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CORRECTIVE MEASURES STUDY REPORT AREA OF CONCERN 613 (AOC 613) ZONE F

CNC CHARLESTON SC

2/1/2003

CH2M HILL

CORRECTIVE MEASURES STUDY REPORT

AOC 613, Zone F

Charleston Naval Complex
North Charleston, South Carolina

SUBMITTED TO
U.S. Navy Southern Division
Naval Facilities Engineering Command

CH2M-Jones

February 2003

Revision No. 0
Contract N62467-99-C-0960

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CH2MHILL

February 7, 2003

Mr. David Scaturo
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: CMS Report (Revision 0) – AOC 613, Zone F

Dear Mr. Scaturo:

Enclosed please find two copies of the CMS Report (Revision 0) for AOC 613 in Zone F of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Louise Palmer. Please contact her at 704/329-0072, extension 296, if you have any questions or comments.

Sincerely,

CH2M HILL

Dean Williamson, P.E.

cc: Dann Spariosu/USEPA, w/att
Tim Frederick/Gannett Fleming, Inc., w/att
Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

CORRECTIVE MEASURES STUDY REPORT

AOC 613, Zone F

Charleston Naval Complex
North Charleston, South Carolina

SUBMITTED TO
U.S. Navy Southern Division
Naval Facilities Engineering Command

PREPARED BY
CH2M-Jones

February 2003

Revision 0
Contract N62467-99-C-0960
158814.ZF.PR.02

Certification Page for Corrective Measures Study Report (Revision 0) – AOC 613, Zone F

I, Dean Williamson, certify that this report has been prepared under my direct supervision. The data and information are, to the best of my knowledge, accurate and correct, and the report has been prepared in accordance with current standards of practice for engineering.

South Carolina

P.E. No. 21428

Dean Williamson, P.E.

1/31/2003

Date

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C Excerpts from the *Rapid Assessment Report for Site 22, Building 242* (TTNUS, 2000)

D Analytical Data Summary Tables for Groundwater Samples Collected at UST Site 22 and for the Phase I IM

E Data Validation Report for Sampling Events at AOC 613

F Cost Estimates for the Proposed Corrective Measure Alternatives

Acronyms and Abbreviations

AOC	Area of concern
BEQ	Benzo[a]pyrene equivalent
BRAC	Base Realignment and Closure Act
BRC	Background reference concentration
CA	Corrective action
Cfm	Cubic feet per minute
CMS	Corrective measures study
CNC	Charleston Naval Complex
COC	Chemical of concern
COPC	Chemical of potential concern
CPW	Charleston Public Works
CVOC	Chlorinated volatile organic compound
DCE	Dichloroethene
DO	Dissolved oxygen
DPT	Direct-push technology
EnSafe	EnSafe, Inc.
EPA	U.S. Environmental Protection Agency
ft bls	Feet below land surface
HI	Hazard index
ILCR	Incremental Lifetime Cancer Risk
IM	Interim measure
LUC	Land use control
LUCMP	Land Use Control Management Plan
MCL	Maximum contaminant level
MCS	Media cleanup standard
μg/L	Micrograms per liter
mg/L	Milligrams per liter
MNA	Monitored natural attenuation
MTBE	Methyl tert butyl ethylene

Acronyms and Abbreviations, Continued

NAPL	Non-aqueous phase liquid
NAVBASE	Naval Base
NFA	No further action
O&M	Operation and maintenance
ORC	Oxygen-releasing compound
ORF	Oxidation-reduction potential
PCE	Tetrachloroethene
RAO	Remedial action objective
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RGO	Remedial goal option
SAP	Sampling and Analysis Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SVOC	Semivolatile organic compound
TCE	Trichloroethene
TEAP	Terminal electron accepting process
TTNUS	Tetra Tech NUS
VOC	Volatile organic compound
UST	Underground storage tank

Section 1.0

1.0 Introduction

In 1993, Naval Base (NAVBASE) Charleston was added to the list of bases scheduled for closure as part of the Defense Base Realignment and Closure Act (BRAC), which regulates closure and transition of property to the community. The Charleston Naval Complex (CNC) was formed as a result of the dis-establishment of the Charleston Naval Shipyard and NAVBASE on April 1, 1996.

Corrective Action (CA) activities are being conducted under the Resource Conservation and Recovery Act (RCRA) with the South Carolina Department of Health and Environmental Control (SCDHEC) as the lead agency for CA activities at the CNC. All RCRA CA activities are performed in accordance with the Final Permit (Permit No. SC0 170 022 560). In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation and remediation services at the CNC.

RCRA Facility Investigation (RFI) activities were initially conducted by the Navy/EnSafe Inc. (EnSafe) team. The *Zone F RCRA Facility Investigation (RFI) Report, Revision 0*, submitted to SCDHEC for review on December 31, 1997, provided a summary of these activities. The addendum to the RFI report (RFIRA) and a Corrective Measures Study Work Plan (CMSWP) were subsequently prepared by CH2M-Jones for Areas of Concern (AOCs) 613 and 615 and Solid Waste Management Unit (SWMU) 175 in Zone F of the CNC to complete the RFI process and initiate the Corrective Measures Study (CMS) process (please see *RFI Report Addendum and CMS Work Plan, AOC 613/AOC 615/SWMU 175, Revision 0* [CH2M-Jones, 2002a]). Comments prepared by reviewers at the U.S. Environmental Protection Agency (EPA) dated May 20, 2002 regarding the Revision 0 RFIRA/CMSWP report were received and responded to by issuance of a Revision 1 RFIRA/CMSWP on June 6, 2002. Approval of the revised RFIRA/CMSWP was received on October 25, 2002. Figure 1-1 illustrates the locations of AOC 613, AOC 615, and SWMU 175 within Zone F at CNC. Figure 1-2 presents the site layout of AOC 613.

The RFIRA/CMSWP presented the remedial action objectives (RAOs) and media cleanup standards (MCSs) proposed for AOC 613. This report also recommended No Further Action (NFA) for AOC 615 and SWMU 175. This CMS report has been prepared by CH2M-Jones to complete the next stage of the CMS process for AOC 613.

- Trichloroethene (TCE): 1,500 μg/L
- 1,2-Dichloroethene (1,2-DCE): 1,700 μg/L
- Vinyl chloride: 38 μg/L

The reported concentrations indicated the presence of a potential source area. Of the other groundwater DPT samples surrounding F613GP039, no CVOCs were detected, with the exception of 1,2-DCE at an estimated concentration of 3 μg/L. Groundwater monitoring well F613GW004 was then installed 26 ft from F613GP039. Analyses from groundwater samples collected from that monitoring well between November 12, 1996 and June 22, 2001 were reported in the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP*. The maximum CVOC concentrations reported from F613GW004 were:

- PCE: 3 μg/L
- TCE: 4 μg/L
- 1,2-DCE: 84.5 μg/L
- Vinyl chloride: 10.8 μg/L

These concentrations are not indicative of an adjacent CVOC non-aqueous phase liquid (NAPL) source, and indicate that the potentially impacted aquifer is relatively limited in size. Because vinyl chloride and 1,2-DCE were reported above maximum contaminant levels (MCLs) in monitoring well F613GW004, and PCE, TCE, 1,2-DCE, and vinyl chloride were reported at elevated concentrations in the screening sample F613SP039, these CVOCs were identified as COCs in the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP*. Appendix B presents summary tables from the RFIRA/CMSWP of CVOCs detected in groundwater and figures showing their locations.

The *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP* also identified methylene chloride as a potential COC in groundwater, on the basis of a single reported concentration of 83 μg/L in a monitoring well north of AOC 613. This CMS report will further evaluate methylene chloride in groundwater in the vicinity of monitoring well FGELGW014 and determine what remedial action is needed for that compound.

1.2.5 CMS Work Plan Summary

The CMS Work Plan (CMSWP) for AOC 613 identified PCE, TCE, 1,2-DCE, and vinyl chloride as COCs in shallow groundwater. The RAOs identified in the CMSWP are to prevent ingestion and direct/dermal contact with groundwater having unacceptable carcinogenic or noncarcinogenic risk, and to restore the aquifer to beneficial use. The

1.1 Corrective Measures Study Report Purpose and Scope

This CMS evaluates CA alternatives for chlorinated solvents present in the groundwater at AOC 613, and develops the basis for selection of the alternatives. In addition, this CMS report presents the results of additional characterization of the chlorinated solvents in groundwater as identified in the *Phase I Interim Measure (IM) Work Plan – Source Delineation Sampling and Analysis Plan (SAP), AOC 613, Zone F, Revision 0* (CH2M-Jones, 2002c).

This CMS report consists of: 1) the identification of a set of corrective measure alternatives that are considered to be technically appropriate for addressing groundwater impacted by chlorinated volatile organic compounds (CVOCs); 2) an evaluation of the alternatives using standard criteria from U.S. Environmental Protection Agency (EPA) RCRA guidance; and 3) the selection of a recommended (preferred) corrective measure alternative for the site.

1.2 Background Information

This section of the CMS report presents background information on the facility, site history, and a summary of the nature and extent of the chemicals of concern (COCs) at the site. This information is essential to the understanding of the remedial goal options (RGOs), MCSs, and ultimately the evaluation of corrective measure alternatives for AOC 613. Additional information on the site and hydrogeology in the Zone F area of the CNC is provided in the *Zone F RFI Report, Revision 0* (EnSafe, 1997), and site-specific background information is also presented in the RFIRA/CMSWP issued by CH2M-Jones.

1.2.1 Facility Description

AOC 613 is the site of the former Building 1169, the Locomotive Repair Shop, which is located east of Hobson Avenue at the current location of Building 242. Building 242, constructed in the 1980s, is currently used by the Charleston Public Works (CPW) as a vehicle maintenance facility. Northeast of the former Building 1169 was a former open-air machine shop, which occupied the current location of Building 255. Building 255 was also constructed in the 1980s as the Navy Logistics Center, and has been transferred to the Warren Lasch Conservation Center. Building 255 currently operates as a conservatory for historic artifacts, along with laboratory and other research operations.

The area surrounding both Buildings 242 and 255 is paved with asphaltic concrete. The CNC Reuse Plan identifies this area for industrial land use. The City of North Charleston zoning for this site is M-1, for light marine industrial land use.

1.2.2 Site History

AOC 613 (Locomotive Repair Shop) operated from the 1930s until 1985, when Building 1169 was demolished. Maintenance activities included changing oil, repairing hydraulic systems, and equipment overhaul. Materials potentially released included oil, grease, diesel fuel, and cleaning solvents. The structure was demolished in the late 1980s and replaced with Building 242, an automotive maintenance facility operated by the Navy until 1996. The facility is currently operated under the same function by the CPW.

An underground storage tank (UST) was located between Buildings 242 and 255, receiving waste oil from Building 242 operations. This UST was removed in 1997, and the area surrounding the UST was subsequently identified as UST Site 22 by SCDHEC after a release was discovered from the UST piping. The *Rapid Assessment Report for Site 22, Building 242* (Tetra Tech NUS [TTNUS], 2000) describes the site evaluation. A copy of this report may be found as an appendix to the AOC 613/615/175 RFIRA/CMSWP issued by CH2M-Jones. Groundwater contaminants associated with the UST are benzene and methyl tert butyl ethylene (MTBE). Intrinsic bioremediation/natural attenuation was monitored at Site 22 in accordance with the *Sampling and Analysis Plan for Zone F/Site 22 – Building 242*, (CH2M-Jones, 2000). Results of the monitoring indicate that intrinsic bioremediation is occurring and benzene and MTBE levels have been reduced to below site-specific target levels. This site is being considered for NFA under the UST program.

1.2.3 Site Geology and Hydrogeology

The site geology consists of a series of Quaternary interbedded silty sands and clays, to a depth varying in thickness from 10 to 40 feet below land surface (ft bls) in the general AOC 613 area. The sands and clays contain an unconfined (water table) aquifer system that overlies the Tertiary Ashley Formation. The Ashley Formation is comprised of silts and clays and acts as an aquiclude for the water table aquifer.

A continuous sample soil core was collected as part of the Phase I IM to identify permeable lenses in the Quaternary soils. The core was sampled in the vicinity of the former direct-push technology (DPT) sample F613GP039. The log of the core sample is presented in Appendix A of this report. This core compares favorably to logs of geotechnical borings drilled and sampled for structural design of the adjacent Building 255 foundations. The core identified very thin slightly permeable (sandy) zones at 11.4 to 11.5 ft bls and a moderately water-bearing silty sand at 20 to 23 ft bls. The Ashley Formation was encountered at 24 ft bls at the core location. No odors or visible signs of solvents were identified in the core soil.

The potentiometric surface of the shallow groundwater at the site measured December 31, 2001, is presented in Figure 1-3. The flow direction appeared to be governed by a groundwater mound located southwest of AOC 613, a shallow trough trending north-south through AOC 613, and a groundwater sink between Buildings 241 and 1172.

During the summer of 2002, the CPW relined the sewers within the AOC 613 area. The potentiometric surface of the shallow groundwater in the area was again measured October 3, 2002. The resulting groundwater surface is presented in Figure 1-4. As a result of the sewer maintenance, the groundwater flow direction at AOC 613 in October 2002 was primarily in an east to northeasterly direction, toward the Cooper River.

1.2.4 RFI Sampling and COC Summary

For the RFI at AOC 613/AOC 615/SWMU 175, several sampling events were conducted. In 1996, 65 locations were sampled on approximate 50-ft centers, using DPT equipment. Soil was sampled from 0 to 4 ft below the pavement; DPT groundwater sample depths are unknown. In general, the screening samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals. DPT sampling locations for the AOC 613/AOC 615/SWMU 175 RFI are shown in Figure 1-5.

The second phase of sampling was based on the results of the DPT samples. Nine groundwater monitoring wells were installed at the site, and existing monitoring wells were used to further characterize the site groundwater. Figure 1-6 presents the groundwater monitoring wells used to characterize groundwater at AOC 613. Soil samples were collected at more discrete depth intervals than the screening phase, and analyzed for specific chemicals of potential concern (COPCs) identified from the screening survey. In addition, soil and groundwater samples were collected in the AOC 613/AOC 615/SWMU 175 investigated area along sewer and railroad lines for the Zone L investigation of AOCs 504, 699, and SMWU 37 (see Figure 1-7). All of these data were used to evaluate the nature and extent of contamination for the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP*.

Generally, the site was found to have relatively limited contamination. No surface or subsurface soil COCs were identified. Several CVOCs were identified as COCs in groundwater in a limited portion of the site, as described below.

In DPT groundwater sample F613GP039, located on the southwest side of Building 255, the following concentrations of chlorinated solvents were reported:

- Tetrachloroethene (PCE): 1,900 (micrograms per liter [μg/L])

proposed MCSs for the CVOCs were the National Primary Drinking Water Regulations MCLs for each chemical.

Because of the limited areal extent of the CVOC-impacted groundwater, the CMSWP proposed assessing a limited set of potential corrective measures including land use controls (LUCs), monitored natural attenuation (MNA), enhanced biodegradation, and source area treatment.

In addition, the CMSWP proposed that prior to evaluating the potential corrective measures, a focused groundwater quality assessment in the target AOC be conducted to better refine the understanding of the CVOC concentrations in groundwater and horizontal extent of the elevated concentration area. The resampling of nearby wells was also proposed.

1.3 Report Organization

This CMS report consists of the following sections, including this introductory section:

1.0 Introduction — Presents the purpose of and scope of and background information relating to this CMS report.

2.0 Summary of Phase I IM and Additional Sampling at AOC 613 – Describes the Phase I IM and summarizes pertinent data collected after completion of the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP* (CH2M-Jones, 2002a).

3.0 Remedial Goal Options and Evaluation Criteria – Defines the RGOs for AOC 613 and the criteria used in evaluating the corrective measure alternatives for the site.

4.0 Description of Candidate Corrective Measure Alternatives – Describes each of the candidate corrective measure alternatives for addressing CVOCs in groundwater.

5.0 Evaluation and Comparison of Corrective Measure Alternatives – Evaluates each alternative relative to standard criteria, then compares the alternatives and the degree to which they meet or achieve the evaluation criteria.

6.0 Recommended Corrective Measure Alternative – Describes the preferred corrective measure alternative to achieve the MCSs and RGOs for CVOCs in groundwater based on a comparison of alternatives.

7.0 References — Lists the references used in this document.

NOTE: Original figure created in color

NOTE: Data from groundwater probes, located at soil probe locations, were not reported in the Rev. 0 RFI Report.

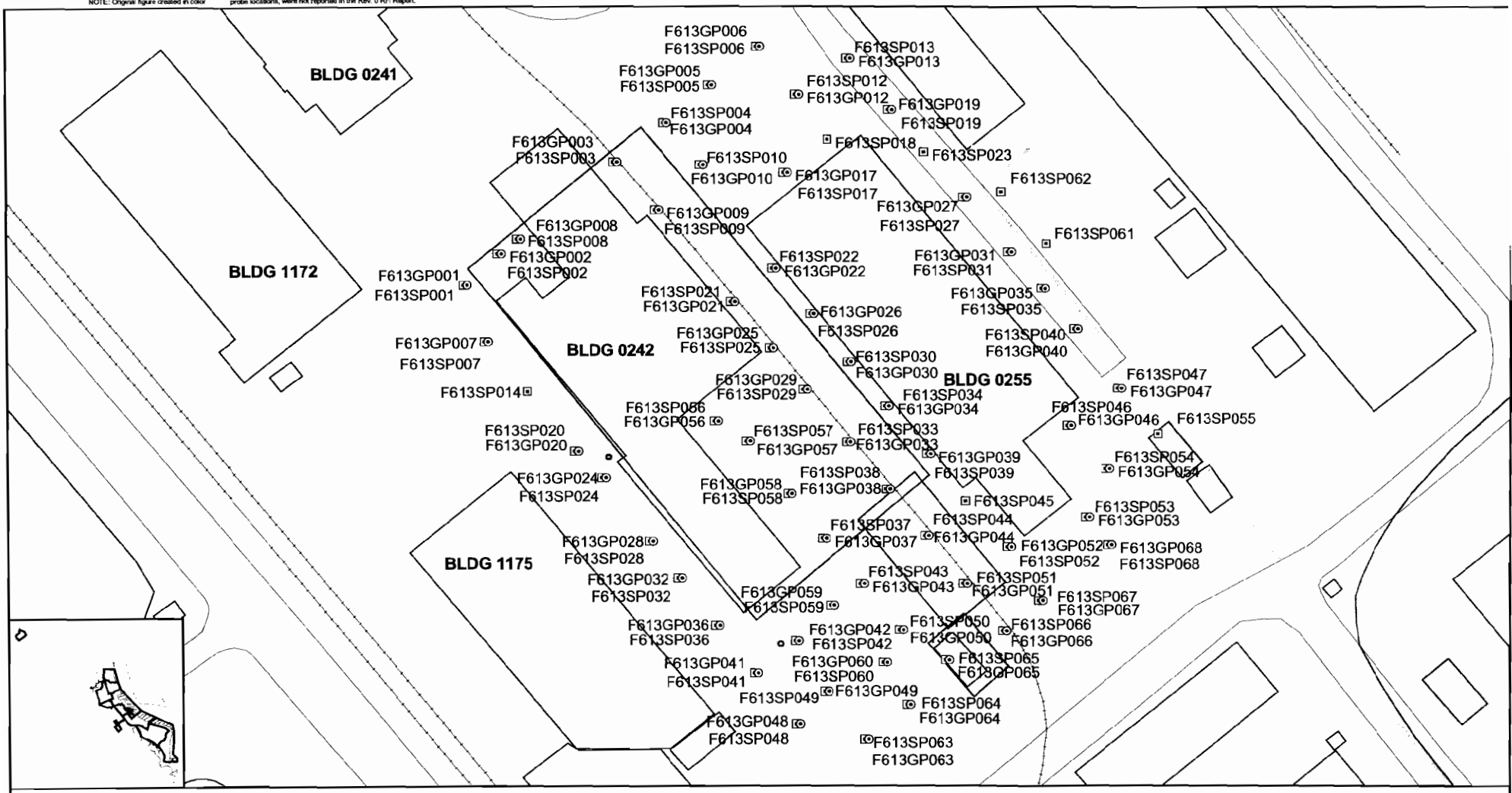


Figure 1-5
Originally Reported AOC613/615/SWMU175 RFI Screening Sample Locations
Soil and Groundwater Probes
AOC 613 CMS
Charleston Naval Complex

CH2MHILL

File Path: d:\18gis\projects\zone_faoc_613\aprs\aoc613.apr Date: 14 Nov 2002 10:00, User: DSANTOS, EGIS. Charleston Naval Complex - Figure 1-5 Originaly Reported RFI Sample Locations

Appendix A contains the well installation logs for monitoring wells F613GW010 and F613GW011, and the soil core log and DPT logs for groundwater samples collected for the Phase I IM.

Appendix B lists CVOC concentrations within groundwater reported in the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP* and figures showing the CVOC spatial distribution .

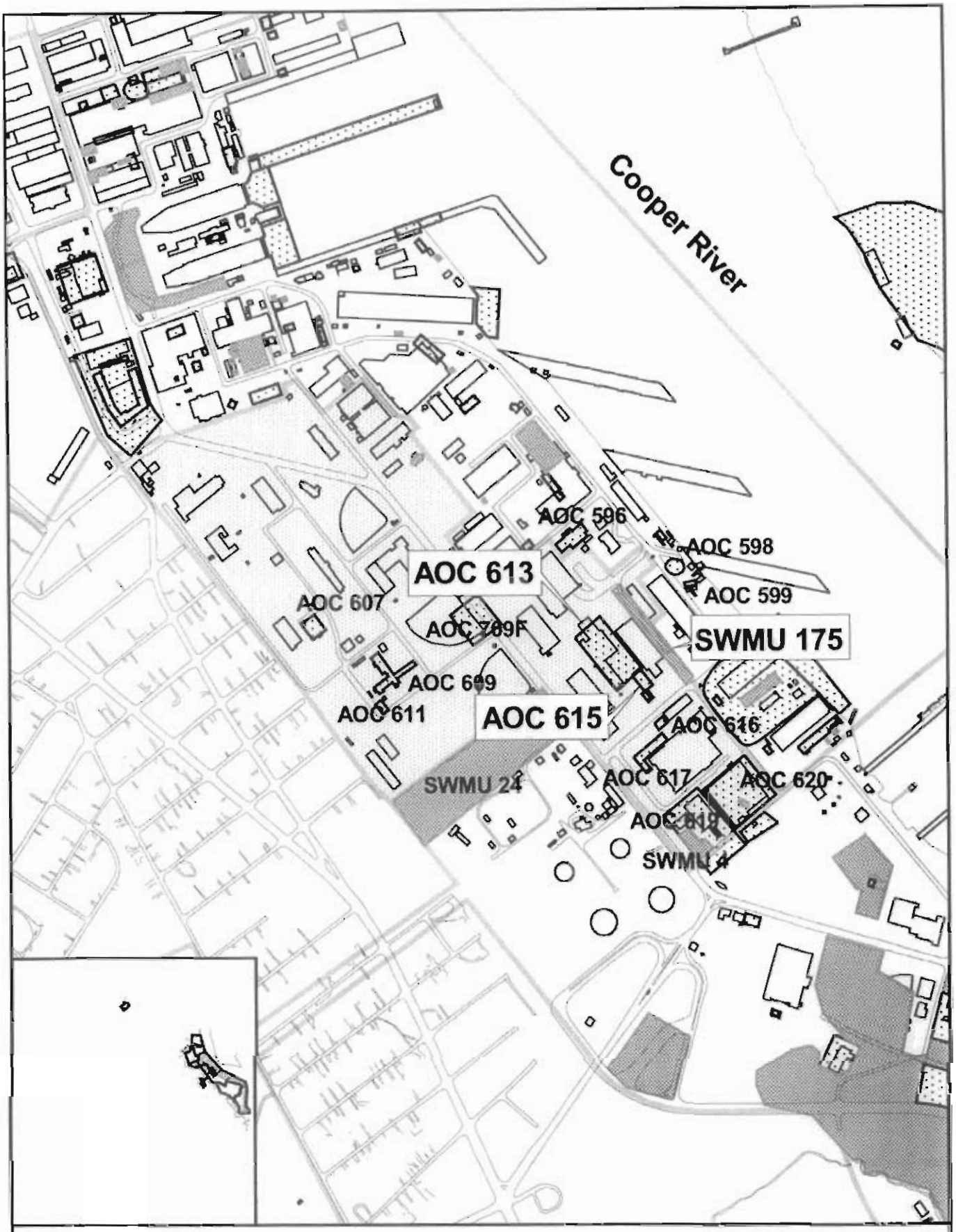
Appendix C contains excerpts from the *Rapid Assessment Report for Site 22, Building 242* (TTNUS, 2000), including well construction logs for monitoring wells FU22GW001 through FU22GW007.

Appendix D presents data summary tables for groundwater samples collected from UST Site 22 monitoring wells and for the Phase I IM at AOC 613.

Appendix E contains data validation summary memoranda for the sampling events described in this report.

Appendix F contains cost estimates developed for the proposed corrective measure alternatives.

All tables and figures appear at the end of their respective sections.



Roads
Shoreline
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary
Zone F

N

0 750 1500 Feet

Figure 1-1
AOCs 613, 615, and SWMU 175
AOC 613, CMS
Charleston Naval Complex

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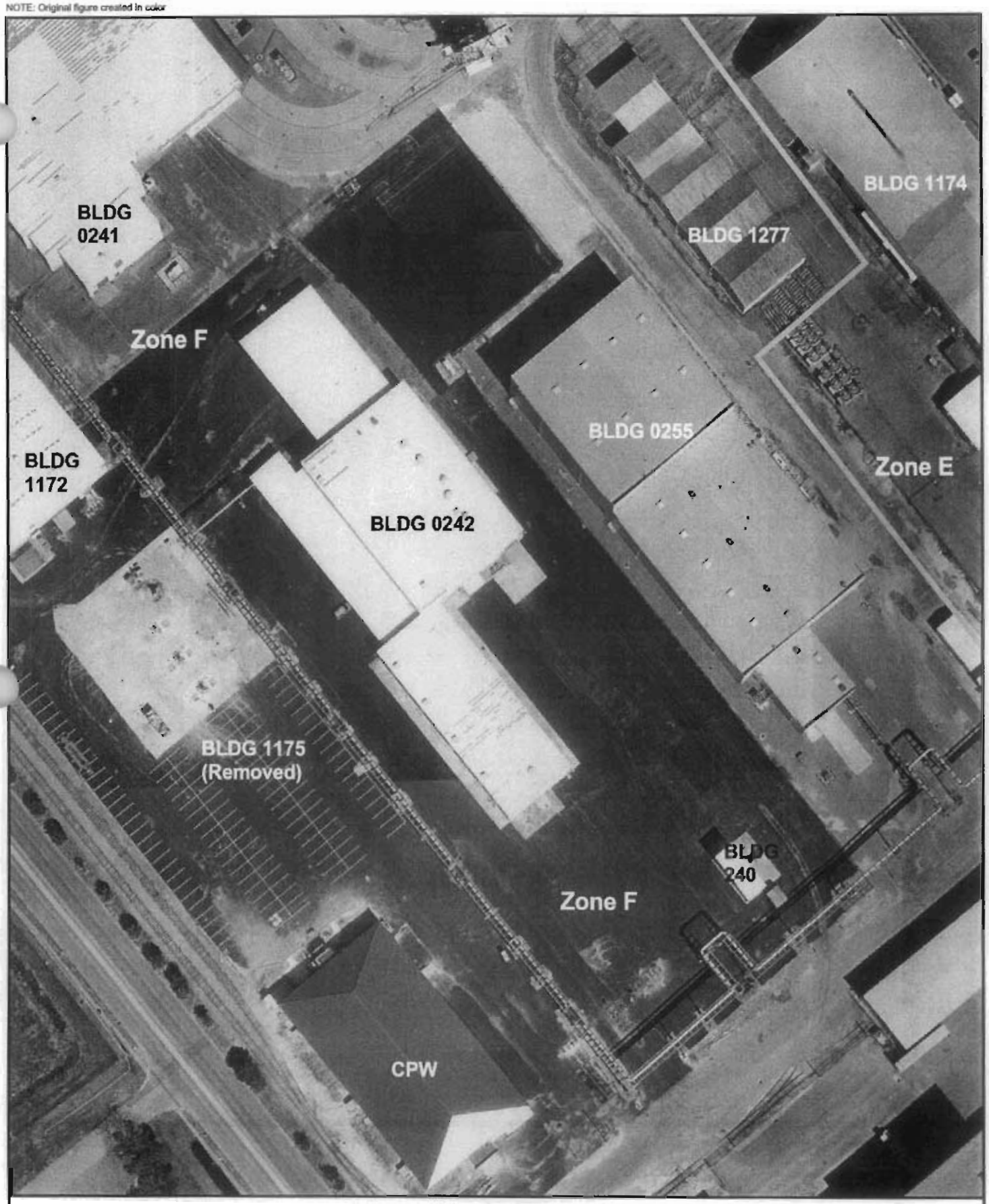
File Path: D:\Projects\Zone_Facs_113\Apns\aoc613.apr, Date: 12 Nov 2002 10:36, User: DSANTOS, Figure 1-1 - Close up of Zone F - Figure 1-1 AOC 613

NOTE: Original figure created in color



Zone Boundary

Buildings

N

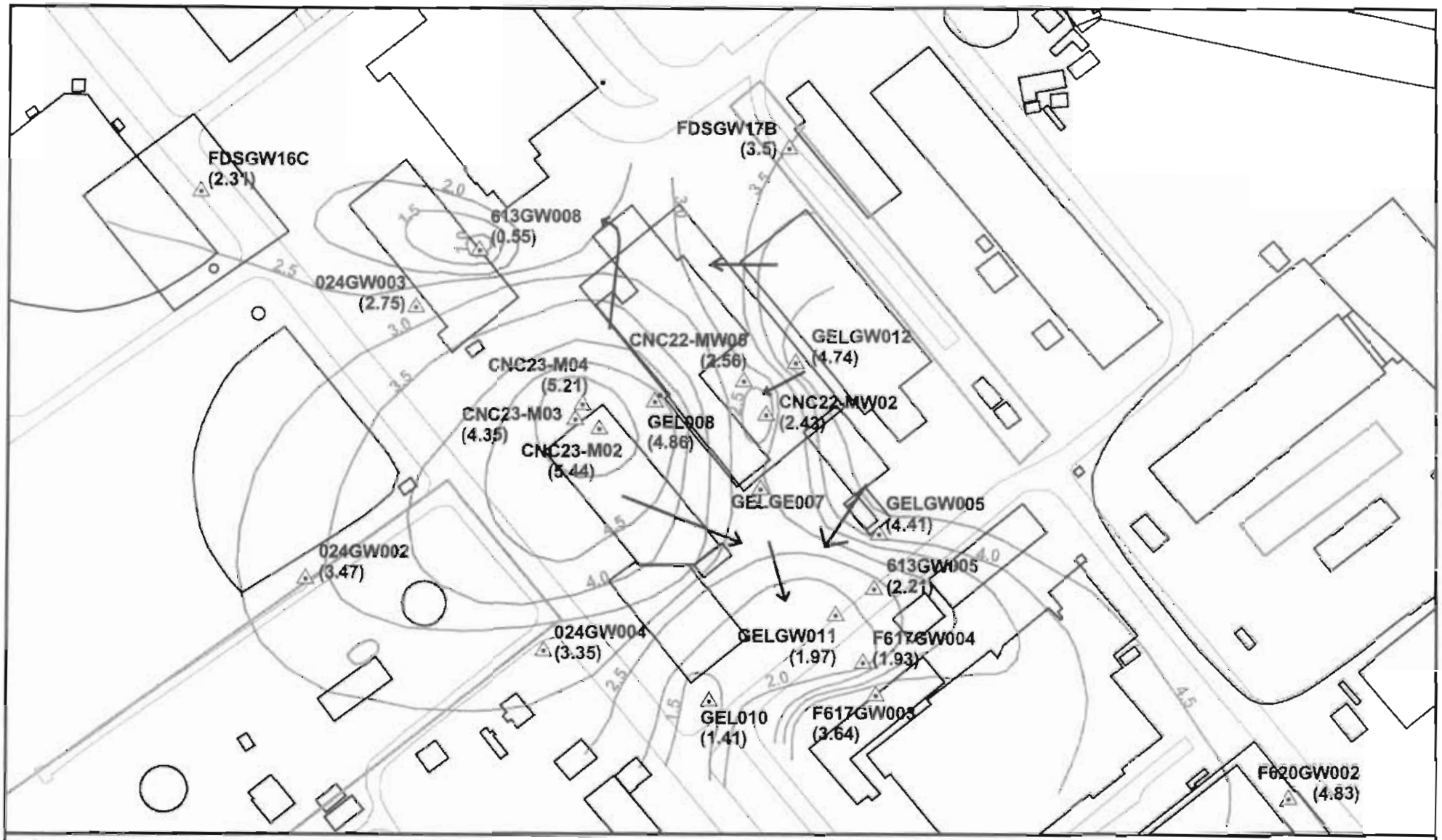
0 100 200 Feet

1 inch = 100 feet

Figure 1-2
Aerial Photo
AOC 613 CMS
Charleston Naval Complex

CH2MHILL

File Path: d:\18gis\projects\zone_f\aoc_613\aprs\aoc613.apr, Date: 06 Jan 2003 12:28, User: DSANTOS, Figure 1-2 Aerial Photo - Figure 1-2 Aerial Photo



Groundwater Survey Wells
AOC Boundary
SWMU Boundary
Buildings
Roads
Groundwater Potentiometric Surface Contour (ft msl)
Groundwater Flow Direction

