceptable risk to human and ecological receptors in a relatively short period (estimated 1 year for construction).
- The remedy would be consistent with the reasonably anticipated future recreational use(s) of the site.

### 2.12.2 Description of Selected Remedy

The selected remedy consists of ensuring (and installing where necessary) a minimum 2-foot soil cover over the defined landfill plus an additional 25 feet, restoration of the site with a vegetative cover, natural attenuation and associated monitoring (MNA) for groundwater and LUCs. The LUCs to be implemented would prevent residential development, the withdrawal or use of groundwater, or excavation of the area

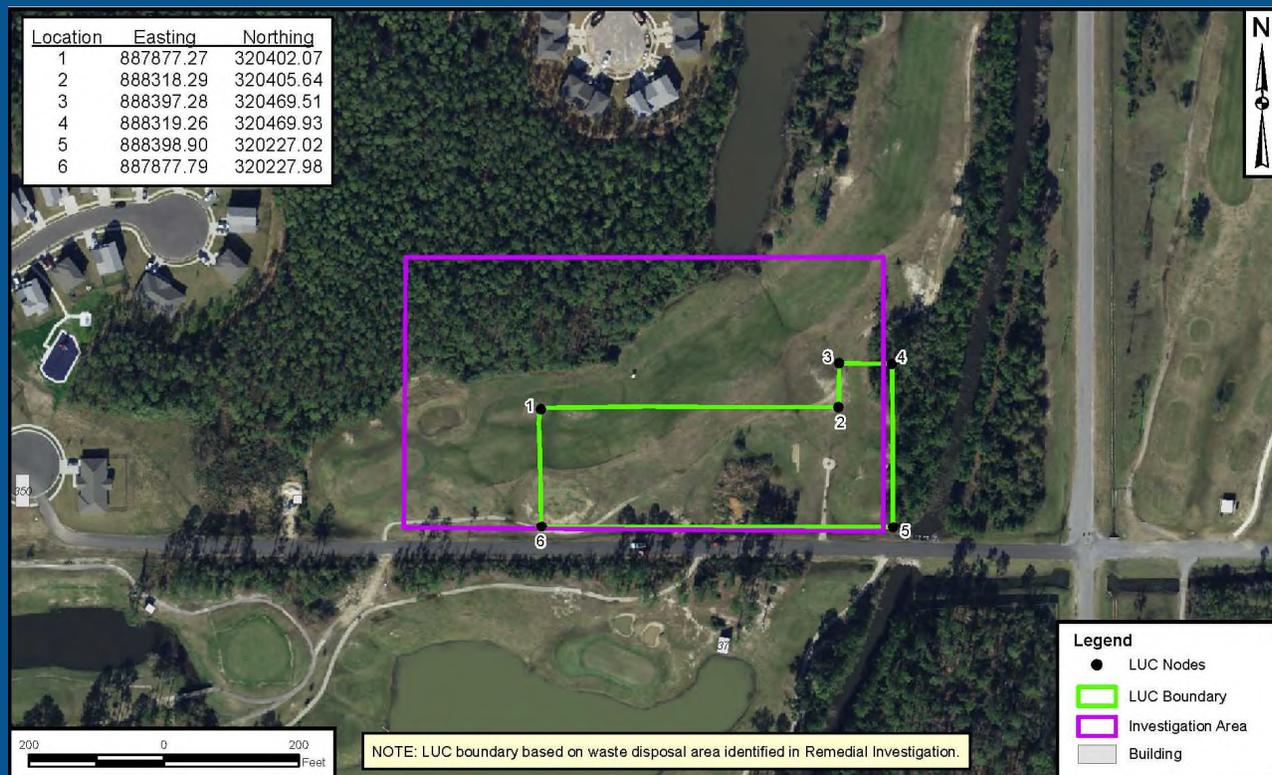
without proper controls. Periodic site inspections would be used to ensure that the integrity of the vegetative cover has not been compromised and to determine maintenance needs to ensure the acceptable performance of the soil cover. The soil cover is to be installed over approximately 115,000 ft<sup>2</sup> of the site would consist of a minimum of 2 feet of clean soil with vegetation planted to limit erosion.

Groundwater monitoring will consist of collection and analysis of groundwater samples from eight monitoring wells on a quarterly basis for the first year. After the first year, the monitoring frequency, analytical parameters, and wells in the program may change based on the results of the previous sampling efforts and agreements made by the Navy and MDEQ. Initially, samples will be analyzed for methylene chloride, cis-1,2-DCE, 1,2-DCA, TCE, vinyl chloride, benzene, arsenic, and iron. Monitoring wells were selected to monitor the existing plume and the downgradient side of the landfill.

Consistent with the RAOs developed for the site, the specific performance objectives for the LUCs to be implemented at Site 3 are as follows. Figure 2-8 shows the LUC boundary and coordinates.

- Prohibit residential uses of the site;
- Prohibit excavation/disturbance of buried waste, and surface/subsurface soil from the site;
- Prohibit extraction of groundwater from the shallow surficial aquifer;
- Maintain the integrity of the soil cover and existing or future monitoring or remediation system(s).

FIGURE 2-8. LUC BOUNDARY AND COORDINATES



The following generally describes those LUCs that will be implemented at Site 3 to achieve the aforementioned LUC performance objectives:

- Non-recreational use and soil cover disturbance prohibitions will be imposed via the Base Master Planning process to include incorporating a figure with geographic information system coordinates showing the boundaries of the site into the NCBC Base Master Plan;
- Posting of signs advising that any site excavation activity must be authorized in advance by the Public Works office;
- Should any portion of the site later be leased or transferred, limits on future use of the Site consistent with the aforementioned LUC objectives will be incorporated into the controlling real estate document(s) (e.g., lease or deed).

The Navy is responsible for implementing, maintaining, reporting, and enforcing the LUCs described in this DD. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity.

LUC implementation actions including periodic site inspections will be specified in a Land Use Control Implementation Plan (LUCIP) that will be prepared by the Navy and provided to MDEQ. The Navy will maintain, monitor, and enforce the above identified LUCs consistent with the *Principles and Procedures for Specifying, Monitoring, and Enforcement of Land Use Controls and Other Post-ROD Actions*, per letter dated October 2, 2003, from Raymond F. DuBois, Deputy Under Secretary of Defense (Installations and Environment), to Hon. Marianne Lamont Horinko, Acting Administrator, USEPA.

Exit strategy for Site 3 soils: Unless the buried waste is removed, there are no foreseeable exit strategies for the above identified soil related LUCs and soil cover maintenance requirements. Therefore, those remedy components will be implemented and maintained by the Navy in perpetuity unless or until the site is otherwise rendered capable of allowing unrestricted use/unrestricted exposure.

Exit strategy for Site 3 groundwater: Monitoring to assess the effectiveness of ongoing natural attenuation processes shall continue until the concentrations of all VOCs in groundwater are less than the MDEQ TRGs. Natural attenuation of the groundwater contaminants may be enhanced at any time during the MNA lifecycle via the use of nutrients, microbes or other technologies, if deemed appropriate.

### 2.12.3 Expected Outcomes of Selected Remedy

Current planned recreational use, which will be supported by the selected remedy, is expected to continue at Site 3. Groundwater at the site is not currently used and is not expected to be used in the future. There are no socio-economic, community revitalization, or economic impacts or benefits associated with implementation of the selected remedy. It is estimated that the RAOs for Site 3 will be achieved upon implementation of the remedy. Table 2-6 describes how the selected remedy mitigates risk and achieves RAOs for Site 3.

Because the reasonably anticipated recreational use of the site is expected to continue for the foreseeable future, it is not expected that modification or removal of the LUCs will be required; however, if proposed land use changes in the future and uses other than recreational-type activities are expected, additional remedial actions would be required. Any modifications to LUCs will be conducted in accordance with provisions to be contained in the Site 3 LUCIP.

| TABLE 2-6. HOW SELECTED REMEDY MITIGATES RISK AND ACHIEVES RAOs        |   |   |
|--|---|---|
| RISK   | RAO   | COMMENTS  |
| Direct exposure to and ingestion of contaminated soil and buried waste | Prevent direct contact with the landfilled waste and soil affected by the landfill, thereby precluding potential unacceptable human exposure(s) to those media. | The landfill cover will provide a barrier to direct contact with the landfill contents. LUCs will prevent disturbance of the soil/vegetative cover and unsuitable use of the site.    |
| Direct exposure to contaminants via groundwater                        | Prevent direct contact with groundwater until contaminant concentrations decrease to acceptable levels  | LUCs will prevent accessing the shallow groundwater at the site. Routine monitoring will ensure attenuation is occurring and uncontrolled migration of contaminants is not occurring. |

### 2.13 STATUTORY DETERMINATIONS

In accordance with Section 121 of CERCLA and the NCP, the Presumptive Remedy meets the following statutory determinations:

- **Protection of Human Health and the Environment** – The Presumptive Remedy is needed to prevent estimated risks associated with hypothetical future residential exposure and to minimize future ecological exposure to contaminated soil. Containment of soil and buried waste will achieve the RAOs, and LUCs will be implemented to ensure protectiveness.
- **Compliance with ARARs** – The selected remedy will attain identified federal and state ARARs, as presented in Appendix C.
- **Cost-Effectiveness** – The selected remedy is a cost-effective alternative that allows for continued recreational use of the property and represents reasonable value for the money. The costs are proportional to overall effectiveness by achieving an adequate amount of long-term effectiveness and permanence within a reasonable period. Detailed costs for the unmodified selected remedy are presented in Appendix A. As stated earlier the costs associated with the changes made after the FS was completed are expected to result in a 30 to 40% savings over the costs estimate presented here.
- **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** – The selected remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be used in a practical manner at Site 3. Based on the type and volume of contamination and the current and reasonably anticipated future use of the site, no waste treatment alternatives were evaluated for Site 3 in the FS. Containment to prevent exposure to site contaminants provides the best balance of tradeoffs for long-term effectiveness and permanence with ease of implementation for reasonable cost.
- **Preference for Treatment as a Principal Element** – Treatment is not a principal element of the selected remedy for soil or groundwater at Site 3 because there are no principal threat wastes at the site and containment provides the best balance of tradeoffs with respect to long-term effectiveness and permanence at a reasonable cost.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site in excess of levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action and every five years thereafter to ensure that the remedy is, or will be, protective of human health and the environment.

## 2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires that an explanation be provided for any significant change(s) to the preferred remedy presented in the Proposed Plan that was published for public comment. For Site 3, two significant remedy changes were made. First, use of a compacted soil cover versus a low permeability cap, and secondly, elimination of the use of a gas collection and venting system for the Site. As noted in Section 2.10 above, these changes were made after further discussions were held with MDEQ staff regarding the actual need for those particular presumptive remedy measures in light of site specific conditions. These revisions to the originally proposed technical approach will provide the same level of protectiveness since when combined with the LUCs proposed for the site, they will likewise serve to eliminate potentially unacceptable human health and/or ecological exposures. In addition it will better allow for the intended use of the site since there will be no gas vents. The selected changes to the presumptive remedy will also provide significant cost savings.

## 3.0 RESPONSIVENESS SUMMARY

### 3.1 STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

Participants at the public meeting held on July 15, 2010, included the general public, current RAB members, and representatives of the Navy and MDEQ. Public participation was minimal. Questions raised at the meeting were addressed at the meeting, as summarized in Table 3-1. No additional written comments, concerns, or questions were received by the Navy or MDEQ during the public comment period.

| <b>QUESTION</b>  | <b>RESPONSE</b>  |
|--|--|
| A resident questioned the location of the former golf course.  | Gordon Crane clarified a question regarding location of the former golf course.  |
| A question arose regarding the sequence of events that led up to the alternative and if they resulted from other operations. | The process was explained and acknowledged that the alternative is being used at another location.   |
| A resident requested the names of the streets around Site 3.   | Robert Fisher clarified to the resident this was an operation which would be conducted on the base. The resident asked what materials were put in the landfill. Gordon Crane explained the materials are similar to those that would have been put in a public dump (household-type garbage), the landfill has been closed for the past 30 years, and no new landfill material will be disposed at the site. |