N

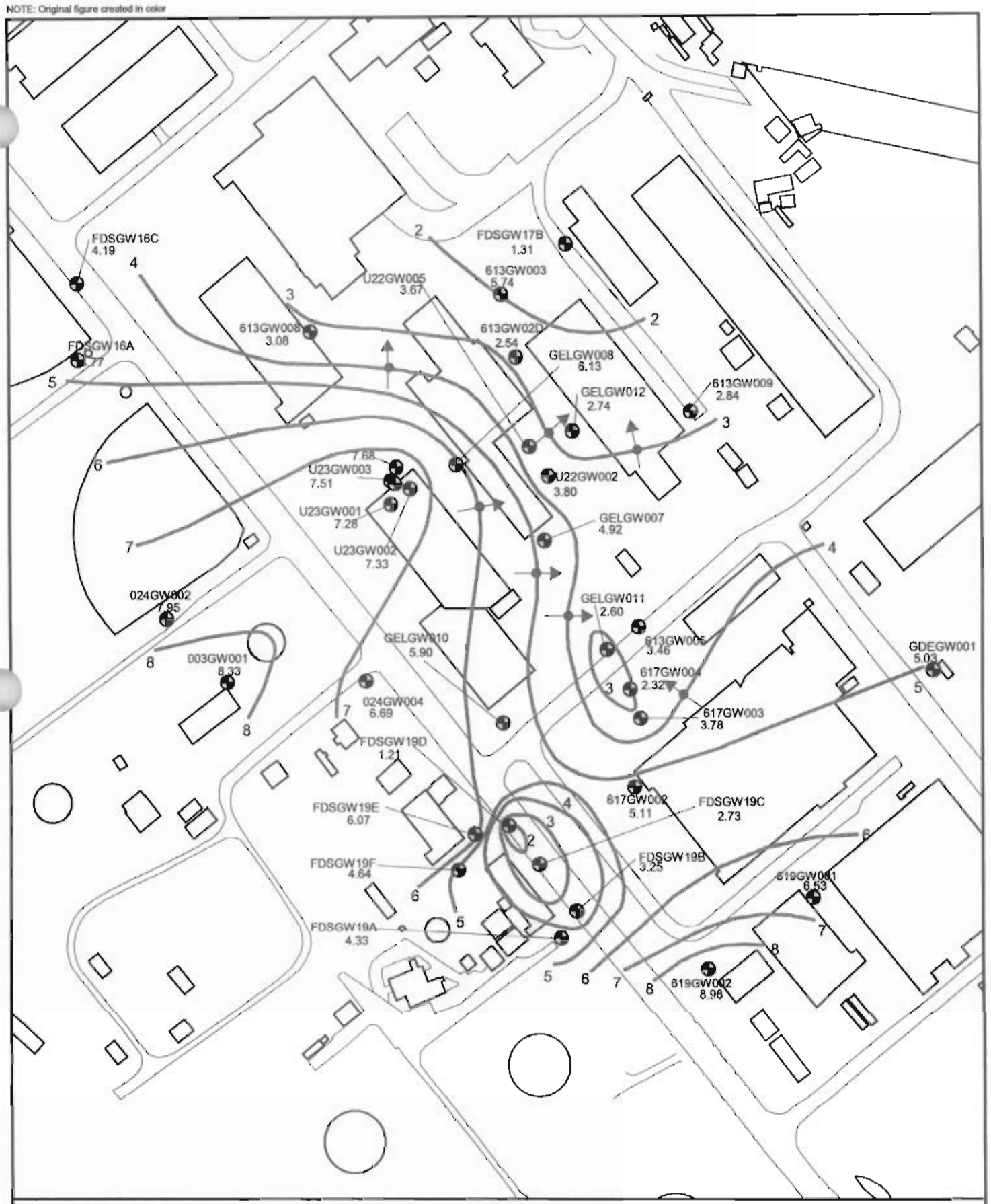
0 200 400 Feet

Figure 1-3
Potentiometric Surface Map of Shallow Groundwater
December 31, 2001
AOC 613, CMS
Charleston Naval Complex

CH2MHILL

File Path: d:\projects\zone_f\aoc_613\apns\aoc613.apr, Date: 12 Nov 2002 9:56, User: CSANTOS, Figure 1-3 - Figure 1-3 Potentiometric Surface Map of Shallow Groundwater December 31, 2001

NOTE: Original figure created in color



Groundwater Flow Direction
Monitoring Well
Groundwater Potentiometric Contours (ft msl)
Roads - Lines
Buildings

N

0 200 400 Feet

1 inch = 200 feet

Figure 1-4
October 3, 2002 Shallow Groundwater Contours
AOC 613 CMS
Charleston Naval Complex

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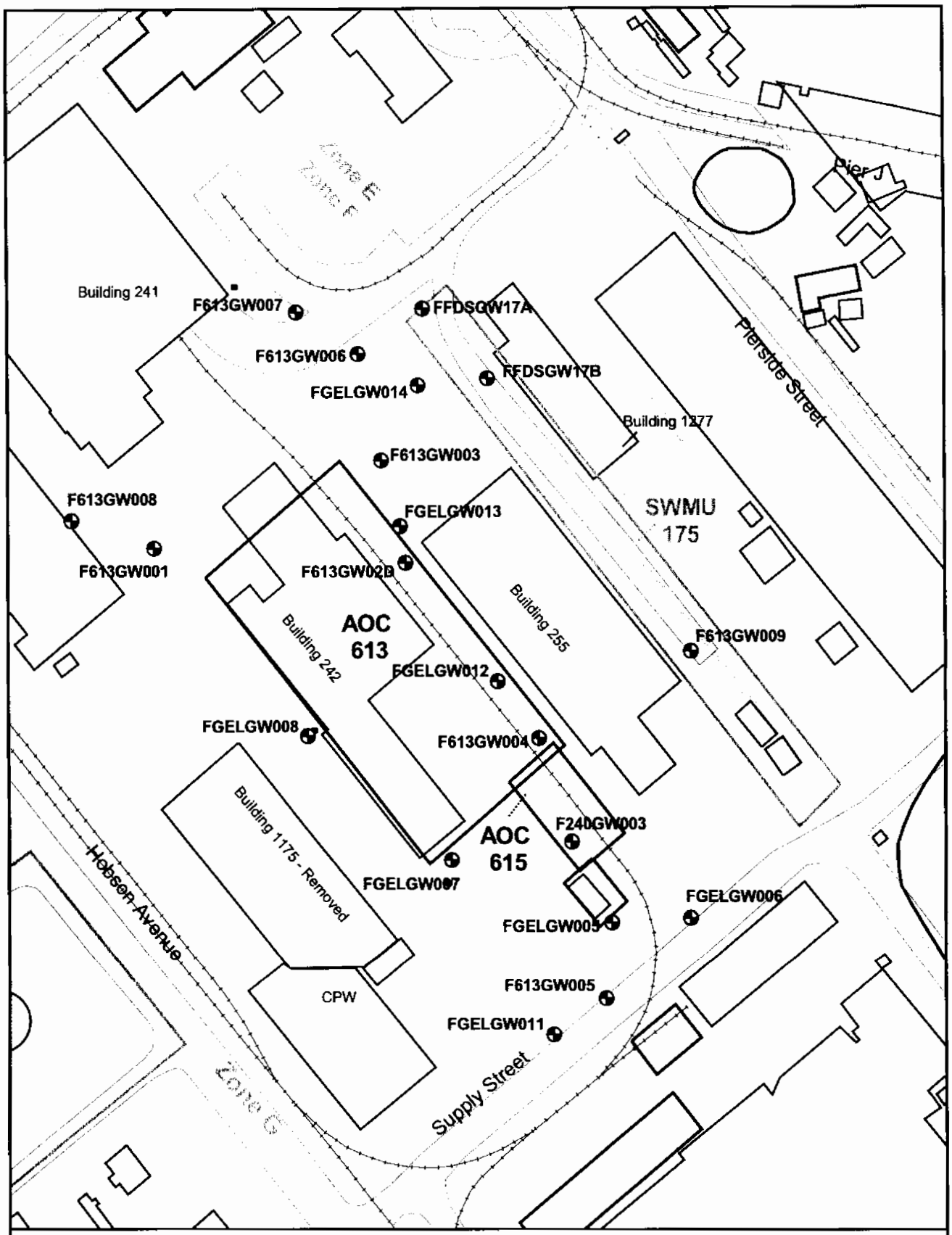
File Path: d:\18gis\projects\zone_f\new.apr, Date: 10 Dec 2002 17:27, User: DSANTOS, FIG 1-4



Groundwater Wells
Railroads
Roads
AOC Boundary
SWMU Boundary
Buildings

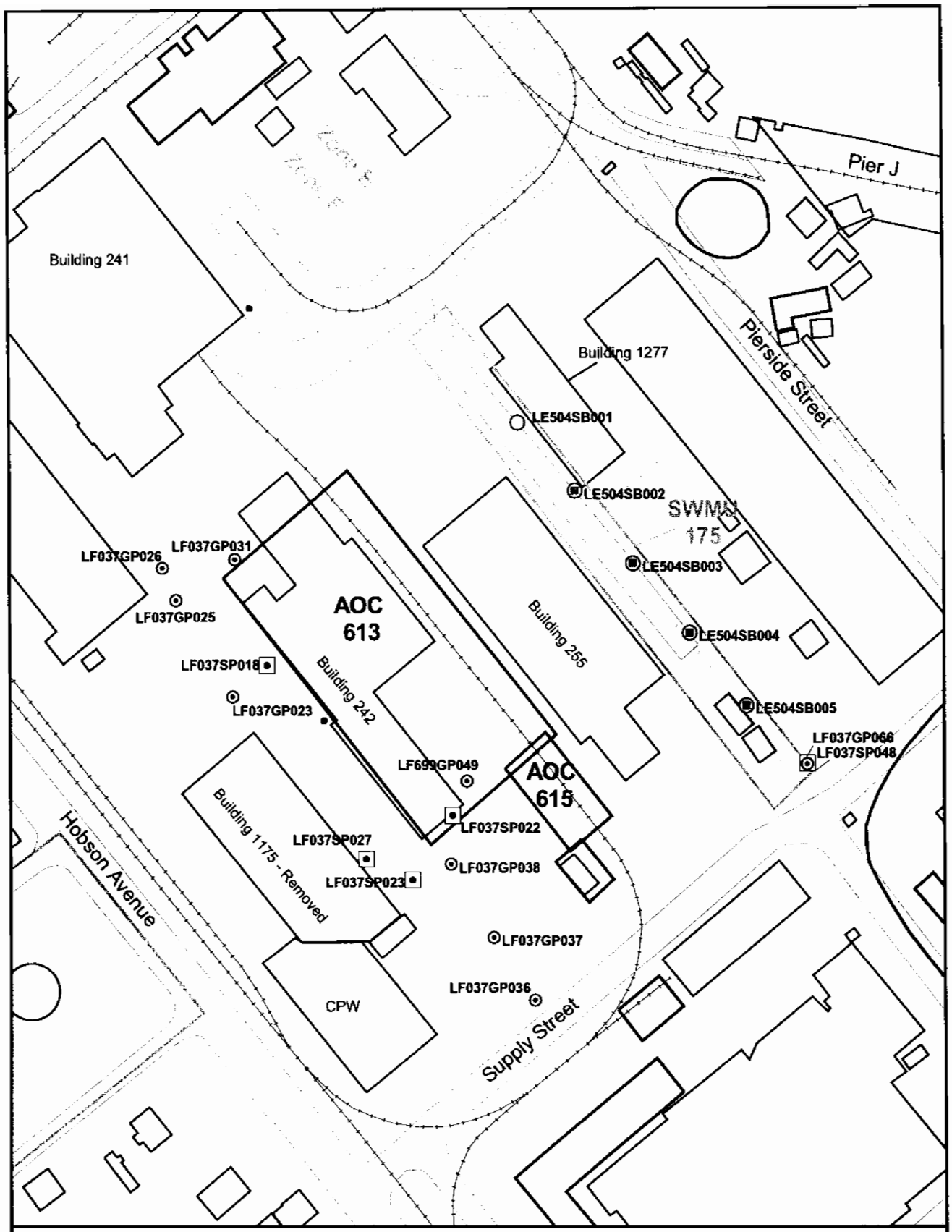
N

0 90 180 Feet

Figure 1-6
RFI Groundwater Monitoring Well Locations
AOCs 613, 615, and SWMU 175, Zone F
Charleston Naval Complex

CH2MHILL

File Path: d:\projects\zone_f\aoc_613\apns\aoc613.apr, Date: 12 Nov 2002 9:21, User: DSANTOS, Figure 1-6 - Figure 1-6 RFI Groundwater Monitor Well Locations



- Subsurface Soil Samples
- Surface Soil Samples
- Soil Probe Samples
- Groundwater Probe
- Roads
- AOC Boundary
- SWMU Boundary
- Buildings
- Railroads
- Zone Boundary

N

0 100 200 Feet

Figure 1-7
Zone L RFI Samples
AOCs 613, CMS
Charleston Naval Complex

CH2MHILL

File Path: d:\projects\zone_l\aoc_613\aprs\aoc613.apr, Date: 12 Nov 2002 9:18, User: DSANTOS, Figure 1-7 - Figure 1-7 Zone L RFI Samples

Section 2.0

2.0 Summary of Phase I Interim Measure and Additional Sampling at AOC 613

This section describes groundwater data collected during the subsequent groundwater quality assessment that was recommended in the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP* (CH2M-Jones, 2002b). This description includes data from samples collected using DPT discrete groundwater sampling methods, as well as data from seven monitoring wells installed to investigate UST Site 22, west of F613GP039. As previously described, UST Site 22 is the site of a former waste oil UST located between Buildings 242 and 255. The UST wells are labeled FU22GW001 through FU22GW007, and the locations of these wells are included in Figure 2-1.

All UST Site 22 wells, with the exception of FU22GW007, were screened approximately 3 to 13 ft bls; the latter was screened 25 to 30 ft bls. Construction logs of the UST Site 22 monitoring wells are presented in Appendix C of this report. A brief review of the RFI data for 2001, along with a description of the results of the 2001 UST well sampling are described first, followed by the results of the DPT and subsequent well sampling.

2.1 CVOCs in Groundwater at AOC 613

2.1.1 2001 Groundwater Data

In May 2001, seven monitoring wells at UST Site 22 were sampled for VOCs, including CVOCs. In addition, monitoring wells installed for the Zone F RFI in the area were sampled for CVOCs in June 2001. Figures 2-2, 2-3, and 2-4 show TCE, 1,2-DCE, and vinyl chloride data, respectively, from these two sampling efforts. In 2001, PCE was detected only at well F613GW004, at an estimated concentration of 0.35 μg/L; therefore, PCE data are not presented in the figures. The CVOC data from these two sampling events are also presented in Table 2-1. Complete data summary tables for the UST Site 22 groundwater samples collected in 2001 and 2002 are presented in Appendix D of this report. Data validation summary memoranda are presented in Appendix E. Data summary tables and data validation memoranda for samples from the RFI wells were presented in the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP*.

The data show that TCE concentrations were all detected below the MCL of 5 μg/L in May and June of 2001. 1,2-DCE concentrations (primarily composed of cis-1,2-DCE) were

detected as high as 85 μg/L at F613GW004, and vinyl chloride was detected as high as 14 μg/L at FU22GW003. These data are consistent with the CVOC groundwater data presented in the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP* that showed that DCE was present in groundwater at the highest concentrations and that TCE and PCE concentrations were relatively low or not detectable.

2.1.2 Phase I Interim Measure Work Plan

The *Phase I Interim Measure Work Plan (IMWP)—Source Delineation Sampling and Analysis Plan for AOC 613, Zone F* (CH2M-Jones, 2002c) was issued after the RFIRA/CMSWP was completed. The AOC 613 Phase I IM was intended to determine whether a source area of CVOCs was present in the vicinity of boring F613GP039. If a source area was identified, an IM, likely consisting of in situ groundwater treatment (for example, in situ chemical oxidation) would be conducted. The IMWP described sampling locations both outside and inside of Building 255. A row of five groundwater sample locations was planned along the outside wall of Building 255. Groundwater was to be sampled using a Waterloo Profiler to obtain three discreet depth samples at each location. Groundwater sampling was also planned at five locations inside Building 255, if the results from groundwater samples collected outside the building suggested the potential presence of a source area beneath the building.

Continuous Soil Coring

To identify the optimum sampling depth, a continuous sample soil core was first collected in the vicinity of the former F613GP039. Soil was sampled to a depth of 28 ft in 4-ft segments and visually inspected for saturated and permeable zones. A log of the soil core is presented in Appendix A of this report. This log described a stratigraphy very similar to those presented in geotechnical boring logs prepared for the design of the Building 255 foundations. The core sample identified very thin slightly permeable zones at 11.4 to 11.5 ft and a moderately water-bearing silty sand at 20 to 23 ft bls. No odors or visible signs of solvents were identified in the core.

DPT Groundwater Sampling

Because the water-bearing zones observed in the core had low permeability, it appeared that the Waterloo Profiler would not have enough screen length to collect sufficient groundwater for a VOC analysis. Therefore, the sampling method was changed to DPT geoprobe samples with 4-ft screen lengths. Groundwater was to be collected at 8 to 12 ft, 14 to 17 ft, and 20 to 24 ft bls at each of the five sample locations outside the building. After results of the

groundwater samples from outside the building were evaluated, sample intervals would then be designated for the samples to be collected from below the building.

Groundwater samples from DPT locations F613GP069 through F613GP073 were planned outside the building, and F613GP074 through F613GP078 were contingent sampling locations inside the building. Phase I IM proposed sample locations are presented in Figure 2-5. The samples planned at the exterior of the building would be collected first to corroborate the 1996 groundwater probe data. The locations of the groundwater samples inside the building would be adjusted on the basis of the CVOC concentrations detected outside of the building.

Monitoring Well Installation and Sampling

Groundwater monitoring wells in the area were proposed for sampling for CVOCs. Two of the UST Site 22 monitoring wells were to be sampled, along with shallow RFI monitoring wells F613GW004, F613GW009, FGELGW011, and FGELGW012.

As described in the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP*, two isolated locations, north and south of Building 242, had also been identified as potentially containing vinyl chloride concentrations above MCLs, on the basis of 1996 DPT groundwater screening samples. Other CVOCs were not detected above MCLs at either of these two locations. These areas are shown on Figure 2-6. Monitoring wells were installed at the two locations to verify the vinyl chloride detections. Monitoring well F613GW010 was installed near previous sample locations F613GP002 and F613GP008, in which vinyl chloride had been detected at estimated concentrations of 4 and 5 μg/L in 1996. Monitoring well F613GW011 was installed as close as possible downgradient to previous location LF037GP037, in which vinyl chloride had been detected at a concentration of 17.1 μg/L in 1997. The well construction logs are presented in Appendix A of this document.

2.1.3 July 2002 Groundwater Data

In July 2002, the area around the screening sample F613GP039 was sampled for CVOCs. Three RFI and two UST Site 22 monitoring wells were sampled. In addition, groundwater from DPT samples at F613GP069 through F613GP073 was collected. The soil core log and DPT logs for groundwater samples collected are presented in Appendix A. At the DPT sample locations, attempts were made to collect groundwater at all three sample interval depths described in the Phase I IMWP, however, with the exception of F613GP069, water was only available from the 20 to 24 ft depth interval. At F613GP069, the depth interval 8 to

12 ft bls also yielded sufficient water for a sample. The lack of groundwater had been predicted from the core log from location F613GP070.

Table 2-1 and Figures 2-7, 2-8, and 2-9 present TCE, 1,2-DCE, and vinyl chloride data, respectively, from the July 2002 sampling efforts. In July 2002, PCE was detected only at F613GW004, at an estimated concentration of 0.42 μg/L; therefore PCE data are not presented in the figures. TCE was again measured below the MCL; 1,2-DCE concentrations were measured as high as 75 μg/L at F613GW004, and vinyl chloride was measured as high as 10.2 μg/L at F613GW004. It should be noted that the well with the highest vinyl chloride content in 2001 was not sampled in the July 2002 sampling event.

Groundwater data from the DPT samples located along Building 255 indicate trace concentrations of TCE and 1,2-DCE; no PCE or vinyl chloride was detected. Specifically, F613GP070 was collected at the former location of F613GP039, and only 1,2-DCE (0.9 J μg/L) was identified at that location.

DPT sampling along the edge of Building 255 did not confirm the presence of a potential source area for CVOCs in groundwater adjacent to or beneath Building 255. The lack of CVOCs detected in groundwater samples collected along the building wall indicates little likelihood of the presence of CVOCs in groundwater beneath the building. On the basis of the absence of CVOCs near the only sample location that had formerly indicated the possibility of a CVOC source area, it was concluded that further exploration of groundwater beneath and adjacent to Building 255 was not necessary.

2.1.4 August 2002 Groundwater Data

Monitoring wells F613GW010 and F613GW011 were installed in the two isolated areas north and south of Building 242, in which vinyl chloride had been detected in 1996 and 1997. Groundwater samples from these wells were collected August 5, 2002. Table 2-1 presents data from that sampling effort. Appendices D and E present data summary tables and data validation details for the sampling event. Figure 2-10 presents the sampling results.

CVOCs were not detected above MCLs in the groundwater at F613GW010, north of Building 242, in which vinyl chloride had been previously detected at 5 μg/L. Trace concentrations of cis-1,2-DCE (estimated at 1.5 μg/L) and vinyl chloride (estimated at 0.7 μg/L) were detected in the well sample.

South of Building 242, no CVOCs were detected in F613GW011, located downgradient of the previous screening sample LF037GP037, in which vinyl chloride had been detected at 17.1 μg/L in 1997.

2.1.5 October 2002 Groundwater Data

In October 2002, groundwater at AOC 613 was sampled for CVOCs. The following wells were sampled for CVOCs:

- RFI monitoring wells FGELGW007, FGELGW008, FGELGW012, F613GW004, F613GW009, F613GW010, and F613GW011
- UST Site 22 monitoring wells FU22GW001, FU22GW002, FU22GW003, FU22GW004, FU22GW005, FU22GW006, and FU22GW007

Table 2-1 and Figures 2-11, 2-12, and 2-13 present TCE, 1,2-DCE, and vinyl chloride data, respectively, from the October 2002 sampling efforts. In October 2002, PCE was detected only at FGELGW007, FU22GW004, and FU22GW006, at a maximum estimated concentration of 1.9 μg/L; therefore PCE data are not presented in the figures. TCE and 1,2-DCE concentrations were measured below their respective MCLs, and vinyl chloride was measured as high as 11.2 μg/L at F613GW004.

2.1.6 CVOC Data Evaluation

Table 2-2 presents the 2001/2002 data from wells where individual TCE, 1,2-DCE, and vinyl chloride concentrations exceeded 1 μg/L. Concentrations at these low levels are considered estimated, and are less precise than those closer to the reporting limits of 5 or 10 μg/L. A review of these data shows these trends:

- TCE and 1,2-DCE have consistently decreased in concentration in the groundwater, to below MCLs. TCE concentrations have reduced an average of 55 percent, and DCE concentrations an average of 45 percent. The location with the highest DCE concentration, F613GW004, reported a 40 μg/L reduction in the 16 months between measurements.
- Vinyl chloride concentrations have reduced an average of 23 percent, although the range of concentration reductions varied from –4 percent (virtually no change) to 60 percent. The location with the maximum concentrations in 2002, F613GW004, reported a negligible 0.4 μg/L increase in concentration over the 16 months between measurements, compared to a 40 μg/L reduction in 1,2-DCE. At FU22GW003, which had the highest vinyl chloride concentration in 2001, vinyl chloride reduced by 8 μg/L, along with a 5 μg/L reduction in DCE concentrations. This indicates that although the DCE is degrading to vinyl chloride, vinyl chloride is also degrading at this site.

2.2 Methylene Chloride in Groundwater

As discussed in the *AOC 613/AOC 615/SWMU 175 RFIRA/CMSWP*, methylene chloride was reported in a groundwater sample at FGELGW014 for the October 12, 1999 sample, at an estimated concentration of 83 μg/L, compared to the EPA Region III tap water RBC of 4.1 μg/L. It had not been detected in the six previous samples from the well, and was not detected in any groundwater samples from the other 19 wells at the site.

Monitoring well FGELGW014 was resampled for methylene chloride on July 1, 2002, resulting in an estimated concentration of 1.9 μg/L. The data are presented in Appendix D of this report. This concentration is consistent with the previous data, with the exception of the sample collected on October 12, 1999, and indicates that methylene chloride does not exist in site groundwater at concentrations in excess of health-based criteria. The detected concentration from the October 12, 1999 sample is considered an anomaly, potentially caused by laboratory or field contamination. Therefore, methylene chloride is not considered an issue at AOC 613 and does not need remedial action or further investigation.

2.3 Natural Attenuation Indicator Parameters

Parameters indicative of natural attenuation and biological activity were measured in the groundwater in the 2002 sampling events, and the UST Site 22 monitoring wells. Alkalinity, methane, dissolved iron, dissolved oxygen (DO), chlorides, nitrates, and sulfates were analyzed on selected samples. A summary of these parameters is presented in Table 2-3.

A review of concentrations of indicator parameters of natural attenuation in Table 2-3 show several important aspects regarding the hydrogeochemistry of the site. Of particular interest are the elevated iron concentrations in groundwater, ranging from approximately 1 to 42 milligrams per liter (mg/L). Such elevated iron levels are an indicator of iron-reducing conditions. Iron-reducing conditions have been found to be prevalent across much of the CNC. The data suggest that iron-reduction is most likely the predominant terminal electron accepting process (TEAP) in groundwater in this area. While iron-reducing conditions are not optimal for anaerobic dehalogenation of PCE and TCE, these conditions are favorable for continued biodegradation of DCE and vinyl chloride. Thus, it is expected that the decreases in CVOC concentrations previously observed will continue to occur at the site.

A general trend of decreasing methane concentrations is also notable in the data, perhaps indicating the any residual hydrocarbons associated with the former UST site have degraded. Oxidation-reduction potential (ORP) also appears fairly stable, in the range of

–140 to +130, with an average near –30 (slightly reducing). DO levels are low, generally less than 1.5.

2.4 Conclusions and Recommendations

2.4.1 CVOCs

No CVOC source area in groundwater has been identified at AOC 613. Elevated CVOC concentrations reported from a single groundwater screening sample collected in 1996 were not confirmed in subsequent samples from the area. The CVOCs in the dissolved plume area at AOC 613, located between Buildings 242 and 255, appear to have undergone natural biodegradation to such an extent that PCE, TCE, and 1,2-DCE have been reduced to below MCLs. The vinyl chloride concentration is likewise decreasing, although at a lower rate.

Groundwater at the two isolated areas in which vinyl chloride had been previously detected above its MCL, north and south of Building 242, was resampled. Evidence of CVOCs were detected in the groundwater (traces of degradation products) at concentrations less than the MCLs, indicating that natural attenuation had occurred at these locations. The groundwater at these locations has concentrations within State of South Carolina standards, and these two areas are recommended for NFA.

2.4.2 Methylene Chloride

Data from the sixth sample collected from monitoring well FGELGW014 for the AOC 613 RFI indicated a methylene chloride concentration of 83 $\mu g/L$, compared to the EPA Region III tap water RBC of 4.1 $\mu g/L$ and the previous five non-detects. This well was resampled for the Phase I IM, resulting in an estimated methylene chloride concentration of 1.9 $\mu g/L$. It is concluded that the previous elevated concentration was an anomaly and that methylene chloride is not a COC at AOC 613.

2.4.3 Natural Attenuation

The geochemical data suggest that iron-reducing conditions are present in groundwater at AOC 613 in the area of interest. These conditions are favorable for continued natural biodegradation of the CVOCs. TCE concentrations have been progressively reduced in groundwater to levels less than the MCL, indicating that natural attenuation is occurring. The prevalence of cis-1,2-DCE generally indicates reductive dechlorination of TCE (*Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water*, EPA/600/R-98/128, October 1998) and cis-1,2-DCE has also been reduced to less than the MCL. The data suggest that significant decreases in CVOC concentrations in groundwater have occurred over the past few years. It is expected that additional reductions will continue to naturally occur.

TABLE 2-1
Chlorinated Volatile Organic Compounds (CVOCs) in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
PCE	F613GW003	5	U	06/22/2001	5
	F613GW004	0.35	J	06/22/2001	
	F613GW004	0.42	J	07/01/2002	
	F613GW004	5	U	10/31/2002	
	F613GW009	5	U	06/22/2001	
	F613GW009	5	UJ	07/01/2002	
	F613GW009	5	U	10/31/2002	
	F613GW010	5	U	08/05/2002	
	F613GW010	5	U	10/31/2002	
	F613GW011	5	U	08/05/2002	
	F613GW011	5	U	10/31/2002	
	FGELGW007	1.9	J	10/31/2002	
	FGELGW008	5	U	10/31/2002	
	FGELGW011	5	UJ	07/01/2002	
	FGELGW012	5	U	06/22/2001	
	FGELGW012	5	UJ	07/01/2002	
	FGELGW012	5	U	10/31/2002	
	FU22GW001	5	U	05/21/2001	
	FU22GW001	5	U	10/31/2002	
	FU22GW002	5	U	05/21/2001	
	FU22GW002	5	UJ	07/01/2002	
	FU22GW002	5	U	10/31/2002	
	FU22GW003	5	U	05/21/2001	
	FU22GW003	5	U	10/31/2002	
	FU22GW004	5	U	05/21/2001	
	FU22GW004	0.74	J	10/31/2002	
	FU22GW005	5	U	05/21/2001	
	FU22GW005	5	U	10/31/2002	
	FU22GW006	5	U	05/21/2001	
	FU22GW006	0.44	J	10/31/2002	

TABLE 2-1
Chlorinated Volatile Organic Compounds (CVOCs) in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
PCE	FU22GW007	5	U	05/21/2001	5
	FU22GW007	5	U	07/01/2002	
	FU22GW007	5	U	10/31/2002	
	F613GP069				
	(8 - 12 ft bls)	5	U	07/10/2002	
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP070				
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP071				
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP072				
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP073				
	(20 - 24 ft bls)	5	U	07/10/2002	
TCE	F613GW003	5	U	06/22/2001	5
	F613GW004	4	J	06/22/2001	
	F613GW004	3.4	J	07/01/2002	
	F613GW004	0.86	J	10/31/2002	
	F613GW009	5	U	06/22/2001	
	F613GW009	5	UJ	07/01/2002	
	F613GW009	5	U	10/31/2002	
	F613GW010	5	U	08/05/2002	
	F613GW010	5	U	10/31/2002	
	F613GW011	5	U	08/05/2002	
	F613GW011	5	U	10/31/2002	
	FGELGW007	5	U	10/31/2002	
	FGELGW008	5	U	10/31/2002	
	FGELGW011	5	UJ	07/01/2002	
	FGELGW012	5	U	06/22/2001	
	FGELGW012	5	UJ	07/01/2002	

TABLE 2-1
Chlorinated Volatile Organic Compounds (CVOCs) in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
TCE	FGELGW012	5	U	10/31/2002	5
	FU22GW001	5	U	05/21/2001	
	FU22GW001	5	U	10/31/2002	
	FU22GW002	0.8	J	05/21/2001	
	FU22GW002	5	UJ	07/01/2002	
	FU22GW002	5	U	10/31/2002	
	FU22GW003	0.81	J	05/21/2001	
	FU22GW003	0.4	J	10/31/2002	
	FU22GW004	1.1	J	05/21/2001	
	FU22GW004	0.75	J	10/31/2002	
	FU22GW005	5	U	05/21/2001	
	FU22GW005	5	U	10/31/2002	
	FU22GW006	5	U	05/21/2001	
	FU22GW006	0.69	J	10/31/2002	
	FU22GW007	0.91	J	05/21/2001	
	FU22GW007	1	J	07/01/2002	
	FU22GW007	0.91	J	10/31/2002	
	F613GP069			07/10/2002	
	(8 - 12 ft bls)	0.4	J	07/10/2002	
	(20 - 24 ft bls)	5	U		
	F613GP070			07/10/2002	
	(20 - 24 ft bls)	5	U		
	F613GP071			07/10/2002	
	(20 - 24 ft bls)	5	U		
	F613GP072			07/10/2002	
	(20 - 24 ft bls)	5	U		
	F613GP073			07/10/2002	
	(20 - 24 ft bls)	5	U		
cis-1,2-DCE	F613GW003	5	U	06/22/2001	70
	F613GW004	**83.6**	=	06/22/2001	

TABLE 2-1
Chlorinated Volatile Organic Compounds (CVOCs) in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
cis-1,2-DCE	F613GW004	74.6	J	07/01/2002	70
	F613GW004	43.8	=	10/31/2002	
	F613GW009	5	U	06/22/2001	
	F613GW009	5	UJ	07/01/2002	
	F613GW009	5	U	10/31/2002	
	F613GW010	1.5	J	08/05/2002	
	F613GW010	1.4	J	10/31/2002	
	F613GW011	5	U	08/05/2002	
	F613GW011	5	U	10/31/2002	
	FGELGW007	5	U	10/31/2002	
	FGELGW008	5	U	10/31/2002	
	FGELGW011	5	UJ	07/01/2002	
	FGELGW012	1.8	J	06/22/2001	
	FGELGW012	0.57	J	07/01/2002	
	FGELGW012	0.62	J	10/31/2002	
	FU22GW001	5	U	05/21/2001	
	FU22GW001	5	U	10/31/2002	
	FU22GW002	3.6	J	05/21/2001	
	FU22GW002	3.8	J	07/01/2002	
	FU22GW003	8.2	=	05/21/2001	
	FU22GW003	3.2	J	10/31/2002	
	FU22GW004	2	J	05/21/2001	
	FU22GW004	1.2	J	10/31/2002	
	FU22GW005	5	U	05/21/2001	
	FU22GW005	5	U	10/31/2002	
	FU22GW006	5.4	=	05/21/2001	
	FU22GW006	3	J	10/31/2002	
	FU22GW007	5	U	05/21/2001	
	FU22GW007	5	UJ	07/01/2002	
	FU22GW007	5	U	10/31/2002	

TABLE 2-1
Chlorinated Volatile Organic Compounds (CVOCs) in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
cis-1,2-DCE	F613GP069	1.6	J	07/10/2002	70
	(8 - 12 ft bls)				
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP070				
	(20 - 24 ft bls)	0.9	J	07/10/2002	
	F613GP071				
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP072				
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP073				
	(20 - 24 ft bls)	5	U	07/10/2002	
trans-1,2-DCE	F613GW003	5	U	06/22/2001	100
	F613GW004	0.9	J	06/22/2001	
	F613GW004	0.9	J	07/01/2002	
	F613GW004	0.4	J	10/31/2002	
	F613GW009	5	U	06/22/2001	
	F613GW009	5	UJ	07/01/2002	
	F613GW009	5	U	10/31/2002	
	F613GW010	5	U	08/05/2002	
	F613GW010	5	U	10/31/2002	
	F613GW011	5	U	08/05/2002	
	F613GW011	5	U	10/31/2002	
	FGELGW007	5	U	10/31/2002	
	FGELGW008	5	U	10/31/2002	
	FGELGW011	5	UJ	07/01/2002	
	FGELGW012	5	U	06/22/2001	
	FGELGW012	5	UJ	07/01/2002	
	FGELGW012	5	U	10/31/2002	
	FU22GW001	5	U	05/21/2001	
	FU22GW001	5	U	10/31/2002	

TABLE 2-1
Chlorinated Volatile Organic Compounds (CVOCs) in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
trans-1,2-DCE	FU22GW002	5	U	05/21/2001	100
	FU22GW002	5	UJ	07/01/2002	
	FU22GW002	5	U	10/31/2002	
	FU22GW003	5	U	05/21/2001	
	FU22GW003	5	U	10/31/2002	
	FU22GW004	5	U	05/21/2001	
	FU22GW004	5	U	10/31/2002	
	FU22GW005	5	U	05/21/2001	
	FU22GW005	5	U	10/31/2002	
	FU22GW006	5	U	05/21/2001	
	FU22GW006	5	U	10/31/2002	
	FU22GW007	5	U	05/21/2001	
	FU22GW007	5	UJ	07/01/2002	
	FU22GW007	5	U	10/31/2002	
	F613GP069	5	U		
	(8 - 12 ft bls)	5	U	07/10/2002	
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP070				
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP071				
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP072				
	(20 - 24 ft bls)	5	U	07/10/2002	
	F613GP073				
	(20 - 24 ft bls)	5	U	07/10/2002	
Vinyl Chloride	F613GW003	10	U	06/22/2001	2
	F613GW004	**10.8**	=	06/22/2001	
	F613GW004	**10.2**	J	07/01/2002	
	F613GW004	**11.2**	=	10/31/2002	
	F613GW009	10	U	06/22/2001	

TABLE 2-1
Chlorinated Volatile Organic Compounds (CVOCs) in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
Vinyl Chloride	F613GW009	10	UJ	07/01/2002	2
	F613GW009	10	U	10/31/2002	
	F613GW010	0.7	J	08/05/2002	
	F613GW010	10	U	10/31/2002	
	F613GW011	1	U	08/05/2002	
	F613GW011	10	U	10/31/2002	
	FGELGW007	10	U	10/31/2002	
	FGELGW008	10	U	10/31/2002	
	FGELGW011	10	UJ	07/01/2002	
	FGELGW012	10	U	06/22/2001	
	FGELGW012	10	UJ	07/01/2002	
	FGELGW012	10	U	10/31/2002	
	FU22GW001	10	U	05/21/2001	
	FU22GW001	10	U	10/31/2002	
	FU22GW002	**4.5**	J	05/21/2001	
	FU22GW002	**3.8**	J	07/01/2002	
	FU22GW002	**4.2**	J	10/31/2002	
	FU22GW003	**14**	=	05/21/2001	
	FU22GW003	**5.6**	J	10/31/2002	
	FU22GW004	0.86	J	05/21/2001	
	FU22GW004	10	U	10/31/2002	
	FU22GW005	10	U	05/21/2001	
	FU22GW005	10	U	10/31/2002	
	FU22GW006	**6**	J	05/21/2001	
	FU22GW006	**4.2**	J	10/31/2002	
	FU22GW007	10	U	05/21/2001	
	FU22GW007	10	UJ	07/01/2002	
	FU22GW007	10	U	10/31/2002	
	F613GP069 (8 - 12 ft bls)	10	U	07/10/2002	

TABLE 2-1
Chlorinated Volatile Organic Compounds (CVOCs) in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
Vinyl Chloride	(20 - 24 ft bls)	10	U	07/10/2002	2
	F613GP070				
	(20 - 24 ft bls)	10	U	07/10/2002	
	F613GP071				
	(20 - 24 ft bls)	10	U	07/10/2002	
	F613GP072				
	(20 - 24 ft bls)	10	U	07/10/2002	
	F613GP073				
	(20 - 24 ft bls)	10	U	07/10/2002	

Concentrations in bold and outlined within the text are exceedances of the screening criterion.
Values are presented in units of micrograms per liter (µg/L).
[a] Maximum Contaminant Levels obtained from the EPA National Primary Drinking Water Standards (March 2001).