### 3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues associated with the Site 3 DD were identified.

**APPENDIX A**

**NAVAL CONSTRUCTION BATTALION CENTER  
GULFPORT, MISSISSIPPI  
Site 3 Design Cost Estimate A  
Capital Cost**

| Item  | Quantity | Unit | Unit Cost   |            |            |            | Extended Cost |          |          |           | Subtotal |
|---|----------|------|-------------|------------|------------|------------|---------------|----------|----------|-----------|----------|
|   |          |      | Subcontract | Material   | Labor      | Equipment  | Subcontract   | Material | Labor    | Equipment |          |
| <b>1 PROJECT PLANNING</b>                                     |          |      |             |            |            |            |               |          |          |           |          |
| 1.1 Prepare Construction/Work Plans                           | 350      | hr   |             |            | \$40.00    |            | \$0           | \$0      | \$14,000 | \$0       | \$14,000 |
| <b>2 MOBILIZATION AND DEMOBILIZATION</b>                      |          |      |             |            |            |            |               |          |          |           |          |
| 2.1 Site Support Facilities (trailers, phone, electric, etc.) | 1        | ls   |             | \$6,050.00 | \$3,300.00 | \$3,850.00 | \$0           | \$6,050  | \$3,300  | \$3,850   | \$13,200 |
| 2.2 Equipment Mobilization/Demobilization                     | 8        | ea   |             |            | \$195.00   | \$640.00   | \$0           | \$0      | \$1,560  | \$5,120   | \$6,680  |
| <b>3 FIELD SUPPORT</b>  |          |      |             |            |            |            |               |          |          |           |          |
| 3.1 Office Trailer  | 1        | mo   |             |            |            | \$340.00   | \$0           | \$0      | \$0      | \$340     | \$340    |
| 3.2 Field Office Equipment, Utilities, & Support              | 1        | mo   |             | \$508.00   |            |            | \$0           | \$508    | \$0      | \$0       | \$508    |
| 3.3 Storage Trailer   | 1        | mo   |             |            |            | \$102.00   | \$0           | \$0      | \$0      | \$102     | \$102    |
| 3.4 Utility Connection/Disconnection (phone/electric)         | 1        | ls   | \$1,375.00  |            |            |            | \$1,375       | \$0      | \$0      | \$0       | \$1,375  |
| 3.5 Construction Layout Survey                                | 5        | day  | \$1,875.00  |            |            |            | \$9,375       | \$0      | \$0      | \$0       | \$9,375  |
| 3.6 Pick-up Truck (2)   | 90       | day  |             |            |            | \$100.00   | \$0           | \$0      | \$0      | \$9,000   | \$9,000  |
| 3.7 Sanitary Facilities (2)                                   | 6        | mo   |             |            |            | \$95.00    | \$0           | \$0      | \$0      | \$570     | \$570    |
| 3.8 Site Superintendent                                       | 50       | day  |             | \$138.00   | \$440.00   |            | \$0           | \$6,900  | \$22,000 | \$0       | \$28,900 |
| 3.9 Site Health & Safety and QA/QC                            | 40       | day  |             | \$138.00   | \$390.00   |            | \$0           | \$5,520  | \$15,600 | \$0       | \$21,120 |
| <b>4 DECONTAMINATION</b>                                      |          |      |             |            |            |            |               |          |          |           |          |
| 4.1 Decontamination Services                                  | 1        | mo   |             | \$1,308.00 | \$2,407.00 | \$1,660.00 | \$0           | \$1,308  | \$2,407  | \$1,660   | \$5,375  |
| 4.2 Temporary Equipment Decon Pad                             | 1        | ls   |             | \$1,500.00 | \$2,000.00 | \$300.00   | \$0           | \$1,500  | \$2,000  | \$300     | \$3,800  |
| 4.3 Decon Water   | 1,000    | gal  |             | \$0.20     |            |            | \$0           | \$200    | \$0      | \$0       | \$200    |
| 4.4 Decon Water Storage Tank, 6,000 gallon                    | 1        | mo   |             |            |            | \$837.00   | \$0           | \$0      | \$0      | \$837     | \$837    |
| 4.5 Clean Water Storage Tank, 4,000 gallon                    | 1        | mo   |             |            |            | \$757.00   | \$0           | \$0      | \$0      | \$757     | \$757    |
| 4.6 Disposal of Decon Waste (liquid & solid)                  | 1        | mo   | \$950.00    |            |            |            | \$950         | \$0      | \$0      | \$0       | \$950    |
| <b>5 COVER AND SITE RESTORATION</b>                           |          |      |             |            |            |            |               |          |          |           |          |
| 5.1 Erosion & Sediment Silt Fence                             | 0        | lf   |             | \$0.25     | \$0.35     |            | \$0           | \$0      | \$0      | \$0       | \$0      |
| 5.2 Super Silt Fence  | 1,200    | lf   |             | \$1.95     | \$3.30     | \$1.20     | \$0           | \$2,340  | \$3,960  | \$1,440   | \$7,740  |
| 5.3 Clear & Grub  | 2        | day  |             |            | \$1,825.00 | \$1,675.00 | \$0           | \$0      | \$3,650  | \$3,350   | \$7,000  |
| 5.4 Forestry Stumpage Fee                                     | 1        | ls   | \$250.00    |            |            |            | \$250         | \$0      | \$0      | \$0       | \$250    |
| 5.5 Common Fill   | 3,320    | cy   |             | \$16.07    |            |            | \$0           | \$53,352 | \$0      | \$0       | \$53,352 |
| 5.6 Borrow Material Sampling & Analysis                       | 5        | ea   | \$500.00    |            |            |            | \$2,500       | \$0      | \$0      | \$0       | \$2,500  |
| 5.7 Dozer, 300 hp   | 29       | day  |             |            | \$380.00   | \$1,829.00 | \$0           | \$0      | \$11,020 | \$53,041  | \$64,061 |
| 5.8 Compactor, 125 hp   | 24       | day  |             |            | \$380.00   | \$656.40   | \$0           | \$0      | \$9,120  | \$15,754  | \$24,874 |
| 5.9 Excavator, 2 cy   | 2        | day  |             |            | \$380.00   | \$1,363.00 | \$0           | \$0      | \$760    | \$2,726   | \$3,486  |
| 5.10 Dump Truck, 16 cy  | 2        | day  |             |            | \$380.00   | \$692.40   | \$0           | \$0      | \$760    | \$1,385   | \$2,145  |
| 5.11 Skid-Steer   | 28       | day  |             |            | \$293.60   | \$308.60   | \$0           | \$0      | \$8,221  | \$8,641   | \$16,862 |
| 5.12 Gradall  | 5        | day  |             |            | \$380.00   | \$1,010.00 | \$0           | \$0      | \$1,900  | \$5,050   | \$6,950  |
| 5.13 Site Labor (2 laborers)                                  | 80       | day  |             |            | \$293.60   |            | \$0           | \$0      | \$23,488 | \$0       | \$23,488 |
| 5.14 Topsoil (loam)   | 1,480    | cy   |             | \$26.92    |            |            | \$0           | \$39,842 | \$0      | \$0       | \$39,842 |
| 5.15 Sediment Recovery Trap                                   | 1        | ea   |             | \$285.00   | \$850.00   | \$685.00   | \$0           | \$285    | \$850    | \$685     | \$1,820  |
| 5.16 HDPE Pipe, 15" diam.                                     | 40       | lf   |             | \$8.00     | \$3.18     |            | \$0           | \$320    | \$127    | \$0       | \$447    |
| 5.17 Rock Construction Entrance                               | 1        | ls   |             | \$856.00   | \$1,541.00 | \$1,325.00 | \$0           | \$856    | \$1,541  | \$1,325   | \$3,722  |
| 5.18 Temporary ECM  | 1,530    | sy   |             | \$1.24     | \$0.35     | \$0.14     | \$0           | \$1,897  | \$536    | \$214     | \$2,647  |
| 5.19 Hydro Seed   | 119      | msf  | \$49.50     |            |            |            | \$5,891       | \$0      | \$0      | \$0       | \$5,891  |
| 5.20 Sod  | 93       | msf  | \$295.80    |            |            |            | \$27,509      | \$0      | \$0      | \$0       | \$27,509 |
| <b>6 MONITORING WELL INSTALLATION AND ABANDOMENT</b>          |          |      |             |            |            |            |               |          |          |           |          |
| 6.1 Well Installation (9 wells)                               | 250      | lf   | \$80.00     |            |            |            | \$20,000      | \$0      | \$0      | \$0       | \$20,000 |
| 6.2 Well Development  | 36       | hr   | \$200.00    |            |            |            | \$7,200       | \$0      | \$0      | \$0       | \$7,200  |
| 6.3 Protective Well Casing & Apron                            | 9        | ea   | \$750.00    |            |            |            | \$6,750       | \$0      | \$0      | \$0       | \$6,750  |
| 6.4 Abandon Wells (9 wells)                                   | 270      | lf   | \$12.50     |            |            |            | \$3,375       | \$0      | \$0      | \$0       | \$3,375  |

**NAVAL CONSTRUCTION BATTALION CENTER**  
**GULFPORT, MISSISSIPPI**  
**Site 3 Design Cost Estimate A**  
**Capital Cost**

| Item   | Quantity | Unit | Unit Cost   |          |         |           | Extended Cost |           |           |           | Subtotal  |
|--|----------|------|-------------|----------|---------|-----------|---------------|-----------|-----------|-----------|-----------|
|  |          |      | Subcontract | Material | Labor   | Equipment | Subcontract   | Material  | Labor     | Equipment |           |
| <b>1 PROJECT PLANNING</b>                    |          |      |             |          |         |           |               |           |           |           |           |
| 6.5 IDW Transport & Disposal, solid non-haz  | 18       | drum | \$195.00    |          |         |           | \$3,510       | \$0       | \$0       | \$0       | \$3,510   |
| 6.6 IDW Transport & Disposal, liquid non-haz | 18       | drum | \$185.00    |          |         |           | \$3,330       | \$0       | \$0       | \$0       | \$3,330   |
| <b>7 POST CONSTRUCTION COST</b>              |          |      |             |          |         |           |               |           |           |           |           |
| 7.1 Contractor Completion Report             | 150      | hr   |             |          | \$40.00 |           | \$0           | \$0       | \$6,000   | \$0       | \$6,000   |
| 7.2 Remedial Action Closeout Report          | 200      | hr   |             |          | \$40.00 |           | \$0           | \$0       | \$8,000   | \$0       | \$8,000   |
| <b>Subtotal</b>                              |          |      |             |          |         |           | \$92,015      | \$120,878 | \$140,800 | \$116,146 | \$469,839 |



**NAVAL CONSTRUCTION BATTALION CENTER  
 GULFPORT, MISSISSIPPI  
 Site 3 Design Cost Estimate A  
 Annual Cost**

| Item                     | Item Cost<br>year 1 | Item Cost<br>years 2 & 3 | Item Cost<br>years 4 to 30 | Item Cost<br>every 5 years | Notes   |
|--------------------------|---------------------|--------------------------|----------------------------|----------------------------|---|
| Site Inspection & Report | \$2,350             | \$2,350                  | \$2,350                    |                            | Labor and supplies once a year to inspect Land Use Controls with  |
| Cover Inspection         | \$6,100             | \$6,100                  | \$6,100                    |                            | Visit to inspect cover twice a year   |
| Cover Maintenance        | \$19,000            | \$19,000                 | \$19,000                   |                            | Cut (mow) cover 20 times a year   |
| Cover Repair             | \$4,100             | \$4,100                  |                            | \$4,100                    | Cover repair in years 1, 2, 3, 5, 10,15, 20, 25, & 30   |
| Sampling                 | \$29,800            | \$14,900                 | \$7,450                    |                            | Labor and supplies to collect samples from wells using a crew of two.   |
| Analysis/Water           | \$41,440            | \$20,720                 | \$10,360                   |                            | Analyze groundwater samples from 8 wells for VOCs, metals, &<br>dioxins/furans in years 1 through 30. Collect samples 4 times a year in<br>year 1, twice a year in years 2 & 3, and once a year for years 4 through |
| Report                   | \$6,000             | \$3,000                  | \$1,500                    |                            | Document sampling & results   |
| Five Year Site Review    |                     |                          |                            | \$23,000                   | Labor and supplies to evaluate site every five years for 5-year review  |
| Subtotal                 | \$108,790           | \$70,170                 | \$46,760                   | \$27,100                   |   |
| Contingency @ 10%        | \$10,879            | \$7,017                  | \$4,676                    | \$2,710                    |   |
| <b>TOTAL</b>             | \$119,669           | \$77,187                 | \$51,436                   | \$29,810                   |   |

**NAVAL CONSTRUCTION BATTALION CENTER  
 GULFPORT, MISSISSIPPI  
 Site 3 Design Cost Estimate A  
 Present Worth Analysis**

| Year | Capital Cost | Annual Cost | Total Year Cost | Annual Discount Rate at 7% | Present Worth |
|------|--------------|-------------|-----------------|----------------------------|---------------|
| 0    | \$880,751    |             | \$880,751       | 1.000                      | \$880,751     |
| 1    |              | \$119,669   | \$119,669       | 0.935                      | \$111,891     |
| 2    |              | \$77,187    | \$77,187        | 0.873                      | \$67,384      |
| 3    |              | \$77,187    | \$77,187        | 0.816                      | \$62,985      |
| 4    |              | \$51,436    | \$51,436        | 0.763                      | \$39,246      |
| 5    |              | \$81,246    | \$81,246        | 0.713                      | \$57,928      |
| 6    |              | \$51,436    | \$51,436        | 0.666                      | \$34,256      |
| 7    |              | \$51,436    | \$51,436        | 0.623                      | \$32,045      |
| 8    |              | \$51,436    | \$51,436        | 0.582                      | \$29,936      |
| 9    |              | \$51,436    | \$51,436        | 0.544                      | \$27,981      |
| 10   |              | \$81,246    | \$81,246        | 0.508                      | \$41,273      |
| 11   |              | \$51,436    | \$51,436        | 0.475                      | \$24,432      |
| 12   |              | \$51,436    | \$51,436        | 0.444                      | \$22,838      |
| 13   |              | \$51,436    | \$51,436        | 0.415                      | \$21,346      |
| 14   |              | \$51,436    | \$51,436        | 0.388                      | \$19,957      |
| 15   |              | \$81,246    | \$81,246        | 0.362                      | \$29,411      |
| 16   |              | \$51,436    | \$51,436        | 0.339                      | \$17,437      |
| 17   |              | \$51,436    | \$51,436        | 0.317                      | \$16,305      |
| 18   |              | \$51,436    | \$51,436        | 0.296                      | \$15,225      |
| 19   |              | \$51,436    | \$51,436        | 0.277                      | \$14,248      |
| 20   |              | \$81,246    | \$81,246        | 0.258                      | \$20,961      |
| 21   |              | \$51,436    | \$51,436        | 0.242                      | \$12,448      |
| 22   |              | \$51,436    | \$51,436        | 0.226                      | \$11,625      |
| 23   |              | \$51,436    | \$51,436        | 0.211                      | \$10,853      |
| 24   |              | \$51,436    | \$51,436        | 0.197                      | \$10,133      |
| 25   |              | \$81,246    | \$81,246        | 0.184                      | \$14,949      |
| 26   |              | \$51,436    | \$51,436        | 0.172                      | \$8,847       |
| 27   |              | \$51,436    | \$51,436        | 0.161                      | \$8,281       |
| 28   |              | \$51,436    | \$51,436        | 0.15                       | \$7,715       |
| 29   |              | \$51,436    | \$51,436        | 0.141                      | \$7,252       |
| 30   |              | \$81,246    | \$81,246        | 0.131                      | \$10,643      |

**TOTAL PRESENT WORTH      \$1,690,582**

**APPENDIX B**

**TABLE 6-11  
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN  
SITE 3 REMEDIAL INVESTIGATION REPORT  
NCBC GULFPORT  
GULFPORT, MISSISSIPPI**

| <b>Chemical</b>                       | <b>Surface Soil<br/>(mg/kg)</b> | <b>Subsurface Soil<br/>(mg/kg)</b> | <b>Groundwater<br/>(ug/L)</b> | <b>Surface Water<br/>(ug/L)</b> | <b>Sediment<br/>(mg/kg)</b> |
|---------------------------------------|---------------------------------|------------------------------------|-------------------------------|---------------------------------|-----------------------------|
| <b>Volatile Organic Compounds</b>     |                                 |                                    |                               |                                 |                             |
| 1,2,4-Trichlorobenzene                | NA                              | NA                                 | 2.23 <sup>(1)</sup>           | NA                              | NA                          |
| 1,2-Dichloroethane                    | NA                              | NA                                 | 2.06 <sup>(1)</sup>           | NA                              | NA                          |
| Benzene                               | NA                              | NA                                 | 2.22 <sup>(1)</sup>           | NA                              | NA                          |
| cis-1,2-Dichloroethene                | NA                              | NA                                 | 132 <sup>(1)</sup>            | NA                              | NA                          |
| Methylene Chloride                    | NA                              | NA                                 | 2.58 <sup>(1)</sup>           | NA                              | NA                          |
| trans-1,2-Dichloroethene              | NA                              | NA                                 | 11.6 <sup>(1)</sup>           | NA                              | NA                          |
| Trichloroethene                       | NA                              | NA                                 | 12.8 <sup>(1)</sup>           | NA                              | NA                          |
| Vinyl Chloride                        | NA                              | NA                                 | 17.1 <sup>(1)</sup>           | NA                              | NA                          |
| <b>Semivolatile Organic Compounds</b> |                                 |                                    |                               |                                 |                             |
| Benzo(a)pyrene Equivalents            | 0.265 <sup>(2)</sup>            | NA                                 | NA                            | NA                              | NA                          |
| Bis(2-ethylhexyl)phthalate            | NA                              | NA                                 | NA                            | 19 <sup>(2)</sup>               | NA                          |
| <b>Inorganics</b>                     |                                 |                                    |                               |                                 |                             |
| Aluminum                              | NA                              | NA                                 | 799 <sup>(1)</sup>            | NA                              | 10752 <sup>(3)</sup>        |
| Arsenic                               | 3.66 <sup>(4)</sup>             | 1.17 <sup>(3)</sup>                | 11.5 <sup>(1)</sup>           | NA                              | 7.83 <sup>(3)</sup>         |
| Chromium                              | NA                              | NA                                 | 3.24 <sup>(1)</sup>           | NA                              | NA                          |
| Iron                                  | 7331 <sup>(3)</sup>             | 2905 <sup>(4)</sup>                | 15878 <sup>(1)</sup>          | 3680 <sup>(2)</sup>             | 7435 <sup>(3)</sup>         |
| Lead                                  | NA                              | NA                                 | 1.51 <sup>(1)</sup>           | NA                              | NA                          |
| Manganese                             | NA                              | NA                                 | 137 <sup>(1)</sup>            | 98.2 <sup>(2)</sup>             | NA                          |
| Vanadium                              | 12 <sup>(3)</sup>               | 7.48 <sup>(4)</sup>                | 5.33 <sup>(1)</sup>           | NA                              | 17.1 <sup>(3)</sup>         |

Notes:

The exposure point concentrations (EPCs) were calculated according to USEPA's ProUCL guidance. See the RAGS PART D Table 3s in Appendix X for details concerning the EPCs.

NA - Not applicable. Not a COPC for this media.