= Analyte was detected; the reported value is equal to the sample location.
ft bls Feet below land surface
J Analyte was detected; the reported value is an estimated concentration.
U Analyte was not detected; the reported value is the detection limit.
UJ Analyte was not detected; the reported value is an estimated detection limit.

TABLE 2-2
Reduction of CVOCs in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
TCE	F613GW004	4	J	06/22/2001	5
	F613GW004	3.4	J	07/01/2002	
	F613GW004	0.86	J	10/31/2002	
	FGELGW012	5	U	06/22/2001	
	FGELGW012	5	UJ	07/01/2002	
	FGELGW012	5	U	10/31/2002	
	FU22GW002	0.8	J	05/21/2001	
	FU22GW002	5	UJ	07/01/2002	
	FU22GW002	5	U	10/31/2002	
	FU22GW003	0.81	J	05/21/2001	
	FU22GW003	0.4	J	10/31/2002	
	FU22GW004	1.1	J	05/21/2001	
	FU22GW004	0.75	J	10/31/2002	
	FU22GW006	5	U	05/21/2001	
	FU22GW006	0.69	J	10/31/2002	
cis-1,2-DCE	F613GW004	**83.6**	=	06/22/2001	70
	F613GW004	**74.6**	J	07/01/2002	
	F613GW004	43.8	=	10/31/2002	
	FGELGW012	1.8	J	06/22/2001	
	FGELGW012	0.57	J	07/01/2002	
	FGELGW012	0.62	J	10/31/2002	
	FU22GW002	3.6	J	05/21/2001	
	FU22GW002	3.8	J	07/01/2002	
	FU22GW002	3.1	J	10/31/2002	
	FU22GW003	8.2	=	05/21/2001	
	FU22GW003	3.2	J	10/31/2002	
	FU22GW004	2	J	05/21/2001	
	FU22GW004	1.2	J	10/31/2002	
	FU22GW006	5.4	=	05/21/2001	
	FU22GW006	3	J	10/31/2002	

TABLE 2-2
Reduction of CVOCs in AOC 613 Groundwater (2001-2002 Sampling Events)
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Analyte	Sample Location	Concentration (µg/L)	Qualifier	Date Collected	MCL[a]
Vinyl Chloride	F613GW004	**10.8**	=	06/22/2001	2
	F613GW004	**10.2**	J	07/01/2002	
	F613GW004	**11.2**	=	10/31/2002	
	FGELGW012	10	U	06/22/2001	
	FGELGW012	10	UJ	07/01/2002	
	FGELGW012	10	U	10/31/2002	
	FU22GW002	**4.5**	J	05/21/2001	
	FU22GW002	**3.8**	J	07/01/2002	
	FU22GW002	**4.2**	J	10/31/2002	
	FU22GW003	**14**	=	05/21/2001	
	FU22GW003	**5.6**	J	10/31/2002	
	FU22GW004	0.86	J	05/21/2001	
	FU22GW004	10	U	10/31/2002	
	FU22GW006	**6**	J	05/21/2001	
	FU22GW006	**4.2**	J	10/31/2002	

Concentrations in bold and outlined within the text are exceedances of the screening criterion.

Values are presented in units of micrograms per liter (µg/L).

[a] Maximum Contaminant Levels obtained from the EPA National Primary Drinking Water Standards (March 2001).

= Analyte was detected; the reported value is equal to the sample location.

ft bls Feet below land surface

J Analyte was detected; the reported value is an estimated concentration.

U Analyte was not detected; the reported value is the detection limit.

UJ Analyte was not detected; the reported value is an estimated detection limit.

TABLE 2-3
Natural Attenuation Indicator Parameters
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Parameter	Sample Location	Concentration	Qualifier	Units	Date Collected
Alkalinity, Total (as CaCO3)	F613GW004	463	=	mg/L	07/01/2002
	FGELGW012	29.6	U		07/01/2002
	FU22GW001	198	=		11/15/2000
	FU22GW001	237	J		11/12/2001
	FU22GW002	353	=		11/15/2000
	FU22GW002	120	=		05/21/2001
	FU22GW002	446	J		11/12/2001
	FU22GW002	296	=		07/01/2002
	FU22GW003	79.2			09/21/1999
	FU22GW003	166	=		11/15/2000
	FU22GW003	200	=		05/21/2001
	FU22GW003	194	J		11/12/2001
	FU22GW004	19.7			09/21/1999
	FU22GW004	2	U		11/15/2000
	FU22GW004	12.8	J		11/12/2001
	FU22GW005	345	=		11/15/2000
	FU22GW005	459	J		11/12/2001
	FU22GW006	116			09/21/1999
	FU22GW006	129	=		11/15/2000
	FU22GW006	115	J		11/12/2001
	FU22GW007	378	=		11/15/2000
	FU22GW007	413	J		11/12/2001
	FU22GW007	483	=		07/01/2002
Chloride	F613GW004	284	=	mg/L	07/01/2002
	FGELGW012	638	=		07/01/2002
	FU22GW002	639	=		07/01/2002
	FU22GW007	2,000	=		07/01/2002
Nitrate (as Nitrous Oxide)	FU22GW001	102	=	µg/L	11/15/2000
	FU22GW001	50	U		11/12/2001
	FU22GW002	50	U		11/15/2000
	FU22GW002	50	U		11/12/2001
	FU22GW003	50	U		11/15/2000

TABLE 2-3
Natural Attenuation Indicator Parameters
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Parameter	Sample Location	Concentration	Qualifier	Units	Date Collected
Nitrate (as Nitrous Oxide)	FU22GW003	115	=	µg/L	11/12/2001
	FU22GW004	50	U		11/15/2000
	FU22GW004	50	U		11/12/2001
	FU22GW005	50	U		11/15/2000
	FU22GW005	221	=		11/12/2001
	FU22GW006	50	U		11/15/2000
	FU22GW006	115	=		11/12/2001
	FU22GW007	50	U		11/15/2000
	FU22GW007	66	=		11/12/2001
Nitrogen, Nitrate (as N)	F613GW004	100	U	µg/L	10/31/2002
	F613GW009	100	U		10/31/2002
	FGELGW008	100	U		10/31/2002
	FGELGW012	100	U		10/31/2002
	FU22GW002	100	UJ		05/21/2001
	FU22GW002	100	U		10/31/2002
	FU22GW003	100	UJ		05/21/2001
	FU22GW003	100	U		10/31/2002
	FU22GW006	100	U		10/31/2002
pH	F613GW004	6.08		SU	07/01/2002
	F613GW004	4.69			10/31/2002
	F613GW009	6.26			07/01/2002
	F613GW009	4.92			10/31/2002
	FGELGW012	4.76			07/01/2002
	FGELGW012	4.83			10/31/2002
	FU22GW001	6.34			09/10/1999
	FU22GW001	6.6			11/15/2000
	FU22GW001	6.72			11/12/2001
	FU22GW001	4.84			10/31/2002
	FU22GW002	6.04			09/10/1999
	FU22GW002	6.11			11/15/2000
	FU22GW002	6.57			11/12/2001
	FU22GW002	5.61			07/01/2002

TABLE 2-3
Natural Attenuation Indicator Parameters
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Parameter	Sample Location	Concentration	Qualifier	Units	Date Collected
pH	FU22GW002	4.77		SU	10/31/2002
	FU22GW003	5.56			09/10/1999
	FU22GW003	6.04			11/15/2000
	FU22GW003	6.71			11/12/2001
	FU22GW003	6.15			10/31/2002
	FU22GW004	4.47			09/10/1999
	FU22GW004	4.42			11/15/2000
	FU22GW004	6.13			11/12/2001
	FU22GW004	4.42			10/31/2002
	FU22GW005	5.94			09/10/1999
	FU22GW005	6.48			11/15/2000
	FU22GW005	4.92			11/12/2001
	FU22GW005	6.49			10/31/2002
	FU22GW006	5.72			09/10/1999
	FU22GW006	5.79			11/15/2000
	FU22GW006	6.69			11/12/2001
	FU22GW006	4.84			10/31/2002
	FU22GW007	8.45			09/10/1999
	FU22GW007	7.2			11/15/2000
	FU22GW007	5.84			11/12/2001
	FU22GW007	6.58			07/01/2002
	FU22GW007	5.04			10/31/2002
Sulfate (as SO4)	F613GW004	89.8	=	mg/L	10/31/2002
	F613GW009	216	=		10/31/2002
	FGELGW008	0.4	U		10/31/2002
	FGELGW012	226	=		10/31/2002
	FU22GW001	590	=		11/15/2000
	FU22GW001	685	=		11/12/2001
	FU22GW002	76.9	=		11/15/2000
	FU22GW002	250	=		05/21/2001
	FU22GW002	42.4	=		11/12/2001
	FU22GW002	39.3	=		10/31/2002
	FU22GW003	604	=		11/15/2000

TABLE 2-3
Natural Attenuation Indicator Parameters
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Parameter	Sample Location	Concentration	Qualifier	Units	Date Collected
Sulfate (as SO4)	FU22GW003	730	=	mg/L	05/21/2001
	FU22GW003	679	=		11/12/2001
	FU22GW003	386	=		10/31/2002
	FU22GW004	337	=		11/15/2000
	FU22GW004	373	=		11/12/2001
	FU22GW005	158	=		11/15/2000
	FU22GW005	75	=		11/12/2001
	FU22GW006	262	=		11/15/2000
	FU22GW006	299	=		11/12/2001
	FU22GW006	283	=		10/31/2002
	FU22GW007	90.5	=		11/15/2000
	FU22GW007	86.4	=		11/12/2001
Methane	F613GW004	174	=	µg/L	10/31/2002
	F613GW009	146	=		10/31/2002
	FGELGW008	23,900	=		10/31/2002
	FGELGW012	15.5	J		10/31/2002
	FU22GW001	11,200	=		11/15/2000
	FU22GW001	780	=		11/12/2001
	FU22GW002	25,100	=		11/15/2000
	FU22GW002	390	=		05/21/2001
	FU22GW002	990	=		11/12/2001
	FU22GW002	1,880	=		10/31/2002
	FU22GW003	14,400	=		11/15/2000
	FU22GW003	990	=		05/21/2001
	FU22GW003	440	=		11/12/2001
	FU22GW003	1,460	=		10/31/2002
	FU22GW004	2,310	=		11/15/2000
	FU22GW004	61	=		11/12/2001
	FU22GW005	4,660	=		11/15/2000
	FU22GW005	130	=		11/12/2001
	FU22GW006	3,200	=		11/15/2000
	FU22GW006	97	=		11/12/2001
	FU22GW006	399	=		10/31/2002

TABLE 2-3
Natural Attenuation Indicator Parameters
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Parameter	Sample Location	Concentration	Qualifier	Units	Date Collected
Methane	FU22GW007	8,760	=	µg/L	11/15/2000
	FU22GW007	880	=		11/12/2001
Iron, Dissolved	FU22GW001	2.84	=	mg/L	11/15/2000
	FU22GW002	4.58	=		11/15/2000
	FU22GW003	42.3	=		11/15/2000
	FU22GW004	9.54	=		11/15/2000
	FU22GW005	7.74	=		11/15/2000
	FU22GW006	17.3	=		11/15/2000
	FU22GW007	2.45	=		11/15/2000
Iron (Ferrous)	F613GW004	3.6	J	mg/L	07/01/2002
	F613GW004	0.9	UJ		10/31/2002
	F613GW009	13.7	J		10/31/2002
	FGELGW008	1	J		10/31/2002
	FGELGW012	7.8	J		07/01/2002
	FGELGW012	8.3	J		10/31/2002
	FU22GW002	20	J		07/01/2002
	FU22GW002	3	J		10/31/2002
	FU22GW003	3.3			09/21/1999
	FU22GW003	20	J		10/31/2002
	FU22GW004	3.3			09/21/1999
	FU22GW006	3.3			09/21/1999
	FU22GW006	13.5	J		10/31/2002
	FU22GW007	3.8	J		11/12/2001
Dissolved Oxygen	F613GW004	3.34		mg/L	07/01/2002
	F613GW004	0.75			10/31/2002
	F613GW009	0			07/01/2002
	F613GW009	0.54			10/31/2002
	FGELGW012	10.1			07/01/2002
	FGELGW012	0			10/31/2002
	FU22GW001	1.48			09/10/1999
	FU22GW001	0.44			10/31/2002
	FU22GW002	0.65			09/10/1999

TABLE 2-3
Natural Attenuation Indicator Parameters
CMS Report, AOC 613, Zone F, Charleston Naval Complex

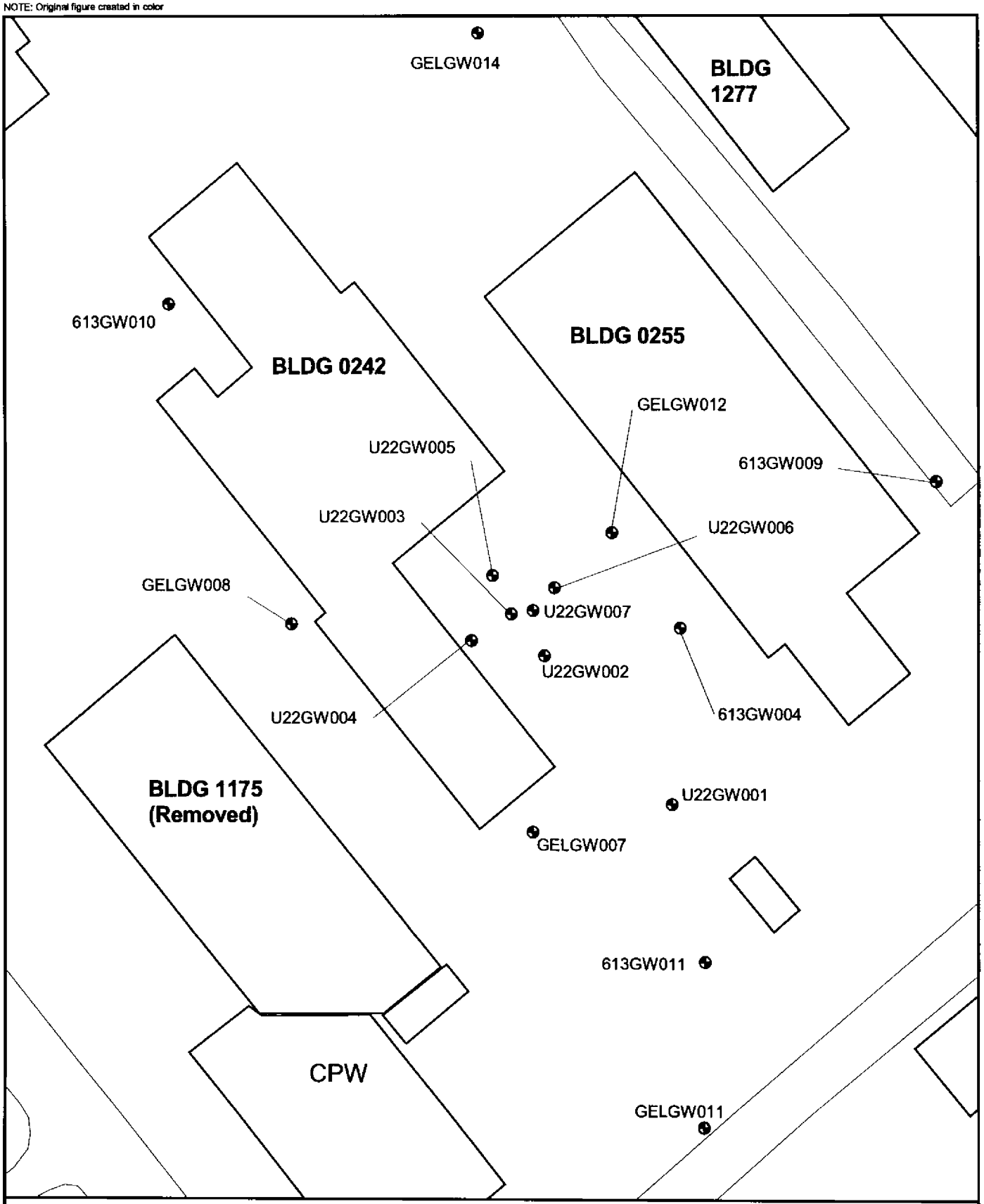
Parameter	Sample Location	Concentration	Qualifier	Units	Date Collected
Dissolved Oxygen	FU22GW002	11		mg/L	07/01/2002
	FU22GW002	0.63			10/31/2002
	FU22GW003	1.28			09/10/1999
	FU22GW003	0.8			09/21/1999
	FU22GW003	0			10/31/2002
	FU22GW004	1.05			09/10/1999
	FU22GW004	0.3			09/21/1999
	FU22GW004	0			10/31/2002
	FU22GW005	1.85			09/10/1999
	FU22GW005	0			10/31/2002
	FU22GW006	1.5			09/10/1999
	FU22GW006	1.0			09/21/1999
	FU22GW006	0.58			10/31/2002
	FU22GW007	3.42			09/10/1999
	FU22GW007	0.52			07/01/2002
	FU22GW007	0.66			10/31/2002
Carbon Dioxide	FU22GW003	384		mg/L	09/21/1999
	FU22GW004	500			09/21/1999
	FU22GW006	588			09/21/1999
ORP	F613GW004	-75			07/01/2002
	F613GW004	-2			10/31/2002
	F613GW009	-140			07/01/2002
	F613GW009	-83			10/31/2002
	FGELGW012	122			07/01/2002
	FGELGW012	127			10/31/2002
	FU22GW001	-51			10/31/2002
	FU22GW002	-24			07/01/2002
	FU22GW002	-71			10/31/2002
	FU22GW003	-129			10/31/2002
	FU22GW004	219			10/31/2002
	FU22GW005	-144			10/31/2002
	FU22GW006	23			10/31/2002

TABLE 2-3
Natural Attenuation Indicator Parameters
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Parameter	Sample Location	Concentration	Qualifier	Units	Date Collected
ORP	FU22GW007	-126			07/01/2002
	FU22GW007	-50			10/31/2002
Ethene	F613GW004	25	U	µg/L	10/31/2002
	F613GW009	25	U		10/31/2002
	FGELGW008	1,250	U		10/31/2002
	FGELGW012	25	U		10/31/2002
	FU22GW002	250	U		10/31/2002
	FU22GW003	250	U		10/31/2002
	FU22GW006	25	U		10/31/2002
Ethane	F613GW004	25	U	µg/L	10/31/2002
	F613GW009	25	U		10/31/2002
	FGELGW008	1,250	U		10/31/2002
	FGELGW012	25	U		10/31/2002
	FU22GW002	250	U		10/31/2002
	FU22GW003	250	U		10/31/2002
	FU22GW006	25	U		10/31/2002

= Analyte was detected; the reported value is equal to the sample location.
J Analyte was detected; the reported value is an estimated concentration.
µg/L Micrograms per liter
mg/L Milligrams per liter
ORP Oxidation-reduction potential
U Analyte was not detected; the reported value is the detection limit.
UJ Analyte was not detected; the reported value is an estimated detection limit.

NOTE: Original figure created in color



Groundwater Well
Roads
Buildings

N

0 80 160 Feet

1 inch = 80 feet

Figure 2-1

AOC 613 CMS Monitoring Wells

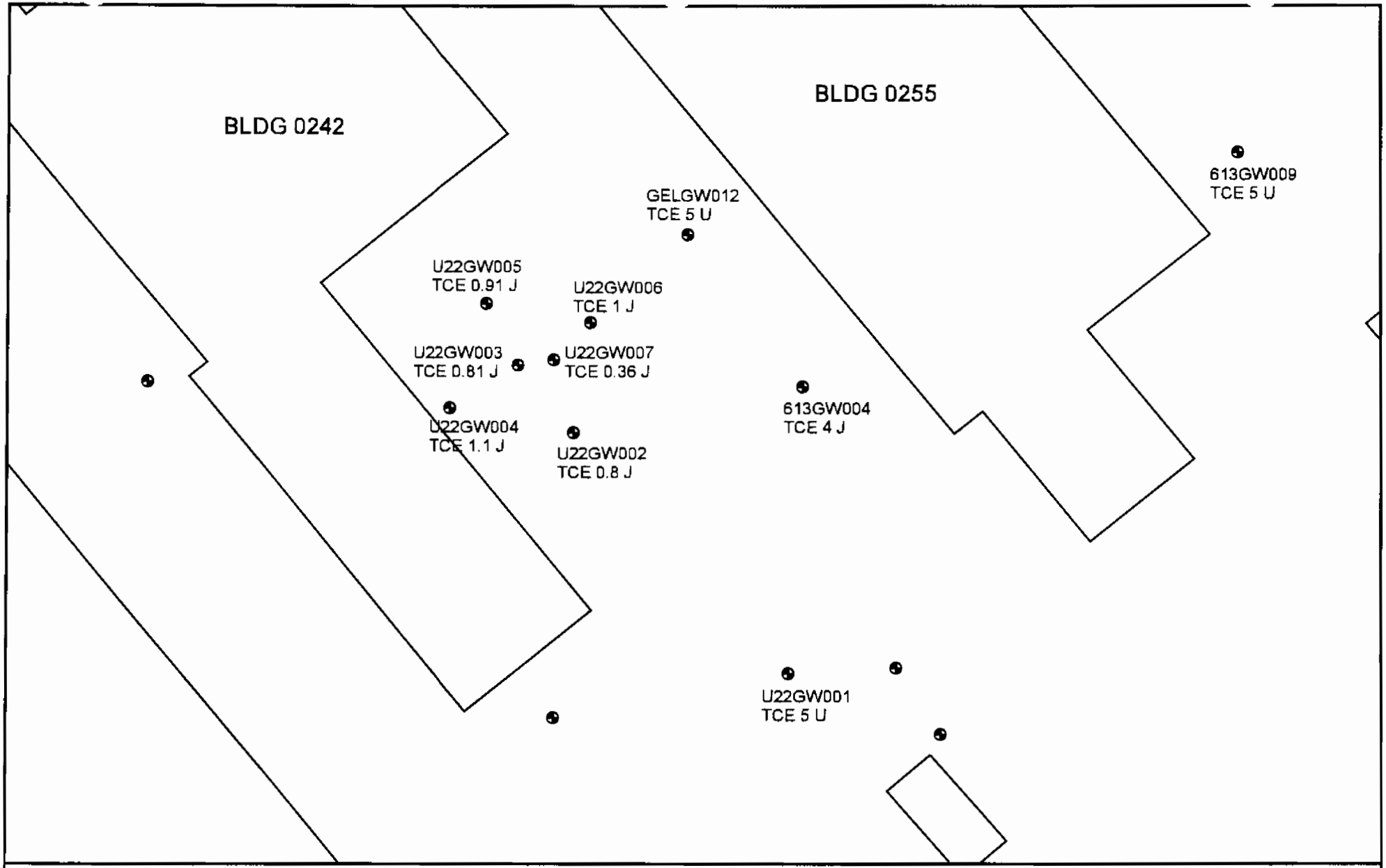
AOC 613 CMS

Charleston Naval Complex

CH2MHILL

File Path: d:\18gis\projects\zone_f\aoc_613_aoc_615_swmu_175\aprs\aoc613_fig2-1.apr, Date: 14 Jan 2003 11:32, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-1 OAC 613 CMS Monitoring Wells

NOTE: Original treated in color



Groundwater Well
Buildings

Note: MCL = 5 µg/L
All Concentration in µg/L
U= Not Detected
J= Estimated Concentration

N

0 50 100 Feet

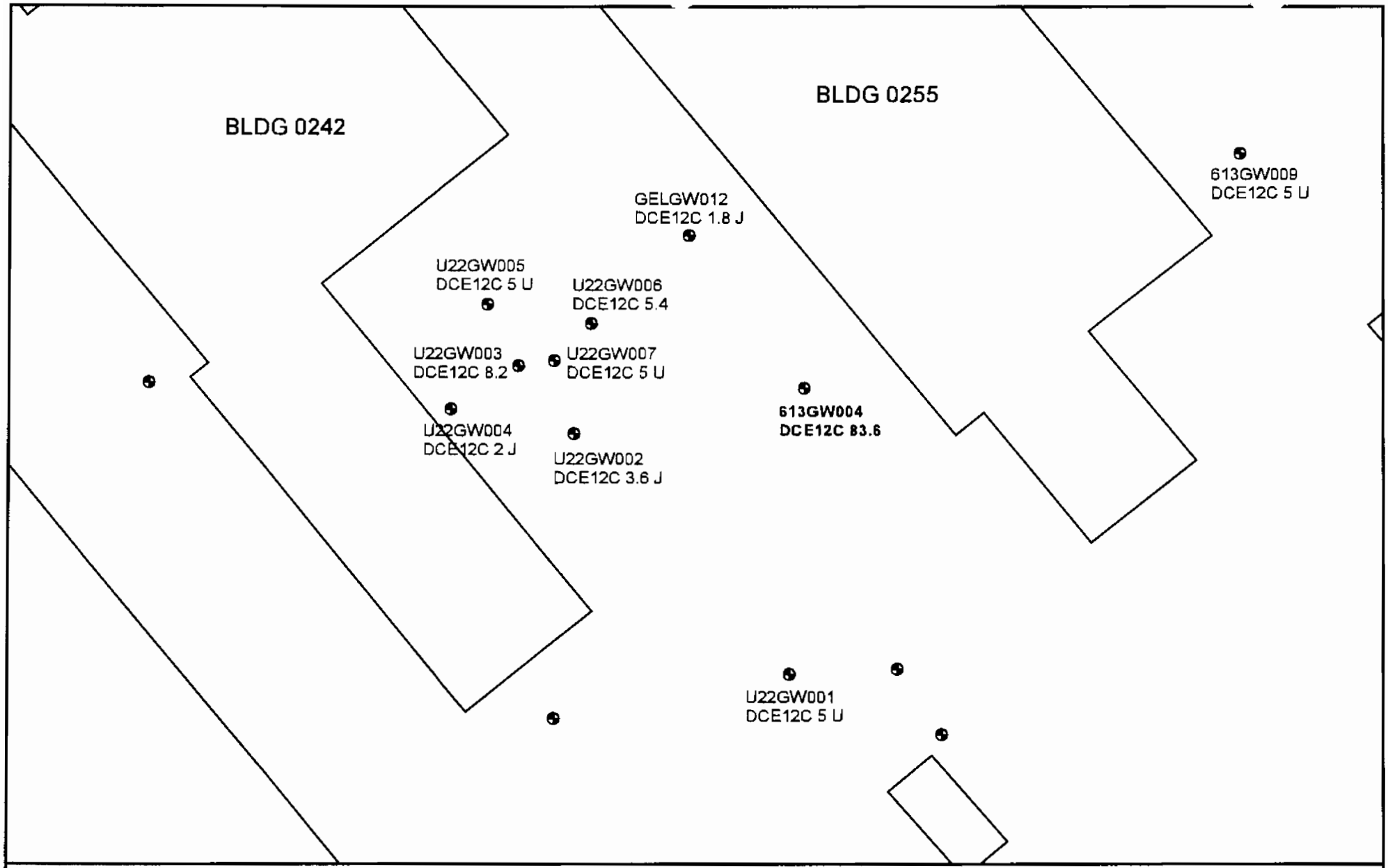
1 inch = 50 feet

Figure 2-2
2001 Data - TCE
AOC 613, CMS
Charleston Naval Complex

CH2MHILL

File Path: D:\16gis\Projects\Zone_F\Aoc_613_Aoc_615_Swmu_175\Aprs\aoc613_2001-02data.apr, Date: 12 Nov 2002 11:47, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-2 2001 Data - TCE

NOTE: Original created in color



Groundwater Well
Buildings

Note: Concentrations in bold exceed MCL = 70 µg/L
All Concentrations in µg/L
J= Estimated Concentration
U= Not Detected

N

0 50 100 Feet

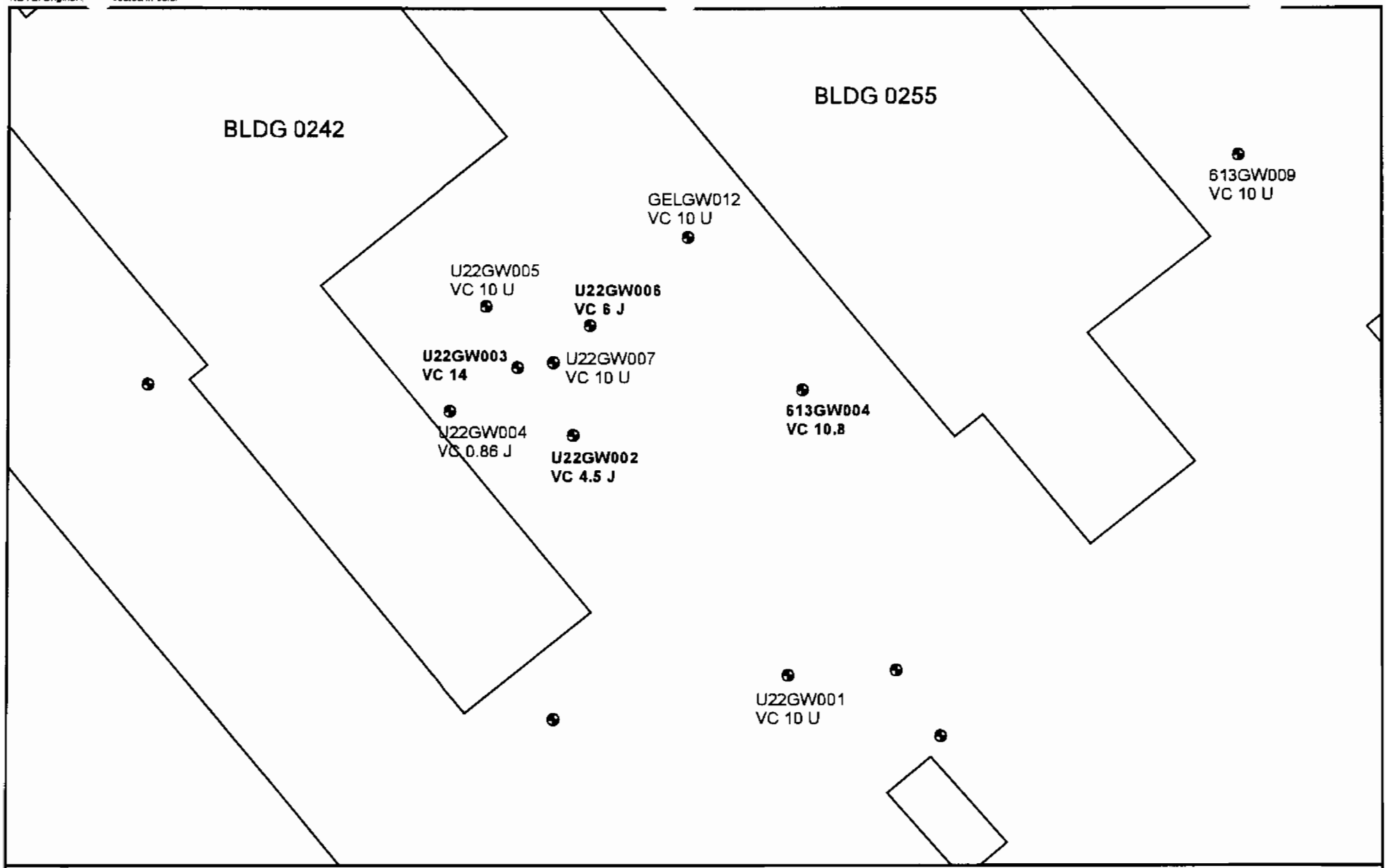
1 inch = 50 feet

Figure 2-3
2001 Data - cis-1,2,DCE
AOC 613, CMS
Charleston Naval Complex

CH2MHILL

File Path: D:\18gis\Projects\Zone_FV\aoc_613_Aoc_615_Swmu_175\Aprs\aoc613_2001-02data.apr, Date: 13 Nov 2002 12:21, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-3 2001 Data - cis-1,2 DCE

NOTE: Original is created in color



Groundwater Well
Buildings

Note: Concentrations in bold exceed MCL = 2 µg/L
All concentrations in µg/L
J= Estimated Concentration
U= Not Detected

N

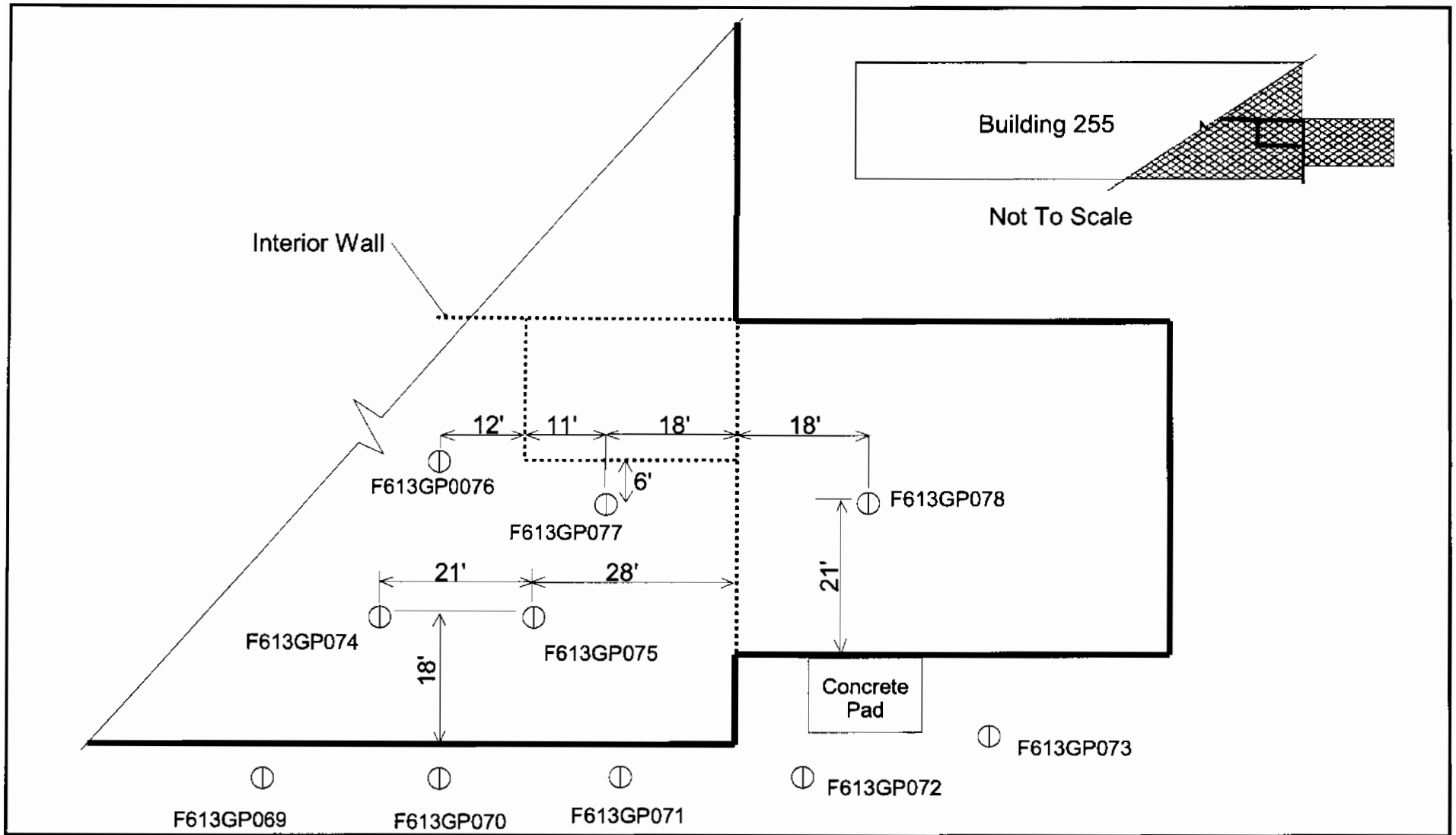
0 50 100 Feet

1 inch = 50 feet

Figure 2-4
2001 Data - Vinyl Chloride
AOC 613, CMS
Charleston Naval Complex

CH2MHILL

File Path: D:\16gis\Projects\Zone_F\Aoc_613_Aoc_615_Gwmu_175\Aprs\aoc613_2001-02data.apr, Date: 13 Nov 2002 12:10, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-4 2001 Data - Vinyl Chloride



Building 255
Interior Wall
Proposed Groundwater Sample Locations

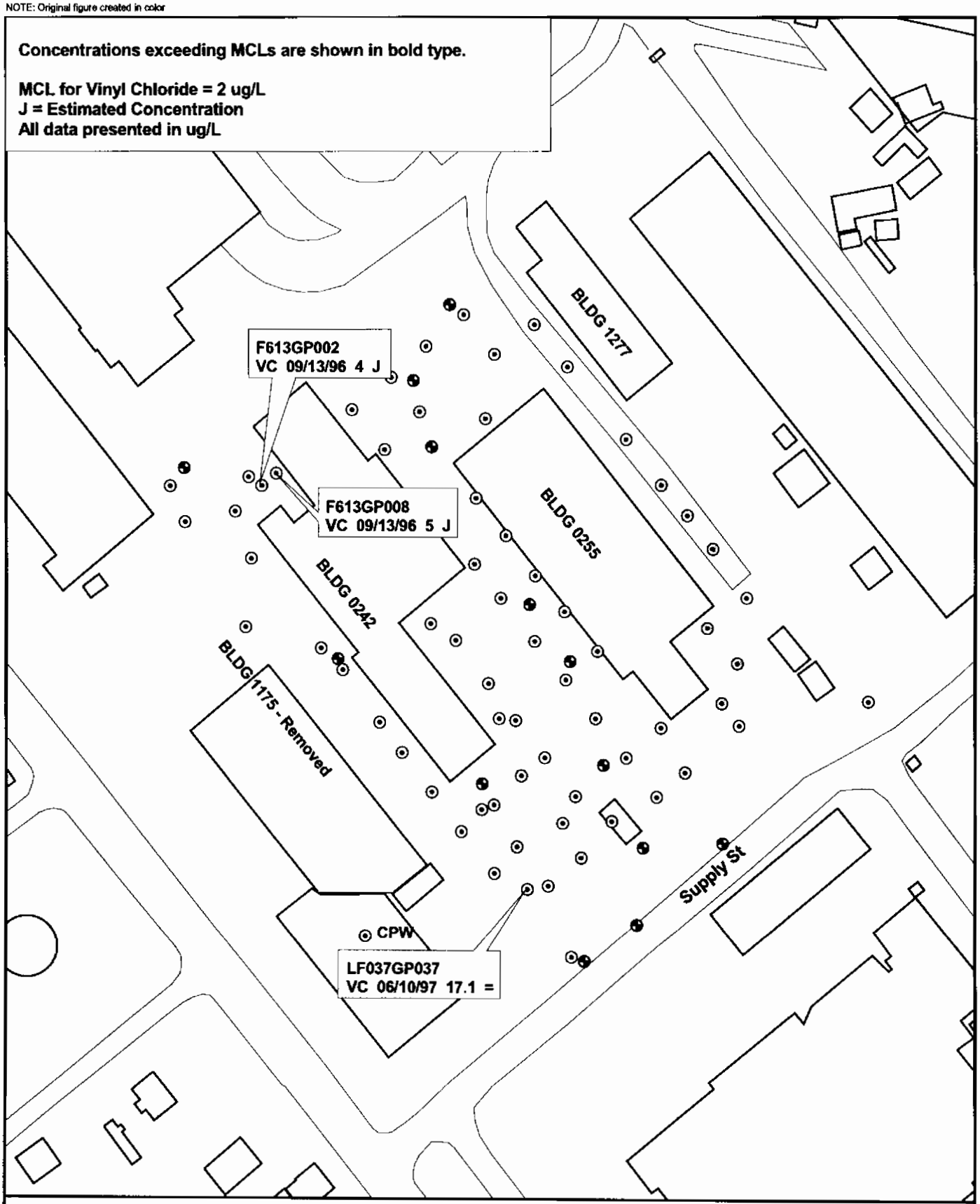
0 20 40 Feet
1 inch = 20 feet

Figure 2-5
Proposed Phase I IM Sample Locations
AOC 613, CMS
Charleston Naval Complex

CH2MHILL

File Path: c:\16gis\projects\zone_f\aoc_613\aprs\aoc613.apr, Date: 03 Jun 2002 12:59, User: AHOLECEK, CAD drawing - Figure 2-2 Proposed IM Vertical Profiling Locations

NOTE: Original figure created in color



Groundwater Probe
Groundwater Well
Roads
Buildings

N

0 100 200 Feet

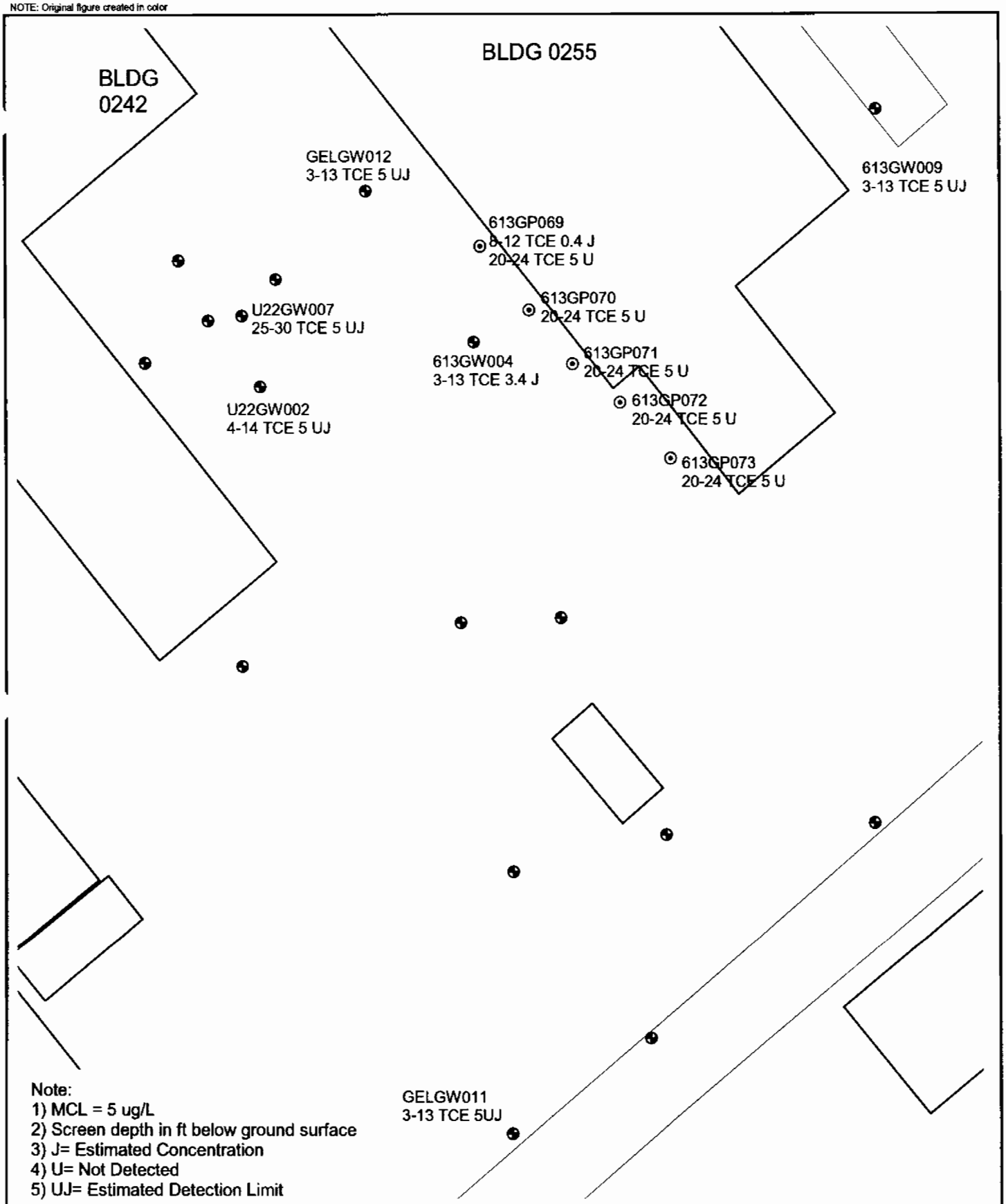
1 inch = 135 feet

Figure 2-6
Isolated Locations with
Vinyl Chloride Detections in Groundwater
AOC 613 CMS
Charleston Naval Complex

CH2MHILL

File Path: d:\18gis\projects\zone_f\aoc_613\aprs\aoc613_fig2.apr, Date: 10 Dec 2002 15:59, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2 Vinyl Chloride Detections in Groundwater

NOTE: Original figure created in color



Note:
1) MCL = 5 ug/L
2) Screen depth in ft below ground surface
3) J= Estimated Concentration
4) U= Not Detected
5) UJ= Estimated Detection Limit

Groundwater Probe
Groundwater Well
Buildings

N

0 50 100 Feet

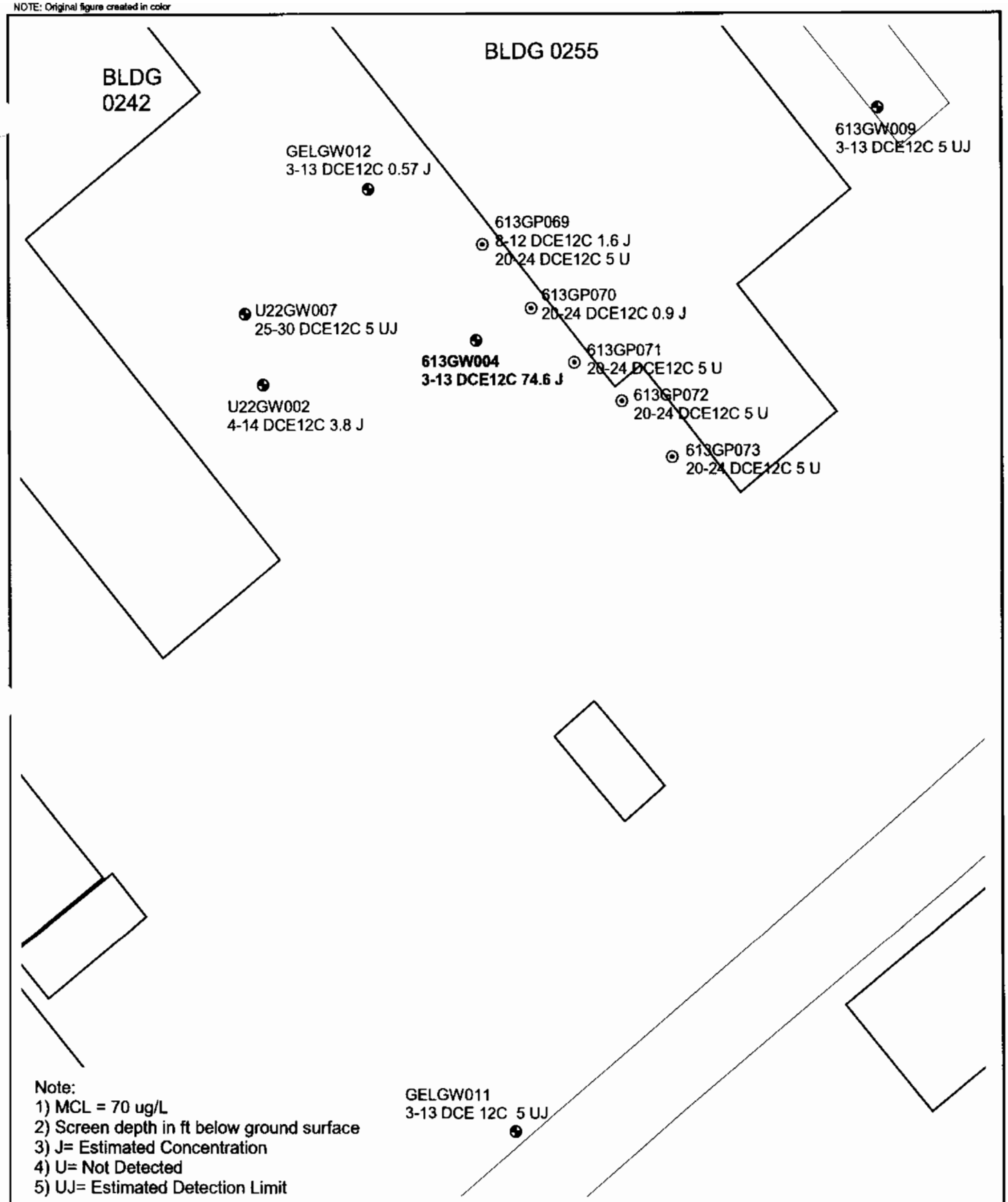
1 inch = 50 feet

Figure 2-7
July, 2002 Data - TCE
AOC 613, CMS
Charleston Naval Complex

File Path: d:\18gis\projects\zone_f\aoc_613_aoc_615_swmu_175\aprs\aoc613_fig2-7.apr, Date: 14 Jan 2003 11:58, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-7 2002 Data - TCE

CH2MHILL

NOTE: Original figure created in color



Note:
1) MCL = 70 ug/L
2) Screen depth in ft below ground surface
3) J= Estimated Concentration
4) U= Not Detected
5) UJ= Estimated Detection Limit

Groundwater Probe
Groundwater Well
Buildings

N

0 50 100 Feet

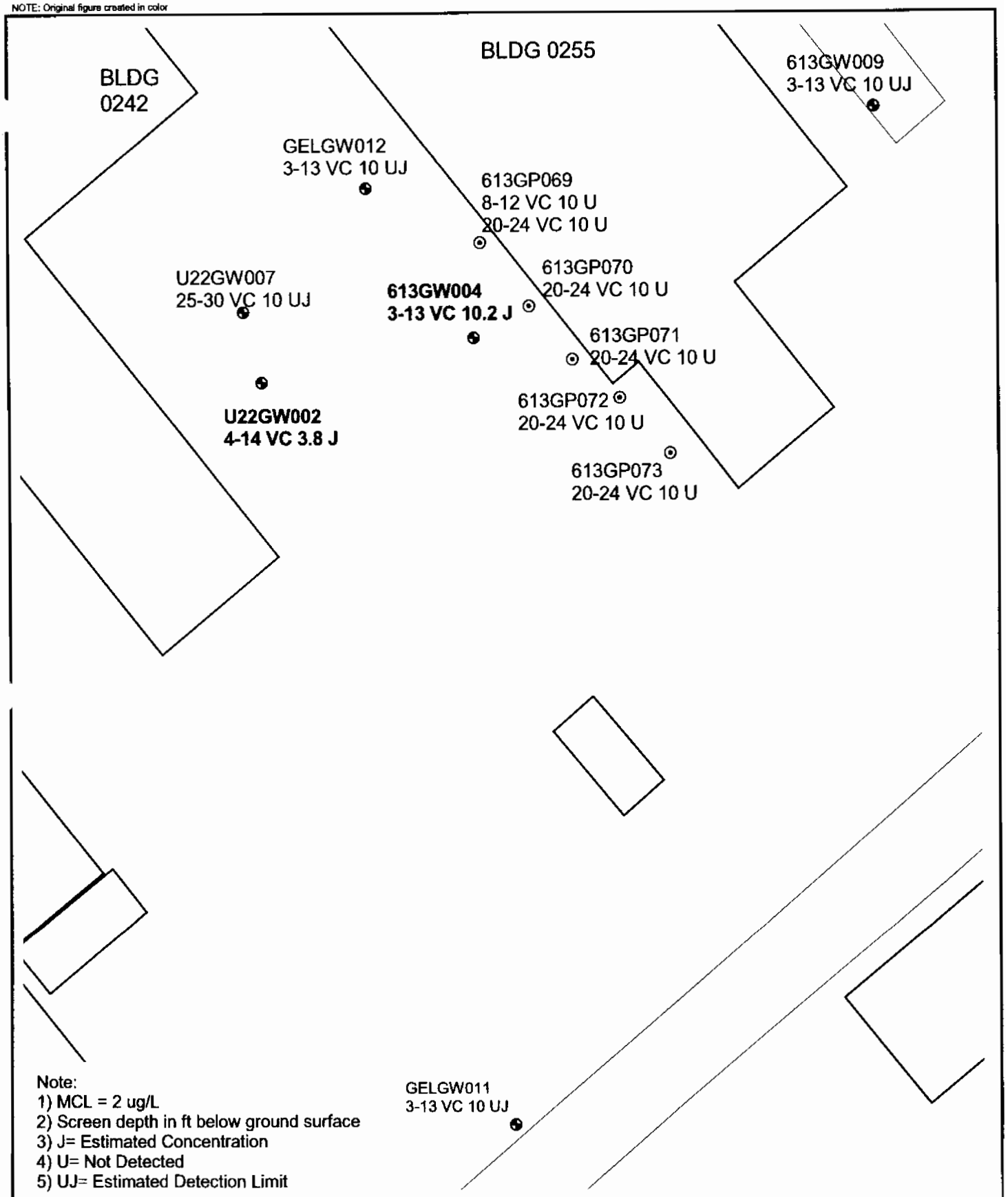
1 inch = 50 feet

Figure 2-8
July, 2002 Data - cis-1,2,DCE
AOC 613, CMS
Charleston Naval Complex

CH2MHILL

File Path: d:\18gis\projects\zone_f\aoc_613_aoc_615_swmu_175\aprs\aoc613_fig2-7.apr, Date: 14 Jan 2003 12:05, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-8 2002 Data - cis-1

NOTE: Original figure created in color



Note:
1) MCL = 2 ug/L
2) Screen depth in ft below ground surface
3) J= Estimated Concentration
4) U= Not Detected
5) UJ= Estimated Detection Limit

Groundwater Probe
Groundwater Well
Buildings

N

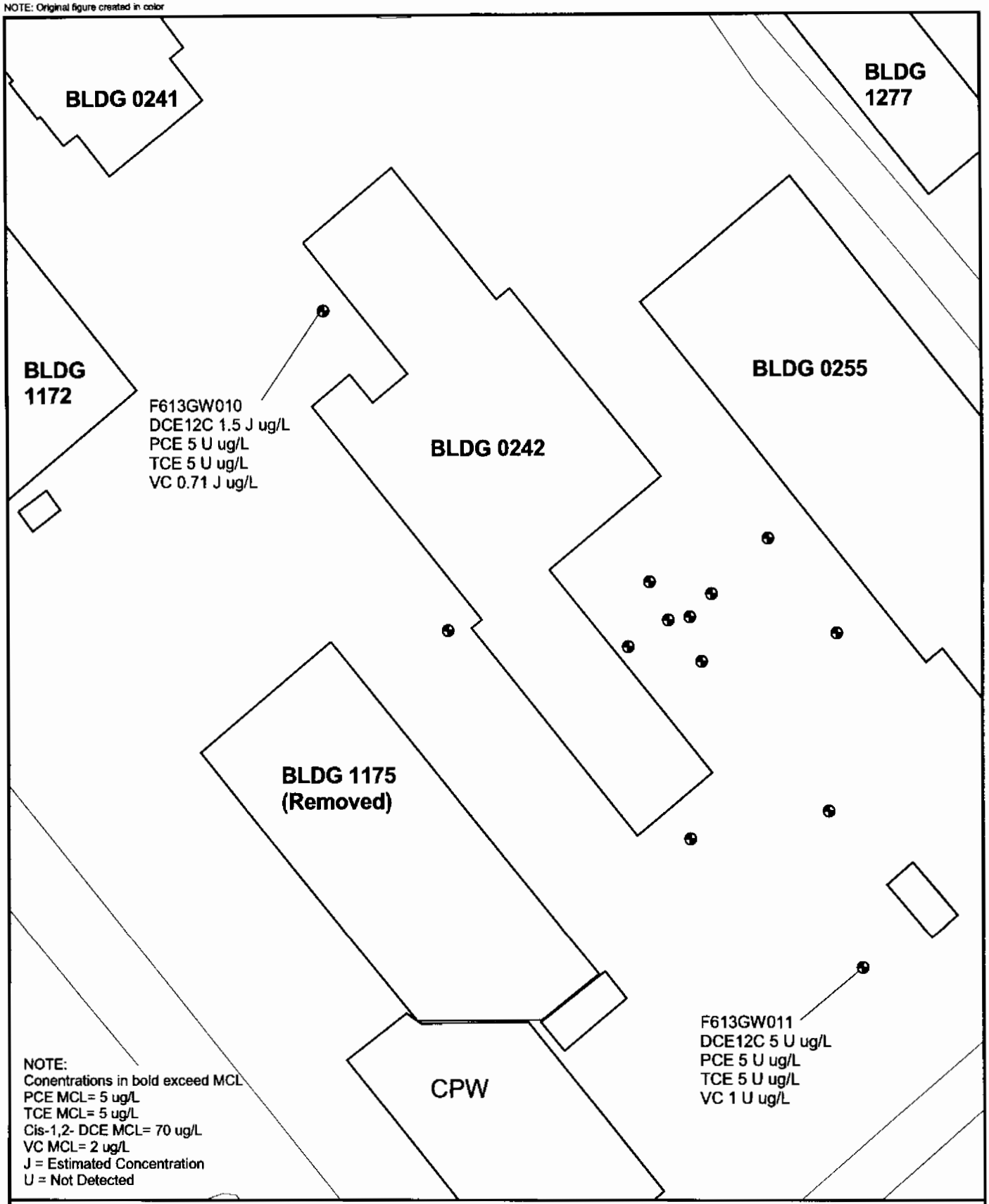
0 50 100 Feet

1 inch = 50 feet

Figure 2-9
July, 2002 Data - Vinyl Chloride
AOC 613, CMS
Charleston Naval Complex

File Path: d:\18gis\projects\zone_f\aoc_613_aoc_615_swmu_175\aprs\aoc613_fig2-9.apr, Date: 14 Jan 2003 13:41, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-9 2002 Data - Vinyl Chloride

NOTE: Original figure created in color



Groundwater Well
Roads
Buildings

N

0 80 160 Feet

1 inch = 80 feet

Figure 2-10

August 2002 CVOCs in Isolated Areas

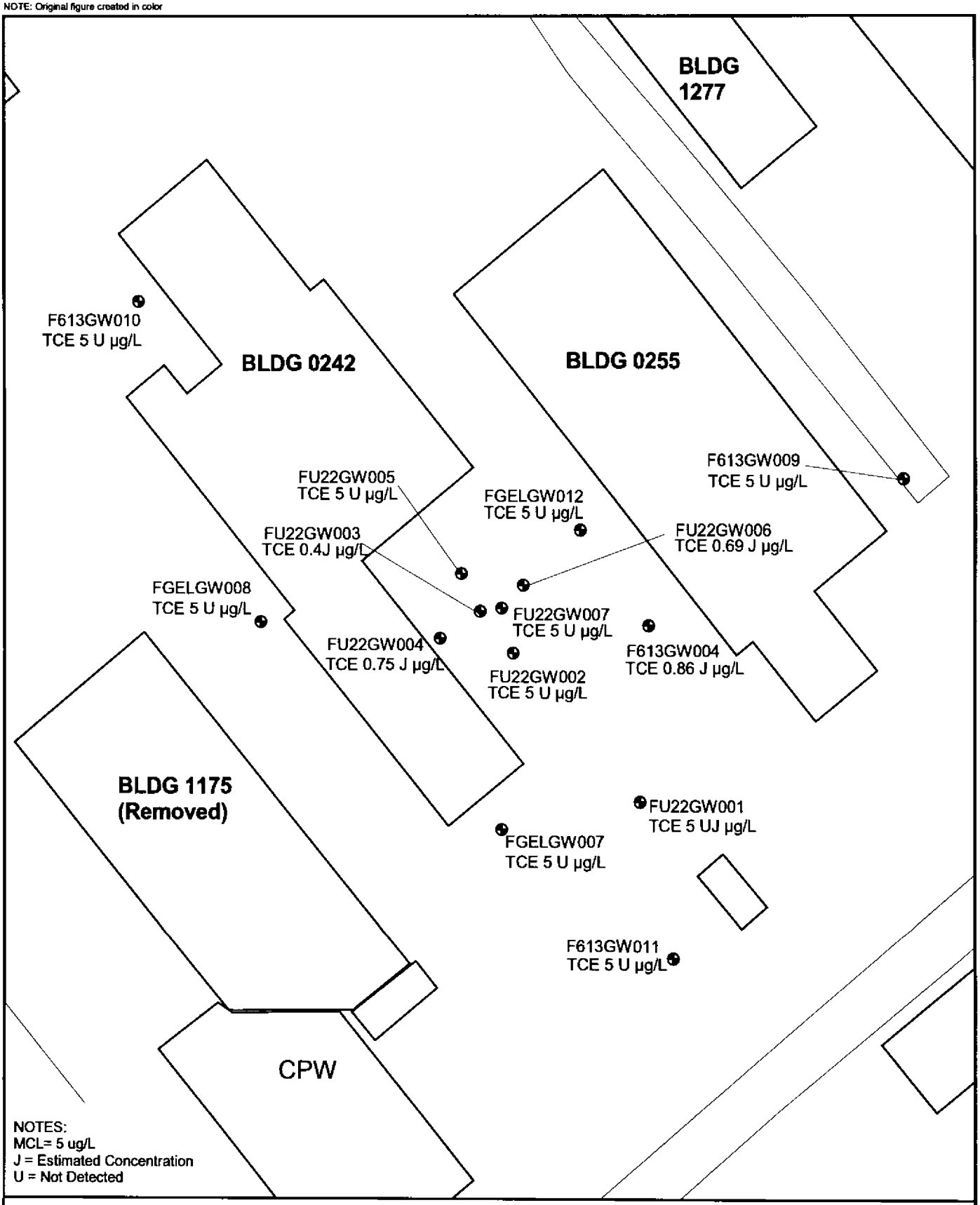
AOC 613 CMS

Charleston Naval Complex

CH2MHILL

File Path: d:\18gis\projects\zone_f\aoc_613\aprs\aoc613_fig2-10.apr, Date: 03 Jan 2003 12:25, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-10 Originally Reported RFI Sample Locations

NOTE: Original figure created in color



Groundwater Well
Roads
Buildings

N

0 80 160 Feet

1 inch = 80 feet

Figure 2-11
October 2002 TCE
AOC 613 CMS
Charleston Naval Complex

CH2MHILL

File Path: d:\18gis\projects\zone_f\aoc_613\aprs\aoc613_fig2-11.apr, Date: 06 Jan 2003 13:39, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-11 Originally Reported RFI Sample Locations

NOTE: Original figure created in color

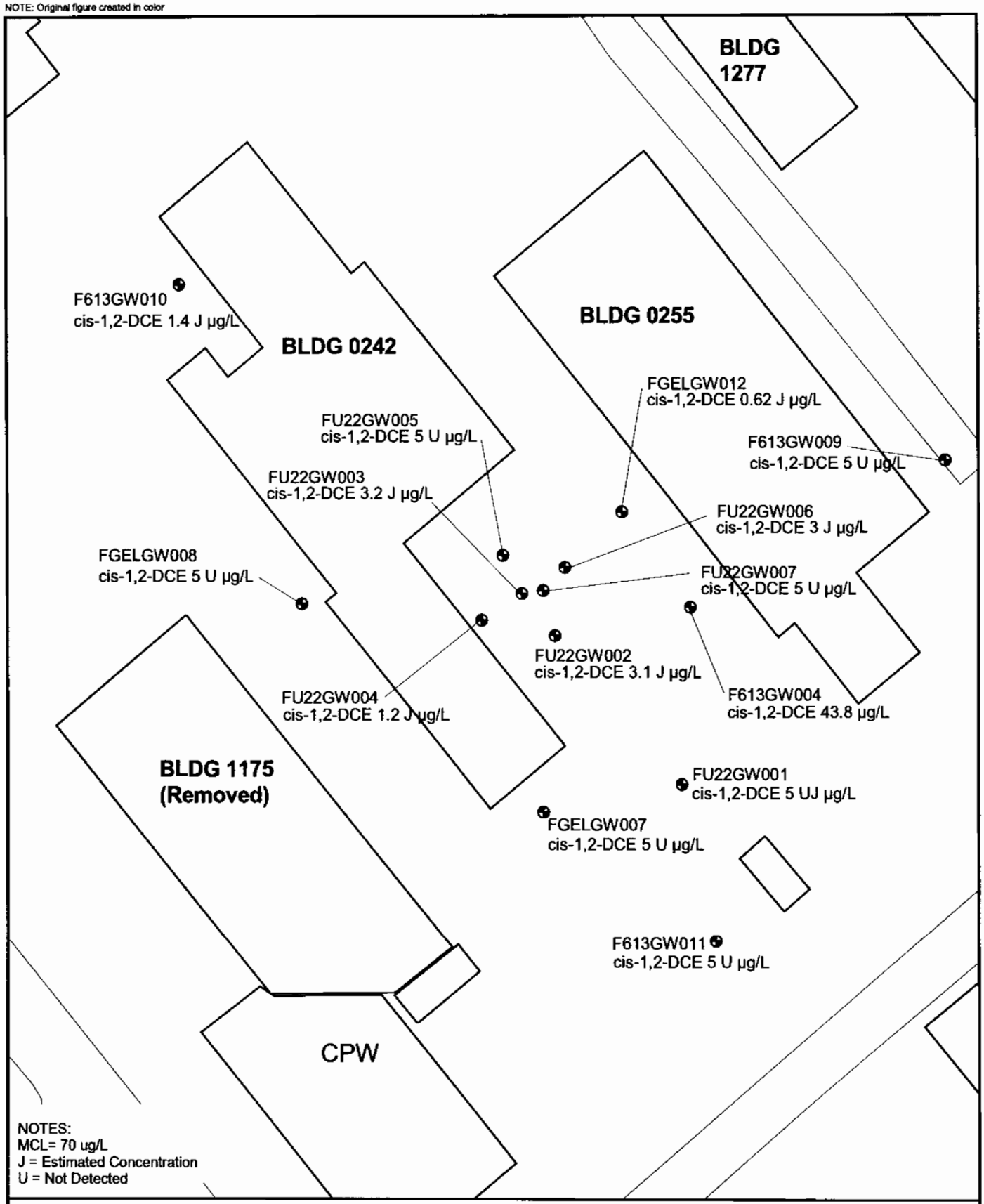


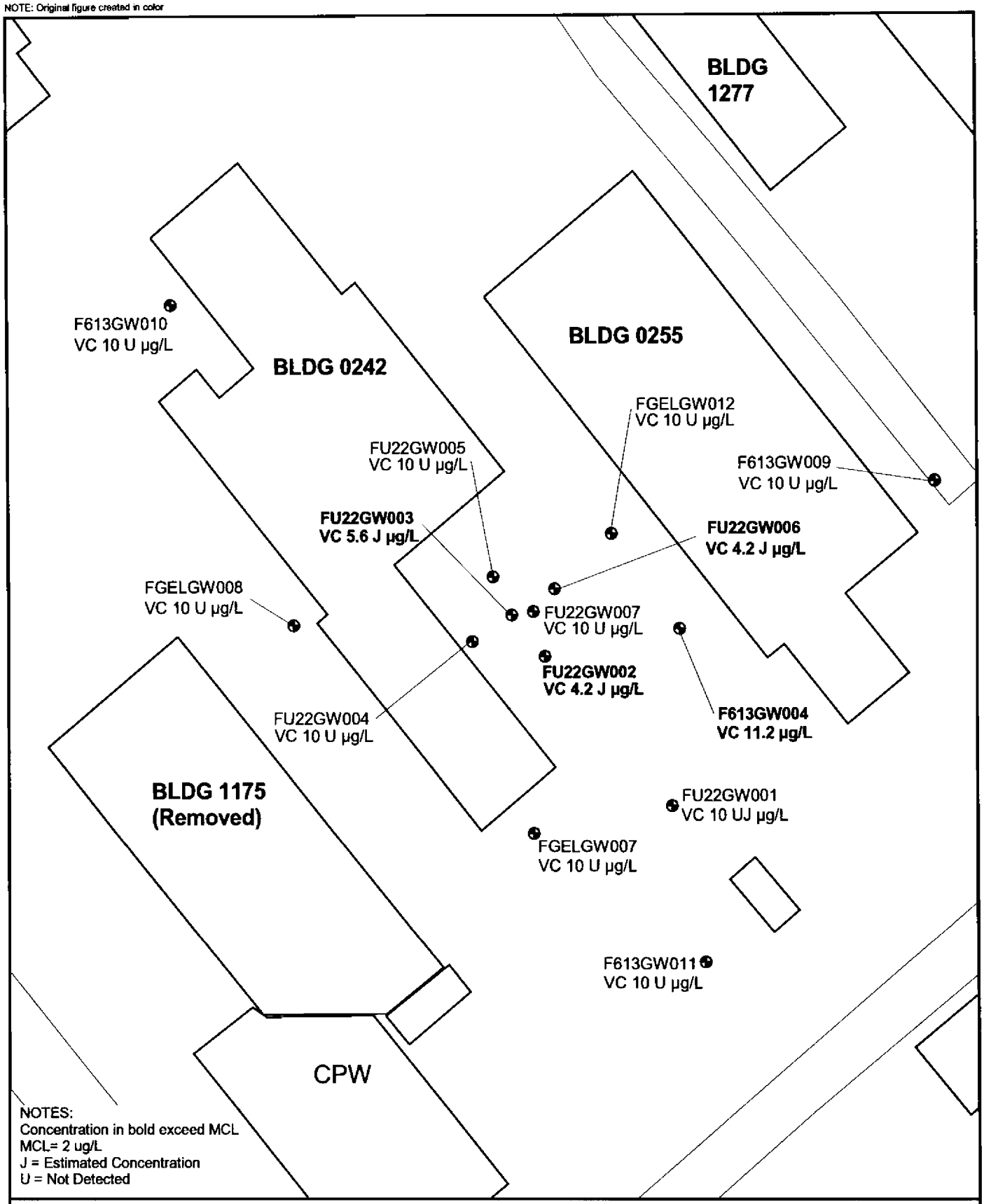
Figure 2-12

October 2002 cis-1,2-DCE
AOC 613 CMS
Charleston Naval Complex

CH2MHILL

File Path: d:\18gis\projects\zone_f\aoc_613\aprs\aoc613_fig2-12.apr, Date: 07 Jan 2003 10:07, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-12 Originally Reported RFI Sample Locations

NOTE: Original figure created in color



Groundwater Well
Roads
Buildings

N

0 80 160 Feet

1 inch = 80 feet

Figure 2-13

October 2002 Vinylchloride
AOC 613 CMS
Charleston Naval Complex

CH2MHILL

File Path: d:\18gis\projects\zone_f\aoc_613\aprs\aoc613_fig2-13.apr, Date: 07 Jan 2003 10:37, User: DSANTOS, EGIS: Charleston Naval Complex - Figure 2-13 Originally Reported RFI Sample Locations

Section 3.0

3.0 Remedial Goal Options and Evaluation Criteria

This section discusses the RAOs of this CMS and presents MCSs for CVOCs in groundwater. Once the RAOs and MCSs are established, candidate remedial technologies and alternatives can be developed to meet these objectives. This section also identifies the evaluation criteria used in comparing the CMS alternatives.