µg/L - micrograms per liter

mg/L - milligrams per liter

1 - Arithmetic Mean Concentration

2 - Maximum Detected Concentration

3 - Student-t = mean calculation using the t test

4 - Approximate Gamma 95% UCL

**TABLE 6-14**  
**NON-CANCER TOXICITY DATA -- ORAL/DERMAL**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**

| Chemical of Potential Concern         | Chronic/<br>Subchronic | Oral RfD |           | Oral Absorption Efficiency for Dermal <sup>(1)</sup> | Absorbed RfD for Dermal <sup>(2)</sup> |           | Primary Target Organ(s) | Combined Uncertainty/Modifying Factors | RfD:Target Organ(s) |                      |
|---------------------------------------|------------------------|----------|-----------|--|--|-----------|-------------------------|--|---------------------|----------------------|
|                                       |                        | Value    | Units     |  | Value                                  | Units     |                         |  | Source(s)           | Date(s) (MM/DD/YYYY) |
| <b>Volatile Organic Compounds</b>     |                        |          |           |  |  |           |                         |  |                     |                      |
| 1,2,4-Trichlorobenzene                | Chronic                | 1.0E-02  | mg/kg/day | 1  | 1.0E-02                                | mg/kg/day | Kidney                  | 1000/1                                 | IRIS                | 2/25/2008            |
| 1,2-Dichloroethane                    | NA                     | NA       | NA        | NA   | NA                                     | NA        | NA                      | NA                                     | NA                  | NA                   |
| Benzene                               | Chronic                | 4.0E-03  | mg/kg/day | 1  | 4.0E-03                                | mg/kg/day | Blood                   | 300/1                                  | IRIS                | 2/25/2008            |
| Chloromethane                         | NA                     | NA       | NA        | NA   | NA                                     | NA        | NA                      | NA                                     | NA                  | NA                   |
| cis-1,2-Dichloroethene                | Chronic                | 1.0E-02  | mg/kg/day | 1  | 1.0E-02                                | mg/kg/day | Blood                   | 3000                                   | PPRTV               | 3/01/2006            |
| Methylene Chloride                    | Chronic                | 6.0E-02  | mg/kg/day | 1  | 6.0E-02                                | mg/kg/day | Liver                   | 100/1                                  | IRIS                | 2/25/2008            |
| trans-1,2-Dichloroethene              | Chronic                | 2.0E-02  | mg/kg/day | 1  | 2.0E-02                                | mg/kg/day | Blood                   | 1000/1                                 | IRIS                | 2/25/2008            |
| Trichloroethene                       | Chronic                | 5.0E-01  | mg/kg/day | 1  | 5.0E-01                                | mg/kg/day | Liver                   | NA                                     | CA EPA              | 12/2002              |
| Vinyl Chloride                        | Chronic                | 3.0E-03  | mg/kg/day | 1  | 3.0E-03                                | mg/kg/day | Liver                   | 30/1                                   | IRIS                | 2/25/2008            |
| <b>Semivolatile Organic Compounds</b> |                        |          |           |  |  |           |                         |  |                     |                      |
| Benzo(a)pyrene Equivalents            | NA                     | NA       | NA        | NA   | NA                                     | NA        | NA                      | NA                                     | NA                  | NA                   |
| Bis(2-ethylhexyl)phthalate            | Chronic                | 2.0E-02  | mg/kg/day | 1  | 2.0E-02                                | mg/kg/day | Liver                   | 1000/1                                 | IRIS                | 2/25/2008            |
| <b>Inorganics</b>                     |                        |          |           |  |  |           |                         |  |                     |                      |
| Aluminum                              | Chronic                | 1.0E+00  | mg/kg/day | 1  | 1.0E+00                                | mg/kg/day | CNS                     | 100                                    | PPRTV               | 10/23/2006           |
| Arsenic                               | Chronic                | 3.0E-04  | mg/kg/day | 1  | 3.0E-04                                | mg/kg/day | Skin, CVS               | 3/1                                    | IRIS                | 2/25/2008            |
| Chromium                              | Chronic                | 3.0E-03  | mg/kg/day | 0.025  | 7.5E-05                                | mg/kg/day | Fetotoxicity, GS, Bone  | 300/3                                  | IRIS                | 2/25/2008            |
| Iron                                  | Chronic                | 7.0E-01  | mg/kg/day | 1  | 7.0E-01                                | mg/kg/day | GS                      | 1.5                                    | PPRTV               | 9/11/2006            |
| Lead                                  | NA                     | NA       | NA        | NA   | NA                                     | NA        | NA                      | NA                                     | NA                  | NA                   |
| Manganese                             | Chronic                | 2.4E-02  | mg/kg/day | 0.04   | 9.6E-04                                | mg/kg/day | CNS                     | 1/3                                    | IRIS                | 2/25/2008            |
| Thallium <sup>(3)</sup>               | Chronic                | 7.0E-05  | mg/kg/day | 1  | 7.0E-05                                | mg/kg/day | Liver                   | 3000                                   | USEPA III           | 10/11/2007           |
| Vanadium                              | Chronic                | 1.0E-03  | mg/kg/day | 0.026  | 2.6E-05                                | mg/kg/day | Kidney                  | 300                                    | USEPA III           | 10/11/2007           |

Notes:

- 1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
- 2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
- 3 - Values are for cadmium water.
- 4 - Values are for mercuric chloride.
- 5 - Weight adjustment of the IRIS value.

Definitions:

- CNS = Central Nervous System  
 CVS = Cardiovascular system  
 USEPA III = USEPA Region 3 RBC Table, October 11, 2007.  
 GS = Gastrointestinal  
 IRIS = Integrated Risk Information System  
 NA = Not Applicable  
 PPRTV - Provisional Peer Review Toxicity Value  
 CA EPA = California Environmental Protection Agency  
 RfD = Reference Dose

**TABLE 6-15  
NON-CANCER TOXICITY DATA -- INHALATION  
SITE 3 REMEDIAL INVESTIGATION REPORT  
NCBC GULFPORT  
GULFPORT, MISSISSIPPI**

| Chemical of Potential Concern         | Chronic/<br>Subchronic | Inhalation RfC |                   | Extrapolated RfD <sup>(1)</sup> |             | Primary Target Organ(s) | Combined Uncertainty/Modifying Factors | RfC : Target Organ(s) |                         |
|---------------------------------------|------------------------|----------------|-------------------|---------------------------------|-------------|-------------------------|--|-----------------------|-------------------------|
|                                       |                        | Value          | Units             | Value                           | Units       |                         |  | Source(s)             | Date(s)<br>(MM/DD/YYYY) |
| <b>Volatile Organic Compounds</b>     |                        |                |                   |                                 |             |                         |  |                       |                         |
| 1,2,4-Trichlorobenzene                | NA                     | NA             | NA                | NA                              | NA          | NA                      | NA                                     | NA                    | NA                      |
| 1,2-Dichloroethane                    | Chronic                | 2.5E+00        | mg/m <sup>3</sup> | 7.0E-01                         | (mg/kg/day) | NA                      | NA                                     | USEPA III             | 10/11/2007              |
| Benzene                               | Chronic                | 3.0E-02        | mg/m <sup>3</sup> | 8.6E-03                         | (mg/kg/day) | Blood                   | 300/1                                  | IRIS                  | 2/25/2008               |
| Chloromethane                         | Chronic                | 0.09           | mg/m <sup>3</sup> | 2.6E-02                         | (mg/kg/day) | CNS                     | 1000/1                                 | IRIS                  | 2/25/2008               |
| cis-1,2-Dichloroethene                | NA                     | NA             | NA                | NA                              | NA          | NA                      | NA                                     | NA                    | NA                      |
| Methylene Chloride                    | Chronic                | 1.1E+00        | mg/m <sup>3</sup> | 3.0E-01                         | (mg/kg/day) | Liver                   | NA                                     | USEPA III             | 10/11/2007              |
| trans-1,2-Dichloroethene              | Chronic                | 6.0E-02        | mg/m <sup>3</sup> | 1.7E-02                         | (mg/kg/day) | Blood                   | 3000                                   | PPRTV                 | 3/1/2006                |
| Trichloroethene                       | Chronic                | 6.0E-01        | mg/m <sup>3</sup> | 1.7E-01                         | (mg/kg/day) | Liver                   | NA                                     | CA EPA                | 12/2002                 |
| Vinyl Chloride                        | Chronic                | 1.0E-01        | mg/m <sup>3</sup> | 2.9E-02                         | (mg/kg/day) | Liver                   | 30/1                                   | IRIS                  | 2/25/2008               |
| <b>Semivolatile Organic Compounds</b> |                        |                |                   |                                 |             |                         |  |                       |                         |
| Benzo(a)pyrene Equivalents            | NA                     | NA             | NA                | NA                              | NA          | NA                      | NA                                     | NA                    | NA                      |
| Bis(2-ethylhexyl)phthalate            | NA                     | NA             | NA                | NA                              | NA          | NA                      | NA                                     | NA                    | NA                      |
| <b>Inorganics</b>                     |                        |                |                   |                                 |             |                         |  |                       |                         |
| Aluminum                              | Chronic                | 5.0E-03        | mg/m <sup>3</sup> | 1.4E-03                         | (mg/kg/day) | CNS                     | 300                                    | PPRTV                 | 10/23/2006              |
| Arsenic                               | NA                     | NA             | NA                | NA                              | NA          | NA                      | NA                                     | NA                    | NA                      |
| Chromium                              | Chronic                | 1.0E-04        | mg/m <sup>3</sup> | 2.9E-05                         | (mg/kg/day) | Lungs                   | 300/1                                  | IRIS                  | 2/25/2008               |
| Iron                                  | NA                     | NA             | NA                | NA                              | NA          | NA                      | NA                                     | NA                    | NA                      |
| Lead                                  | NA                     | NA             | NA                | NA                              | NA          | NA                      | NA                                     | NA                    | NA                      |
| Manganese                             | Chronic                | 5.0E-05        | mg/m <sup>3</sup> | 1.4E-05                         | (mg/kg/day) | CNS                     | 1000/1                                 | IRIS                  | 2/25/2008               |
| Thallium                              | NA                     | NA             | NA                | NA                              | NA          | NA                      | NA                                     | NA                    | NA                      |
| Vanadium                              | NA                     | NA             | NA                | NA                              | NA          | NA                      | NA                                     | NA                    | NA                      |

Notes:

1 - Extrapolated RfD = RfC \*20m<sup>3</sup>/day / 70 kg

Definitions:

CNS = Central Nervous System  
 USEPA III = USEPA Region 3 RBC Table, April 6, 2007.  
 HEAST= Health Effects Assessment Summary Tables  
 IRIS = Integrated Risk Information System  
 NA = Not Applicable  
 PPRTV - Provisional Peer Review Toxicity Value  
 CA EPA = California Environmental Protection Agency  
 RfD = Reference Dose

**TABLE 6-16**  
**CANCER TOXICITY DATA -- ORAL/DERMAL**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**

| Chemical of Potential Concern         | Oral Cancer Slope Factor |                           | Oral Absorption Efficiency for Dermal <sup>(1)</sup> | Absorbed Cancer Slope Factor for Dermal <sup>(2)</sup> |                           | Weight of Evidence/ Cancer Guideline Description | Oral CSF  |                      |
|---------------------------------------|--------------------------|---------------------------|--|--|---------------------------|--|-----------|----------------------|
|                                       | Value                    | Units                     |  | Value  | Units                     |  | Source(s) | Date(s) (MM/DD/YYYY) |
| <b>Volatile Organic Compounds</b>     |                          |                           |  |  |                           |  |           |                      |
| 1,2,4-Trichlorobenzene                | NA                       | NA                        | NA   | NA   | NA                        | D  | IRIS      | 2/25/2008            |
| 1,2-Dichloroethane                    | 9.1E-02                  | (mg/kg/day) <sup>-1</sup> | 1  | 9.1E-02  | (mg/kg/day) <sup>-1</sup> | B2   | IRIS      | 2/25/2008            |
| Benzene                               | 5.5E-02                  | (mg/kg/day) <sup>-1</sup> | 1  | 5.5E-02  | (mg/kg/day) <sup>-1</sup> | A  | IRIS      | 2/25/2008            |
| Chloromethane                         | NA                       | NA                        | NA   | NA   | NA                        | D  | IRIS      | 2/25/2008            |
| cis-1,2-Dichloroethene                | NA                       | NA                        | NA   | NA   | NA                        | D  | IRIS      | 2/25/2008            |
| Methylene Chloride                    | 7.5E-03                  | (mg/kg/day) <sup>-1</sup> | 1  | 7.5E-03  | (mg/kg/day) <sup>-1</sup> | B2   | IRIS      | 2/25/2008            |
| trans-1,2-Dichloroethene              | NA                       | NA                        | NA   | NA   | NA                        | NA   | NA        | NA                   |
| Trichloroethene                       | 1.3E-02                  | (mg/kg/day) <sup>-1</sup> | 1  | 1.3E-02  | (mg/kg/day) <sup>-1</sup> | C  | CA EPA    | 12/2002              |
| Vinyl Chloride (early life)           | 1.5E+00                  | (mg/kg/day) <sup>-1</sup> | 1  | 1.5E+00  | (mg/kg/day) <sup>-1</sup> | A  | IRIS      | 2/25/2008            |
| Vinyl Chloride (adult)                | 7.2E-01                  | (mg/kg/day) <sup>-1</sup> | 1  | 7.2E-01  | (mg/kg/day) <sup>-1</sup> | A  | IRIS      | 2/25/2008            |
| <b>Semivolatile Organic Compounds</b> |                          |                           |  |  |                           |  |           |                      |
| Benzo(a)pyrene Equivalents            | 7.3E+00                  | (mg/kg/day) <sup>-1</sup> | 1  | 7.3E+00  | (mg/kg/day) <sup>-1</sup> | B2   | IRIS      | 2/25/2008            |
| Bis(2-ethylhexyl)phthalate            | 1.4E-02                  | (mg/kg/day) <sup>-1</sup> | 1  | 1.4E-02  | (mg/kg/day) <sup>-1</sup> | B2   | IRIS      | 2/25/2008            |
| <b>Inorganics</b>                     |                          |                           |  |  |                           |  |           |                      |
| Aluminum                              | NA                       | NA                        | NA   | NA   | NA                        | NA   | NA        | NA                   |
| Antimony                              | NA                       | NA                        | NA   | NA   | NA                        | NA   | NA        | NA                   |
| Cadmium                               | NA                       | NA                        | NA   | NA   | NA                        | B1   | IRIS      | 2/25/2008            |
| Iron                                  | NA                       | NA                        | NA   | NA   | NA                        | NA   | NA        | NA                   |
| Chromium                              | NA                       | NA                        | NA   | NA   | NA                        | D  | IRIS      | 2/25/2008            |
| Lead                                  | NA                       | NA                        | NA   | NA   | NA                        | B2   | IRIS      | 2/25/2008            |
| Manganese                             | NA                       | NA                        | NA   | NA   | NA                        | D  | IRIS      | 2/25/2008            |
| Thallium                              | NA                       | NA                        | NA   | NA   | NA                        | NA   | NA        | NA                   |
| Vanadium                              | NA                       | NA                        | NA   | NA   | NA                        | NA   | NA        | NA                   |

Notes:

- 1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
- 2 - Adjusted cancer slope factor for dermal =  
Oral cancer slope factor / Oral Absorption Efficiency for Dermal.

EPA Group:

- A - Human carcinogen.
- B1 - Probable human carcinogen - indicates that limited human data are available.
- B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .
- C - Possible human carcinogen.
- D - Not classifiable as a human carcinogen.
- E - Evidence of noncarcinogenicity.

USEPA(1) = Draft Trichloroethylene Health Risk Assessment: Synthesis and Characterization, August 2001.

USEPA(2) = USEPA, Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, July 1993, EPA/600/R-93/089.

IRIS = Integrated Risk Information System.

NA = Not Available.