3.1 Remedial Action Objectives

RAOs are medium-specific goals that the remedial actions are designed to accomplish in order to protect human health and the environment by preventing or reducing exposures under current and future land use conditions. The RAOs identified for groundwater at AOC 613 are 1) to prevent ingestion and direct/dermal contact with groundwater having unacceptable carcinogenic or noncarcinogenic risk, and 2) to restore the aquifer to beneficial use. No remedial actions are required for surface or subsurface soil at AOC 613.

3.2 Remedial Goal Options and Media Cleanup Standards

Throughout the process of remediating a hazardous waste site, a risk manager uses a progression of increasingly acceptable site-specific media levels in considering remedial alternatives. RGOs and MCSs under RCRA are developed at the end of the risk assessment in the RFI/Remedial Investigation/State programs.

RGOs can be based on a variety of criteria, such as specific Incremental Lifetime Cancer Risk (ILCR) levels (e.g., 1E-04, 1E-05, or 1E-06), hazard index (HI) levels (e.g., 0.1, 1.0, 3.0), regulatory limits, or site background concentrations. For a particular RGO, specific MCSs can be determined as target concentration values. Achieving these MCSs is accepted as demonstrating that RGOs and RAOs have been achieved. Achieving these goals should promote the protection of human health and the environment, while achieving compliance with applicable state and federal standards.

The exposure medium of concern for AOC 613 is groundwater containing CVOCs. Because AOC 613 is located within a highly developed area of the CNC, and there are no surface

water bodies adjacent to the site, ecological exposures were not considered necessary for evaluation.

Chlorinated solvents and daughter products (PCE, TCE, 1,2-DCE, and vinyl chloride) were identified as COCs in groundwater. As presented in the *AOC 613/AOC 615/SWMU 175, RFI Report Addendum and CMS Work Plan, Revision 1* (CH2M-Jones, 2002b), MCSs and RGOs were selected from EPA National Primary Drinking Water Regulations, and are listed below:

- PCE – 5 μg/L
- TCE – 5 μg/L
- cis-1,2-DCE – 70 μg/L
- trans-1,2-DCE – 100 μg/L
- Vinyl chloride – 2 μg/L

3.3 Evaluation Criteria

According to the RCRA permit issued by SCDHEC (SCDHEC, 1998), the alternatives will be evaluated with the following five criteria:

1. Protect human health and the environment.
2. Attain MCSs.
3. Control the source of releases to minimize future releases that may pose a threat to human health and the environment.
4. Comply with applicable standards for the management of wastes generated by remedial activities.
5. Other factors, including (a) long-term reliability and effectiveness; (b) reduction in toxicity, mobility, or volume of wastes; (c) short-term effectiveness; (d) implementability; and (e) cost.

Each of the five criteria is defined in more detail below.

3.3.1 Protection of Human Health and the Environment

The alternatives will be evaluated on the basis of their ability to protect human health and the environment. The ability of an alternative to achieve this standard may or may not be independent of its ability to achieve the other standards. For example, an alternative may be

protective of human health, but may not be able to attain the MCSs if the MCSs were not developed on the basis of human health protection factors.

3.3.2 Attainment of MCSs

The alternatives will be evaluated on the basis of their ability to achieve the MCSs defined in this CMS. Another aspect of this criterion is the time frame to achieve the MCSs. Estimates of the time frame for the alternatives to achieve RGOs will be provided.

3.3.3 Control of Release Source

This criterion deals with the control of releases of contamination from the source (the area in which the contamination originated) and the prevention of future migration to uncontaminated areas.

3.3.4 Compliance with Applicable Standards for Management of Generated Wastes

This standard deals with the management of wastes derived from implementing the alternatives; for example, treatment or disposal of pumped groundwater. The remedial alternative will be designed to comply with all standards for management of wastes generated by the remedial action. Consequently, this criterion will not be explicitly included in the detailed evaluation presented in the CMS, but such compliance would be incorporated into the cost estimates for which this criterion is relevant.

3.3.5 Other factors

Five other criteria are to be considered if an alternative is found to meet the four standards described above. These other factors are as follows:

a. **Long-term reliability and effectiveness**
The alternatives will be evaluated on the basis of their reliability, and the potential impact should the alternative fail. In other words, a qualitative assessment will be made as to the chance of the alternative's failing and the consequences of that failure.

b. **Reduction in the toxicity, mobility, or volume of wastes**
Alternatives with technologies that reduce the toxicity, mobility, or volume of the contamination will be generally favored over those that do not. Consequently, a qualitative assessment of this factor will be performed for each alternative.

c. Short-term effectiveness

Alternatives will be evaluated on the basis of the risk they create during the implementation of the remedy. Factors that may be considered include fire, explosion, and exposure of workers to hazardous substances.

d. Implementability

The alternatives will be evaluated for their implementability by considering any difficulties associated with conducting the alternatives (such as the construction disturbances they may create), operation of the alternatives, and the availability of equipment and resources to implement the technologies comprising the alternatives.

e. Cost

A net present value of each alternative will be developed. These cost estimates will be used for the relative evaluation of the alternatives, not to bid or budget the work. The estimates will be based on information available at the time of the CMS and on a conceptual design of the alternative. They will be "order-of-magnitude" estimates with a generally expected accuracy of -50 percent to +100 percent for the scope of action described for each alternative. The estimates will be categorized into capital costs and operations and maintenance costs for each alternative.

Section 4.0

4.0 Description of Candidate Corrective Measure Alternatives

Currently available groundwater remedial technologies were screened for applicability to the contaminants and physical conditions present at AOC 613, with only the most viable remedial technologies known for effective treatment of CVOCs selected for alternative analysis. As described in Section 2.0, no source area has been identified; therefore, no source control is required. The CVOC plume to be addressed has been identified as the area between Buildings 242 and 155. The area of affected groundwater is limited in size (approximately 15,000 square feet), has not mobilized off site, and shows no likelihood of doing so.

Detailed analyses of these selected technologies, presented in this section, provide the rationale to support the selection of the recommended corrective measure alternative. Two candidate corrective measure alternatives were selected for this site:

- Alternative 1: Natural Attenuation with Land Use Controls (LUCs)
- Alternative 2: In situ Biosparging with LUCs

Two other candidate alternatives were initially considered potentially applicable to the site. Enhanced biodegradation, which consists of injecting a biodegradation-enhancing substrate (such as lactate) into the subgrade, was considered infeasible in the relatively low-permeability soils at the site. Injecting oxygen-releasing compounds (ORCs) to stimulate aerobic biodegradation would have similar reagent delivery problems. Chemical oxidation, which consists of injecting an oxidizing agent such as hydrogen peroxide, was also eliminated as an alternative because of the absence of a significant source area.

A description of the remaining alternatives is presented in this section.

4.1 Alternative 1: Natural Attenuation with Land Use Controls

This alternative will allow the CVOCs to continue to naturally attenuate in the subsurface, will monitor groundwater concentrations periodically until the MCSs are reached, and will impose LUCs (such as a deed restriction) to restrict the installation of drinking water wells.

Natural attenuation is the reduction of CVOC concentrations by the natural processes present in the aquifer, including volatilization, hydrolysis, dilution, dispersion, adsorption,

and biotic and abiotic degradation. The collective effort of these processes is termed natural attenuation. MNA is a careful evaluation of natural attenuation mechanisms using monitoring. EPA has issued a Final OSWER Directive on Monitored Natural Attenuation (EPA, 1999), in which it recognizes that MNA is appropriate as a remedial approach, "where it can be demonstrated capable of achieving a site's remedial objectives within a time frame that is reasonable compared to that offered by other methods, and where it meets the applicable remedy selection criteria for that particular OSWER program." EPA clearly states its expectation that "monitored natural attenuation will be most appropriate when used in conjunction with active remediation measures (e.g., source control) or as a follow-up to active remediation measures that already have been implemented."

The presence of chlorinated solvent daughter products (1,2-DCE and vinyl chloride), and the relative absence of the parent compounds (PCE and TCE) demonstrates that degradation of the solvents has occurred. Vinyl chloride has been produced as a result of reductive dechlorination of TCE and 1,2 DCE. TCE and DCE have been reduced to less than their respective MCLs. Vinyl chloride typically attenuates under the natural iron-reducing conditions at the site and natural attenuation of vinyl chloride is expected to continue to effectively proceed at the site. Concentrations of vinyl chloride are only slightly above the MCL of 2 μg/L, with maximum concentrations of 11.2 μg/L at F613GW004, 5.6 μg/L at FU22GW003, and 4.2 μg/L at FU22GW002 as of October 31, 2002.

Under the natural attenuation alternative, the CVOC plume would be evaluated using a monitoring system designed to track the plume location and concentrations. Monitoring data would be compared to the predicted transport and fate of the CVOCs to check the predictions accuracy. In general, the MNA alternative consists of three major features:

- A designed monitoring program

and biotic and abiotic degradation. The collective effort of these processes is termed natural attenuation. MNA is a careful evaluation of natural attenuation mechanisms using monitoring. EPA has issued a Final OSWER Directive on Monitored Natural Attenuation (EPA, 1999), in which it recognizes that MNA is appropriate as a remedial approach, "where it can be demonstrated capable of achieving a site's remedial objectives within a time frame that is reasonable compared to that offered by other methods, and where it meets the applicable remedy selection criteria for that particular OSWER program." EPA clearly states its expectation that "monitored natural attenuation will be most appropriate when used in conjunction with active remediation measures (e.g., source control) or as a follow-up to active remediation measures that already have been implemented."

The presence of chlorinated solvent daughter products (1,2-DCE and vinyl chloride), and the relative absence of the parent compounds (PCE and TCE) demonstrates that degradation of the solvents has occurred. Vinyl chloride has been produced as a result of reductive dechlorination of TCE and 1,2 DCE. TCE and DCE have been reduced to less than their respective MCLs. Vinyl chloride typically attenuates under the natural iron-reducing conditions at the site and natural attenuation of vinyl chloride is expected to continue to effectively proceed at the site. Concentrations of vinyl chloride are only slightly above the MCL of 2 $\mu g/L$, with maximum concentrations of 11.2 $\mu g/L$ at F613GW004, 5.6 $\mu g/L$ at FU22GW003, and 4.2 $\mu g/L$ at FU22GW002 as of October 31, 2002.

Under the natural attenuation alternative, the CVOC plume would be evaluated using a monitoring system designed to track the plume location and concentrations. Monitoring data would be compared to the predicted transport and fate of the CVOCs to check the predictions accuracy. In general, the MNA alternative consists of three major features:

- A designed monitoring program
- A tracking and data evaluation program
- A contingency response plan in the event that the monitoring indicates downgradient migration of dissolved CVOCs

The MNA alternative would be implemented in conjunction with a long-term monitoring plan. The purpose of the plan is to monitor plume migration over time, and to verify that natural attenuation is occurring. The plan would specify existing wells located within, upgradient to, crossgradient to, and downgradient of the plume. Because of the significant amount of data already available for the site, the monitoring plan would focus primarily on monitoring for the CVOCs. Field measurements, such as DO, ORP, and turbidity, would continue to be monitored. Additional parameters, such as ferrous iron, common cations and anions, and dissolved ethene, ethane, and methane, might also be occasionally monitored

for, if additional information on these parameters was needed. The data would provide ongoing characterization of plume extent, groundwater quality, hydraulic gradients, ORP indicators, and indicators of biological degradation products of the CVOCs.

It is expected that the CVOC plume will slowly decrease in concentration as a result of natural attenuation. Additional contingency remedies would be considered if natural attenuation indicates low performance as evidenced by increasing trends for total CVOC concentrations at the downgradient edge of the plume that significantly increase potential exposures or related risks. Existing data indicate that this scenario is not likely.

LUCs, such as deed restrictions, would be implemented to restrict the installation of drinking water wells at AOC 613. Such LUCs could be removed after CVOC concentrations have reduced to MCLs or lower. LUCs are planned for the adjacent Zone E industrial area, and are anticipated to extend into the industrial portions of Zone F, including the AOC 613 area.

4.2 Alternative 2: In Situ Biosparging with Land Use Controls

Natural biodegradation processes occurring at AOC 613 have resulted in the depletion of the parent compounds PCE and TCE, and the presence of primarily the daughter products DCE and vinyl chloride. These degradation products are generally more biodegradable in an aerobic environment; hence their continued presence in the groundwater at AOC 613, although they will continue to degrade in the iron-reducing conditions at the site.

Biosparging is the injection of air at low flow rates (i.e., 0.5 cubic feet per minute [cfm] to 2 to 3 cfm per injection point) into the saturated formation to enhance biodegradation. The application of biosparging would be appropriate for aerobically biodegradable compounds such as cis-1,2-DCE and vinyl chloride. In calculating the remedial technique cost estimates provided in this CMS report, it was assumed that five sparge wells would be installed at the site. Because the vinyl chloride plume is located beneath a traffic area used by the CPW, air supply piping would be installed below grade.

In addition to the other required design parameters (such as air injection rate and pressure), the sparge well spacing would be evaluated from pilot test results. A six-month pilot test might effectively remediate the plume because of the low site concentrations and its relatively small area. However, effectiveness of this technique may be limited due to the high percentage of fine particles in the aquifer.

LUCs to preclude the consumption of shallow groundwater would also need to be implemented at the site until the target MCSs are achieved.

Section 5.0

5.0 Evaluation and Comparison of Corrective Measure Alternatives

The corrective measure alternatives were evaluated relative to the evaluation criteria previously described in Section 3.0, and then subjected to a comparison evaluation. A cost estimate for each alternative was also developed; the assumptions and unit costs used for these estimates are included in Appendix F.

5.1 Alternative 1: Natural Attenuation with Land Use Controls

The assumptions for Alternative 1 include the following:

- A basewide Land Use Control Management Plan (LUCMP) will be developed for the CNC. The plan will allow for restrictions on the use of groundwater from AOC 613 and other industrial areas, and will be developed outside of the scope of this CMS. Periodic monitoring would verify the site's usage is consistent with the LUCs.
- Periodic groundwater monitoring will be performed until results indicate that the natural attenuation is considered complete and CVOC concentrations are below MCLs, estimated at no more than five years at this site. Samples will be collected from up to five groundwater wells on an annual basis, and will be analyzed for CVOCs. Selected MNA parameters will be analyzed as needed in the groundwater samples. Standard field parameters (DO, ORP, turbidity, temperature) will be monitored in all wells. For cost estimating purposes, monitoring will be planned for a five-year period.

5.1.1 Protection of Human Health and the Environment

This alternative is effective at protecting human health because it uses LUCs to prevent the ingestion of and direct contact with groundwater. Indirect exposures are not considered likely at AOC 613. The environment is protected because the plume is not expected to migrate from its present position before it degrades to MCSs. Monitoring will be conducted to evaluate if the plume is migrating and degrading.

5.1.2 Attainment of MCSs

This alternative is expected to eventually meet MCSs for cis-1,2-DCE and vinyl chloride.

5.1.3 Control of Release Source

There are no ongoing sources of releases at AOC 613.

5.1.4 Compliance with Applicable Standards for Management of Generated Wastes

This alternative is not expected to produce significant quantities of waste requiring management. Wastes produced from sampling activities are easily managed to applicable standards.

5.1.5 Other Factors (a) Long-term Reliability and Effectiveness

This alternative has adequate long-term reliability and effectiveness. In the unlikely event that plume migration occurs, additional corrective measures may be considered.

5.1.6 Other Factors (b) Reduction in the Toxicity, Mobility, or Volume of Wastes

Alternative 1 relies on natural attenuation to continue at AOC 613. The biodegradation of CVOCs has been proven at the site; as evidenced by the absence of parent compounds. Mobility is not affected by the natural attenuation alternative.

5.1.7 Other Factors (c) Short-term Effectiveness

MNA with LUCs has short-term effectiveness for preventing contact with contaminated groundwater. Workers conducting groundwater sampling would follow a Health and Safety Plan that would provide appropriate actions to avoid risk of exposure.

5.1.8 Other Factors (d) Implementability

Alternative 1 is easy to implement. It requires the development of a LUCMP (to be developed independent of AOC 613) and a monitoring plan, as well as conventional processes for sampling and analysis.

5.1.9 Other Factors (e) Cost

Alternative 1 is the least costly to implement since it requires no construction of treatment facilities or disposal of wastes. The significant cost for this alternative is for groundwater monitoring. Using the assumptions described earlier, the total present value of the MNA with LUCs alternative, including monitoring for up to five years, is $39,000.

5.2 Alternative 2: In Situ Biosparging with Land Use Controls

A pilot test would be conducted to determine the optimum spacing and pumping rate for Alternative 2 – Biosparging with LUCs at AOC 613. To evaluate this alternative, the assumptions include the following:

- A pilot test would be conducted to evaluate appropriate sparge well spacing, depth, and air pressure. Five air sparge wells would be installed at the site, screened at the 15-ft depth. It is anticipated that the site groundwater would be remediated during the pilot test.
- Quarterly groundwater monitoring will be performed until results indicate that the CVOCs have attained MCSs, for an estimated six months. Monitoring well locations and analytical parameters would be the same as for Alternative 1 – MNA.

5.2.1 Protection of Human Health and the Environment

This alternative, if viable in the subsurface conditions at AOC 613, would be protective of human health and the environment because it would remove the toxic daughter products of the solvents. The degree of protection would be similar or greater than Alternative 1 – MNA.

5.2.2 Attainment of MCSs

This alternative is expected to meet MCSs for cis-1,2-DCE and vinyl chloride, at a faster rate than Alternative 1 – MNA. The rate of effectiveness will be dependent on the ability for oxygen dispersion in the low permeability soils.

5.2.3 Control of Release Source

There are no ongoing sources of releases at AOC 613

5.2.4 Compliance with Applicable Standards for Management of Generated Wastes

This alternative is not expected to produce significant quantities of waste requiring management. The sparging rate is not expected to strip VOCs from the subsurface, and vapor recovery is not planned. Wastes produced from sampling activities are easily managed to applicable standards.

5.2.5 Other Factors (a) Long-term Reliability and Effectiveness

This alternative has adequate long-term reliability and effectiveness. In the event that plume migration occurs, additional corrective measures may be considered. Factors potentially limiting effectiveness may include low permeability of the soil, limiting air migration.

5.2.6 Other Factors (b) Reduction in the Toxicity, Mobility, or Volume of Wastes

Alternative 2 will be designed to reduce CVOCs to MCSs; the biodegradation process is irreversible. Plume mobility is not anticipated due to biosparging.

5.2.7 Other Factors (c) Short-term Effectiveness

No exposure to site workers or the community, or impacts to the environment, are anticipated with Alternative 2. Workers conducting groundwater sampling would follow a Health and Safety Plan that would provide appropriate actions to avoid risk of exposure.

5.2.8 Other Factors (d) Implementability

Alternative 2 is fairly easy to implement. The process uses conventional and readily available technology. Sparge wells and air lines would be installed below-grade to avoid long-term interruption of tenants' operations. The alternative requires the development of a monitoring plan and conventional processes for sampling and analysis. A pilot test would be required as part of the design process.

5.2.9 Other Factors (e) Cost

Alternative 2 is comparatively costly to implement since it requires a pilot test, installation of sparge wells, long-term operation and maintenance (O&M), and groundwater monitoring. Although it is anticipated that the pilot test would effectively remediate the plume, additional annual monitoring for up to two years after completion of the pilot test would be conducted to verify that the plume has been remediated to MCSs. For cost estimating purposes, annual monitoring of only CVOCs will be conducted for up to two years after the pilot test. Using the assumptions described earlier, the total present value of the biosparging alternative, including monitoring for up to two years, is $138,000.

5.3 Comparative Ranking of Corrective Measure Alternatives

Each corrective measure alternative's overall ability to meet the evaluation criteria is described above. In Table 5-1, a comparative evaluation of the degree to which each alternative meets a particular criteria is presented. Alternative 1 (MNA with LUCs) is the preferred alternative. It provides a protective and reliable remedy at a cost lower than Alternative 2, with minimal disruption of the tenant's operations.

TABLE 5-1
Qualitative Comparison of Corrective Measure Alternatives
CMS Report, AOC 613, Zone F, Charleston Naval Complex

Criterion	Alternative 1: Natural Attenuation with Land Use Controls	Alternative 2: In Situ BioSparging with Land Use Controls
Overall Protection of Human Health and the Environment	Protects human health and the environment	Protects human health and the environment
Attainment of MCSs	Would achieve MCSs	Would achieve MCSs
Control of Release Source	N/A	N/A
Compliance with Applicable Standards for Management of Generated Wastes	Complies with applicable standards	Complies with applicable standards
Long-term reliability and effectiveness	Reliable and effective long-term	Moderately reliable and effective long-term, provided soil conditions allow air migration
Reduction in the toxicity, mobility, or volume of wastes	Reduces toxicity and volume via chemical degradation	Reduces toxicity and volume via chemical degradation, more quickly than the current natural processes
Short-term effectiveness	Effective in short-term	Effective in short-term
Implementability	Easy to implement	Moderately easy to implement: requires installation of piping and equipment control unit in CPW traffic area
Cost Ranking	Inexpensive	Moderately Expensive
Estimated Cost	$ 39,000	$ 138,000

Section 6.0

6.0 Recommended Corrective Measure Alternative

Two corrective measure alternatives were evaluated using the criteria described in Section 3.0 of this CMS report. These alternatives included:

- Alternative 1: Natural Attenuation with LUCs
- Alternative 2: In Situ BioSparging with LUCs

On the basis of the alternatives evaluation and RGOs for the site, as well as current uncertainties associated with each alternative, the preferred corrective measure alternative is Alternative 1: Natural Attenuation with LUCs. The remedy would be protective at a lower cost, with less disruption of the current tenant's activities than Alternative 2.

Alternative 1 would provide protection of human health and the environment by maintaining the current and planned future use of the site as industrial/commercial while the contaminants naturally degrade to non-toxic end products. Limitations would prevent residential and other unrestricted land use, including installation of water supply wells, that could expose sensitive populations.

A LUCMP is being developed for the industrial areas of the CNC, and AOC 613 will be added to the plan. The LUCMP will limit future site activities to those that would limit exposure to groundwater. Current data indicate that the contaminants are degrading and will continue to do so, and are not migrating. The expected reliability of this alternative is good.

Section 7.0

7.0 References

CH2M-Jones. *Sampling and Analysis Plan for Zone F/Site 22 - Building 242, Charleston Naval Base*. August 2000.

CH2M-Jones. *RFI Report Addendum and CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Base*. Revision 0. March 5, 2002a.

CH2M-Jones. *RFI Report Addendum and CMS Work Plan, AOC 613/AOC 615/SWMU 175, Zone F, Charleston Naval Base*. Revision 1. June 6, 2002b.

CH2M-Jones. *Phase 1 Interim Measure Work Plan - Source Delineation Sampling and Analysis Plan, AOC 613, Zone F, Charleston Naval Base*. Revision 0. June 11, 2002c.

EnSafe Inc. *Zone F RCRA Facility Investigation Report, NAVBASE Charleston*. December 31, 1997.

SCDHEC. RCRA Permit. Charleston Naval Complex. SC0 170 022 560. August 17, 1998.

Tetra Tech NUS, Inc. *Rapid Assessment for Site 22, Building 242*. January 25, 2000.

U.S. Environmental Protection Agency. *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water*. National Risk Management Research Laboratory (NRMRL), Ada, Oklahoma, Publication EPA/600/R-98/128. October 1998.

U.S. Environmental Protection Agency. *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*. Final OSWER Directive, Publication EPA/540/R-99/009. April 1999.

Appendix A

CH2MHILL

Boring Number: F613GP070

Client: US Navy
Project: Charleston Naval Complex
Location: Building 255
Project Number: 158814.ZF.PR.02

Driller: Prosonic
Drilling Method: Geoprobe - DPT
Sampling Method: Continuous Sample (4ft core)
Logged by: William Elliott
Start/Finish Date: 6/19/2002 - 6/19/2002

Depth (ft)	Sample Information: Sample	Sample Type	Recovery (Ft)	SPT (6"-6"-6")	Soil Log	Soil Description	Depth / Elev (ft)	Comments
						Ground Surface		
0						**Asphalt/fill**	0.0	0905 - Richard from Prosonic was on site
						Fill Sand/gravel, orange	1.0	
	001	DPT				**Clay, fat** CH - Gray, very stiff, plastic, dry to slightly moist	2.0	0910 - Open hole with rock bit through asphalt, hand auger to 4' - hit rock/concrete at approximately 2'
						Clay CL - Brown/tan, silty, plastic, moist, organic mottling as above, grading to green with iron stains at 5.5', very moist	3.0	0915 - Move (offset) 1' + 1' and open hole again - rock @ 1' auger to 4'
5	002	DPT				**Clay, fat** CH - Green, very stiff, very plastic, slightly moist, abundant iron staining - becoming siltier at 8'	5.5	0930 - Push 4' macrocore sampler to 8'
								0935 - Push 4' macrocore sampler to 12'
10	003	DPT				**Clay** CL - Green, silty, moist, plastic	10.5	
						Sand SM - Brown, silty	11.5	
	004	DPT				**Clay** CL - Green, silty, moist, plastic, orange iron staining, grading siltier with depth 13.2' to 14.0' tan to green, some silt, no iron stains	14.0	
15						**Clay, fat** CH - Light green, very stiff and plastic, moist, no iron stains 15.0' to 15.1' - Orange 15.1' to 16.0' - Tan sticky clay, plastic, w/ fine grained black inclusions 16.0' - Yellow mottling		0945 - Push 4' macrocore sampler to 20'
	005	DPT						0955 - Push 4' macrocore sampler to 24'
20								

CH2MHILL

Boring Number: F613GP070

Client: US Navy
Project: Charleston Naval Complex
Location: Building 255
Project Number: 158814.ZF.PR.02

Driller: Prosonic
Drilling Method: Geoprobe - DPT
Sampling Method: Continuous Sample (4ft core)
Logged by: William Elliott
Start/Finish Date: 6/19/2002 - 6/19/2002

Depth (ft)	Sample Information: Sample	Sample Type	Recovery (Ft)	SPT (6"-6"-6")	Soil Log	Soil Description	Depth / Elev (ft)	Comments
	006	DPT				**Clay/Sand** CL/SM - Green/gray, clay/sand mix - very fine grained sand w/ black inclusions, becoming less clayey - more silty at 22.0', color grades to olive tan at 22.0'		
						Clay/Silt CL/ML - Tan, silty clay, some sand, moist, thin buff colored fine grained sand laminae, wet	22.5 23.0	
							24.0	1005 - Push 4' macrocore sampler to 28'
25	007	DPT				**Silt** ML - Olive green, w/ black inclusions, fine grained sand laminae, stiff, plastic, blocky structure		
						Silt/Sand ML/SM - Olive, very fine grained sand, abundant black trace minerals, white/buff mollusk fragments, moist, stiff		
						Silt/Clay ML/CL - Olive green, stiff, moist, very plastic at 28.0', black trace minerals, very fine sand, no mollusks, becoming more clayey	28.0	1015 - Check w/ Darryl Gates. Review old boring logs from Bldg. Supt. (John), confirm Cooper Marl encountered as silt @ 28'
30						End of Log		
								1030 - Grout borehole
35								
40								

CH2MHILL

PROJECT NUMBER	DPT NUMBER	
158814.ZF.PR.02	F613GP069	page 1 of 1

DPT GROUNDWATER SAMPLE LOG

PROJECT : Charleston Naval Complex, Charleston, SC **NORTHING:** 373860.3

ELEVATION : 9.44 **LOCATION:** AOC 613 **DRILLING CONTRACTOR :** Prosonic License # 1435 **EASTING:** 2319625.7

DRILLING METHOD AND EQUIPMENT USED : Geoprobe Direct-Push Sampling, 4.0 - ft screen

START : 7-10-2002 / 1630 **END:** 7-10-2002 / 1710 **LOGGER :** Darryl Gates

DEPTH BELOW SURFACE (FT)	SAMPLING DEPTH SCREEN INTERVAL	COMMENTS ABANDONMENT METHOD TESTS, INSTRUMENTATION SOIL DESCRIPTION, IF VISIBLE
5		
10		Portland Type I Cement with 5% Bentonite Pressure Trimmie to Surface
15		
20		
25	End of Boring	
30		

CH2MHILL

PROJECT NUMBER	DPT NUMBER	
158814.ZF.PR.02	F613GP070	page 1 of 1

DPT GROUNDWATER SAMPLE LOG

PROJECT : Charleston Naval Complex, Charleston, SC **NORTHING:** 373836.2

ELEVATION : 9.55 **LOCATION:** AOC 613 **DRILLING CONTRACTOR :** Prosonic License # 1435 **EASTING:** 2319644.7

DRILLING METHOD AND EQUIPMENT USED : Geoprobe Direct-Push Sampling, 4.0 - ft screen

START : 7-10-2002 / 1600 **END:** 7-10-2002 / 1615 **LOGGER :** Darryl Gates

DEPTH BELOW SURFACE (FT)	SAMPLING DEPTH SCREEN INTERVAL	COMMENTS ABANDONMENT METHOD TESTS, INSTRUMENTATION SOIL DESCRIPTION, IF VISIBLE
5		
10		Portland Type I Cement with 5% Bentonite Pressure Trimmie to Surface
15		
20		
25	End of Boring	
30		

CH2MHILL

PROJECT NUMBER	DPT NUMBER	
158814.ZF.PR.02	F613GP071	page 1 of 1

DPT GROUNDWATER SAMPLE LOG

PROJECT : Charleston Naval Complex, Charleston, SC **NORTHING:** 373815.6

ELEVATION : 9.52 **LOCATION:** AOC 613 **DRILLING CONTRACTOR :** Prosonic License # 1435 **EASTING:** 2319661.6