CA EPA = California Environmental Protection Agency

**TABLE 6-17  
CANCER TOXICITY DATA -- INHALATION  
SITE 3 REMEDIAL INVESTIGATION REPORT  
NCBC GULFPORT  
GULFPORT, MISSISSIPPI**

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| Chemical of Potential Concern         | Unit Risk |                                    | Inhalation Cancer Slope Factor <sup>(1)</sup> |                           | Weight of Evidence/<br>Cancer Guideline<br>Description | Unit Risk : Inhalation CSF |                         |
|---------------------------------------|-----------|------------------------------------|---|---------------------------|--|----------------------------|-------------------------|
|                                       | Value     | Units                              | Value   | Units                     |  | Source(s)                  | Date(s)<br>(MM/DD/YYYY) |
| <b>Volatile Organic Compounds</b>     |           |                                    |   |                           |  |                            |                         |
| 1,2,4-Trichlorobenzene                | NA        | NA                                 | NA  | NA                        | D  | IRIS                       | 2/25/2008               |
| 1,2-Dichloroethane                    | 2.6E-05   | (ug/m <sup>3</sup> ) <sup>-1</sup> | 9.1E-02                                       | (mg/kg/day) <sup>-1</sup> | B2   | IRIS                       | 2/25/2008               |
| Benzene                               | 7.8E-06   | (ug/m <sup>3</sup> ) <sup>-1</sup> | 2.7E-02                                       | (mg/kg/day) <sup>-1</sup> | A  | IRIS                       | 2/25/2008               |
| Chloromethane                         | NA        | NA                                 | NA  | NA                        | D  | IRIS                       | 2/25/2008               |
| cis-1,2-Dichloroethene                | NA        | NA                                 | NA  | NA                        | D  | IRIS                       | 2/25/2008               |
| Methylene Chloride                    | 4.7E-07   | (ug/m <sup>3</sup> ) <sup>-1</sup> | 1.6E-03                                       | (mg/kg/day) <sup>-1</sup> | B2   | IRIS                       | 2/25/2008               |
| trans-1,2-Dichloroethene              | NA        | NA                                 | NA  | NA                        | NA   | NA                         | NA                      |
| Trichloroethene                       | 2.0E-03   | (mg/m3)-1                          | 7.0E-03                                       | (mg/kg/day)-1             | C  | CA EPA                     | 12/2002                 |
| Vinyl Chloride (early life)           | 8.8E-06   | (ug/m <sup>3</sup> ) <sup>-1</sup> | 3.1E-02                                       | (mg/kg/day) <sup>-1</sup> | A  | IRIS                       | 2/25/2008               |
| Vinyl Chloride (adult)                | 4.4E-06   | (ug/m <sup>3</sup> ) <sup>-1</sup> | 1.5E-02                                       | (mg/kg/day) <sup>-1</sup> | A  | IRIS                       | 2/25/2008               |
| <b>Semivolatile Organic Compounds</b> |           |                                    |   |                           |  |                            |                         |
| Benzo(a)pyrene Equivalents            | 8.9E-04   | (ug/m <sup>3</sup> ) <sup>-1</sup> | 3.1E+00                                       | (mg/kg/day) <sup>-1</sup> | NA   | USEPA III                  | 10/11/2007              |
| Bis(2-ethylhexyl)phthalate            | NA        | NA                                 | NA  | NA                        | NA   | NA                         | NA                      |
| <b>Inorganics</b>                     |           |                                    |   |                           |  |                            |                         |
| Aluminum                              | NA        | NA                                 | NA  | NA                        | NA   | NA                         | NA                      |
| Antimony                              | NA        | NA                                 | NA  | NA                        | NA   | NA                         | NA                      |
| Cadmium                               | 1.8E-03   | (ug/m <sup>3</sup> ) <sup>-1</sup> | 6.3E+00                                       | (mg/kg/day) <sup>-1</sup> | B1   | IRIS                       | 2/25/2008               |
| Iron                                  | NA        | NA                                 | NA  | NA                        | NA   | NA                         | NA                      |
| Chromium                              | 1.2E-02   | (ug/m <sup>3</sup> ) <sup>-1</sup> | 4.2E+01                                       | (mg/kg/day) <sup>-1</sup> | A  | IRIS                       | 2/25/2008               |
| Lead                                  | NA        | NA                                 | NA  | NA                        | B2   | IRIS                       | 2/25/2008               |
| Manganese                             | NA        | NA                                 | NA  | NA                        | D  | IRIS                       | 2/25/2008               |
| Thallium                              | NA        | NA                                 | NA  | NA                        | NA   | NA                         | NA                      |
| Vanadium                              | NA        | NA                                 | NA  | NA                        | NA   | NA                         | NA                      |

**TABLE 6-17  
CANCER TOXICITY DATA -- INHALATION  
SITE 3 REMEDIAL INVESTIGATION REPORT  
NCBC GULFPORT  
GULFPORT, MISSISSIPPI**

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| Chemical<br>of Potential<br>Concern | Unit Risk |       | Inhalation Cancer<br>Slope Factor <sup>(1)</sup> |       | Weight of Evidence/<br>Cancer Guideline<br>Description | Unit Risk : Inhalation CSF |                         |
|-------------------------------------|-----------|-------|--|-------|--|----------------------------|-------------------------|
|                                     | Value     | Units | Value  | Units |  | Source(s)                  | Date(s)<br>(MM/DD/YYYY) |

Notes:

1 - Inhalation CSF = Unit Risk \* 70 kg / 20m<sup>3</sup>/day.

Definitions:

IRIS = Integrated Risk Information System.

NA = Not Available.

USEPA III = USEPA Region 3 RBC Table, April 6, 2007.

USEPA(1) = Draft Trichloroethylene Health Risk Assessment: Synthesis and Characterization, August 2001.

CA EPA = California Environmental Protection Agency

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

TABLE 6-18  
SUMMARY OF CANCER RISKS AND HAZARD INDICES  
REASONABLE MAXIMUM EXPOSURES  
SITE 3 REMEDIAL INVESTIGATION REPORT  
NCBC GULFPORT  
GULFPORT, MISSISSIPPI  
PAGE 1 OF 4

| Receptor                 | Media                   | Exposure Route       | Cancer Risk          | Chemicals with Cancer Risks > 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup> | Hazard Index | Chemicals Contributing to an HI > 1 |    |
|--------------------------|-------------------------|----------------------|----------------------|--|---|---|--------------|-------------------------------------|----|
| Construction Workers     | Surface Soil            | Incidental Ingestion | 3E-07                | --   | --  | --  | 0.1          | --                                  |    |
|                          |                         | Dermal Contact       | 6E-08                | --   | --  | --  | 0.004        | --                                  |    |
|                          |                         | Total                | 4E-07                | --   | --  | --  | 0.1          | --                                  |    |
|                          | Subsurface Soil         | Incidental Ingestion | 8E-08                | --   | --  | --  | 0.05         | --                                  |    |
|                          |                         | Dermal Contact       | 7E-09                | --   | --  | --  | 0.001        | --                                  |    |
|                          |                         | Total                | 9E-08                | --   | --  | --  | 0.05         | --                                  |    |
|                          | Groundwater             | Dermal Contact       | 2E-08                | --   | --  | --  | 0.01         | --                                  |    |
|                          |                         | Inhalation           | 4E-09                | --   | --  | --  | 0.0008       | --                                  |    |
|                          |                         | Total                | 3E-08                | --   | --  | --  | 0.01         | --                                  |    |
|                          | Surface Water           | Incidental Ingestion | 4E-11                | --   | --  | --  | 0.0001       | --                                  |    |
|                          |                         | Dermal Contact       | 3E-09                | --   | --  | --  | 0.001        | --                                  |    |
|                          |                         | Total                | 3E-09                | --   | --  | --  | 0.001        | --                                  |    |
|                          | Sediment                | Incidental Ingestion | 6E-08                | --   | --  | --  | 0.03         | --                                  |    |
|                          |                         | Dermal Contact       | 6E-09                | --   | --  | --  | 0.0009       | --                                  |    |
|                          |                         | Total                | 7E-08                | --   | --  | --  | 0.03         | --                                  |    |
| Total All Media          |                         |                      | 6E-07                |  |   |   | 0.2          |                                     |    |
| Site Maintenance Workers | Surface Soil            | Incidental Ingestion | 2E-07                | --   | --  | --  | 0.003        | --                                  |    |
|                          |                         | Dermal Contact       | 9E-08                | --   | --  | --  | 0.0002       | --                                  |    |
|                          |                         | Total                | 3E-07                | --   | --  | --  | 0.003        | --                                  |    |
|                          | Subsurface Soil         | Incidental Ingestion | 6E-08                | --   | --  | --  | 0.001        | --                                  |    |
|                          |                         | Dermal Contact       | 1E-08                | --   | --  | --  | 0.00007      | --                                  |    |
|                          |                         | Total                | 7E-08                | --   | --  | --  | 0.002        | --                                  |    |
|                          | Surface Water           | Incidental Ingestion | 9E-10                | --   | --  | --  | 0.00010      | --                                  |    |
|                          |                         | Dermal Contact       | 7E-08                | --   | --  | --  | 0.0010       | --                                  |    |
|                          |                         | Total                | 7E-08                | --   | --  | --  | 0.001        | --                                  |    |
|                          | Sediment                | Incidental Ingestion | 4E-07                | --   | --  | --  | 0.006        | --                                  |    |
|                          |                         | Dermal Contact       | 8E-08                | --   | --  | --  | 0.0005       | --                                  |    |
|                          |                         | Total                | 5E-07                | --   | --  | --  | 0.007        | --                                  |    |
|                          | Total All Media         |                      |                      | 1E-06  |   |   |              | 0.01                                |    |
|                          | Site Industrial Workers | Surface Soil         | Incidental Ingestion | 3E-06  | --  | --  | Arsenic      | 0.03                                | -- |
|                          |                         |                      | Dermal Contact       | 1E-06  | --  | --  | --           | 0.002                               | -- |
| Total                    |                         |                      | 4E-06                | --   | --  | Arsenic   | 0.04         | --                                  |    |
| Subsurface Soil          |                         | Incidental Ingestion | 6E-07                | --   | --  | --  | 0.02         | --                                  |    |
|                          |                         | Dermal Contact       | 1E-07                | --   | --  | --  | 0.0008       | --                                  |    |
|                          |                         | Total                | 7E-07                | --   | --  | --  | 0.02         | --                                  |    |
| Surface Water            |                         | Incidental Ingestion | 9E-10                | --   | --  | --  | 0.00010      | --                                  |    |
|                          |                         | Dermal Contact       | 7E-08                | --   | --  | --  | 0.0010       | --                                  |    |
|                          |                         | Total                | 7E-08                | --   | --  | --  | 0.001        | --                                  |    |
| Sediment                 |                         | Incidental Ingestion | 2E-07                | --   | --  | --  | 0.003        | --                                  |    |
|                          |                         | Dermal Contact       | 8E-08                | --   | --  | --  | 0.0005       | --                                  |    |
|                          |                         | Total                | 3E-07                | --   | --  | --  | 0.004        | --                                  |    |
| Total All Media          |                         |                      | 5E-06                |  |   |   | 0.06         |                                     |    |

TABLE 6-18  
SUMMARY OF CANCER RISKS AND HAZARD INDICES  
REASONABLE MAXIMUM EXPOSURES  
SITE 3 REMEDIAL INVESTIGATION REPORT  
NCBC GULFPORT  
GULFPORT, MISSISSIPPI  
PAGE 2 OF 4

| Receptor                                       | Media           | Exposure Route       | Cancer Risk | Chemicals with Cancer Risks > 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup> | Hazard Index | Chemicals Contributing to an HI > 1 |
|--|-----------------|----------------------|-------------|--|---|---|--------------|-------------------------------------|
| Adolescent Trespassers                         | Surface Soil    | Incidental Ingestion | 3E-07       | --   | --  | --  | 0.006        | --                                  |
|  |                 | Dermal Contact       | 8E-08       | --   | --  | --  | 0.0004       | --                                  |
|  |                 | Total                | 4E-07       | --   | --  | --  | 0.007        | --                                  |
|  | Subsurface Soil | Incidental Ingestion | 5E-08       | --   | --  | --  | 0.003        | --                                  |
|  |                 | Dermal Contact       | 1E-08       | --   | --  | --  | 0.0001       | --                                  |
|  |                 | Total                | 6E-08       | --   | --  | --  | 0.003        | --                                  |
|  | Surface Water   | Incidental Ingestion | 4E-09       | --   | --  | --  | 0.0009       | --                                  |
|  |                 | Dermal Contact       | 6E-08       | --   | --  | --  | 0.002        | --                                  |
|  |                 | Total                | 6E-08       | --   | --  | --  | 0.003        | --                                  |
|  | Sediment        | Incidental Ingestion | 3E-07       | --   | --  | --  | 0.01         | --                                  |
|  |                 | Dermal Contact       | 7E-08       | --   | --  | --  | 0.0009       | --                                  |
|  |                 | Total                | 4E-07       | --   | --  | --  | 0.01         | --                                  |
| Total All Media                                |                 |                      | 9E-07       |  |   |   | 0.03         |                                     |
| Adult Trespassers                              | Surface Soil    | Incidental Ingestion | 2E-07       | --   | --  | --  | 0.004        | --                                  |
|  |                 | Dermal Contact       | 5E-08       | --   | --  | --  | 0.0002       | --                                  |
|  |                 | Total                | 3E-07       | --   | --  | --  | 0.004        | --                                  |
|  | Subsurface Soil | Incidental Ingestion | 6E-08       | --   | --  | --  | 0.002        | --                                  |
|  |                 | Dermal Contact       | 7E-09       | --   | --  | --  | 0.00005      | --                                  |
|  |                 | Total                | 6E-08       | --   | --  | --  | 0.002        | --                                  |
|  | Surface Water   | Incidental Ingestion | 8E-10       | --   | --  | --  | 0.0001       | --                                  |
|  |                 | Dermal Contact       | 1E-07       | --   | --  | --  | 0.002        | --                                  |
|  |                 | Total                | 1E-07       | --   | --  | --  | 0.002        | --                                  |
|  | Sediment        | Incidental Ingestion | 4E-07       | --   | --  | --  | 0.008        | --                                  |
|  |                 | Dermal Contact       | 4E-08       | --   | --  | --  | 0.0004       | --                                  |
|  |                 | Total                | 4E-07       | --   | --  | --  | 0.008        | --                                  |
| Total All Media                                |                 |                      | 9E-07       |  |   |   | 0.02         |                                     |
| Lifelong Trespassers<br>(Adolescent and Adult) | Surface Soil    | Incidental Ingestion | 6E-07       | --   | --  | --  | NA           | --                                  |
|  |                 | Dermal Contact       | 1E-07       | --   | --  | --  | NA           | --                                  |
|  |                 | Total                | 7E-07       | --   | --  | --  | NA           | --                                  |
|  | Subsurface Soil | Incidental Ingestion | 1E-07       | --   | --  | --  | NA           | --                                  |
|  |                 | Dermal Contact       | 2E-08       | --   | --  | --  | NA           | --                                  |
|  |                 | Total                | 1E-07       | --   | --  | --  | NA           | --                                  |
|  | Surface Water   | Incidental Ingestion | 5E-09       | --   | --  | --  | NA           | --                                  |
|  |                 | Dermal Contact       | 2E-07       | --   | --  | --  | NA           | --                                  |
|  |                 | Total                | 2E-07       | --   | --  | --  | NA           | --                                  |
|  | Sediment        | Incidental Ingestion | 7E-07       | --   | --  | --  | NA           | --                                  |
|  |                 | Dermal Contact       | 1E-07       | --   | --  | --  | NA           | --                                  |
|  |                 | Total                | 8E-07       | --   | --  | --  | NA           | --                                  |
| Total All Media                                |                 |                      | 2E-06       |  |   |   | NA           |                                     |

TABLE 6-18  
SUMMARY OF CANCER RISKS AND HAZARD INDICES  
REASONABLE MAXIMUM EXPOSURES  
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| Receptor        | Media           | Exposure Route       | Cancer Risk | Chemicals with Cancer Risks > 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup> | Hazard Index | Chemicals Contributing to an HI > 1   |
|-----------------|-----------------|----------------------|-------------|--|---|---|--------------|---------------------------------------|
| Child Residents | Surface Soil    | Incidental Ingestion | 2E-05       | --   | --  | cPAHs, Arsenic  | 0.4          | --                                    |
|                 |                 | Dermal Contact       | 5E-06       | --   | --  | cPAHs   | 0.01         | --                                    |
|                 |                 | Total                | 2E-05       | --   | --  | cPAHs, Arsenic  | 0.5          | --                                    |
|                 | Subsurface Soil | Incidental Ingestion | 6E-07       | --   | --  | --  | 0.2          | --                                    |
|                 |                 | Dermal Contact       | 5E-08       | --   | --  | --  | 0.001        | --                                    |
|                 |                 | Total                | 7E-07       | --   | --  | --  | 0.2          | --                                    |
|                 | Groundwater     | Ingestion            | 4E-04       | Vinyl Chloride                                 | Arsenic   | 1,2-Dichloroethane  | 9            | Arsenic, Iron                         |
|                 |                 | Dermal Contact       | 4E-06       | --   | --  | Vinyl Chloride  | 0.2          | --                                    |
|                 |                 | Inhalation           | 2E-04       | Vinyl Chloride                                 | --  | 1,2-Dichloroethane  | 2            | --                                    |
|                 |                 | Total                | 6E-04       | Vinyl Chloride                                 | Arsenic   | 1,2-Dichloroethane, Benzene, Trichloroethene                          | 11           | cis-1,2-Dichloroethene, Arsenic, Iron |
|                 | Surface Water   | Incidental Ingestion | 6E-09       | --   | --  | --  | 0.003        | --                                    |
|                 |                 | Dermal Contact       | 8E-08       | --   | --  | --  | 0.005        | --                                    |
|                 |                 | Total                | 8E-08       | --   | --  | --  | 0.008        | --                                    |
|                 | Sediment        | Incidental Ingestion | 1E-06       | --   | --  | --  | 0.07         | --                                    |
|                 |                 | Dermal Contact       | 9E-08       | --   | --  | --  | 0.002        | --                                    |
| Total           |                 | 1E-06                | --          | --   | --  | 0.07  | --           |                                       |
| Total All Media |                 |                      | 6E-04       |  |   | 12  |              |                                       |
| Adult Residents | Surface Soil    | Incidental Ingestion | 4E-06       | --   | --  | cPAHs, Arsenic  | 0.05         | --                                    |
|                 |                 | Dermal Contact       | 1E-06       | --   | --  | --  | 0.002        | --                                    |
|                 |                 | Total                | 5E-06       | --   | --  | cPAHs, Arsenic  | 0.05         | --                                    |
|                 | Subsurface Soil | Incidental Ingestion | 3E-07       | --   | --  | --  | 0.02         | --                                    |
|                 |                 | Dermal Contact       | 4E-08       | --   | --  | --  | 0.0003       | --                                    |
|                 |                 | Total                | 4E-07       | --   | --  | --  | 0.02         | --                                    |
|                 | Groundwater     | Ingestion            | 4E-04       | Arsenic, Vinyl Chloride                        | --  | 1,2-Dichloroethane, Trichloroethene                                   | 3            | --                                    |
|                 |                 | Dermal Contact       | 1E-05       | --   | --  | Vinyl Chloride  | 0.09         | --                                    |
|                 |                 | Inhalation           | 2E-04       | Vinyl Chloride                                 | --  | 1,2-Dichloroethane, Trichloroethene                                   | 0.6          | --                                    |
|                 |                 | Total                | 7E-04       | Arsenic, Vinyl Chloride                        | --  | 1,2-Dichloroethane, Benzene, Trichloroethene                          | 3            | --                                    |
|                 | Surface Water   | Incidental Ingestion | 1E-09       | --   | --  | --  | 0.0001       | --                                    |
|                 |                 | Dermal Contact       | 1E-07       | --   | --  | --  | 0.002        | --                                    |
|                 |                 | Total                | 1E-07       | --   | --  | --  | 0.002        | --                                    |
|                 | Sediment        | Incidental Ingestion | 5E-07       | --   | --  | --  | 0.008        | --                                    |
|                 |                 | Dermal Contact       | 6E-08       | --   | --  | --  | 0.0004       | --                                    |
| Total           |                 | 5E-07                | --          | --   | --  | 0.008   | --           |                                       |
| Total All Media |                 |                      | 7E-04       |  |   | 3   |              |                                       |

TABLE 6-18  
SUMMARY OF CANCER RISKS AND HAZARD INDICES  
REASONABLE MAXIMUM EXPOSURES  
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| Receptor                                | Media           | Exposure Route       | Cancer Risk | Chemicals with Cancer Risks > 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup> | Hazard Index | Chemicals Contributing to an HI > 1 |
|---|-----------------|----------------------|-------------|--|---|---|--------------|-------------------------------------|
| Lifelong Residents<br>(Child and Adult) | Surface Soil    | Incidental Ingestion | 2E-05       | --   | --  | cPAHs, Arsenic  | NA           | --                                  |
|   |                 | Dermal Contact       | 6E-06       | --   | --  | cPAHs   | NA           | --                                  |
|   |                 | Total                | 3E-05       | --   | cPAHs   | Arsenic   | NA           | --                                  |
|   | Subsurface Soil | Incidental Ingestion | 1E-06       | --   | --  | --  | NA           | --                                  |
|   |                 | Dermal Contact       | 9E-08       | --   | --  | --  | NA           | --                                  |
|   |                 | Total                | 1E-06       | --   | --  | --  | NA           | --                                  |
|   | Groundwater     | Ingestion            | 8E-04       | Arsenic, Vinyl Chloride                        | --  | 1,2-Dichloroethane, Benzene, Trichloroethene                          | NA           | --                                  |
|   |                 | Dermal Contact       | 1E-05       | --   | --  | Vinyl Chloride  | NA           | --                                  |
|   |                 | Inhalation           | 5E-04       | Vinyl Chloride                                 | --  | 1,2-Dichloroethane, Benzene, Trichloroethene                          | NA           | --                                  |
|   |                 | Total                | 1E-03       | Arsenic, Vinyl Chloride                        | --  | 1,2-Dichloroethane, Benzene, Trichloroethene                          | NA           | --                                  |
|   | Surface Water   | Incidental Ingestion | 7E-09       | --   | --  | --  | NA           | --                                  |
|   |                 | Dermal Contact       | 2E-07       | --   | --  | --  | NA           | --                                  |
|   |                 | Total                | 2E-07       | --   | --  | --  | NA           | --                                  |
|   | Sediment        | Incidental Ingestion | 2E-06       | --   | --  | --  | NA           | --                                  |
|   |                 | Dermal Contact       | 1E-07       | --   | --  | --  | NA           | --                                  |
| Total                                   |                 | 2E-06                | --          | --   | --  | NA  | --           |                                     |
| Total All Media                         |                 |                      | 1E-03       |  |   |   | NA           |                                     |

TABLE 6-19  
SUMMARY OF CANCER RISKS AND HAZARD INDICES  
CENTRAL TENDENCY EXPOSURES  
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| Receptor                 | Media                   | Exposure Route       | Cancer Risk          | Chemicals with Cancer Risks > 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup> | Hazard Index | Chemicals Contributing to an HI > 1 |    |
|--------------------------|-------------------------|----------------------|----------------------|--|---|---|--------------|-------------------------------------|----|
| Construction Workers     | Surface Soil            | Incidental Ingestion | 9E-08                | --   | --  | --  | 0.03         | --                                  |    |
|                          |                         | Dermal Contact       | 1E-08                | --   | --  | --  | 0.0006       | --                                  |    |
|                          |                         | Total                | 1E-07                | --   | --  | --  | 0.03         | --                                  |    |
|                          | Subsurface Soil         | Incidental Ingestion | 2E-08                | --   | --  | --  | 0.01         | --                                  |    |
|                          |                         | Dermal Contact       | 1E-09                | --   | --  | --  | 0.0002       | --                                  |    |
|                          |                         | Total                | 2E-08                | --   | --  | --  | 0.01         | --                                  |    |
|                          | Groundwater             | Dermal Contact       | 6E-09                | --   | --  | --  | 0.003        | --                                  |    |
|                          |                         | Inhalation           | 1E-09                | --   | --  | --  | 0.0002       | --                                  |    |
|                          |                         | Total                | 7E-09                | --   | --  | --  | 0.003        | --                                  |    |
|                          | Surface Water           | Incidental Ingestion | 2E-11                | --   | --  | --  | 0.00006      | --                                  |    |
|                          |                         | Dermal Contact       | 2E-09                | --   | --  | --  | 0.0006       | --                                  |    |
|                          |                         | Total                | 2E-09                | --   | --  | --  | 0.0007       | --                                  |    |
|                          | Sediment                | Incidental Ingestion | 2E-08                | --   | --  | --  | 0.006        | --                                  |    |
|                          |                         | Dermal Contact       | 1E-09                | --   | --  | --  | 0.0002       | --                                  |    |
|                          |                         | Total                | 2E-08                | --   | --  | --  | 0.006        | --                                  |    |
| Total All Media          |                         |                      | 1E-07                |  |   |   | 0.1          |                                     |    |
| Site Maintenance Workers | Surface Soil            | Incidental Ingestion | 2E-08                | --   | --  | --  | 0.0008       | --                                  |    |
|                          |                         | Dermal Contact       | 2E-09                | --   | --  | --  | 0.00001      | --                                  |    |
|                          |                         | Total                | 2E-08                | --   | --  | --  | 0.0008       | --                                  |    |
|                          | Subsurface Soil         | Incidental Ingestion | 5E-09                | --   | --  | --  | 0.0004       | --                                  |    |
|                          |                         | Dermal Contact       | 2E-10                | --   | --  | --  | 0.000004     | --                                  |    |
|                          |                         | Total                | 6E-09                | --   | --  | --  | 0.0004       | --                                  |    |
|                          | Surface Water           | Incidental Ingestion | 2E-10                | --   | --  | --  | 0.00005      | --                                  |    |
|                          |                         | Dermal Contact       | 1E-08                | --   | --  | --  | 0.0005       | --                                  |    |
|                          |                         | Total                | 1E-08                | --   | --  | --  | 0.0005       | --                                  |    |
|                          | Sediment                | Incidental Ingestion | 4E-08                | --   | --  | --  | 0.002        | --                                  |    |
|                          |                         | Dermal Contact       | 1E-09                | --   | --  | --  | 0.00002      | --                                  |    |
|                          |                         | Total                | 4E-08                | --   | --  | --  | 0.002        | --                                  |    |
|                          | Total All Media         |                      |                      | 8E-08  |   |   |              | 0.003                               |    |
|                          | Site Industrial Workers | Surface Soil         | Incidental Ingestion | 4E-07  | --  | --  | --           | 0.01                                | -- |
|                          |                         |                      | Dermal Contact       | 3E-08  | --  | --  | --           | 0.0002                              | -- |
| Total                    |                         |                      | 4E-07                | --   | --  | --  | 0.02         | --                                  |    |
| Subsurface Soil          |                         | Incidental Ingestion | 1E-07                | --   | --  | --  | 0.007        | --                                  |    |
|                          |                         | Dermal Contact       | 4E-09                | --   | --  | --  | 0.00007      | --                                  |    |
|                          |                         | Total                | 1E-07                | --   | --  | --  | 0.007        | --                                  |    |
| Surface Water            |                         | Incidental Ingestion | 2E-10                | --   | --  | --  | 0.00005      | --                                  |    |
|                          |                         | Dermal Contact       | 1E-08                | --   | --  | --  | 0.0005       | --                                  |    |
|                          |                         | Total                | 1E-08                | --   | --  | --  | 0.0005       | --                                  |    |
| Sediment                 |                         | Incidental Ingestion | 2E-08                | --   | --  | --  | 0.0008       | --                                  |    |
|                          |                         | Dermal Contact       | 1E-09                | --   | --  | --  | 0.00002      | --                                  |    |
|                          |                         | Total                | 2E-08                | --   | --  | --  | 0.0008       | --                                  |    |
| Total All Media          |                         |                      | 6E-07                |  |   |   | 0.02         |                                     |    |

TABLE 6-19  
SUMMARY OF CANCER RISKS AND HAZARD INDICES  
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| Receptor                                       | Media           | Exposure Route       | Cancer Risk | Chemicals with Cancer Risks > 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup> | Hazard Index | Chemicals Contributing to an HI > 1 |
|--|-----------------|----------------------|-------------|--|---|---|--------------|-------------------------------------|
| Adolescent Trespassers                         | Surface Soil    | Incidental Ingestion | 8E-08       | --   | --  | --  | 0.002        | --                                  |
|  |                 | Dermal Contact       | 8E-09       | --   | --  | --  | 0.00004      | --                                  |
|  |                 | Total                | 9E-08       | --   | --  | --  | 0.002        | --                                  |
|  | Subsurface Soil | Incidental Ingestion | 1E-08       | --   | --  | --  | 0.0007       | --                                  |
|  |                 | Dermal Contact       | 1E-09       | --   | --  | --  | 0.00001      | --                                  |
|  |                 | Total                | 1E-08       | --   | --  | --  | 0.0007       | --                                  |
|  | Surface Water   | Incidental Ingestion | 2E-09       | --   | --  | --  | 0.0005       | --                                  |
|  |                 | Dermal Contact       | 3E-08       | --   | --  | --  | 0.0009       | --                                  |
|  |                 | Total                | 3E-08       | --   | --  | --  | 0.001        | --                                  |
|  | Sediment        | Incidental Ingestion | 8E-08       | --   | --  | --  | 0.003        | --                                  |
|  |                 | Dermal Contact       | 7E-09       | --   | --  | --  | 0.00009      | --                                  |
|  |                 | Total                | 9E-08       | --   | --  | --  | 0.003        | --                                  |
| Total All Media                                |                 |                      | 2E-07       |  |   |   | 0.007        |                                     |
| Adult Trespassers                              | Surface Soil    | Incidental Ingestion | 4E-08       | --   | --  | --  | 0.002        | --                                  |
|  |                 | Dermal Contact       | 2E-09       | --   | --  | --  | 0.00002      | --                                  |
|  |                 | Total                | 4E-08       | --   | --  | --  | 0.002        | --                                  |
|  | Subsurface Soil | Incidental Ingestion | 9E-09       | --   | --  | --  | 0.0008       | --                                  |
|  |                 | Dermal Contact       | 3E-10       | --   | --  | --  | 0.000007     | --                                  |
|  |                 | Total                | 9E-09       | --   | --  | --  | 0.0008       | --                                  |
|  | Surface Water   | Incidental Ingestion | 4E-10       | --   | --  | --  | 0.00006      | --                                  |
|  |                 | Dermal Contact       | 5E-08       | --   | --  | --  | 0.001        | --                                  |
|  |                 | Total                | 5E-08       | --   | --  | --  | 0.001        | --                                  |
|  | Sediment        | Incidental Ingestion | 5E-08       | --   | --  | --  | 0.002        | --                                  |
|  |                 | Dermal Contact       | 7E-09       | --   | --  | --  | 0.0001       | --                                  |
|  |                 | Total                | 6E-08       | --   | --  | --  | 0.002        | --                                  |
| Total All Media                                |                 |                      | 2E-07       |  |   |   | 0.006        |                                     |
| Lifelong Trespassers<br>(Adolescent and Adult) | Surface Soil    | Incidental Ingestion | 1E-07       | --   | --  | --  | NA           | --                                  |
|  |                 | Dermal Contact       | 1E-08       | --   | --  | --  | NA           | --                                  |
|  |                 | Total                | 1E-07       | --   | --  | --  | NA           | --                                  |
|  | Subsurface Soil | Incidental Ingestion | 2E-08       | --   | --  | --  | NA           | --                                  |
|  |                 | Dermal Contact       | 1E-09       | --   | --  | --  | NA           | --                                  |
|  |                 | Total                | 2E-08       | --   | --  | --  | NA           | --                                  |
|  | Surface Water   | Incidental Ingestion | 2E-09       | --   | --  | --  | NA           | --                                  |
|  |                 | Dermal Contact       | 8E-08       | --   | --  | --  | NA           | --                                  |
|  |                 | Total                | 8E-08       | --   | --  | --  | NA           | --                                  |
|  | Sediment        | Incidental Ingestion | 1E-07       | --   | --  | --  | NA           | --                                  |
|  |                 | Dermal Contact       | 1E-08       | --   | --  | --  | NA           | --                                  |
|  |                 | Total                | 2E-07       | --   | --  | --  | NA           | --                                  |
| Total All Media                                |                 |                      | 4E-07       |  |   |   | NA           |                                     |