DRILLING METHOD AND EQUIPMENT USED : Geoprobe Direct-Push Sampling, 4.0 - ft screen

START : 7-10-2002 / 1520 **END:** 7-10-2002 / 1545 **LOGGER :** Darryl Gates

DEPTH BELOW SURFACE (FT)	SAMPLING DEPTH SCREEN INTERVAL	COMMENTS ABANDONMENT METHOD TESTS, INSTRUMENTATION SOIL DESCRIPTION, IF VISIBLE
5		
10		Portland Type I Cement with 5% Bentonite Pressure Trimmie to Surface
15		
20		
25	End of Boring	
30		

CH2MHILL

PROJECT NUMBER	DPT NUMBER	
158814.ZF.PR.02	F613GP072	page 1 of 1

DPT GROUNDWATER SAMPLE LOG

PROJECT : Charleston Naval Complex, Charleston, SC **NORTHING:** 373800.9

ELEVATION : 9.66 **LOCATION:** AOC 613 **DRILLING CONTRACTOR :** Prosonic License # 1435 **EASTING:** 2319680.2

DRILLING METHOD AND EQUIPMENT USED : Geoprobe Direct-Push Sampling, 4.0 - ft screen

START : 7-10-2002 / 1450 **END:** 7-10-2002 / 1510 **LOGGER :** Darryl Gates

DEPTH BELOW SURFACE (FT)	SAMPLING DEPTH SCREEN INTERVAL	COMMENTS ABANDONMENT METHOD TESTS, INSTRUMENTATION SOIL DESCRIPTION, IF VISIBLE
5		
10		Portland Type I Cement with 5% Bentonite Pressure Trimmie to Surface
15		
20		
25	End of Boring	
30		

CH2MHILL

PROJECT NUMBER	DPT NUMBER	
158814.ZF.PR.02	F613GP073	page 1 of 1

DPT GROUNDWATER SAMPLE LOG

PROJECT : Charleston Naval Complex, Charleston, SC **NORTHING:** 373779.8

ELEVATION : 9.44 **LOCATION:** AOC 613 **DRILLING CONTRACTOR :** Prosonic License # 1435 **EASTING:** 2319699.8

DRILLING METHOD AND EQUIPMENT USED : Geoprobe Direct-Push Sampling, 4.0 - ft screen

START : 7-10-2002 / 1320 **END:** 7-10-2002 / 1345 **LOGGER :** Darryl Gates

DEPTH BELOW SURFACE (FT)	SAMPLING DEPTH SCREEN INTERVAL	COMMENTS ABANDONMENT METHOD TESTS, INSTRUMENTATION SOIL DESCRIPTION, IF VISIBLE
5		
10		Portland Type I Cement with 5% Bentonite Pressure Trimmie to Surface
15		
20		
25	End of Boring	
30		

Appendix B

Appendix B
CVOCs in Groundwater reported in AOC 613/AOC 615/SWMU 175 RFI Report Addendum
AOC 613 CMS Report, Revision 0

		1,2-Dichloroethene (total)		Tetrachloroethene (PCE)		Trichloroethene (TCE)		Vinyl Chloride		Methylene Chloride	
	Units	(ug/L)		(ug/L)		(ug/L)		(ug/L)		(ug/L)	
	MCL/RBC*	70 [a]		5		5		2		4.1*	
Station	Date	Conc.		Conc.		Conc.		Conc.		Conc.	
F613GP001	12-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP002	13-Sep-96	10	=	5.0	U	5.0	U	**4.0**	J	5.0	U
F613GP003	29-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP004	02-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP005	03-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP006	04-Oct-96	NA		NA		NA		NA		NA	
F613GP007	12-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP008	13-Sep-96	29	=	5.0	U	1.0	J	**5.0**	J	5.0	U
F613GP009	29-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP010	02-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP012	10-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	11.0	U
F613GP013	07-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP017	03-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP019	08-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP020	12-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP021	29-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP022	15-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP024	11-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP025	29-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP026	15-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP027	15-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP028	11-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U

Appendix B
CVOCs in Groundwater reported in AOC 613/AOC 615/SWMU 175 RFI Report Addendum
AOC 613 CMS Report, Revision 0

		1,2-Dichloroethene (total)		Tetrachloroethene (PCE)		Trichloroethene (TCE)		Vinyl Chloride		Methylene Chloride	
	Units	(ug/L)		(ug/L)		(ug/L)		(ug/L)		(ug/L)	
	MCL/RBC*	70 [a]		5		5		2		4.1*	
Station	Date	Conc.		Conc.		Conc.		Conc.		Conc.	
F613GP029	28-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP030	18-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP031	14-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP032	10-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP033	28-Aug-96	3.0	J	5.0	U	5.0	U	10.0	U	5.0	U
F613GP034	28-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP035	16-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP036	09-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP037	30-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP038	16-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP039	29-Sep-96	**1700**	J	**1900**	J	**1500**	J	**38.0**	=	5.0	U
F613GP040	13-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP041	10-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP042	03-Sep-96	1.0	J	5.0	U	5.0	U	10.0	U	5.0	U
F613GP043	09-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U
F613GP044	27-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP046	09-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP047	08-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP048	10-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP049	09-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U
F613GP050	04-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP051	27-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U

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		1,2-Dichloroethene (total)		Tetrachloroethene (PCE)		Trichloroethene (TCE)		Vinyl Chloride		Methylene Chloride	
	Units	(ug/L)		(ug/L)		(ug/L)		(ug/L)		(ug/L)	
	MCL/RBC*	70 [a]		5		5		2		4.1*	
Station	Date	Conc.		Conc.		Conc.		Conc.		Conc.	
F613GP052	09-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP053	17-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP054	17-Sep-96	5.0	U	5.0	U	1.0	J	10.0	U	5.0	U
F613GP056	03-Sep-96	25	U	25	U	25.0	U	50.0	U	50.0	U
F613GP057	30-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP058	30-Aug-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP059	03-Sep-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP060	04-Sep-96	1.0	J	5.0	U	5.0	U	10.0	U	5.0	U
F613GP063	16-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP064	15-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP065	14-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP066	13-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP067	12-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GP068	11-Oct-96	5.0	U	5.0	U	5.0	U	10.0	U	17.0	U
LF037GP023	09-Jun-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
LF037GP025	08-Jun-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
LF037GP026	09-Jun-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
LF037GP031	09-Jun-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
LF037GP036	10-Jun-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
LF037GP037	10-Jun-97	13.3 [b]	=	5.0	U	5.0	U	**17.1**	=	5.0	U
LF037GP038	10-Jun-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
LF037GP065	01-Jul-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

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CVOCs in Groundwater reported in AOC 613/AOC 615/SWMU 175 RFI Report Addendum
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		1,2-Dichloroethene (total)		Tetrachloroethene (PCE)		Trichloroethene (TCE)		Vinyl Chloride		Methylene Chloride	
	Units	(ug/L)		(ug/L)		(ug/L)		(ug/L)		(ug/L)	
	MCL/RBC*	70 [a]		5		5		2		4.1*	
Station	Date	Conc.		Conc.		Conc.		Conc.		Conc.	
LF037GP066	01-Jul-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
LF699GP049	12-Aug-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
F240GW003	18-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	7.0	U
	06-May-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	19-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	6.0	U
	12-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
F613GW001	20-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	7.0	U
	29-Apr-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	04-Sep-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	06-Nov-97	5.0	UJ	5.0	U	5.0	U	10.0	U	5.0	U
	12-Oct-99	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
F613GW003	18-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	7.0	U
	29-Apr-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	18-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	07-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	22-Jun-01	5.0	U	5.0	U	5.0	U	10.0	U	NA	
F613GW004	12-Nov-96	24	=	2.0	J	3.0	J	10.0	U	5.0	U
	30-Apr-97	39	=	3.0	J	3.0	J	**7.0**	J	5.0	U
	22-Aug-97	35	=	5.0	U	5.0	U	10.0	U	5.0	U
	06-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	22-Jun-01	**84.5** [b]	=	0.35	J	4.0	J	**10.8**	=	NA	
F613GW005	20-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	8.0	U
	05-May-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	19-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	25-Nov-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
F613GW006	20-Oct-98	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
	18-Jun-99	33	=	5.0	U	5.0	U	5.0	U	5.0	U
	12-Oct-99	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
F613GW007	19-Nov-99	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U

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CVOCs in Groundwater reported in AOC 613/AOC 615/SWMU 175 RFI Report Addendum
AOC 613 CMS Report, Revision 0

		1,2-Dichloroethene (total)		Tetrachloroethene (PCE)		Trichloroethene (TCE)		Vinyl Chloride		Methylene Chloride	
	Units	(ug/L)		(ug/L)		(ug/L)		(ug/L)		(ug/L)	
	MCL/RBC*	70 [a]		5		5		2		4.1*	
Station	Date	Conc.		Conc.		Conc.		Conc.		Conc.	
F613GW008	19-Nov-99	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
F613GW009	22-Jun-01	5	U	5.0	U	5.0	U	10.0	U	NA	
F613GW02D	21-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	30-Apr-97	5.0	U	2.0	J	5.0	U	10.0	U	5.0	U
	19-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	6.0	U
	07-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
FFDSGW17A	28-Jan-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	17-Jun-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	24-Apr-98	1.0	U	1.0	U	1.0	U	1.0	U	5.0	U
	20-Oct-98	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
	12-Oct-99	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
FFDSGW17B	28-Jan-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	17-Jun-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	24-Apr-98	1.0	U	1.0	U	1.0	U	1.0	U	5.0	U
	20-Oct-98	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
	12-Oct-99	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
FGELGW005	11-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	05-May-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	28-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	12-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
FGELGW006	12-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	06-May-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	25-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	14-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
FGELGW007	10-Nov-96	3.0	J	5.0	U	5.0	U	10.0	U	5.0	U
	07-May-97	3.0	J	5.0	U	5.0	U	10.0	U	5.0	U
	25-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	12-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
FGELGW008	10-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U

Appendix B
CVOCs in Groundwater reported in AOC 613/AOC 615/SWMU 175 RFI Report Addendum
AOC 613 CMS Report, Revision 0

		1,2-Dichloroethene (total)		Tetrachloroethene (PCE)		Trichloroethene (TCE)		Vinyl Chloride		Methylene Chloride	
	Units	(ug/L)		(ug/L)		(ug/L)		(ug/L)		(ug/L)	
	MCL/RBC*	70 [a]		5		5		2		4.1*	
Station	Date	Conc.		Conc.		Conc.		Conc.		Conc.	
	07-May-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	26-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	14-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
FGELGW011	12-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	08-May-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	26-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	12-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
FGELGW012	12-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	08-May-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	27-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	13-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	22-Jun-01	1.8 [b]	J	5.0	U	5.0	U	10.0	U	NA	
FGELGW013	12-Nov-96	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	09-May-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	29-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	14-Nov-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
FGELGW014	12-Nov-96	6000	U	6000	U	6000.0	U	12000	U	6000.0	U
	09-May-97	5.0	U	5.0	=	5.0	U	10.0	U	5.0	U
	27-Aug-97	5.0	U	5.0	U	5.0	U	10.0	U	5.0	U
	01-Dec-97	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
	22-Apr-98	1.0	U	1.0	U	1.0	U	1.0	U	5.0	U
	20-Oct-98	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
	12-Oct-99	150	U	150	U	150.0	U	150.0	U	**83.0**	J

Bolded and outlined values are exceedences of background reference concentrations (BRCs) and MCLs/RBCs
* RBC obtained from US EPA Region III (Noncarcinogen HI = 1.0) Table 10/05/2000, where no MCL exists
MCL = Maximum Contaminant Level from US EPA National Primary Drinking Water Standards March 2001
[a] MCL for cis-1,2-Dichlorothene used; MCL for trans-1,2-Dichlororethene = 100 ug/L
[b] Value is sum of separate reported values for cis-1,2-dichloroethene and trans-1,2-dichloroethene
= Analyte was detected; the reported value is equal to the sample concentration.
J Analyte was detected; the reported value is an estimated concentration.

Appendix B
CVOCs in Groundwater reported in AOC 613/AOC 615/SWMU 175 RFI Report Addendum
AOC 613 CMS Report, Revision 0

		1,2-Dichloroethene (total)	Tetrachloroethene (PCE)	Trichloroethene (TCE)	Vinyl Chloride	Methylene Chloride
	Units	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
	MCL/RBC*	70 [a]	5	5	2	4.1*
Station	Date	Conc.	Conc.	Conc.	Conc.	Conc.

NA Data not available or analyte was not analyzed in the sample.

U Analyte was not detected; the reported value is the detection limit.

UJ Analyte was not detected; the reported value is an estimated detection limit.

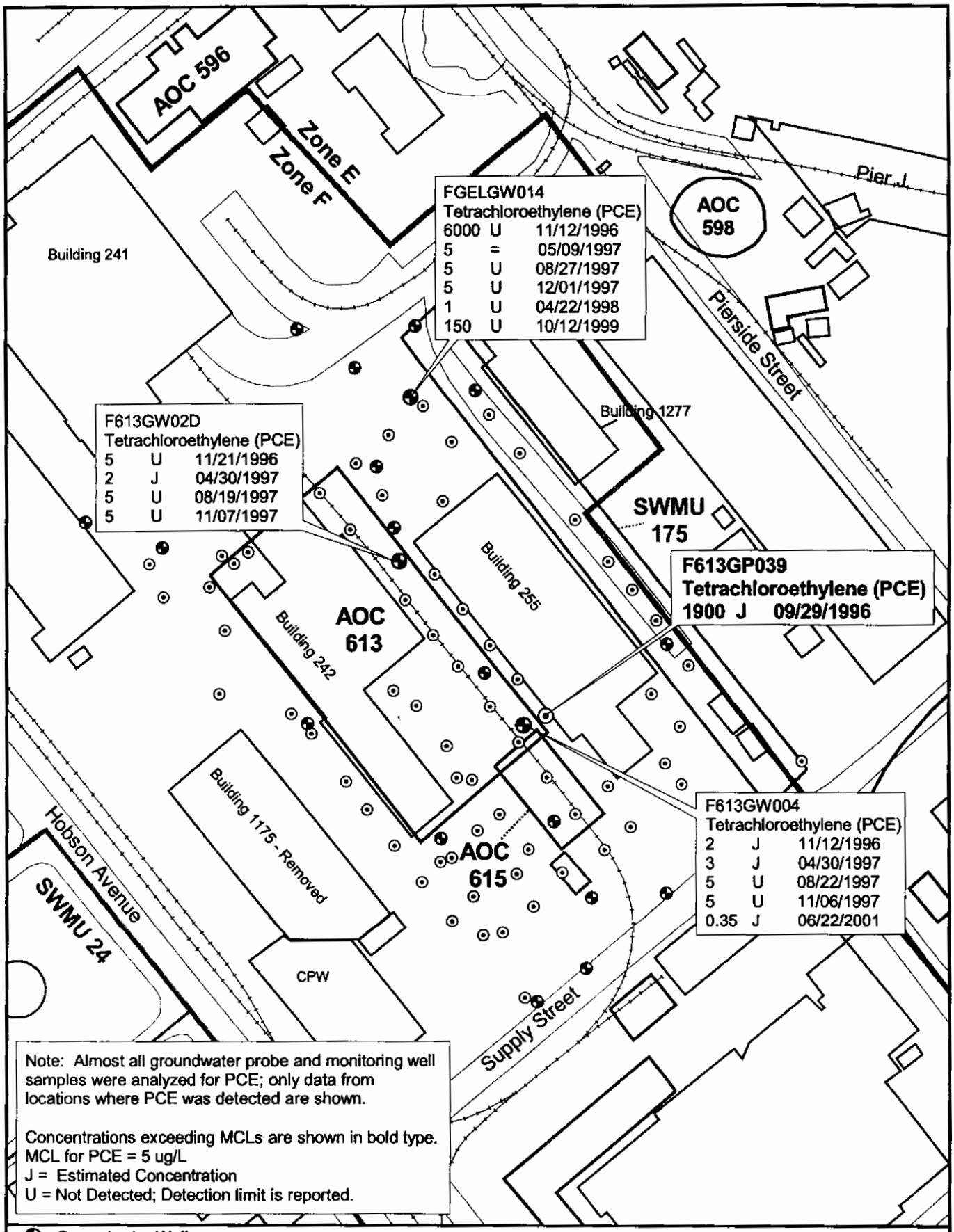


Figure 5-8
PCE Detected in Groundwater
AOCs 613, 615, and SWMU 175, Zone F
Charleston Naval Complex

CH2MHILL

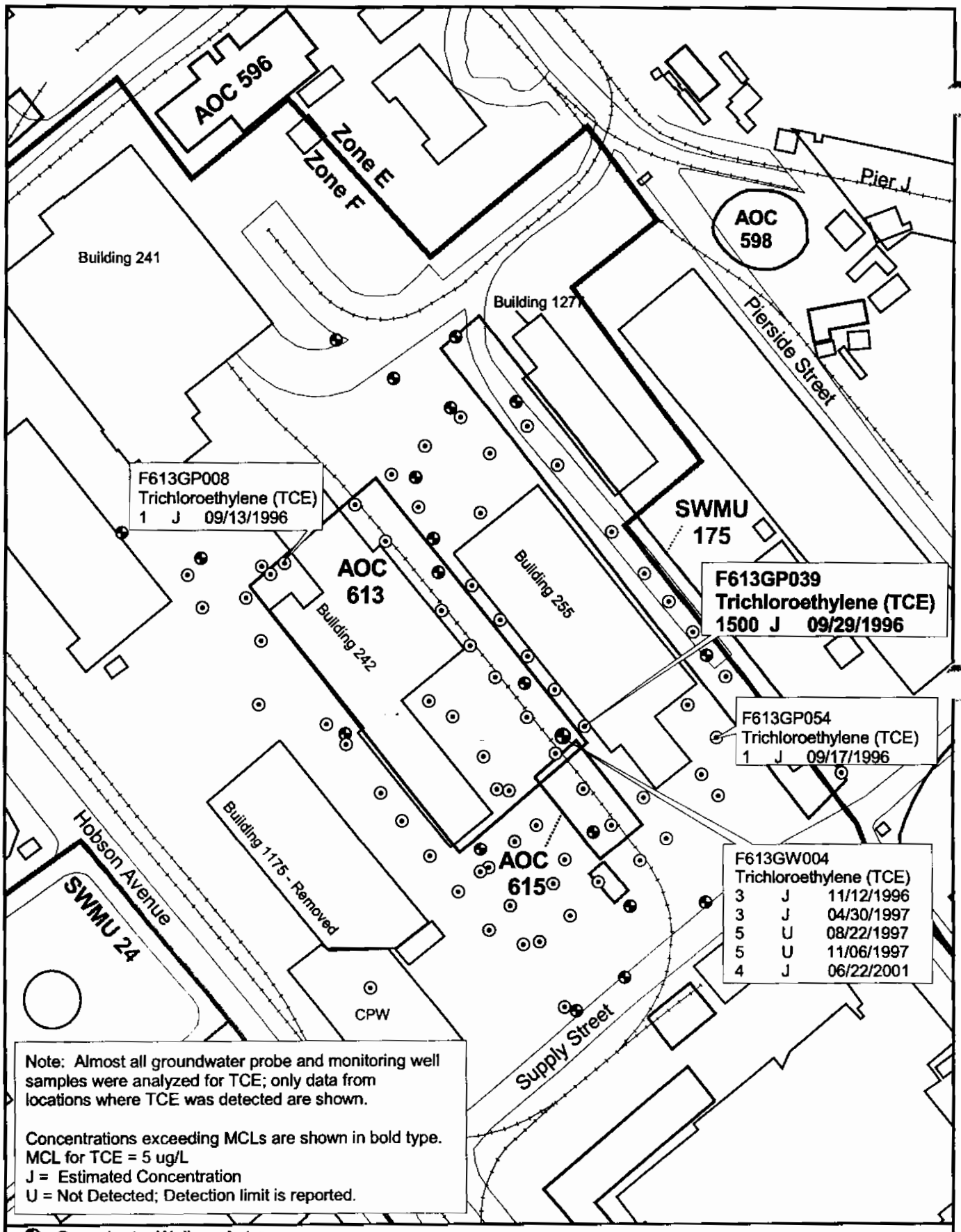


Figure 5-9
TCE Detections in Groundwater
AOCs 613, 615, and SWMU 175, Zone F
Charleston Naval Complex

CH2MHILL

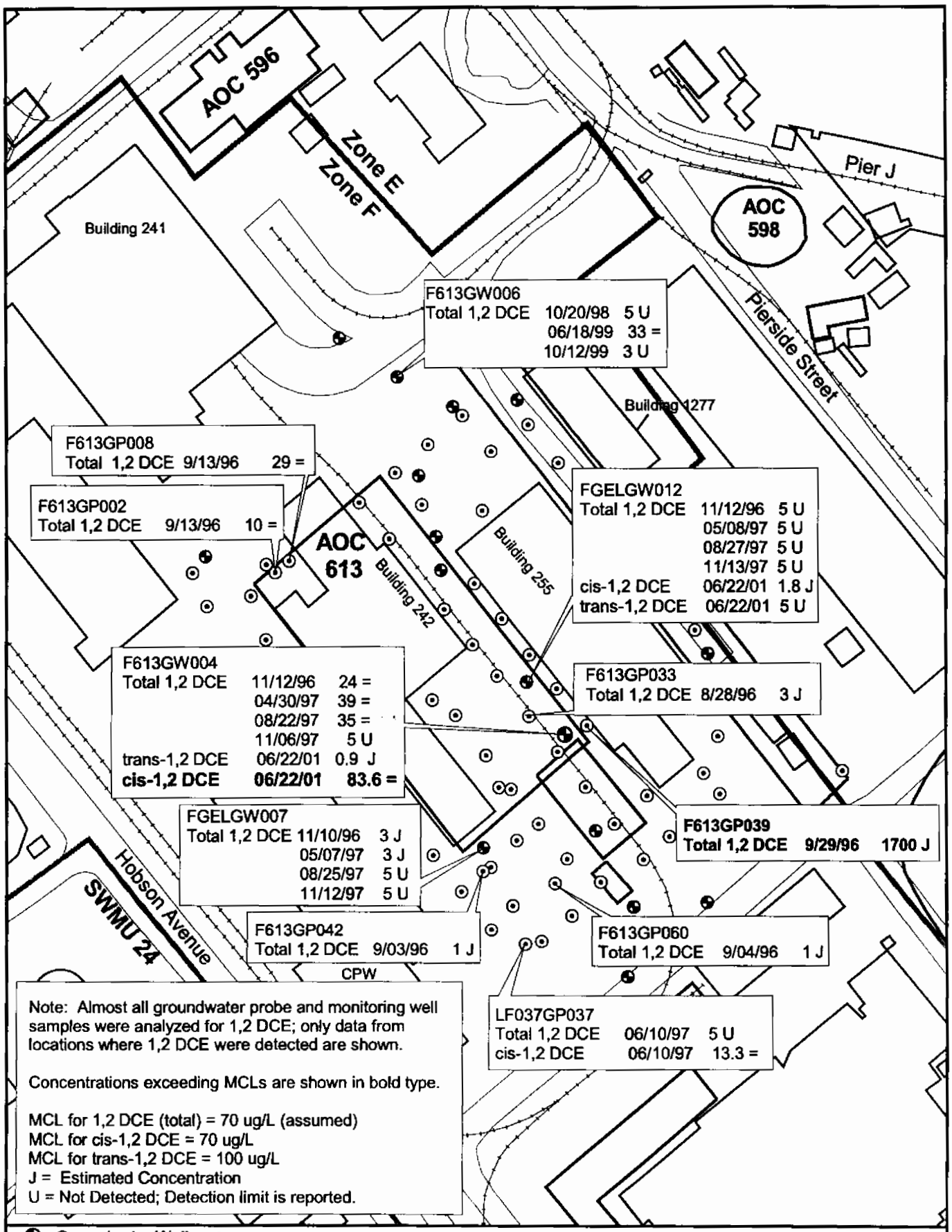
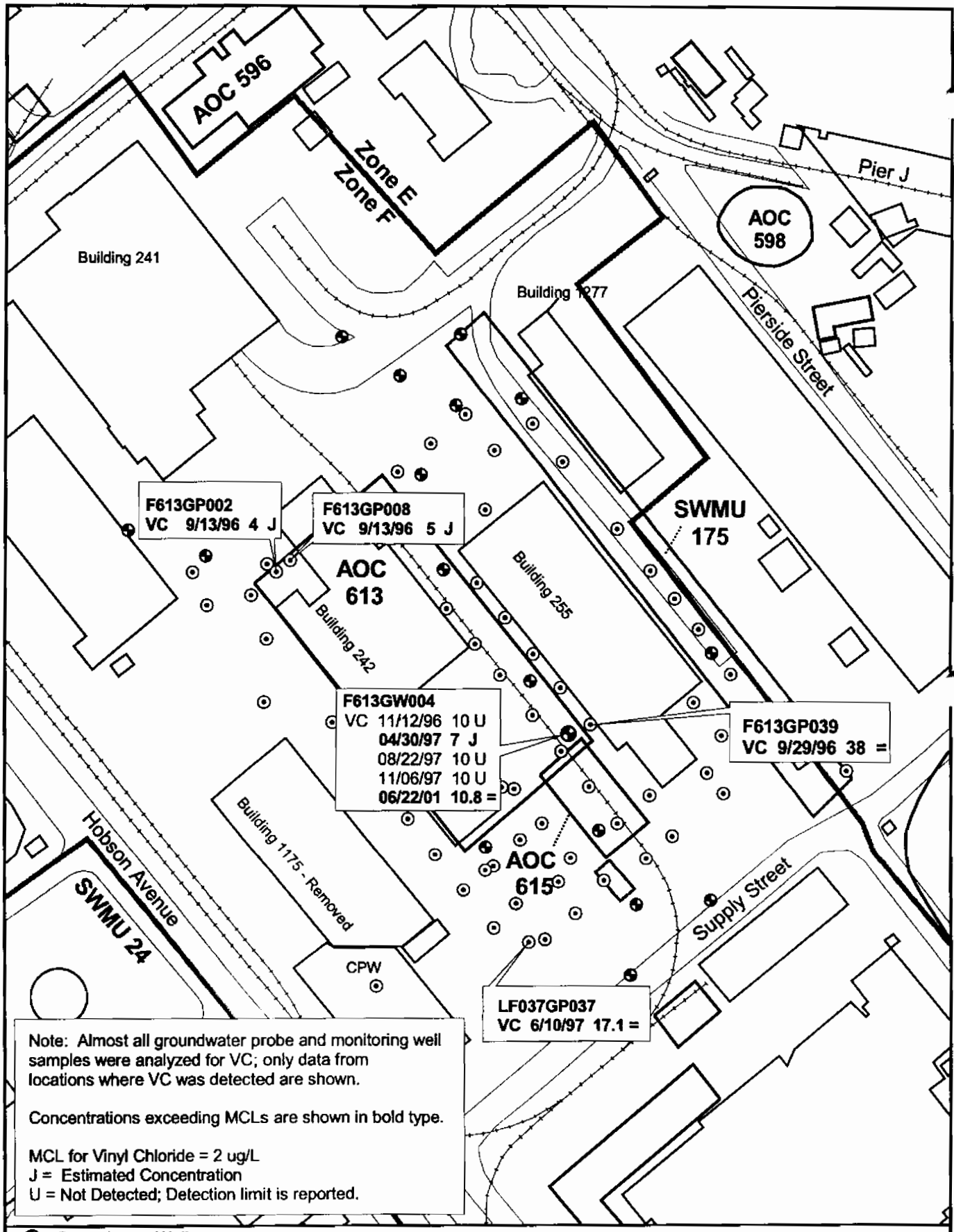


Figure 5-10
1,2-DCE Detections in Groundwater
AOCs 613, 615, and SWMU 175, Zone F
Charleston Naval Complex

CH2MHILL



Groundwater Well
Groundwater Probe
Roads
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary
Railroads

N

0 100 200 Feet

Figure 5-11
Vinyl Chloride Detections in Groundwater
AOCs 613, 615, and SWMU 175, Zone F
Charleston Naval Complex

CH2MHILL

Appendix C

BORING LOG

PROJECT NAME: CNC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratoprobe
BORING NUMBER: 22B11
DATE: 6/4/99
GEOLOGIST:
DRILLER: Randy

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification**	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1				Bl.		Asphalt w/base		Dry				
	2				Ol. Gr.		Silty Clay-Stiff						
	3												
	4		4/4							0	0	0	0
	5												
	6			Moist	Red-Green		Silty Clay-Stiff						
	7												
	8		4/4							0	0	0	0
	9				Red-Gray		Stiff Silty Clay-Sandy Sand		Moist				
	10									0	0	0	0
	11						Sandy Clay						
	12		4/4		Dk. Gray		Clay						
	13				Brown		Fine Sand w/Some		Saturated				
	14						Clay						
	15												
	16		3/4										
	17				Gray		~~Fine~~ Sandy Clay						
	18				Brown		Fine to Coarse Sand						
	19						w/Clay						
	20		4/4										
	21				Lt. Brown		Fine Sand w/Coarse						
	22				Olive		Clayey sand						
	23												
	24		3.5/4										
	25				Brown		~~Sil~~ Silty Sand						

*When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes Temp No Well I.D. #:

BORING LOG

PROJECT NAME: CNC
PROJECT NUMBER:
DRILLING COMPANY: Columbia
DRILLING RIG: Stratoprobe

BORING NUMBER: 22B11
DATE: 6/14/99
GEOLOGIST:
DRILLER: Randy

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	26					Dl.	Sandy Clay		Saturated				
	27					↓	↓		↓				
	28		4/4			↓	↓		↓				
	29					Br.	Medium Sand		↓				
	30		.5/2			↓	↓		↓				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

BORING LOG

Page ___ of ___

PROJECT NAME: CNC
PROJECT NUMBER: 0219
DRILLING COMPANY: Custom Drilling
DRILLING RIG: Mobile B-57

BORING NUMBER: CNC22-MW02D
DATE: 8/19/99
GEOLOGIST: M. Darrington
DRILLER: R. Fuller.

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/Consistency or Rock Hardness	Color	Material Description	USCS*	Remarks	PID/FID Reading (ppm)			
(1)	22	3/6	24"		Soft	olive green	Sandy silt -		No petro. odor	177	0	0	0
		3/6					Fo[illegible] in, Heavy						
		4/6					minerals, slight cohesive (moist)						
	24	6/6					in spots, no fossils, well phosphate nodules.						
(2)	24	1/6	24"		Soft.	olive green	(as above)						
		4/6											
		5/6											
	26	6/6											
(3)	26	3/6	24"		Soft.	olive green	(as above)						
		5/6											
		5/6											
	28	7/6											
(4)	28	2/6	24"	28.	Soft.	olive green	(as above) Top						
		2/6		29.0	loose		1' saturated, loose, clumpy.						
		3/6			Soft	olive green.	(as above) but						
	30	3/6					bottom 1' no clumpy						
				EOB			or loose						
					(*)	28-30 - Suspected of being as this the uppermost portion of the Ashley Formation of the Cooper Group.							
					(*)	30' Termination Depth - Well will be a very low yield well.							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: _____

Drilling Area Background (ppm): 4.4

Converted to Well: Yes ✓ No _____ Well I.D. #: CNC22-MW D

BORING LOG

Page ___ of ___

PROJECT NAME: CNC
PROJECT NUMBER: AK0219
DRILLING COMPANY: Custom Drilling Services
DRILLING RIG: CME

BORING NUMBER: ~~22-MW04-D~~ MW07D (Remain be to CNC22-~~MW04D~~ MW07D)
DATE: 8/16/99
GEOLOGIST: M. Darrington
DRILLER: Bob Fuller.

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length (in.)	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness*	Color	Soil Material Classification	USCS*	Remarks	PID/FID Reading (ppm)			
	9				No Split spoon samples - See								
	15				Boring log for 22B11. on 6/4/99.								
1	15	2 6	24		Firm Gy/B Sandy Clay -			SC	No odors.	22	0	0	0
		4 6					mottled, fairly co-						
		7 6					hesive, plastic, damp,						
	17	8 6					no fossils. Iron staining						
2	17	2	18		Firm Gy/O sandy clay as above				(no odors)	2	0	0	0
		7		19.7	Firm or/Tan sandy clay,				no petro. odors.				
		10			(sand V-Coarse, poorly sorted)								
	19	12			stiff but not cohesive, non plastic, damp - dry								
3	19												
				NO	SAMPLE.								
	21												
4													
				4	TO set 6" dia. PVC Surface Casing								
					to 20.0 ft. bls								
				—	Borehole during split spooning 8.25" / using 4.25" HSAs.								
5				—	Borehole during s. casing installation / 12.25" using 8.25" HSAs.								
6													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 6" PVC Surface Case set to 20.0 ft. bls.

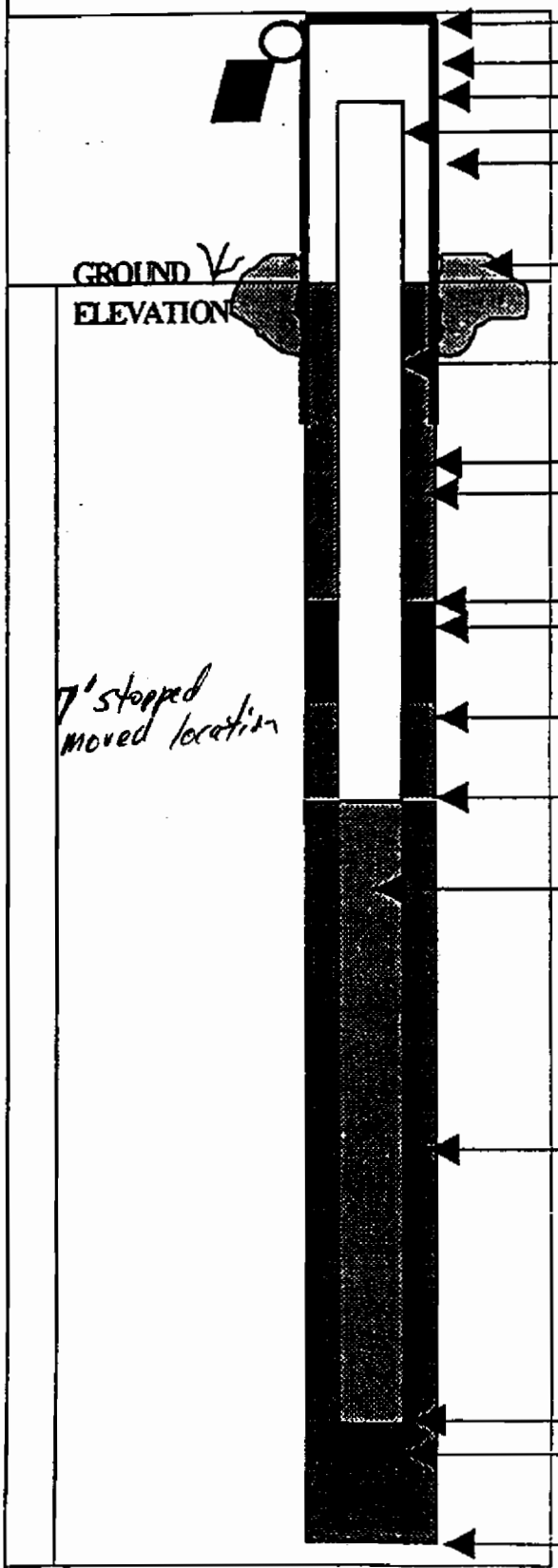
Drilling Area Background (ppm): 0.0

Converted to Well: Yes ✓ No ___ Well I.D. #: 22-MW04-D

BORING NO.: _____

OVERBURDEN MONITORING WELL SHEET

PROJECT CNC	LOCATION: CNC22-MW01	DRILLER Rod
PROJECT NO. CNC22	BORING CNC22-MW01	METHOD: ~~DPT~~ HSA
ELEVATION	DATE 8/5/99	DRILLING Custom Drilling
FIELD GEOLOGIST Marty Ray		DEVELOPMENT: NA



ELEVATION OF TOP OF SURFACE CASING: flush.