TABLE 6-19  
SUMMARY OF CANCER RISKS AND HAZARD INDICES  
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| Receptor                                | Media           | Exposure Route       | Cancer Risk | Chemicals with Cancer Risks > 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-5</sup> and ≤ 10 <sup>-4</sup> | Chemicals with Cancer Risks > 10 <sup>-6</sup> and ≤ 10 <sup>-5</sup> | Hazard Index | Chemicals Contributing to an HI > 1 |
|---|-----------------|----------------------|-------------|--|---|---|--------------|-------------------------------------|
| Child Residents                         | Surface Soil    | Incidental Ingestion | 9E-07       | --   | --  | --  | 0.1          | --                                  |
|   |                 | Dermal Contact       | 6E-08       | --   | --  | --  | 0.002        | --                                  |
|   |                 | Total                | 1E-06       | --   | --  | --  | 0.1          | --                                  |
|   | Subsurface Soil | Incidental Ingestion | 2E-07       | --   | --  | --  | 0.07         | --                                  |
|   |                 | Dermal Contact       | 7E-09       | --   | --  | --  | 0.0006       | --                                  |
|   |                 | Total                | 2E-07       | --   | --  | --  | 0.07         | --                                  |
|   | Groundwater     | Ingestion            | 3E-05       | --   | Vinyl Chloride  | Arsenic   | 3            | --                                  |
|   |                 | Dermal Contact       | 8E-07       | --   | --  | --  | 0.08         | --                                  |
|   |                 | Inhalation           | 2E-05       | --   | Vinyl Chloride  | --  | 0.6          | --                                  |
|   |                 | Total                | 6E-05       | --   | Vinyl Chloride  | Arsenic   | 3            | --                                  |
|   | Surface Water   | Incidental Ingestion | 1E-09       | --   | --  | --  | 0.001        | --                                  |
|   |                 | Dermal Contact       | 1E-08       | --   | --  | --  | 0.002        | --                                  |
|   |                 | Total                | 1E-08       | --   | --  | --  | 0.004        | --                                  |
|   | Sediment        | Incidental Ingestion | 9E-08       | --   | --  | --  | 0.02         | --                                  |
|   |                 | Dermal Contact       | 3E-09       | --   | --  | --  | 0.0002       | --                                  |
| Total                                   |                 | 9E-08                | --          | --   | --  | 0.02  | --           |                                     |
| Total All Media                         |                 |                      | 6E-05       |  |   |   | 4            |                                     |
| Adult Residents                         | Surface Soil    | Incidental Ingestion | 3E-07       | --   | --  | --  | 0.02         | --                                  |
|   |                 | Dermal Contact       | 2E-08       | --   | --  | --  | 0.0002       | --                                  |
|   |                 | Total                | 4E-07       | --   | --  | --  | 0.02         | --                                  |
|   | Subsurface Soil | Incidental Ingestion | 8E-08       | --   | --  | --  | 0.007        | --                                  |
|   |                 | Dermal Contact       | 3E-09       | --   | --  | --  | 0.00006      | --                                  |
|   |                 | Total                | 8E-08       | --   | --  | --  | 0.007        | --                                  |
|   | Groundwater     | Ingestion            | 6E-05       | --   | Vinyl Chloride, Arsenic   | --  | 1            | --                                  |
|   |                 | Dermal Contact       | 2E-06       | --   | --  | --  | 0.05         | --                                  |
|   |                 | Inhalation           | 3E-05       | --   | Vinyl Chloride  | --  | 0.3          | --                                  |
|   |                 | Total                | 9E-05       | --   | Vinyl Chloride, Arsenic   | --  | 2            | --                                  |
|   | Surface Water   | Incidental Ingestion | 2E-10       | --   | --  | --  | 0.00006      | --                                  |
|   |                 | Dermal Contact       | 2E-08       | --   | --  | --  | 0.001        | --                                  |
|   |                 | Total                | 2E-08       | --   | --  | --  | 0.001        | --                                  |
|   | Sediment        | Incidental Ingestion | 3E-08       | --   | --  | --  | 0.002        | --                                  |
|   |                 | Dermal Contact       | 1E-09       | --   | --  | --  | 0.00003      | --                                  |
| Total                                   |                 | 4E-08                | --          | --   | --  | 0.002   | --           |                                     |
| Total All Media                         |                 |                      | 9E-05       |  |   |   | 2            |                                     |
| Lifelong Residents<br>(Child and Adult) | Surface Soil    | Incidental Ingestion | 1E-06       | --   | --  | --  | NA           | --                                  |
|   |                 | Dermal Contact       | 8E-08       | --   | --  | --  | NA           | --                                  |
|   |                 | Total                | 1E-06       | --   | --  | --  | NA           | --                                  |
|   | Subsurface Soil | Incidental Ingestion | 3E-07       | --   | --  | --  | NA           | --                                  |
|   |                 | Dermal Contact       | 1E-08       | --   | --  | --  | NA           | --                                  |
|   |                 | Total                | 3E-07       | --   | --  | --  | NA           | --                                  |
|   | Groundwater     | Ingestion            | 9E-05       | --   | Vinyl Chloride, Arsenic   | --  | NA           | --                                  |
|   |                 | Dermal Contact       | 3E-06       | --   | --  | Vinyl Chloride  | NA           | --                                  |
|   |                 | Inhalation           | 5E-05       | --   | Vinyl Chloride  | --  | NA           | --                                  |
|   |                 | Total                | 1E-04       | --   | Vinyl Chloride, Arsenic   | --  | NA           | --                                  |
|   | Surface Water   | Incidental Ingestion | 1E-09       | --   | --  | --  | NA           | --                                  |
|   |                 | Dermal Contact       | 3E-08       | --   | --  | --  | NA           | --                                  |
|   |                 | Total                | 3E-08       | --   | --  | --  | NA           | --                                  |
|   | Sediment        | Incidental Ingestion | 1E-07       | --   | --  | --  | NA           | --                                  |
|   |                 | Dermal Contact       | 4E-09       | --   | --  | --  | NA           | --                                  |
| Total                                   |                 | 1E-07                | --          | --   | --  | NA  | --           |                                     |
| Total All Media                         |                 |                      | 1E-04       |  |   |   | NA           |                                     |

**TABLE 7-1**  
**SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN IN SURFACE SOIL**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**  
**PAGE 1 OF 2**

| Analyte                                       | Frequency of Detection | Range of Detected Concentrations | Sample of Maximum Detected Concentration | Range of Non-detects <sup>(1)</sup> | Ecological Screening Value | Maximum Hazard Quotient <sup>(2)</sup> | COPC (Yes/No) <sup>(3)</sup> |
|---|------------------------|----------------------------------|--|-------------------------------------|----------------------------|--|------------------------------|
| <b>Volatile Organic Compounds (µg/kg)</b>     |                        |                                  |  |                                     |                            |  |                              |
| Chloroform                                    | 1/10                   | 0.61                             | 03SS0801                                 | 5 - 7.5                             | 1.0                        | 0.6                                    | No                           |
| <b>Semivolatile Organic Compounds (µg/kg)</b> |                        |                                  |  |                                     |                            |  |                              |
| Benzo(a)anthracene                            | 3/10                   | 84 - 170                         | 03SS0901                                 | 360 - 450                           | 1100                       | 0.2                                    | No                           |
| Benzo(a)pyrene                                | 3/10                   | 170 - 210                        | 03SS0101                                 | 360 - 450                           | 1100                       | 0.2                                    | No                           |
| Benzo(b)fluoranthene                          | 3/10                   | 270 - 360                        | 03SS0101                                 | 360 - 450                           | 1100                       | 0.3                                    | No                           |
| Benzo(g,h,i)perylene                          | 1/10                   | 100                              | 03SS0901                                 | 360 - 450                           | 1100                       | 0.1                                    | No                           |
| Benzo(k)fluoranthene                          | 3/10                   | 200 - 240                        | 03SS0101/03SS0901                        | 360 - 450                           | 1100                       | 0.2                                    | No                           |
| Bis(2-ethylhexyl)phthalate                    | 6/10                   | 52 - 280                         | 03SS0901                                 | 370 - 450                           | NA                         | NA                                     | Yes                          |
| Caprolactam                                   | 2/10                   | 170 - 260                        | 03SS0301                                 | 360 - 430                           | NA                         | NA                                     | Yes                          |
| Chrysene                                      | 3/10                   | 150 - 230                        | 03SS0901                                 | 360 - 450                           | 1100                       | 0.2                                    | No                           |
| Fluoranthene                                  | 3/10                   | 73 - 160                         | 03SS0101                                 | 360 - 450                           | 29000                      | 0.01                                   | No                           |
| Pyrene  | 3/10                   | 140 - 370                        | 03SS0101                                 | 360 - 450                           | 1100                       | 0.3                                    | No                           |
| <b>Pesticides/PCBs (µg/kg)</b>                |                        |                                  |  |                                     |                            |  |                              |
| 4,4'-DDD                                      | 4/10                   | 0.73 - 3.3                       | 03SS1001                                 | 0.56 - 0.72                         | 21                         | 0.2                                    | No                           |
| 4,4'-DDE                                      | 4/10                   | 0.73 - 4.9                       | 03SS0101                                 | 0.56 - 0.72                         | 21                         | 0.2                                    | No                           |
| 4,4'-DDT                                      | 5/10                   | 0.29 - 17                        | 03SS1001                                 | 0.58 - 0.72                         | 21                         | 0.8                                    | No                           |
| Aldrin  | 2/10                   | 0.31 - 0.66                      | 03SS1001                                 | 0.28 - 0.36                         | 2.5                        | 0.3                                    | No                           |
| Alpha-BHC                                     | 4/10                   | 0.22 - 0.68                      | 03SS0701                                 | 0.28 - 0.36                         | 2.5                        | 0.3                                    | No                           |
| Beta-BHC                                      | 3/10                   | 0.11 - 0.19                      | 03SS0201                                 | 0.29 - 0.36                         | 1.0                        | 0.2                                    | No                           |
| Gamma-BHC (Lindane)                           | 5/10                   | 0.45 - 1.2                       | 03SS0301                                 | 0.29 - 0.32                         | 0.05                       | 24.0                                   | Yes                          |
| Alpha-Chlordane                               | 7/10                   | 0.14 - 26                        | 03SS0901                                 | 0.29 - 0.36                         | NA                         | NA                                     | Yes                          |
| Gamma-Chlordane                               | 6/10                   | 0.098 - 14                       | 03SS0901                                 | 0.28 - 0.36                         | NA                         | NA                                     | Yes                          |
| Dieldrin                                      | 6/10                   | 0.17 - 3.7                       | 03SS0701                                 | 0.58 - 0.72                         | 4.9                        | 0.8                                    | No                           |
| Endosulfan II                                 | 4/10                   | 0.28 - 1.5                       | 03SS0901                                 | 0.56 - 0.72                         | NA                         | NA                                     | Yes                          |
| Endosulfan Sulfate                            | 1/10                   | 2.1                              | 03SS0901                                 | 0.56 - 0.72                         | NA                         | NA                                     | Yes                          |
| Endrin  | 1/10                   | 0.62                             | 03SS1001                                 | 0.56 - 0.72                         | 1.0                        | 0.6                                    | No                           |
| Endrin Aldehyde                               | 2/10                   | 0.18 - 0.45                      | 03SS0101                                 | 0.56 - 0.72                         | 1.0 <sup>(4)</sup>         | 0.5                                    | No                           |
| Heptachlor Epoxide                            | 3/10                   | 0.23 - 0.47                      | 03SS0101                                 | 0.28 - 0.36                         | NA                         | NA                                     | Yes                          |
| <b>Herbicides (µg/kg)</b>                     |                        |                                  |  |                                     |                            |  |                              |
| Dinoseb                                       | 1/10                   | 14                               | 03SS1001                                 | 13 - 17                             | NA                         | NA                                     | Yes                          |

**TABLE 7-1**  
**SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN IN SURFACE SOIL**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**  
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| Analyte                                 | Frequency of Detection | Range of Detected Concentrations | Sample of Maximum Detected Concentration | Range of Non-detects <sup>(1)</sup> | Ecological Screening Value | Maximum Hazard Quotient <sup>(2)</sup> | COPC (Yes/No) <sup>(3)</sup> |
|---|------------------------|----------------------------------|--|-------------------------------------|----------------------------|--|------------------------------|
| <b>Inorganics (mg/kg)</b>               |                        |                                  |  |                                     |                            |  |                              |
| Aluminum                                | 10/10                  | 2670 - 7300                      | 03SS0701                                 | -                                   | 50                         | 146                                    | Yes                          |
| Antimony                                | 1/10                   | 1.2                              | 03SS0901                                 | 0.99 - 1.2                          | 0.27                       | 4.4                                    | Yes                          |
| Arsenic                                 | 10/10                  | 1.1 - 6                          | 03SS0901                                 | -                                   | 18                         | 0.3                                    | No                           |
| Barium                                  | 10/10                  | 6.7 - 23.2                       | 03SS0901                                 | -                                   | 330                        | 0.1                                    | No                           |
| Cadmium                                 | 1/10                   | 0.91                             | 03SS0901                                 | 0.2 - 0.25                          | 0.36                       | 2.5                                    | Yes                          |
| Calcium                                 | 6/10                   | 497 - 4560                       | 03SS0501                                 | 204 - 246                           | NA                         | NA                                     | No                           |
| Chromium                                | 10/10                  | 2.8 - 10.6                       | 03SS0901                                 | -                                   | 26                         | 0.4                                    | No                           |
| Cobalt                                  | 3/10                   | 1.1 - 2.1                        | 03SS1001-D                               | 0.99 - 1.2                          | 13                         | 0.2                                    | No                           |
| Copper                                  | 5/10                   | 1.3 - 15.2                       | 03SS0901                                 | 0.99 - 1.2                          | 28                         | 0.5                                    | No                           |
| Iron                                    | 10/10                  | 2560 - 12900                     | 03SS0401                                 | -                                   | 200                        | 64.5                                   | Yes                          |
| Lead                                    | 10/10                  | 2.6 - 59.3                       | 03SS0901                                 | -                                   | 11                         | 5.4                                    | Yes                          |
| Magnesium                               | 2/10                   | 277 - 1080                       | 03SS0901                                 | 197 - 246                           | NA                         | NA                                     | No                           |
| Manganese                               | 10/10                  | 1.9 - 44.2                       | 03SS0901                                 | 0                                   | 220                        | 0.2                                    | No                           |
| Mercury                                 | 5/10                   | 0.014 - 0.08                     | 03SS0701                                 | 0.013 - 0.015                       | 0.1                        | 0.8                                    | No                           |
| Nickel                                  | 7/10                   | 1.4 - 8                          | 03SS0901                                 | 1 - 1.2                             | 38                         | 0.2                                    | No                           |
| Selenium                                | 1/10                   | 0.68                             | 03SS0401                                 | 0.61 - 0.74                         | 0.52                       | 1.3                                    | Yes                          |
| Vanadium                                | 10/10                  | 5.1 - 18.8                       | 03SS0401                                 | -                                   | 7.8                        | 2.4                                    | Yes                          |
| Zinc                                    | 10/10                  | 1.7 - 255                        | 03SS0901                                 | -                                   | 46                         | 5.5                                    | Yes                          |
| <b>Miscellaneous Parameters (mg/kg)</b> |                        |                                  |  |                                     |                            |  |                              |
| Cyanide                                 | 1/10                   | 0.14                             | 03SS0601                                 | 0.13 - 0.17                         | 0.9                        | 0.2                                    | No                           |

Notes

(1) Sample-specific quantitation limits

(2) Hazard quotient (HQ) = maximum detected concentration ÷ ecological screening value.

(3) An analyte was an ecological chemical of potential concern (COPC) if the maximum detected concentration was greater than the ecological screening value (i.e., HQ>1), or if an ecological screening value was not available. Calcium and magnesium, however, are nutrients that were not considered to be COPCs.

(4) Ecological screening value for endrin.

NA = Ecological screening value not available.

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

**TABLE 7-2**  
**SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN IN SURFACE WATER**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**

| Analyte                                      | Frequency of Detection | Range of Detected Concentrations | Sample of Maximum Detected Concentration | Range of Non-detects <sup>(1)</sup> | Ecological Screening Value | Maximum Hazard Quotient <sup>(2)</sup> | COPC (Yes/No) <sup>(3)</sup> |
|--|------------------------|----------------------------------|--|-------------------------------------|----------------------------|--|------------------------------|
| <b>Volatile Organic Compounds (µg/L)</b>     |                        |                                  |  |                                     |                            |  |                              |
| ACETONE                                      | 1/8                    | 4                                | 03SW1501                                 | 5                                   | NA                         | NA                                     | Yes                          |
| <b>Semivolatile Organic Compounds (µg/L)</b> |                        |                                  |  |                                     |                            |  |                              |
| BIS(2-ETHYLHEXYL)PHTHALATE                   | 1/8                    | 19                               | 03SW1501                                 | 10                                  | 0.3                        | 63.3                                   | Yes                          |
| <b>Inorganics (µg/L)</b>                     |                        |                                  |  |                                     |                            |  |                              |
| ALUMINUM                                     | 1/8                    | 427                              | 03SW1501                                 | 21.2 - 398                          | 87                         | 4.9                                    | Yes                          |
| BARIUM                                       | 8/8                    | 1.9 - 53.3                       | 03SW1501                                 | -                                   | NA                         | NA                                     | Yes                          |
| CALCIUM                                      | 8/8                    | 2680 - 22000                     | 03SW0501                                 | -                                   | NA                         | NA                                     | No                           |
| COPPER                                       | 2/8                    | 13 - 15.5                        | 03SW1501                                 | 3.19                                | 6.54                       | 2.4                                    | Yes                          |
| IRON   | 7/8                    | 135 - 3680                       | 03SW0501                                 | 131                                 | 1000                       | 3.7                                    | Yes                          |
| LEAD   | 2/8                    | 1.9                              | 03SW0301/03SW1501                        | 1.8                                 | 1.32                       | 1.4                                    | Yes                          |
| MAGNESIUM                                    | 8/8                    | 1720 - 4150                      | 03SW0401                                 | -                                   | NA                         | NA                                     | No                           |
| MANGANESE                                    | 8/8                    | 8 - 98.2                         | 03SW0301                                 | -                                   | NA                         | NA                                     | Yes                          |
| POTASSIUM                                    | 2/8                    | 5520 - 6010                      | 03SW0601-D                               | 1570 - 3880                         | NA                         | NA                                     | No                           |
| SELENIUM                                     | 1/8                    | 4.7                              | 03SW0601-D                               | 4.04                                | 5                          | 0.9                                    | No                           |
| SODIUM                                       | 8/8                    | 13400 - 21600                    | 03SW0601                                 | -                                   | NA                         | NA                                     | No                           |
| ZINC   | 7/8                    | 3.4 - 13.4                       | 03SW0301                                 | 3.22                                | 58.91                      | 0.2                                    | No                           |

Notes

(1) Sample-specific quantitation limits

(2) Hazard quotient (HQ) = maximum detected concentration ÷ ecological screening value.

(3) An analyte was an ecological chemical of potential concern (COPC) if the maximum detected concentration was greater than the ecological screening value (i.e., HQ>1), or if an ecological screening value was not available. However, calcium, magnesium, potassium, and sodium are nutrients that were not considered to be COPCs.

NA = Ecological screening value not available.

µg/L = micrograms per liter

**TABLE 7-3**  
**SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN IN SEDIMENT**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**  
**PAGE 1 OF 2**

| Analyte                                   | Frequency of Detection | Range of Detected Concentrations | Sample of Maximum Detected Concentration | Range of Non-detects <sup>(1)</sup> | Ecological Screening Value | Maximum Hazard Quotient <sup>(2)</sup> | COPC (Yes/No) <sup>(3)</sup> |
|---|------------------------|----------------------------------|--|-------------------------------------|----------------------------|--|------------------------------|
| <b>Volatile Organic Compounds (µg/kg)</b> |                        |                                  |  |                                     |                            |  |                              |
| Acetone                                   | 9/10                   | 18 - 160                         | 03SD0801                                 | 75                                  | NA                         | NA                                     | Yes                          |
| Carbon Disulfide                          | 1/10                   | 7                                | 03SD0401                                 | 5 - 10                              | NA                         | NA                                     | Yes                          |
| <b>Pesticides/PCBs (µg/kg)</b>            |                        |                                  |  |                                     |                            |  |                              |
| 4,4'-DDD                                  | 3/10                   | 1.7 - 3.1                        | 03SD0201                                 | 3.8 - 5.6                           | 3.3                        | 0.9                                    | No                           |
| 4,4'-DDE                                  | 4/10                   | 1.4 - 3.7                        | 03SD0101                                 | 3.8 - 4.7                           | 3.3                        | 1.1                                    | Yes                          |
| 4,4'-DDT                                  | 3/10                   | 4.4 - 9.8                        | 03SD0101                                 | 3.8 - 4.7                           | 3.3                        | 3.0                                    | Yes                          |
| Total DDT <sup>(4)</sup>                  | 5/10                   | 1.4 - 13.5                       | 03SD0101                                 | 3.8 - 4.7                           | 3.3                        | 4.1                                    | Yes                          |
| alpha-BHC                                 | 2/10                   | 1.8 - 2.1                        | 03SD0601-D                               | 2 - 2.9                             | NA                         | NA                                     | Yes                          |
| delta-BHC                                 | 1/10                   | 2                                | 03SD0901                                 | 2 - 2.9                             | NA                         | NA                                     | Yes                          |
| gamma-BHC (Lindane)                       | 1/10                   | 2                                | 03SD0201                                 | 2 - 2.9                             | 3.3                        | 0.6                                    | No                           |
| alpha-Chlordane                           | 2/10                   | 2.2 - 3.3                        | 03SD0601-D                               | 2 - 2.6                             | 1.7                        | 1.9                                    | Yes                          |
| gamma-Chlordane                           | 2/10                   | 1.5 - 2.1                        | 03SD0601-D                               | 2 - 2.6                             | 1.7                        | 1.2                                    | Yes                          |
| Aroclor-1254                              | 3/10                   | 35 - 86                          | 03SD0101                                 | 20 - 26                             | NA                         | NA                                     | Yes                          |
| Aroclor-1260                              | 4/10                   | 32 - 130                         | 03SD0101                                 | 20 - 24                             | NA                         | NA                                     | Yes                          |
| Total Aroclor <sup>(5)</sup>              | 4/10                   | 56 - 216                         | 03SD0101                                 | 20 - 24                             | 33                         | 6.5                                    | Yes                          |
| Dieldrin                                  | 3/9                    | 1.9 - 2.8                        | 03SD0201                                 | 3.8 - 5                             | 3.3                        | 0.8                                    | No                           |
| Endrin Ketone <sup>(6)</sup>              | 1/10                   | 3.2                              | 03SD0101                                 | 3.8 - 5.6                           | 3.3                        | 0.97                                   | No                           |
| <b>Inorganics (mg/kg)</b>                 |                        |                                  |  |                                     |                            |  |                              |
| Aluminum                                  | 10/10                  | 713 - 15600                      | 03SD0401                                 | -                                   | NA                         | NA                                     | Yes                          |
| Arsenic                                   | 6/10                   | 2.9 - 13.2                       | 03SD0301                                 | 0.28 - 1.4                          | 7.24                       | 1.8                                    | Yes                          |
| Barium                                    | 10/10                  | 1.7 - 38.3                       | 03SD0101                                 | -                                   | NA                         | NA                                     | Yes                          |
| Calcium                                   | 8/10                   | 74.4 - 892                       | 03SD0401                                 | 18.8 - 23.9                         | NA                         | NA                                     | No                           |
| Chromium                                  | 10/10                  | 1.4 - 17.1                       | 03SD0401                                 | -                                   | 52.3                       | 0.3                                    | No                           |
| Cobalt                                    | 5/10                   | 0.84 - 2                         | 03SD0101                                 | 0.11 - 0.95                         | NA                         | NA                                     | Yes                          |
| Copper                                    | 7/10                   | 2.3 - 9.3                        | 03SD0401                                 | 0.9 - 1.9                           | 18.7                       | 0.5                                    | No                           |
| Iron                                      | 10/10                  | 579 - 12000                      | 03SD0401                                 | -                                   | NA                         | NA                                     | Yes                          |
| Lead                                      | 9/10                   | 2.6 - 22                         | 03SD0401                                 | 0.71                                | 30.2                       | 0.7                                    | No                           |
| Magnesium                                 | 10/10                  | 33.2 - 568                       | 03SD0401                                 | -                                   | NA                         | NA                                     | No                           |
| Manganese                                 | 10/10                  | 1.7 - 33.4                       | 03SD0101                                 | -                                   | NA                         | NA                                     | Yes                          |
| Mercury                                   | 6/10                   | 0.01 - 0.07                      | 03SD0401                                 | 0.01                                | 0.13                       | 0.5                                    | No                           |

**TABLE 7-3**  
**SELECTION OF ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN IN SEDIMENT**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**  
**PAGE 2 OF 2**

| Analyte  | Frequency of Detection | Range of Detected Concentrations | Sample of Maximum Detected Concentration | Range of Non-detects <sup>(1)</sup> | Ecological Screening Value | Maximum Hazard Quotient <sup>(2)</sup> | COPC (Yes/No) <sup>(3)</sup> |
|----------|------------------------|----------------------------------|--|-------------------------------------|----------------------------|--|------------------------------|
| Nickel   | 6/10                   | 3 - 6.2                          | 03SD0401                                 | 0.87 - 1.7                          | 15.9                       | 0.4                                    | No                           |
| Sodium   | 2/10                   | 37.4 - 39                        | 03SD0101                                 | 4.8 - 23.2                          | NA                         | NA                                     | No                           |
| Vanadium | 10/10                  | 1.3 - 25.4                       | 03SD0401                                 | -                                   | NA                         | NA                                     | Yes                          |
| Zinc     | 10/10                  | 1.3 - 57.5                       | 03SD0401                                 | -                                   | 124                        | 0.5                                    | No                           |

Notes

(1) Sample-specific quantitation limits

(2) Hazard quotient (HQ) = maximum detected concentration ÷ ecological screening value.

(3) An analyte was an ecological chemical of potential concern (COPC) if the maximum detected concentration was greater than the ecological screening value (i.e., HQ>1), or if an ecological screening value was not available. However, calcium, magnesium, and sodium are nutrients that were not considered to be COPCs.

(4) Total DDT = the sum of detected DDD, DDE, and DDT isomers.

(5) Total Aroclor = the sum of detected Aroclors

(6) Ecological screening value for endrin.

NA = Ecological screening value not available.

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

**TABLE 7-4**  
**DATA SUMMARY FOR SURFACE SOIL ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN**  
**SSITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**

| Analyte                                       | Frequency of Detection | Range of Detected Concentrations | Sample of Maximum Detected Concentration | Range of Detection Limits <sup>(1)</sup> | Average Concentration <sup>(2)</sup> | Ecological Screening Value (ESV) | Maximum Hazard Quotient | Number of Detects > ESV | Number of Nondetects > ESV |
|---|------------------------|----------------------------------|--|--|--------------------------------------|----------------------------------|-------------------------|-------------------------|----------------------------|
| <b>Semivolatile Organic Compounds (µg/kg)</b> |                        |                                  |  |  |                                      |                                  |                         |                         |                            |
| Bis(2-ethylhexyl)phthalate                    | 6/10                   | 52 - 280                         | 03SS0901                                 | 370 - 450                                | 144                                  | NA                               | NA                      | NA                      | NA                         |
| Caprolactam                                   | 2/10                   | 170 - 260                        | 03SS0301                                 | 360 - 430                                | 197                                  | NA                               | NA                      | NA                      | NA                         |
| <b>Pesticides (µg/kg)</b>                     |                        |                                  |  |  |                                      |                                  |                         |                         |                            |
| Alpha-Chlordane                               | 7/10                   | 0.14 - 26                        | 03SS0901                                 | 0.29 - 0.36                              | 5.2                                  | NA                               | NA                      | NA                      | NA                         |
| Gamma-Chlordane                               | 6/10                   | 0.098 - 14                       | 03SS0901                                 | 0.28 - 0.36                              | 3.6                                  | NA                               | NA                      | NA                      | NA                         |
| Endosulfan II                                 | 4/10                   | 0.28 - 1.5                       | 03SS0901                                 | 0.56 - 0.72                              | 0.4                                  | NA                               | NA                      | NA                      | NA                         |
| Endosulfan Sulfate                            | 1/10                   | 2.1                              | 03SS0901                                 | 0.56 - 0.72                              | 0.5                                  | NA                               | NA                      | NA                      | NA                         |
| Gamma-BHC (Lindane)                           | 5/10                   | 0.45 - 1.2                       | 03SS0301                                 | 0.29 - 0.32                              | 0.4                                  | 0.05                             | 24.0                    | 5                       | 5                          |
| Heptachlor Epoxide                            | 3/10                   | 0.23 - 0.47                      | 03SS0101                                 | 0.28 - 0.36                              | 0.20                                 | NA                               | NA                      | NA                      | NA                         |
| <b>Herbicides (µg/kg)</b>                     |                        |                                  |  |  |                                      |                                  |                         |                         |                            |
| Dinoseb                                       | 1/10                   | 14                               | 03SS1001                                 | 13 - 17                                  | 8.1                                  | NA                               | NA                      | NA                      | NA                         |
| <b>Inorganics (mg/kg)</b>                     |                        |                                  |  |  |                                      |                                  |                         |                         |                            |
| Aluminum                                      | 10/10                  | 2670 - 7300                      | 03SS0701                                 | -  | 5110                                 | 50                               | 146.0                   | 10                      | -                          |
| Antimony                                      | 1/10                   | 1.2                              | 03SS0901                                 | 0.99 - 1.2                               | 0.6                                  | 0.27                             | 4.4                     | 1                       | 9                          |
| Cadmium                                       | 1/10                   | 0.91                             | 03SS0901                                 | 0.2 - 0.25                               | 0.19                                 | 0.36                             | 2.5                     | 1                       | 0                          |
| Iron  | 10/10                  | 2560 - 12900                     | 03SS0401                                 | -  | 5578                                 | 200                              | 64.5                    | 10                      | -                          |
| Lead  | 10/10                  | 2.6 - 59.3                       | 03SS0901                                 | -  | 18.4                                 | 11                               | 5.4                     | 4                       | -                          |
| Selenium                                      | 1/10                   | 0.68                             | 03SS0401                                 | 0.61 - 0.74                              | 0.37                                 | 0.52                             | 1.3                     | 1                       | 9                          |
| Vanadium                                      | 10/10                  | 5.1 - 18.8                       | 03SS0401                                 | -  | 9.7                                  | 7.8                              | 2.4                     | 6                       | -                          |
| Zinc  | 10/10                  | 1.7 - 255                        | 03SS0901                                 | -  | 45.1                                 | 46                               | 5.5                     | 2                       | -                          |

Notes

(1) Sample-specific quantitation limits in non-detect samples.

(2) Average concentration of all samples calculated using ½ the detection limit for nondetected samples.

NA = Ecological screening value not available.

ESV = Ecological screening value

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

**TABLE 7-5**  
**DATA SUMMARY FOR SEDIMENT ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**

| Analyte                                   | Frequency of Detection | Range of Detected Concentrations | Sample of Maximum Detected Concentration | Range of Detection Limits <sup>(1)</sup> | Average Concentration <sup>(2)</sup> | Ecological Screening Value (ESV) | Maximum Hazard Quotient | Number of Detects > ESV | Number of Nondetects > ESV |
|---|------------------------|----------------------------------|--|--|--------------------------------------|----------------------------------|-------------------------|-------------------------|----------------------------|
| <b>Volatile Organic Compounds (µg/kg)</b> |                        |                                  |  |  |                                      |                                  |                         |                         |                            |
| Acetone                                   | 9/10                   | 18 - 160                         | 03SD0801                                 | 75                                       | 58.6                                 | NA                               | NA                      | NA                      | NA                         |
| Carbon Disulfide                          | 1/10                   | 7                                | 03SD0401                                 | 5 - 10                                   | 3.7                                  | NA                               | NA                      | NA                      | NA                         |
| <b>Pesticides/PCBs (µg/kg)</b>            |                        |                                  |  |  |                                      |                                  |                         |                         |                            |
| 4,4'-DDE                                  | 4/10                   | 1.4 - 3.7                        | 03SD0101                                 | 3.8 - 4.7                                | 2.2                                  | 3.3                              | 1.1                     | 1                       | 6                          |
| 4,4'-DDT                                  | 3/10                   | 4.4 - 9.8                        | 03SD0101                                 | 3.8 - 4.7                                | 3.3                                  | 3.3                              | 3.0                     | 3                       | 7                          |
| Total DDT <sup>(3)</sup>                  | 5/10                   | 1.4 - 13.5                       | 03SD0101                                 | 3.8 - 4.7                                | 4.5                                  | 3.3                              | 4.1                     | 3                       | 5                          |
| alpha-BHC                                 | 2/10                   | 1.8 - 2.1                        | 03SD0601-D                               | 2 - 2.9                                  | 1.3                                  | NA                               | NA                      | NA                      | NA                         |
| delta-BHC                                 | 1/10                   | 2                                | 03SD0901                                 | 2 - 2.9                                  | 1.3                                  | NA                               | NA                      | NA                      | NA                         |
| alpha-Chlordane                           | 2/10                   | 2.2 - 3.3                        | 03SD0601-D                               | 2 - 2.6                                  | 1.4                                  | 1.7                              | 1.9                     | 2                       | 8                          |
| gamma-Chlordane                           | 2/10                   | 1.5 - 2.1                        | 03SD0601-D                               | 2 - 2.6                                  | 1.3                                  | 1.7                              | 1.2                     | 2                       | 8                          |
| Aroclor-1254                              | 3/10                   | 35 - 86                          | 03SD0101                                 | 20 - 26                                  | 24.7                                 | NA                               | NA                      | NA                      | NA                         |
| Aroclor-1260                              | 4/10                   | 32 - 130                         | 03SD0101                                 | 20 - 24                                  | 32.4                                 | NA                               | NA                      | NA                      | NA                         |
| Total Aroclor <sup>(4)</sup>              | 4/10                   | 56 - 216                         | 03SD0101                                 | 20 - 24                                  | 49.4                                 | 33                               | 6.5                     | 4                       | -                          |
| <b>Inorganics (mg/kg)</b>                 |                        |                                  |  |  |                                      |                                  |                         |                         |                            |
| Aluminum                                  | 10/10                  | 713 - 15600                      | 03SD0401                                 | 0  | 7534                                 | NA                               | NA                      | NA                      | NA                         |
| Arsenic                                   | 6/10                   | 2.9 - 13.2                       | 03SD0301                                 | 0.28 - 1.4                               | 4.9                                  | 7.24                             | 1.8                     | 2                       | 0                          |
| Barium                                    | 10/10                  | 1.7 - 38.3                       | 03SD0101                                 | 0  | 15.9                                 | NA                               | NA                      | NA                      | NA                         |
| Cobalt                                    | 5/10                   | 0.84 - 2                         | 03SD0101                                 | 0.11 - 0.95                              | 0.8                                  | NA                               | NA                      | NA                      | NA                         |
| Iron                                      | 10/10                  | 579 - 12000                      | 03SD0401                                 | 0  | 5073                                 | NA                               | NA                      | NA                      | NA                         |
| Manganese                                 | 10/10                  | 1.7 - 33.4                       | 03SD0101                                 | 0  | 10.9                                 | NA                               | NA                      | NA                      | NA                         |
| Vanadium                                  | 10/10                  | 1.3 - 25.4                       | 03SD0401                                 | 0  | 12.2                                 | NA                               | NA                      | NA                      | NA                         |

Notes

(1) Sample-specific quantitation limits in non-detect samples.