ELEVATION OF TOP OF RISER PIPE: _____

STICK-UP TOP OF SURFACE CASING: _____

STICK-UP RISER PIPE: _____

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: Steel man-hole w/ cover

TYPE OF SURFACE SEAL: concrete pad 2'x2'x6"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Sch 40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 8" Hc

ELEVATION / DEPTH OF SEAL: 1'10"

TYPE OS SEAL: 30/65 sand

DEPTH TOP OF SAND PACK: 1'6"

ELEVATION / DEPTH TOP OF SCREEN: 2'10"

TYPE OF SCREEN: Sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 12'10"

ELEVATION / DEPTH BOTTOM OF SAND PACK: 12'16"

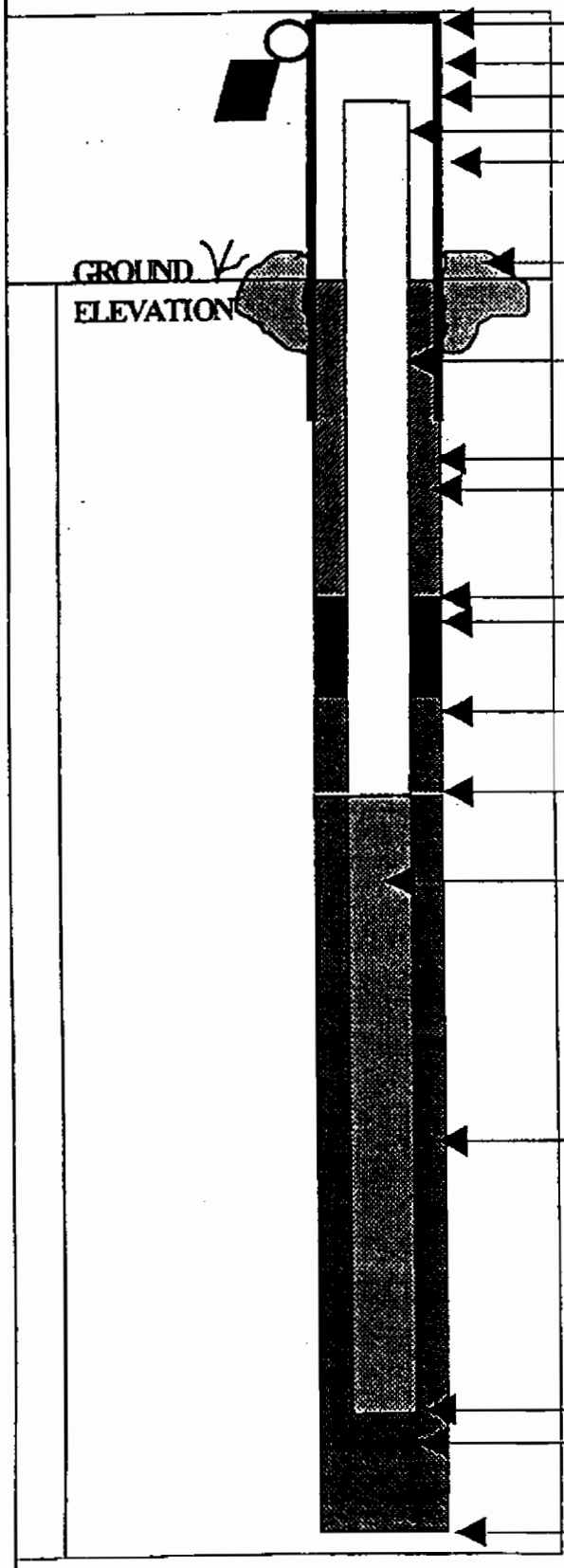
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 sand

ELEVATION / DEPTH OF HOLE: 12'16"

BORING NO.: _____

OVERBURDEN MONITORING WELL SHEET

PROJECT	CNC	LOCATION:	CNC22-MW03	DRILLER	Rod
PROJECT NO.	CNC22	BORING	CNC22-MW03	METHOD:	~~DPT~~ HSA
ELEVATION		DATE	8/6/99	DRILLING	Custom Drilling
FIELD GEOLOGIST	Marty Ray			DEVELOPMENT: NA	



ELEVATION OF TOP OF SURFACE CASING: Flush

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: steel man-hole with cover

TYPE OF SURFACE SEAL: concrete pad 2'x2'x 6"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Sch 40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 6" bls

ELEVATION / DEPTH OF SEAL: 1'0"

TYPE OS SEAL: 30/65 sand

DEPTH TOP OF SAND PACK: 2'0"

ELEVATION / DEPTH TOP OF SCREEN: 4'0"

TYPE OF SCREEN: Sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 14'0"

ELEVATION / DEPTH BOTTOM OF SAND PACK: 14'6"

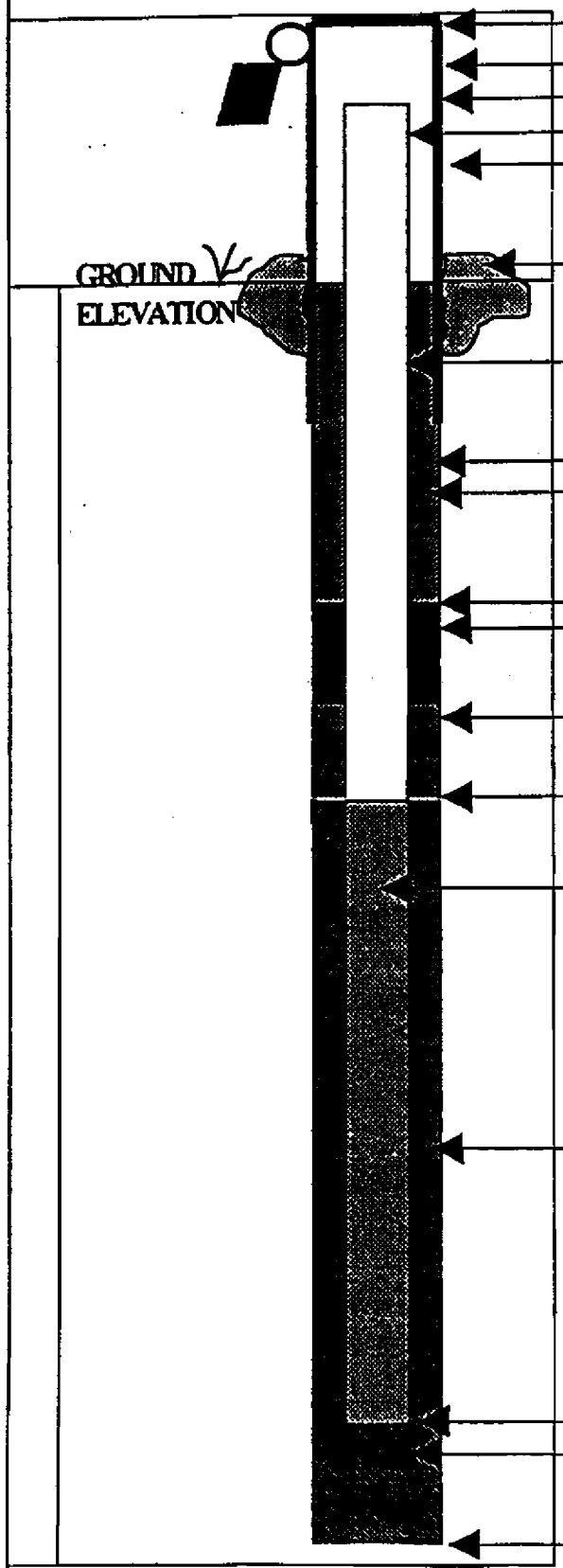
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 sand

ELEVATION / DEPTH OF HOLE: 14'6"

BORING NO.: _____

OVERBURDEN MONITORING WELL SHEET

PROJECT	CNC	LOCATION:	CNC22-MW04	DRILLER	Rod
PROJECT NO.	CNC22	BORING	CNC22-MW04	METHOD: ~~BPT~~	HSA
ELEVATION		DATE	8/2/95	DRILLING	Custom Drilling
FIELD GEOLOGIST	Marty Ray			DEVELOPMENT: NA	



ELEVATION OF TOP OF SURFACE CASING: Flush

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: steel man-hole w/cover

TYPE OF SURFACE SEAL: concrete pad 2'x2'x6"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Sch 40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 6"

ELEVATION / DEPTH OF SEAL: 1'10"

TYPE OS SEAL: 30/65 sand

DEPTH TOP OF SAND PACK: 1'6"

ELEVATION / DEPTH TOP OF SCREEN: 2'10"

TYPE OF SCREEN: Sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30

ELEVATION / DEPTHBOTTOM OF SCREEN: 12'0"

ELEVATION / DEPTH BOTTOM OF SAND PACK: 1

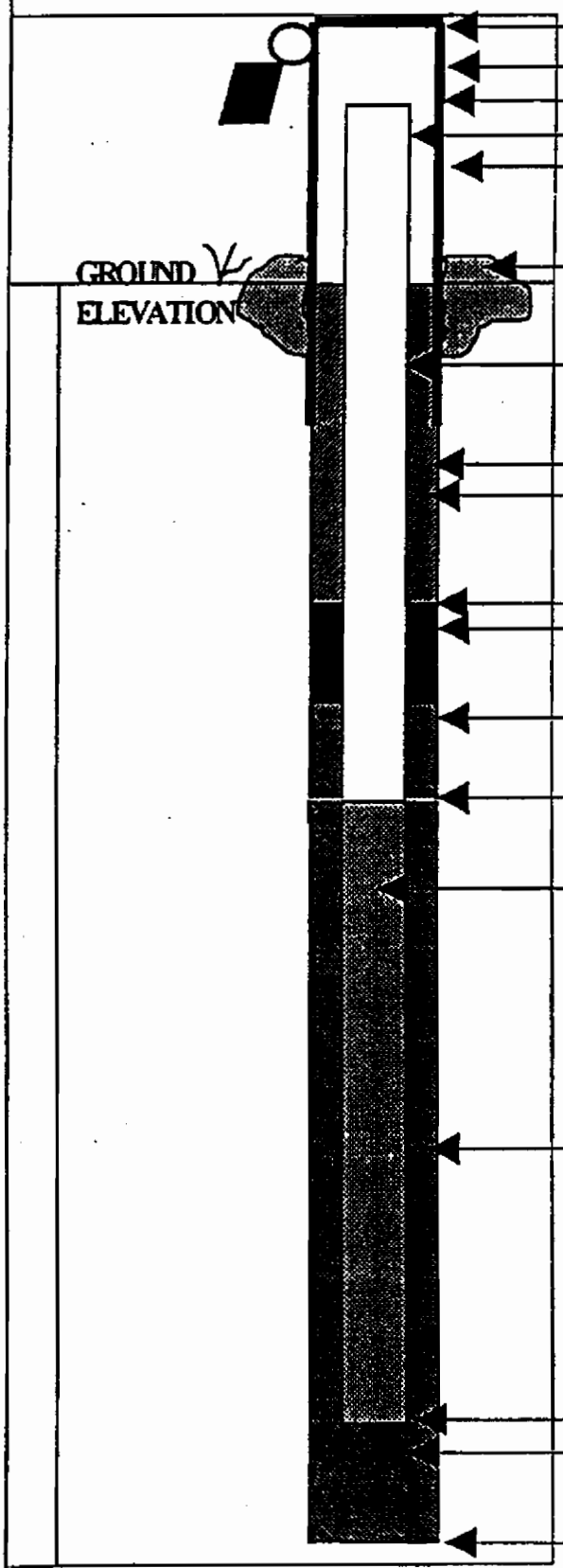
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 sand

ELEVATION / DEPTH OF HOLE: 12'6"

BORING NO.: _____

OVERBURDEN MONITORING WELL SHEET

PROJECT	CNC	LOCATION:	CNC22-MW05	DRILLER	Rod
PROJECT NO.	CNC22	BORING	CNC22-MW05	METHOD:	~~DPT~~ HSA
ELEVATION		DATE	8/6/99	DRILLING	Custom Drilling
FIELD GEOLOGIST	Marty Ray			DEVELOPMENT: NA	



ELEVATION OF TOP OF SURFACE CASING: Flush

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: Steel man-hole w/cover

TYPE OF SURFACE SEAL: concrete pad 2'x2'x6"

RISER PIPE I.D.: 2" Sch 40 PVC

TYPE OF RISER PIPE: Sch 40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 6" b/s

ELEVATION / DEPTH OF SEAL: 1'10"

TYPE OS SEAL: 30/65 sand

DEPTH TOP OF SAND PACK: 2'0"

ELEVATION / DEPTH TOP OF SCREEN: 4'10"

TYPE OF SCREEN: Sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 14'10"

ELEVATION / DEPTH BOTTOM OF SAND PACK: 14'6"

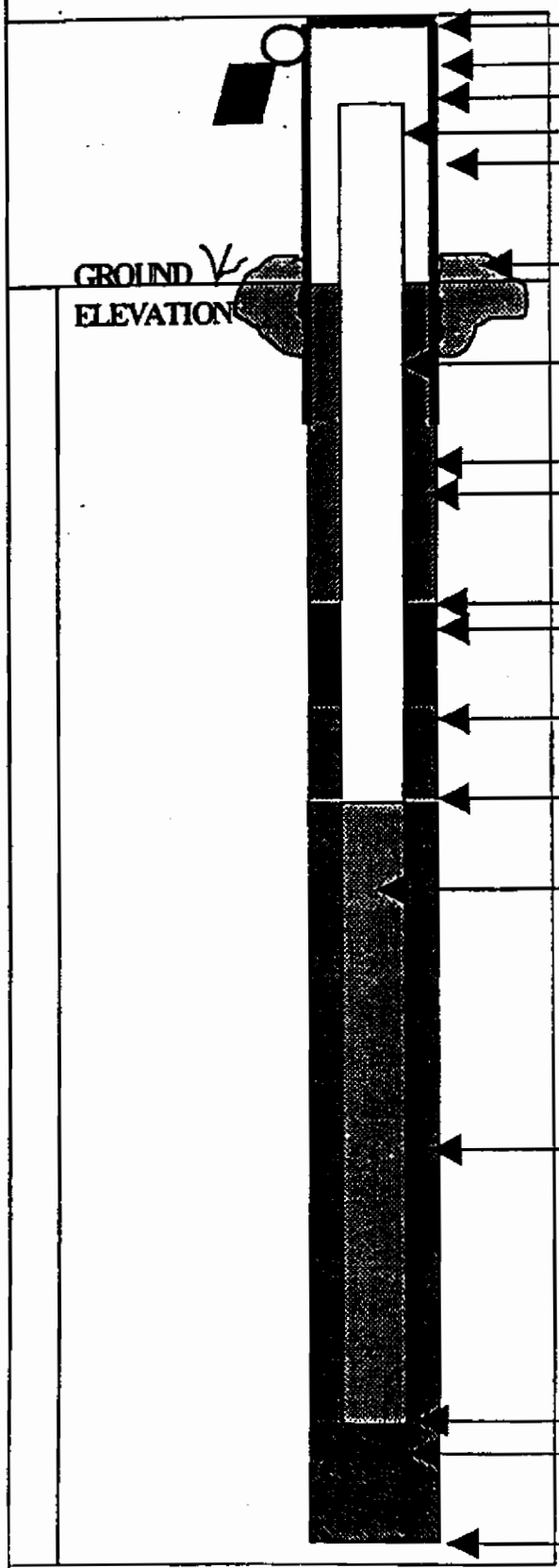
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 Sand

ELEVATION / DEPTH OF HOLE: 14'6"

BORING NO.: _____

OVERBURDEN MONITORING WELL SHEET

PROJECT	CNC	LOCATION:	CNC22-MW07	DRILLER	Rod
PROJECT NO.	CNC22	BORING	CNC22-MW07	METHOD:	~~DPT~~ HSA
ELEVATION		DATE	8/5/99	DRILLING	Custom Drilling
FIELD GEOLOGIST	Marty Ray			DEVELOPMENT: NA	



ELEVATION OF TOP OF SURFACE CASING: Flush

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: steel mud hole w/cover

TYPE OF SURFACE SEAL: concrete pad 2'x2'x6"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Sch 40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 6"bls

ELEVATION / DEPTH OF SEAL: 2'0"

TYPE OS SEAL: 30/65 sand

DEPTH TOP OF SAND PACK: 3'0"

ELEVATION / DEPTH TOP OF SCREEN: 4'0"

TYPE OF SCREEN: Sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 14'0"

ELEVATION / DEPTH BOTTOM OF SAND PACK: 20'0"

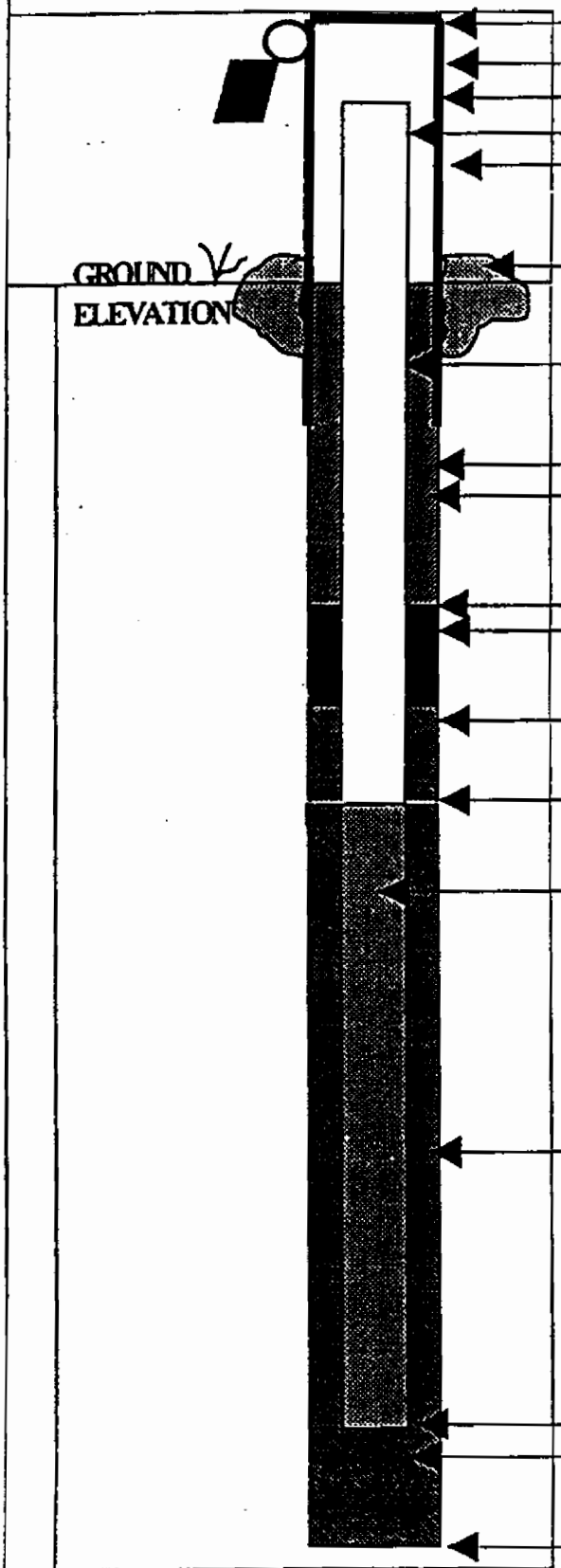
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 sand

ELEVATION / DEPTH OF HOLE: 20'0"

BORING NO.: _____

OVERBURDEN MONITORING WELL SHEET

PROJECT	CNC	LOCATION:	CNC22-MW07	DRILLER	Rod
PROJECT NO.	CNC22	BORING	CNC22-MW07	METHOD: ~~DPT~~ HSA	
ELEVATION		DATE	8/6/97	DRILLING	Custom Drilling
FIELD GEOLOGIST	Marty Ray			DEVELOPMENT: NA	



ELEVATION OF TOP OF SURFACE CASING: Flush

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING:

STICK-UP RISER PIPE:

I.D. OF SURFACE CASING: 8"

TYPE OF SURFACE CASING: Steel man-hole with cover

TYPE OF SURFACE SEAL: concrete pad ~~or~~ 2'x2'x6"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: sch 40 PVC

BOREHOLE DIAMETER: 4.25"

TYPE OF SEAL: grout to 6" b/s

ELEVATION / DEPTH OF SEAL: 1'00

TYPE OS SEAL: 30/65 Sand

DEPTH TOP OF SAND PACK: 2'00

ELEVATION / DEPTH TOP OF SCREEN: 4'00

TYPE OF SCREEN: sch 40 PVC

SLOT SIZE X LENGTH: 10 slot

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 sand

ELEVATION / DEPTHBOTTOM OF SCREEN: 14'10"

ELEVATION / DEPTH BOTTOM OF SAND PACK: 14'15"

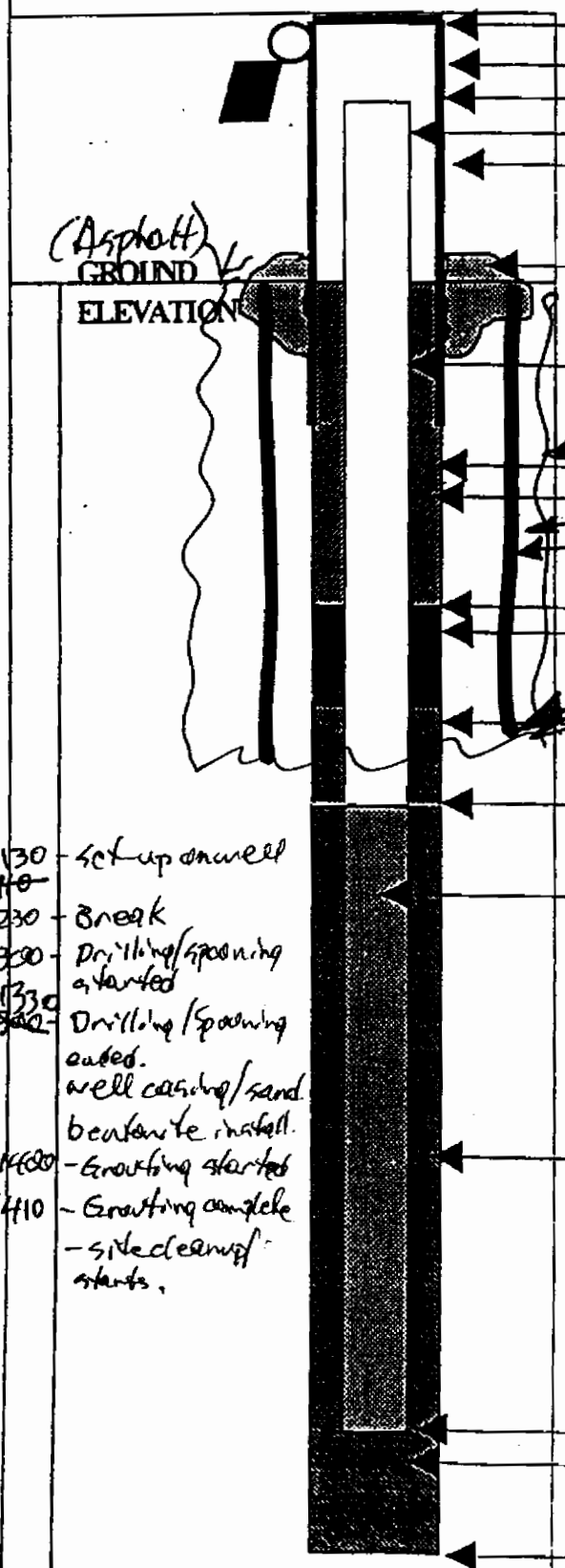
TYPE OF BACKFILL BELOW OBSERVATION WELL: 20/30 sand

ELEVATION / DEPTH OF HOLE: 14'15"

BORING NO.: CNC22-MW07D

OVERBURDEN MONITORING WELL SHEET

PROJECT CNC	LOCATION: S.Yc22/	DRILLER Custom Drilling
PROJECT NO. 0219	BORING CNC22-MW07D	METHOD: ~~DPT~~ ~~#5~~ 7/8" Mud Rotary
ELEVATION	DATE 8/19/99 & 8/16/99	DRILLING Rod Fuller.
FIELD GEOLOGIST Mark Darrington		DEVELOPMENT: NA



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: Flush.

STICK-UP RISER PIPE: Flush

I.D. OF SURFACE CASING: 8" ID x 10" OD

TYPE OF SURFACE CASING: Flush mount steel curb box (PEWCO)

TYPE OF SURFACE SEAL: Concrete Pad (Quickcrete) 2ft x 2ft. x 6 in.

RISER PIPE I.D.: 2 in.

TYPE OF RISER PIPE: PVC, Sch. 40, Flush Thread (F.T.)

Surface Case Borehole: 12.25 in.

BOREHOLE DIAMETER: 6"

TYPE OF SEAL: Portland Cement Type I

6" dia. PVC, Sch. 40, F.T. Surface Casing

ELEVATION / DEPTH OF SEAL: 121

TYPE OS SEAL: 3/8 in Bentonite Plug

Depth of Surface Case: 20 ft.

DEPTH TOP OF SAND PACK: 23

ELEVATION / DEPTH TOP OF SCREEN: 125'

TYPE OF SCREEN: PVC, Sch. 40, F.T.

SLOT SIZE X LENGTH: 0.010 x 5ft.

I.D. OF SCREEN: 2 in.

TYPE OF SAND PACK: Fine Qtz. Sand (20/30) ~~3 50lb~~ (3 bags @ 50 lbs/ea.)

ELEVATION / DEPTHBOTTOM OF SCREEN: 130

ELEVATION / DEPTH BOTTOM OF SAND PACK: 130

TYPE OF BACKFILL BELOW OBSERVATION WELL: (20/30) Fine Qtz. Sand

ELEVATION / DEPTH OF HOLE:

1130 - set up on well
~~1140~~
1230 - Break
1300 - Drilling/spooning started
1330 - Drilling/Spooning ended.
well casing/sand
bentonite install.
1400 - Grouting started
1410 - Grouting complete
- site cleanup starts.

Appendix D

Groundwater VOCs

	StationID	F613GP069		F613GP069		F613GP070	
	SampleID	613GP06912		613GP06924		613GP07024	
	DateCollected	7/10/2002		7/10/2002		7/10/2002	
	DateExtracted	7/16/2002		7/16/2002		7/16/2002	
	DateAnalyzed	7/16/2002		7/16/2002		7/16/2002	
	SDGNumber	63483		63483		63483	
Parameter	**Units**						
Naphthalene	ug/L						
Chloromethane	ug/L						
Vinyl chloride	ug/L	10	U	10	U	10	U
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L	5	U	5	U	5	U
1,1-Dichloroethane	ug/L						
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L	1.6	J	5	U	0.87	J
1,2-Dichloroethene (total)	ug/L	1.6	J	5	U	0.87	J
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L						
Trichloroethylene (TCE)	ug/L	0.4	J	5	U	5	U
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L						
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs

	StationID	F613GP071		F613GP072		F613GP073	
	SampleID	613GP07124		613GP07224		613GP07324	
	DateCollected	7/10/2002		7/10/2002		7/10/2002	
	DateExtracted	7/16/2002		7/16/2002		7/16/2002	
	DateAnalyzed	7/16/2002		7/16/2002		7/16/2002	
	SDGNumber	63483		63483		63483	
Parameter	**Units**						
Naphthalene	ug/L						
Chloromethane	ug/L						
Vinyl chloride	ug/L	10	U	10	U	10	U
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L	5	U	5	U	5	U
1,1-Dichloroethane	ug/L						
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L	5	U	5	U	5	U
1,2-Dichloroethene (total)	ug/L	5	U	5	U	5	U
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L						
Trichloroethylene (TCE)	ug/L	5	U	5	U	5	U
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L						
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	F613GP073		F613GW004		F613GW004	
	SampleID	613HP07324		613GW004M2		613GW004M5	
	DateCollected	7/10/2002		7/1/2002		10/31/2002	
	DateExtracted	7/16/2002		7/9/2002		11/6/2002	
	DateAnalyzed	7/16/2002		7/9/2002		11/6/2002	
	SDGNumber	63483		63056		69740	
Parameter	Units						
Naphthalene	ug/L						
Chloromethane	ug/L						
Vinyl chloride	ug/L	10	U	10.2	J	11.2	=
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L	5	U	0.9	J	0.44	J
1,1-Dichloroethane	ug/L					5	U
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L	5	U	74.6	J	43.8	=
1,2-Dichloroethene (total)	ug/L	5	U	75.5	J	44.3	=
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L						
Trichloroethylene (TCE)	ug/L	5	U	3.4	J	0.86	J
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L						
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	F613GW004		F613GW009		F613GW009	
	SampleID	613HW004M5		613GW009M2		613GW009M5	
	DateCollected	10/31/2002		7/1/2002		10/31/2002	
	DateExtracted	11/6/2002		7/9/2002		11/6/2002	
	DateAnalyzed	11/6/2002		7/9/2002		11/6/2002	
	SDGNumber	69740		63057		69740	
Parameter	**Units**						
Naphthalene	ug/L						
Chloromethane	ug/L						
Vinyl chloride	ug/L	10.1	=	10	UJ	10	U
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L	0.5	J	5	UJ	5	U
1,1-Dichloroethane	ug/L	5	U			5	U
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L	42.4	=	5	UJ	5	U
1,2-Dichloroethene (total)	ug/L	42.9	=	5	UJ	5	U
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L						
Trichloroethylene (TCE)	ug/L	0.82	J	5	UJ	5	U
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L						
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	F613GW010		F613GW010		F613GW011	
	SampleID	613GW010M3		613GW010M5		613GW011M3	
	DateCollected	8/5/2002		10/31/2002		8/5/2002	
	DateExtracted	8/8/2002		11/6/2002		8/8/2002	
	DateAnalyzed	8/8/2002		11/6/2002		8/8/2002	
	SDGNumber	64813		69740		64813	
Parameter	Units						
Naphthalene	ug/L						
Chloromethane	ug/L						
Vinyl chloride	ug/L	0.71	J	10	U	1	U
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L	5	U			5	U
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L	5	U	5	U	5	U
1,1-Dichloroethane	ug/L			1.1	J		
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L	1.5	J	1.4	J	5	U
1,2-Dichloroethene (total)	ug/L	1.5	J	1.4	J	5	U
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L						
Trichloroethylene (TCE)	ug/L	5	U	5	U	5	U
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L						
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	F613GW011		FGELGW007		FGELGW008	
	SampleID	613GW011M5		GELGW007M5		GELGW008M5	
	DateCollected	10/31/2002		10/31/2002		10/31/2002	
	DateExtracted	11/6/2002		11/6/2002		11/6/2002	
	DateAnalyzed	11/6/2002		11/6/2002		11/6/2002	
	SDGNumber	69740		69740		69740	
Parameter	**Units**						
Naphthalene	ug/L						
Chloromethane	ug/L						
Vinyl chloride	ug/L	10	U	10	U	10	U
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L	5	U	5	U	5	U
1,1-Dichloroethane	ug/L	5	U	5	U	5	U
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L	5	U	5	U	5	U
1,2-Dichloroethene (total)	ug/L	5	U	5	U	5	U
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L						
Trichloroethylene (TCE)	ug/L	5	U	5	U	5	U
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L						
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	FGELGW011		FGELGW012		FGELGW012	
	SampleID	GELGW011M2		GELGW012M2		GELGW012M5	
	DateCollected	7/1/2002		7/1/2002		10/31/2002	
	DateExtracted	7/9/2002		7/9/2002		11/6/2002	
	DateAnalyzed	7/9/2002		7/9/2002		11/6/2002	
	SDGNumber	63057		63057		69740	
Parameter	Units						
Naphthalene	ug/L						
Chloromethane	ug/L						
Vinyl chloride	ug/L	10	UJ	10	UJ	10	U
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L	5	UJ	5	UJ	5	U
1,1-Dichloroethane	ug/L					5	U
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L	5	UJ	0.57	J	0.62	J
1,2-Dichloroethene (total)	ug/L	5	UJ	0.57	J	0.62	J
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L						
Trichloroethylene (TCE)	ug/L	5	UJ	5	UJ	5	U
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L						
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	FGELGW014		FU22GW001		FU22GW001	
	SampleID	GELGW014M2		U22GW001L2		U22GW001L3	
	DateCollected	7/2/2002		5/21/2001		11/12/2001	
	DateExtracted	7/9/2002		5/29/2001		11/13/2001	
	DateAnalyzed	7/9/2002		5/29/2001		11/13/2001	
	SDGNumber	63058		CNC18		51883	
Parameter	**Units**						
Naphthalene	ug/L					1	U
Chloromethane	ug/L			10	U		
Vinyl chloride	ug/L			10	U		
Bromomethane	ug/L			10	UJ		
Chloroethane	ug/L			10	U		
1,1-Dichloroethene	ug/L			5	U		
Acetone	ug/L			16	U		
Carbon Disulfide	ug/L			5	U		
Methylene Chloride	ug/L	1.9	J	5	U		
trans-1,2-Dichloroethene	ug/L			5	U		
1,1-Dichloroethane	ug/L			2	J		
Vinyl acetate	ug/L			10	U		
Methyl ethyl ketone (2-Butanone)	ug/L			10	U		
cis-1,2-Dichloroethylene	ug/L			5	U		
1,2-Dichloroethene (total)	ug/L			5	U		
Chloroform	ug/L			5	U		
1,1,1-Trichloroethane	ug/L			5	U		
Carbon Tetrachloride	ug/L			5	U		
1,2-Dichloroethane	ug/L			5	U		
Benzene	ug/L			5	U	1	U
Trichloroethylene (TCE)	ug/L			5	U		
1,2-Dichloropropane	ug/L			5	U		
Bromodichloromethane	ug/L			5	U		
2-Chloroethyl vinyl ether	ug/L			10	U		
cis-1,3-Dichloropropene	ug/L			5	U		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L			10	U		
Toluene	ug/L			5	U	0.36	J
trans-1,3-Dichloropropene	ug/L			5	U		
1,1,2-Trichloroethane	ug/L			5	U		
2-Hexanone	ug/L			10	U		