(2) Average concentration of all samples calculated using ½ the detection limit for nondetected samples.

(3) Total DDT = the sum of detected DDD, DDE, and DDT isomers.

(4) Total Aroclor = the sum of detected Aroclors

NA = Ecological screening value not available.

ESV = Ecological screening value

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

**TABLE 7-6**  
**COMPARISON OF SEDIMENT COPC CONCENTRATIONS TO SEDIMENT QUALITY GUIDELINES**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**

| Analyte                        | Frequency of Detection | Range of Detected Concentrations | Average Concentration <sup>(1)</sup> | ESV <sup>(2)</sup> | Sediment Quality Assessment Guideline <sup>(3)</sup> |     | Number of Detects > ESV | Number of Detects > TEC |
|--------------------------------|------------------------|----------------------------------|--------------------------------------|--------------------|--|-----|-------------------------|-------------------------|
|                                |                        |                                  |                                      |                    | TEC  | PEC |                         |                         |
| <b>Pesticides/PCBs (µg/kg)</b> |                        |                                  |                                      |                    |  |     |                         |                         |
| 4,4'-DDE                       | 4/10                   | 1.4 - 3.7                        | 2.2                                  | 3.3                | 3.2  | 31  | 1                       | 1                       |
| 4,4'-DDT                       | 3/10                   | 4.4 - 9.8                        | 3.3                                  | 3.3                | 4.2  | 63  | 3                       | 3                       |
| Total DDT <sup>(5)</sup>       | 5/10                   | 1.4 - 13.5                       | 4.5                                  | 3.3                | 5.3  | 570 | 3                       | 3                       |
| alpha-Chlordane                | 2/10                   | 2.2 - 3.3                        | 1.4                                  | 1.7                | 3.2  | 18  | 2                       | 1                       |
| gamma-Chlordane                | 2/10                   | 1.5 - 2.1                        | 1.3                                  | 1.7                | 3.2  | 18  | 2                       | 0                       |
| Total Aroclor <sup>(5)</sup>   | 4/10                   | 56 - 216                         | 49.4                                 | 33                 | 60   | 680 | 4                       | 3                       |
| <b>Inorganics (mg/kg)</b>      |                        |                                  |                                      |                    |  |     |                         |                         |
| Arsenic                        | 6/10                   | 2.9 - 13.2                       | 4.9                                  | 7.24               | 9.8  | 33  | 2                       | 2                       |
| Barium                         | 10/10                  | 1.7 - 38.3                       | 15.9                                 | NA                 | 20   | 60  | NA                      | 5                       |
| Cobalt                         | 5/10                   | 0.84 - 2                         | 0.8                                  | NA                 | 50   | NG  | NA                      | 0                       |

Notes

- (1) Average concentration of all samples calculated using ½ the detection limit for nondetected samples.
  - (2) USEPA Region 4 ecological screening value (ESV) (USEPA, 2001).
  - (3) Sediment quality assessment guidelines for the protection of sediment-dwelling organisms in Florida inland waters;  
TEC = Threshold Effect Concentration, PEC = Probable Effect Concentration (MacDonald et al., 2003).
  - (4) Total DDT = the sum of detected DDD, DDE, and DDT isomers.
  - (5) Total Aroclor = the sum of detected Aroclors.
- NA = Ecological screening value not available.  
NG = PEC guideline not available.  
µg/kg = micrograms per kilogram  
mg/kg = milligrams per kilogram

**TABLE 7-7**  
**DATA SUMMARY FOR SURFACE WATER ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**  
**PAGE 1 of 1**

| Analyte                             | Frequency of Detection | Range of Detected Concentrations | Sample of Maximum Detected Concentration | Range of Detection Limits <sup>(1)</sup> | Average Concentrations <sup>(2)</sup> | Ecological Screening Value (ESV) | Maximum Hazard Quotient | Number of Detects > ESV | Number of Nondetects > ESV |
|-------------------------------------|------------------------|----------------------------------|--|--|---------------------------------------|----------------------------------|-------------------------|-------------------------|----------------------------|
| <b>Volatile Organics (ug/L)</b>     |                        |                                  |  |  |                                       |                                  |                         |                         |                            |
| ACETONE                             | 1/8                    | 4                                | 03SW1501                                 | 5  | 2.7                                   | NA                               | NA                      | NA                      | NA                         |
| <b>Semivolatile Organics (ug/L)</b> |                        |                                  |  |  |                                       |                                  |                         |                         |                            |
| BIS(2-ETHYLHEXYL)PHTHALATE          | 1/8                    | 19                               | 03SW1501                                 | 10                                       | 6.8                                   | 0.3                              | 63.3                    | 1                       | 7                          |
| <b>Inorganics (ug/L)</b>            |                        |                                  |  |  |                                       |                                  |                         |                         |                            |
| ALUMINUM                            | 1/8                    | 427                              | 03SW1501                                 | 21.2 - 398                               | 109                                   | 87                               | 4.9                     | 1                       | 3                          |
| BARIUM                              | 8/8                    | 1.9 - 53.3                       | 03SW1501                                 | -  | 28.6                                  | NA                               | NA                      | NA                      | NA                         |
| COPPER                              | 2/8                    | 13 - 15.5                        | 03SW1501                                 | 3.19                                     | 4.8                                   | 6.54                             | 2.4                     | 2                       | 0                          |
| IRON                                | 7/8                    | 135 - 3680                       | 03SW0501                                 | 131                                      | 2373                                  | 1000                             | 3.7                     | 6                       | 0                          |
| LEAD                                | 2/8                    | 1.9                              | 03SW0301, 03SW1501                       | 1.8                                      | 1.2                                   | 1.32                             | 1.4                     | 2                       | 6                          |
| MANGANESE                           | 8/8                    | 8 - 98.2                         | 03SW0301                                 | -  | 47.8                                  | NA                               | NA                      | NA                      | NA                         |

Notes

(1) Sample-specific quantitation limits in non-detect samples.

(2) Average concentration of all samples calculated using ½ the detection limit for nondetected samples.

NA = Ecological screening value not available.

µg/L = micrograms per liter.

**TABLE 7-8  
FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS  
PISCIVOROUS RECEPTORS - CONSERVATIVE SCENARIO  
SITE 3 REMEDIAL INVESTIGATION REPORT  
NCBC GULFPORT  
GULFPORT, MISSISSIPPI**

| <b>Chemical</b> | <b>Mink<br/>HQ<sub>NOAEL</sub></b> | <b>Mink<br/>HQ<sub>LOAEL</sub></b> | <b>Green Heron<br/>HQ<sub>NOAEL</sub></b> | <b>Green Heron<br/>HQ<sub>LOAEL</sub></b> |
|-----------------|------------------------------------|------------------------------------|---|---|
| 4,4'-DDE        | 0.2                                | 0.00                               | 0.1                                       | 0.01                                      |
| 4,4'-DDT        | 0.1                                | 0.003                              | 0.1                                       | 0.01                                      |
| Total DDT       | 0.7                                | 0.02                               | 0.5                                       | 0.04                                      |
| alpha-BHC       | 0.3                                | 0.03                               | 0.01                                      | 0.002                                     |
| delta-BHC       | 0.2                                | 0.02                               | 0.01                                      | 0.002                                     |
| alpha-Chlordane | 0.003                              | 0.002                              | 0.01                                      | 0.002                                     |
| gamma-Chlordane | 0.001                              | 0.0005                             | 0.003                                     | 0.001                                     |
| Aroclor-1254    | <b>1.1</b>                         | 0.2                                | <b>1.03</b>                               | 0.1                                       |
| Aroclor-1260    | <b>1.6</b>                         | 0.3                                | <b>1.6</b>                                | 0.2                                       |
| Total Aroclors  | <b>2.7</b>                         | 0.5                                | <b>2.6</b>                                | 0.3                                       |
| Arsenic         | <b>1.2</b>                         | 0.3                                | 0.7                                       | 0.3                                       |
| Copper          | <b>1.1</b>                         | 0.1                                | <b>1.9</b>                                | 0.2                                       |
| Lead            | 0.4                                | 0.01                               | <b>1.4</b>                                | 0.1                                       |

Notes:

HQ - Ecological Hazard Quotient; HQs greater than 1.0 are shown in bold.

NOAEL - No Observed Adverse Effects Level

LOAEL - Lowest Observed Adverse Effects Level

**TABLE 7-9**  
**FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS**  
**PISCIVOROUS RECEPTORS - AVERAGE SCENARIO**  
**SITE 3 REMEDIAL INVESTIGATION REPORT**  
**NCBC GULFPORT**  
**GULFPORT, MISSISSIPPI**

| <b>Chemical</b> | <b>Mink<br/>HQ<sub>NOAEL</sub></b> | <b>Mink<br/>HQ<sub>LOAEL</sub></b> | <b>Green Heron<br/>HQ<sub>NOAEL</sub></b> | <b>Green Heron<br/>HQ<sub>LOAEL</sub></b> |
|-----------------|------------------------------------|------------------------------------|---|---|
| 4,4'-DDE        | 0.03                               | 0.001                              | 0.1                                       | 0.01                                      |
| 4,4'-DDT        | 0.01                               | 0.0003                             | 0.03                                      | 0.002                                     |
| Total DDT       | 0.1                                | 0.002                              | 0.2                                       | 0.01                                      |
| alpha-BHC       | 0.1                                | 0.01                               | 0.004                                     | 0.001                                     |
| delta-BHC       | 0.05                               | 0.005                              | 0.004                                     | 0.001                                     |
| alpha-Chlordane | 0.0004                             | 0.0002                             | 0.003                                     | 0.001                                     |
| gamma-Chlordane | 0.0002                             | 0.0001                             | 0.001                                     | 0.0003                                    |
| Aroclor-1254    | 0.1                                | 0.02                               | 0.3                                       | 0.03                                      |
| Aroclor-1260    | 0.1                                | 0.03                               | 0.4                                       | 0.04                                      |
| Total Aroclors  | 0.2                                | 0.04                               | 0.5                                       | 0.1                                       |
| Arsenic         | 0.04                               | 0.01                               | 0.1                                       | 0.03                                      |
| Copper          | 0.05                               | 0.003                              | 0.2                                       | 0.03                                      |
| Lead            | 0.01                               | 0.0004                             | 0.1                                       | 0.004                                     |

Notes:

HQ - Ecological Hazard Quotient.

NOAEL - No Observed Adverse Effects Level

LOAEL - Lowest Observed Adverse Effects Level

**APPENDIX C**

**TABLE C-1  
ARARs AND TBC CRITERIA**

SITE 3  
NCBC GULFPORT, MISSISSIPPI  
Page 1 of 2

| NAME / CITATION  | REQUIREMENT   | TYPE / PREREQUISITES   | CATEGORY        |
|--|---|--|-----------------|
| <b>FEDERAL</b>   |   |  |                 |
| Hazardous Materials Transportation Act Regulations (49 CFR Parts 171-179)  | Provides requirements for packaging, labeling, manifesting and transporting of hazardous materials                                  | <u>Applicable</u><br>If any waste debris, contaminated soil or sediment is excavated and transported off-site, that material would need to be managed IAW these regulations.               | Action-specific |
| CAA Regulations setting National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61)                 | Provides standards promulgated under the Clean Air Act (CAA) for controlling significant sources of hazardous air pollutants (HAPs) | <u>Applicable</u><br>Should site activities result in release of hazardous air pollutants controls to minimize their release must be implemented IAW these requirements.                   | Action-specific |
| RCRA Regulations - Hazardous Waste Determinations by Generators of Solid Waste (40 CFR Part 261 and 40 CFR 262.11) | Provides requirements for the proper identification and characterization of hazardous waste   | <u>Applicable</u><br>Should site activities generate solid wastes, determining whether those wastes are hazardous must be done IAW these requirements.                                     | Action-specific |
| RCRA Regulations - Management of Hazardous Waste (40 CFR Parts 262-268)  | Provides requirements for the proper management (treatment, storage and disposal) of hazardous waste                                | <u>Applicable</u><br>Should site activities generate hazardous waste, then such waste must be managed IAW applicable subparts of these regulations.  | Action-specific |
| Executive Order 11988 - Floodplain Management, Section 2(a)(2)   | Provides requirements for assessing alternatives to mitigate / avoid possible adverse impacts to floodplains                        | <u>To-Be-Considered</u><br>Potential impacts of planned site activities must be assessed and alternatives implemented where possible, to avoid or minimize adverse impacts to floodplains. | N/A             |

CAA = Federal Clean Air Act, as amended

CFR = Code of Federal Regulations

RCRA = Federal Resource Conservation and Recovery Act, as amended

IAW = in accordance with

**TABLE C-1  
ARARs AND TBC CRITERIA**

SITE 3  
NCBC GULFPORT, MISSISSIPPI  
Page 2 of 2

| NAME AND CITATION   | REQUIREMENT  | TYPE / PREREQUISITES   | CATEGORY           |
|---|--|--|--------------------|
| <b>STATE</b>  |  |  |                    |
| Target Remediation Goals (TRGs) Miss. Code Ann. Section 49-35-21 (2002)   | Establish default screening levels and human health risk-based cleanup goals for soil and groundwater              | <u>Applicable</u><br>Media-specific numerical standards as shall apply to remedial actions in the State of Mississippi will be satisfied.  | Chemical -specific |
| Hazardous Waste Management Regulations HW-1, Parts 262-268 (MDEQ, 2005)   | Provide requirements for the proper management (treatment, storage and disposal) of hazardous waste.               | <u>Applicable</u><br>Should hazardous wastes be generated those substantive portions (if any) more stringent than their federal RCRA counterpart(s) must be satisfied.   | Action-specific    |
| Solid Waste Management Regulations, SW2 Sections IV. E.a.(1-2) (MDEQ 2005)  | Provides requirements for the post-closure care and monitoring of non-hazardous waste landfills                    | <u>Relevant and Appropriate</u><br>While not directly applicable to Site 3, these regulations establish otherwise relevant landfill cover maintenance and groundwater monitoring standards for similar landfills which will be met for Site 3. | Action-specific    |
| Storm Water Management - Water Pollution Control Act, Miss. Code Ann. 49-17- 1 et. seq. (1972)  | Provides requirements for controlling pollutants in storm water runoff from land disturbing activities < 5 acres   | <u>Applicable</u><br>On-site activities associated with soil cap construction will comply with these requirements and applicable conditions in NCBC Gulfport's MS4 General NPDES Permit, No. MSRMS4036.  | Action-specific    |
| Air Emission Regulations for the Prevention, Abatement, and Control of Air Contaminants, Section 3, 3. (General Nuisances) (MDEQ, APC-S-1, amended December 14, 2011) | Provides requirements for controlling particulate matter and emissions during land grading and clearing activities | <u>Applicable</u><br>Reasonable measures to control fugitive dust emissions from on-site soil disturbing activities will be instituted. Only applicable to extent more stringent than federal requirement(s).                                  | Action-specific    |

NPDES = National Pollutant Discharge Elimination System