Groundwater VOCs	StationID	FU22GW001		FU22GW001		FU22GW001	
	SampleID	U22GW001M1		U22GW001M3		U22GW001M5	
	DateCollected	6/3/2002		12/3/2002		10/31/2002	
	DateExtracted	6/4/2002		12/6/2002		11/6/2002	
	DateAnalyzed	6/4/2002		12/6/2002		11/6/2002	
	SDGNumber	61380		71534		69740	
Parameter	**Units**						
Naphthalene	ug/L	1	U	1	U		
Chloromethane	ug/L						
Vinyl chloride	ug/L					10	UJ
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L					5	UJ
1,1-Dichloroethane	ug/L					5	UJ
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L					5	UJ
1,2-Dichloroethene (total)	ug/L					5	UJ
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L	1	U	1	U		
Trichloroethylene (TCE)	ug/L					5	UJ
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L	0.4	J	1	U		
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	FU22GW002		FU22GW002		FU22GW002	
	SampleID	U22GW002L2		U22GW002L3		U22GW002M1	
	DateCollected	5/21/2001		11/12/2001		6/3/2002	
	DateExtracted	5/29/2001		11/13/2001		6/4/2002	
	DateAnalyzed	5/29/2001		11/13/2001		6/4/2002	
	SDGNumber	CNC18		51883		61380	
Parameter	**Units**						
Naphthalene	ug/L			1	U	1	U
Chloromethane	ug/L	10	U				
Vinyl chloride	ug/L	4.5	J				
Bromomethane	ug/L	10	UJ				
Chloroethane	ug/L	5.5	J				
1,1-Dichloroethene	ug/L	5	U				
Acetone	ug/L	16	U				
Carbon Disulfide	ug/L	5	U				
Methylene Chloride	ug/L	5	U				
trans-1,2-Dichloroethene	ug/L	5	U				
1,1-Dichloroethane	ug/L	26	=				
Vinyl acetate	ug/L	10	U				
Methyl ethyl ketone (2-Butanone)	ug/L	10	U				
cis-1,2-Dichloroethylene	ug/L	3.6	J				
1,2-Dichloroethene (total)	ug/L	3.6	J				
Chloroform	ug/L	5	U				
1,1,1-Trichloroethane	ug/L	5	U				
Carbon Tetrachloride	ug/L	5	U				
1,2-Dichloroethane	ug/L	5	U				
Benzene	ug/L	2.1	J	10.4	=	2.5	=
Trichloroethylene (TCE)	ug/L	0.8	J				
1,2-Dichloropropane	ug/L	5	U				
Bromodichloromethane	ug/L	5	U				
2-Chloroethyl vinyl ether	ug/L	10	U				
cis-1,3-Dichloropropene	ug/L	5	U				
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U				
Toluene	ug/L	5	U	0.21	J	1	U
trans-1,3-Dichloropropene	ug/L	5	U				
1,1,2-Trichloroethane	ug/L	5	U				
2-Hexanone	ug/L	10	U				

Groundwater VOCs	StationID	FU22GW002		FU22GW002		FU22GW002	
	SampleID	U22GW002M2		U22GW002M3		U22GW002M5	
	DateCollected	7/1/2002		12/3/2002		10/31/2002	
	DateExtracted	7/9/2002		12/6/2002		11/6/2002	
	DateAnalyzed	7/9/2002		12/6/2002		11/6/2002	
	SDGNumber	63057		71534		69740	
Parameter	**Units**						
Naphthalene	ug/L			1	U		
Chloromethane	ug/L						
Vinyl chloride	ug/L	3.8	J			4.2	J
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L	5	UJ			5	U
1,1-Dichloroethane	ug/L					17	=
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L	3.8	J			3.1	J
1,2-Dichloroethene (total)	ug/L	3.8	J			3.1	J
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L			5.9	=		
Trichloroethylene (TCE)	ug/L	5	UJ			5	U
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L			1	U		
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	FU22GW002		FU22GW003		FU22GW003	
	SampleID	U22HW002M2		U22GW003L2		U22GW003L3	
	DateCollected	7/1/2002		5/21/2001		11/12/2001	
	DateExtracted	7/9/2002		6/1/2001		11/13/2001	
	DateAnalyzed	7/9/2002		6/1/2001		11/13/2001	
	SDGNumber	63057		CNC18		51883	
Parameter	**Units**						
Naphthalene	ug/L					1	U
Chloromethane	ug/L			10	U		
Vinyl chloride	ug/L	3.5	J	14	=		
Bromomethane	ug/L			10	UJ		
Chloroethane	ug/L			7	J		
1,1-Dichloroethene	ug/L			5	U		
Acetone	ug/L			17	U		
Carbon Disulfide	ug/L			5	U		
Methylene Chloride	ug/L			5	U		
trans-1,2-Dichloroethene	ug/L	5	UJ	5	U		
1,1-Dichloroethane	ug/L			61	=		
Vinyl acetate	ug/L			10	U		
Methyl ethyl ketone (2-Butanone)	ug/L			10	U		
cis-1,2-Dichloroethylene	ug/L	3.6	J	8.2	=		
1,2-Dichloroethene (total)	ug/L	3.6	J	8.2	=		
Chloroform	ug/L			5	U		
1,1,1-Trichloroethane	ug/L			5	U		
Carbon Tetrachloride	ug/L			5	U		
1,2-Dichloroethane	ug/L			5	U		
Benzene	ug/L			12	=	28.5	=
Trichloroethylene (TCE)	ug/L	5	UJ	0.81	J		
1,2-Dichloropropane	ug/L			5	U		
Bromodichloromethane	ug/L			5	U		
2-Chloroethyl vinyl ether	ug/L			10	U		
cis-1,3-Dichloropropene	ug/L			5	U		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L			10	U		
Toluene	ug/L			5	U	0.34	J
trans-1,3-Dichloropropene	ug/L			5	U		
1,1,2-Trichloroethane	ug/L			5	U		
2-Hexanone	ug/L			10	U		

Groundwater VOCs

	StationID	FU22GW003		FU22GW003		FU22GW003	
	SampleID	U22GW003M1		U22GW003M3		U22GW003M5	
	DateCollected	6/3/2002		12/4/2002		10/31/2002	
	DateExtracted	6/4/2002		12/6/2002		11/6/2002	
	DateAnalyzed	6/4/2002		12/6/2002		11/6/2002	
	SDGNumber	61380		71534		69740	
Parameter	**Units**						
Naphthalene	ug/L	1	U	1	U		
Chloromethane	ug/L						
Vinyl chloride	ug/L					5.6	J
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L					5	U
1,1-Dichloroethane	ug/L					26.7	=
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L					3.2	J
1,2-Dichloroethene (total)	ug/L					3.2	J
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L	16.7	=	8.4	=		
Trichloroethylene (TCE)	ug/L					0.4	J
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L	1	U	1	U		
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	FU22GW003		FU22GW003		FU22GW003	
	SampleID	U22HW003L2		U22HW003L2a		U22HW003M1	
	DateCollected	5/21/2001		5/21/2001		6/3/2002	
	DateExtracted	6/1/2001		11/13/2001		6/4/2002	
	DateAnalyzed	6/1/2001		11/13/2001		6/4/2002	
	SDGNumber	CNC18		51883		61380	
Parameter	**Units**						
Naphthalene	ug/L			1	U	1	U
Chloromethane	ug/L	10	U				
Vinyl chloride	ug/L	13	=				
Bromomethane	ug/L	10	UJ				
Chloroethane	ug/L	7.1	J				
1,1-Dichloroethene	ug/L	5	U				
Acetone	ug/L	10	U				
Carbon Disulfide	ug/L	5	U				
Methylene Chloride	ug/L	5	U				
trans-1,2-Dichloroethene	ug/L	5	U				
1,1-Dichloroethane	ug/L	66	=				
Vinyl acetate	ug/L	10	U				
Methyl ethyl ketone (2-Butanone)	ug/L	10	U				
cis-1,2-Dichloroethylene	ug/L	8.9	=				
1,2-Dichloroethene (total)	ug/L	8.9	=				
Chloroform	ug/L	5	U				
1,1,1-Trichloroethane	ug/L	5	U				
Carbon Tetrachloride	ug/L	5	U				
1,2-Dichloroethane	ug/L	5	U				
Benzene	ug/L	13	=	26	=	14.5	=
Trichloroethylene (TCE)	ug/L	0.56	J				
1,2-Dichloropropane	ug/L	5	U				
Bromodichloromethane	ug/L	5	U				
2-Chloroethyl vinyl ether	ug/L	10	U				
cis-1,3-Dichloropropene	ug/L	5	U				
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U				
Toluene	ug/L	5	U	0.32	J	1	U
trans-1,3-Dichloropropene	ug/L	5	U				
1,1,2-Trichloroethane	ug/L	5	U				
2-Hexanone	ug/L	10	U				

Groundwater VOCs	StationID	FU22GW003		FU22GW004		FU22GW004	
	SampleID	U22HW003M3		U22GW004L2		U22GW004L3	
	DateCollected	12/4/2002		5/21/2001		11/12/2001	
	DateExtracted	12/6/2002		5/29/2001		11/14/2001	
	DateAnalyzed	12/6/2002		5/29/2001		11/14/2001	
	SDGNumber	71534		CNC18		51883	
Parameter	**Units**						
Naphthalene	ug/L	1	U			1	U
Chloromethane	ug/L			10	U		
Vinyl chloride	ug/L			0.86	J		
Bromomethane	ug/L			10	UJ		
Chloroethane	ug/L			10	U		
1,1-Dichloroethene	ug/L			5	U		
Acetone	ug/L			10	U		
Carbon Disulfide	ug/L			5	U		
Methylene Chloride	ug/L			5	U		
trans-1,2-Dichloroethene	ug/L			5	U		
1,1-Dichloroethane	ug/L			15	=		
Vinyl acetate	ug/L			10	U		
Methyl ethyl ketone (2-Butanone)	ug/L			10	U		
cis-1,2-Dichloroethylene	ug/L			2	J		
1,2-Dichloroethene (total)	ug/L			2	J		
Chloroform	ug/L			5	U		
1,1,1-Trichloroethane	ug/L			5	U		
Carbon Tetrachloride	ug/L			5	U		
1,2-Dichloroethane	ug/L			5	U		
Benzene	ug/L	8.6	=	0.6	J	1	U
Trichloroethylene (TCE)	ug/L			1.1	J		
1,2-Dichloropropane	ug/L			5	U		
Bromodichloromethane	ug/L			5	U		
2-Chloroethyl vinyl ether	ug/L			10	U		
cis-1,3-Dichloropropene	ug/L			5	U		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L			10	U		
Toluene	ug/L	1	U	5	U	1	U
trans-1,3-Dichloropropene	ug/L			5	U		
1,1,2-Trichloroethane	ug/L			5	U		
2-Hexanone	ug/L			10	U		

Groundwater VOCs	StationID	FU22GW004		FU22GW004		FU22GW004	
	SampleID	U22GW004M1		U22GW004M3		U22GW004M5	
	DateCollected	6/3/2002		12/3/2002		10/31/2002	
	DateExtracted	6/4/2002		12/6/2002		11/6/2002	
	DateAnalyzed	6/4/2002		12/6/2002		11/6/2002	
	SDGNumber	61380		71534		69740	
Parameter	**Units**						
Naphthalene	ug/L	1	U	1	U		
Chloromethane	ug/L						
Vinyl chloride	ug/L					10	U
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L					5	U
1,1-Dichloroethane	ug/L					8.4	=
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L					1.2	J
1,2-Dichloroethene (total)	ug/L					1.2	J
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L	0.5	J	0.58	J		
Trichloroethylene (TCE)	ug/L					0.75	J
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L	1	U	1	U		
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs

	StationID	FU22GW005		FU22GW005		FU22GW005	
	SampleID	U22GW005L2		U22GW005L3		U22GW005M1	
	DateCollected	5/21/2001		11/12/2001		6/3/2002	
	DateExtracted	5/29/2001		11/14/2001		6/4/2002	
	DateAnalyzed	5/29/2001		11/14/2001		6/4/2002	
	SDGNumber	CNC18		51883		61380	
Parameter	**Units**						
Naphthalene	ug/L			1	U	1	U
Chloromethane	ug/L	10	U				
Vinyl chloride	ug/L	10	U				
Bromomethane	ug/L	10	UJ				
Chloroethane	ug/L	10	U				
1,1-Dichloroethene	ug/L	5	U				
Acetone	ug/L	17	U				
Carbon Disulfide	ug/L	5	U				
Methylene Chloride	ug/L	5	U				
trans-1,2-Dichloroethene	ug/L	5	U				
1,1-Dichloroethane	ug/L	5	U				
Vinyl acetate	ug/L	10	U				
Methyl ethyl ketone (2-Butanone)	ug/L	10	U				
cis-1,2-Dichloroethylene	ug/L	5	U				
1,2-Dichloroethene (total)	ug/L	5	U				
Chloroform	ug/L	5	U				
1,1,1-Trichloroethane	ug/L	5	U				
Carbon Tetrachloride	ug/L	5	U				
1,2-Dichloroethane	ug/L	5	U				
Benzene	ug/L	5	U	1	U	1	U
Trichloroethylene (TCE)	ug/L	0.91	J				
1,2-Dichloropropane	ug/L	5	U				
Bromodichloromethane	ug/L	5	U				
2-Chloroethyl vinyl ether	ug/L	10	U				
cis-1,3-Dichloropropene	ug/L	5	U				
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	10	U				
Toluene	ug/L	5	U	1	U	1	U
trans-1,3-Dichloropropene	ug/L	5	U				
1,1,2-Trichloroethane	ug/L	5	U				
2-Hexanone	ug/L	10	U				

Groundwater VOCs	StationID	FU22GW005		FU22GW005		FU22GW006	
	SampleID	U22GW005M3		U22GW005M5		U22GW006L2	
	DateCollected	12/4/2002		10/31/2002		5/21/2001	
	DateExtracted	12/6/2002		11/6/2002		5/29/2001	
	DateAnalyzed	12/6/2002		11/6/2002		5/29/2001	
	SDGNumber	71534		69740		CNC18	
Parameter	**Units**						
Naphthalene	ug/L	1	U				
Chloromethane	ug/L					10	U
Vinyl chloride	ug/L			10	U	6	J
Bromomethane	ug/L					10	UJ
Chloroethane	ug/L					10	U
1,1-Dichloroethene	ug/L					5	U
Acetone	ug/L					11	U
Carbon Disulfide	ug/L					5	U
Methylene Chloride	ug/L					5	U
trans-1,2-Dichloroethene	ug/L			5	U	5	U
1,1-Dichloroethane	ug/L			5	U	34	=
Vinyl acetate	ug/L					10	U
Methyl ethyl ketone (2-Butanone)	ug/L					10	U
cis-1,2-Dichloroethylene	ug/L			5	U	5.4	=
1,2-Dichloroethene (total)	ug/L			5	U	5.4	=
Chloroform	ug/L					5	U
1,1,1-Trichloroethane	ug/L					5	U
Carbon Tetrachloride	ug/L					5	U
1,2-Dichloroethane	ug/L					5	U
Benzene	ug/L	1	U			2.5	J
Trichloroethylene (TCE)	ug/L			5	U	1	J
1,2-Dichloropropane	ug/L					5	U
Bromodichloromethane	ug/L					5	U
2-Chloroethyl vinyl ether	ug/L					10	U
cis-1,3-Dichloropropene	ug/L					5	U
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L					10	U
Toluene	ug/L	1	U			5	U
trans-1,3-Dichloropropene	ug/L					5	U
1,1,2-Trichloroethane	ug/L					5	U
2-Hexanone	ug/L					10	U

Groundwater VOCs

	StationID	FU22GW006		FU22GW006		FU22GW006	
	SampleID	U22GW006L3		U22GW006M1		U22GW006M3	
	DateCollected	11/12/2001		6/3/2002		12/4/2002	
	DateExtracted	11/14/2001		6/4/2002		12/6/2002	
	DateAnalyzed	11/14/2001		6/4/2002		12/6/2002	
	SDGNumber	51883		61380		71534	
Parameter	**Units**						
Naphthalene	ug/L	1	U	1	U	1	U
Chloromethane	ug/L						
Vinyl chloride	ug/L						
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L						
1,1-Dichloroethane	ug/L						
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L						
1,2-Dichloroethene (total)	ug/L						
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L	1	U	0.78	J	1.1	=
Trichloroethylene (TCE)	ug/L						
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L	1	U	1	U	1	U
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs	StationID	FU22GW006		FU22GW007		FU22GW007	
	SampleID	U22GW006M5		U22GW007L2		U22GW007L3	
	DateCollected	10/31/2002		5/21/2001		11/12/2001	
	DateExtracted	11/6/2002		5/29/2001		11/14/2001	
	DateAnalyzed	11/6/2002		5/29/2001		11/14/2001	
	SDGNumber	69740		CNC18		51883	
Parameter	**Units**						
Naphthalene	ug/L					1	U
Chloromethane	ug/L			10	U		
Vinyl chloride	ug/L	4.2	J	10	U		
Bromomethane	ug/L			10	UJ		
Chloroethane	ug/L			10	U		
1,1-Dichloroethene	ug/L			5	U		
Acetone	ug/L			19	U		
Carbon Disulfide	ug/L			5	U		
Methylene Chloride	ug/L			5	U		
trans-1,2-Dichloroethene	ug/L	5	U	5	U		
1,1-Dichloroethane	ug/L	21.3	=	5	U		
Vinyl acetate	ug/L			10	U		
Methyl ethyl ketone (2-Butanone)	ug/L			10	U		
cis-1,2-Dichloroethylene	ug/L	3	J	5	U		
1,2-Dichloroethene (total)	ug/L	3	J	5	U		
Chloroform	ug/L			5	U		
1,1,1-Trichloroethane	ug/L			5	U		
Carbon Tetrachloride	ug/L			5	U		
1,2-Dichloroethane	ug/L			5	U		
Benzene	ug/L			5	U	1	U
Trichloroethylene (TCE)	ug/L	0.69	J	0.36	J		
1,2-Dichloropropane	ug/L			5	U		
Bromodichloromethane	ug/L			5	U		
2-Chloroethyl vinyl ether	ug/L			10	U		
cis-1,3-Dichloropropene	ug/L			5	U		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L			10	U		
Toluene	ug/L			5	U	1	U
trans-1,3-Dichloropropene	ug/L			5	U		
1,1,2-Trichloroethane	ug/L			5	U		
2-Hexanone	ug/L			10	U		

Groundwater VOCs

	StationID	FU22GW007		FU22GW007		FU22GW007	
	SampleID	U22GW007M1		U22GW007M2		U22GW007M3	
	DateCollected	6/3/2002		7/1/2002		12/4/2002	
	DateExtracted	6/4/2002		7/9/2002		12/6/2002	
	DateAnalyzed	6/4/2002		7/9/2002		12/6/2002	
	SDGNumber	61380		63057		71534	
Parameter	**Units**						
Naphthalene	ug/L	1	U			1	U
Chloromethane	ug/L						
Vinyl chloride	ug/L			10	UJ		
Bromomethane	ug/L						
Chloroethane	ug/L						
1,1-Dichloroethene	ug/L						
Acetone	ug/L						
Carbon Disulfide	ug/L						
Methylene Chloride	ug/L						
trans-1,2-Dichloroethene	ug/L			5	UJ		
1,1-Dichloroethane	ug/L						
Vinyl acetate	ug/L						
Methyl ethyl ketone (2-Butanone)	ug/L						
cis-1,2-Dichloroethylene	ug/L			5	UJ		
1,2-Dichloroethene (total)	ug/L			5	UJ		
Chloroform	ug/L						
1,1,1-Trichloroethane	ug/L						
Carbon Tetrachloride	ug/L						
1,2-Dichloroethane	ug/L						
Benzene	ug/L	1	U			1	U
Trichloroethylene (TCE)	ug/L			5	UJ		
1,2-Dichloropropane	ug/L						
Bromodichloromethane	ug/L						
2-Chloroethyl vinyl ether	ug/L						
cis-1,3-Dichloropropene	ug/L						
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L						
Toluene	ug/L	1	U			1	U
trans-1,3-Dichloropropene	ug/L						
1,1,2-Trichloroethane	ug/L						
2-Hexanone	ug/L						

Groundwater VOCs

	StationID	FU22GW007	
	SampleID	U22GW007M5	
	DateCollected	10/31/2002	
	DateExtracted	11/6/2002	
	DateAnalyzed	11/6/2002	
	SDGNumber	69740	
Parameter	**Units**		
Naphthalene	ug/L		
Chloromethane	ug/L		
Vinyl chloride	ug/L	10	U
Bromomethane	ug/L		
Chloroethane	ug/L		
1,1-Dichloroethene	ug/L		
Acetone	ug/L		
Carbon Disulfide	ug/L		
Methylene Chloride	ug/L		
trans-1,2-Dichloroethene	ug/L	5	U
1,1-Dichloroethane	ug/L	5	U
Vinyl acetate	ug/L		
Methyl ethyl ketone (2-Butanone)	ug/L		
cis-1,2-Dichloroethylene	ug/L	5	U
1,2-Dichloroethene (total)	ug/L	5	U
Chloroform	ug/L		
1,1,1-Trichloroethane	ug/L		
Carbon Tetrachloride	ug/L		
1,2-Dichloroethane	ug/L		
Benzene	ug/L		
Trichloroethylene (TCE)	ug/L	5	U
1,2-Dichloropropane	ug/L		
Bromodichloromethane	ug/L		
2-Chloroethyl vinyl ether	ug/L		
cis-1,3-Dichloropropene	ug/L		
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L		
Toluene	ug/L		
trans-1,3-Dichloropropene	ug/L		
1,1,2-Trichloroethane	ug/L		
2-Hexanone	ug/L		

Groundwater VOCs

	StationID	F613GP069		F613GP069		F613GP070	
	SampleID	613GP06912		613GP06924		613GP07024	
	DateCollected	7/10/2002		7/10/2002		7/10/2002	
	DateExtracted	7/16/2002		7/16/2002		7/16/2002	
	DateAnalyzed	7/16/2002		7/16/2002		7/16/2002	
	SDGNumber	63483		63483		63483	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	U	5	U	5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L						
m+p Xylene	ug/L						
o-Xylene	ug/L						
Xylenes, Total	ug/L						
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs	StationID	F613GP071		F613GP072		F613GP073	
	SampleID	613GP07124		613GP07224		613GP07324	
	DateCollected	7/10/2002		7/10/2002		7/10/2002	
	DateExtracted	7/16/2002		7/16/2002		7/16/2002	
	DateAnalyzed	7/16/2002		7/16/2002		7/16/2002	
	SDGNumber	63483		63483		63483	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	U	5	U	5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L						
m+p Xylene	ug/L						
o-Xylene	ug/L						
Xylenes, Total	ug/L						
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	F613GP073		F613GW004		F613GW004	
	SampleID	613HP07324		613GW004M2		613GW004M5	
	DateCollected	7/10/2002		7/1/2002		10/31/2002	
	DateExtracted	7/16/2002		7/9/2002		11/6/2002	
	DateAnalyzed	7/16/2002		7/9/2002		11/6/2002	
	SDGNumber	63483		63056		69740	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	U	0.42	J	5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L						
m+p Xylene	ug/L						
o-Xylene	ug/L						
Xylenes, Total	ug/L						
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	F613GW004		F613GW009		F613GW009	
	SampleID	613HW004M5		613GW009M2		613GW009M5	
	DateCollected	10/31/2002		7/1/2002		10/31/2002	
	DateExtracted	11/6/2002		7/9/2002		11/6/2002	
	DateAnalyzed	11/6/2002		7/9/2002		11/6/2002	
	SDGNumber	69740		63057		69740	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	U	5	UJ	5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L						
m+p Xylene	ug/L						
o-Xylene	ug/L						
Xylenes, Total	ug/L						
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	F613GW010		F613GW010		F613GW011	
	SampleID	613GW010M3		613GW010M5		613GW011M3	
	DateCollected	8/5/2002		10/31/2002		8/5/2002	
	DateExtracted	8/8/2002		11/6/2002		8/8/2002	
	DateAnalyzed	8/8/2002		11/6/2002		8/8/2002	
	SDGNumber	64813		69740		64813	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	U	5	U	5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L						
m+p Xylene	ug/L						
o-Xylene	ug/L						
Xylenes, Total	ug/L						
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	F613GW011		FGELGW007		FGELGW008	
	SampleID	613GW011M5		GELGW007M5		GELGW008M5	
	DateCollected	10/31/2002		10/31/2002		10/31/2002	
	DateExtracted	11/6/2002		11/6/2002		11/6/2002	
	DateAnalyzed	11/6/2002		11/6/2002		11/6/2002	
	SDGNumber	69740		69740		69740	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	U	1.9	J	5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L						
m+p Xylene	ug/L						
o-Xylene	ug/L						
Xylenes, Total	ug/L						
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	FGELGW011		FGELGW012		FGELGW012	
	SampleID	GELGW011M2		GELGW012M2		GELGW012M5	
	DateCollected	7/1/2002		7/1/2002		10/31/2002	
	DateExtracted	7/9/2002		7/9/2002		11/6/2002	
	DateAnalyzed	7/9/2002		7/9/2002		11/6/2002	
	SDGNumber	63057		63057		69740	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	UJ	5	UJ	5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L						
m+p Xylene	ug/L						
o-Xylene	ug/L						
Xylenes, Total	ug/L						
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	FGELGW014		FU22GW001		FU22GW001	
	SampleID	GELGW014M2		U22GW001L2		U22GW001L3	
	DateCollected	7/2/2002		5/21/2001		11/12/2001	
	DateExtracted	7/9/2002		5/29/2001		11/13/2001	
	DateAnalyzed	7/9/2002		5/29/2001		11/13/2001	
	SDGNumber	63058		CNC18		51883	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L			5	U		
Dibromochloromethane	ug/L			5	U		
Chlorobenzene	ug/L			5	U		
Ethylbenzene	ug/L			5	U	1	U
m+p Xylene	ug/L			5	U	2	U
o-Xylene	ug/L			5	U	1	U
Xylenes, Total	ug/L			5	U	3	U
Styrene	ug/L			5	U		
Bromoform	ug/L			5	U		
1,1,2,2-Tetrachloroethane	ug/L			5	U		

Groundwater VOCs

	StationID	FU22GW001		FU22GW001		FU22GW001	
	SampleID	U22GW001M1		U22GW001M3		U22GW001M5	
	DateCollected	6/3/2002		12/3/2002		10/31/2002	
	DateExtracted	6/4/2002		12/6/2002		11/6/2002	
	DateAnalyzed	6/4/2002		12/6/2002		11/6/2002	
	SDGNumber	61380		71534		69740	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L					5	UJ
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L	1	U	1	U		
m+p Xylene	ug/L	2	U	2	U		
o-Xylene	ug/L	1	U	1	U		
Xylenes, Total	ug/L	3	U	3	U		
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	FU22GW002		FU22GW002		FU22GW002	
	SampleID	U22GW002L2		U22GW002L3		U22GW002M1	
	DateCollected	5/21/2001		11/12/2001		6/3/2002	
	DateExtracted	5/29/2001		11/13/2001		6/4/2002	
	DateAnalyzed	5/29/2001		11/13/2001		6/4/2002	
	SDGNumber	CNC18		51883		61380	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	U				
Dibromochloromethane	ug/L	5	U				
Chlorobenzene	ug/L	5	U				
Ethylbenzene	ug/L	5	U	1	U	1	U
m+p Xylene	ug/L	5	U	2	U	2	U
o-Xylene	ug/L	5	U	1	U	1	U
Xylenes, Total	ug/L	5	U	3	U	3	U
Styrene	ug/L	5	U				
Bromoform	ug/L	5	U				
1,1,2,2-Tetrachloroethane	ug/L	5	U				

Groundwater VOCs

	StationID	FU22GW002		FU22GW002		FU22GW002	
	SampleID	U22GW002M2		U22GW002M3		U22GW002M5	
	DateCollected	7/1/2002		12/3/2002		10/31/2002	
	DateExtracted	7/9/2002		12/6/2002		11/6/2002	
	DateAnalyzed	7/9/2002		12/6/2002		11/6/2002	
	SDGNumber	63057		71534		69740	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	UJ			5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L			1	U		
m+p Xylene	ug/L			2	U		
o-Xylene	ug/L			1	U		
Xylenes, Total	ug/L			3	U		
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	FU22GW002		FU22GW003		FU22GW003	
	SampleID	U22HW002M2		U22GW003L2		U22GW003L3	
	DateCollected	7/1/2002		5/21/2001		11/12/2001	
	DateExtracted	7/9/2002		6/1/2001		11/13/2001	
	DateAnalyzed	7/9/2002		6/1/2001		11/13/2001	
	SDGNumber	63057		CNC18		51883	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	UJ	5	U		
Dibromochloromethane	ug/L			5	U		
Chlorobenzene	ug/L			5	U		
Ethylbenzene	ug/L			5	U	1	U
m+p Xylene	ug/L			5	U	2	U
o-Xylene	ug/L			5	U	1	U
Xylenes, Total	ug/L			5	U	3	U
Styrene	ug/L			5	U		
Bromoform	ug/L			5	U		
1,1,2,2-Tetrachloroethane	ug/L			5	U		

Groundwater VOCs

	StationID	FU22GW003		FU22GW003		FU22GW003	
	SampleID	U22GW003M1		U22GW003M3		U22GW003M5	
	DateCollected	6/3/2002		12/4/2002		10/31/2002	
	DateExtracted	6/4/2002		12/6/2002		11/6/2002	
	DateAnalyzed	6/4/2002		12/6/2002		11/6/2002	
	SDGNumber	61380		71534		69740	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L					5	U
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L	1	U	1	U		
m+p Xylene	ug/L	2	U	2	U		
o-Xylene	ug/L	1	U	1	U		
Xylenes, Total	ug/L	3	U	3	U		
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	FU22GW003		FU22GW003		FU22GW003	
	SampleID	U22HW003L2		U22HW003L2a		U22HW003M1	
	DateCollected	5/21/2001		5/21/2001		6/3/2002	
	DateExtracted	6/1/2001		11/13/2001		6/4/2002	
	DateAnalyzed	6/1/2001		11/13/2001		6/4/2002	
	SDGNumber	CNC18		51883		61380	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	U				
Dibromochloromethane	ug/L	5	U				
Chlorobenzene	ug/L	5	U				
Ethylbenzene	ug/L	5	U	1	U	1	U
m+p Xylene	ug/L	5	U	2	U	2	U
o-Xylene	ug/L	5	U	1	U	1	U
Xylenes, Total	ug/L	5	U	3	U	3	U
Styrene	ug/L	5	U				
Bromoform	ug/L	5	U				
1,1,2,2-Tetrachloroethane	ug/L	5	U				

Groundwater VOCs

	StationID	FU22GW003		FU22GW004		FU22GW004	
	SampleID	U22HW003M3		U22GW004L2		U22GW004L3	
	DateCollected	12/4/2002		5/21/2001		11/12/2001	
	DateExtracted	12/6/2002		5/29/2001		11/14/2001	
	DateAnalyzed	12/6/2002		5/29/2001		11/14/2001	
	SDGNumber	71534		CNC18		51883	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L			5	U		
Dibromochloromethane	ug/L			5	U		
Chlorobenzene	ug/L			5	U		
Ethylbenzene	ug/L	1	U	5	U	1	U
m+p Xylene	ug/L	2	U	5	U	2	U
o-Xylene	ug/L	1	U	5	U	1	U
Xylenes, Total	ug/L	3	U	5	U	3	U
Styrene	ug/L			5	U		
Bromoform	ug/L			5	U		
1,1,2,2-Tetrachloroethane	ug/L			5	U		

Groundwater VOCs

	StationID	FU22GW004		FU22GW004		FU22GW004	
	SampleID	U22GW004M1		U22GW004M3		U22GW004M5	
	DateCollected	6/3/2002		12/3/2002		10/31/2002	
	DateExtracted	6/4/2002		12/6/2002		11/6/2002	
	DateAnalyzed	6/4/2002		12/6/2002		11/6/2002	
	SDGNumber	61380		71534		69740	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L					0.74	J
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L	1	U	1	U		
m+p Xylene	ug/L	2	U	2	U		
o-Xylene	ug/L	1	U	1	U		
Xylenes, Total	ug/L	3	U	3	U		
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	FU22GW005		FU22GW005		FU22GW005	
	SampleID	U22GW005L2		U22GW005L3		U22GW005M1	
	DateCollected	5/21/2001		11/12/2001		6/3/2002	
	DateExtracted	5/29/2001		11/14/2001		6/4/2002	
	DateAnalyzed	5/29/2001		11/14/2001		6/4/2002	
	SDGNumber	CNC18		51883		61380	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	5	U				
Dibromochloromethane	ug/L	5	U				
Chlorobenzene	ug/L	5	U				
Ethylbenzene	ug/L	5	U	1	U	1	U
m+p Xylene	ug/L	5	U	2	U	2	U
o-Xylene	ug/L	5	U	1	U	1	U
Xylenes, Total	ug/L	5	U	3	U	3	U
Styrene	ug/L	5	U				
Bromoform	ug/L	5	U				
1,1,2,2-Tetrachloroethane	ug/L	5	U				

Groundwater VOCs

	StationID	FU22GW005		FU22GW005		FU22GW006	
	SampleID	U22GW005M3		U22GW005M5		U22GW006L2	
	DateCollected	12/4/2002		10/31/2002		5/21/2001	
	DateExtracted	12/6/2002		11/6/2002		5/29/2001	
	DateAnalyzed	12/6/2002		11/6/2002		5/29/2001	
	SDGNumber	71534		69740		CNC18	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L			5	U	5	U
Dibromochloromethane	ug/L					5	U
Chlorobenzene	ug/L					5	U
Ethylbenzene	ug/L	1	U			5	U
m+p Xylene	ug/L	2	U			5	U
o-Xylene	ug/L	1	U			5	U
Xylenes, Total	ug/L	3	U			5	U
Styrene	ug/L					5	U
Bromoform	ug/L					5	U
1,1,2,2-Tetrachloroethane	ug/L					5	U

Groundwater VOCs

	StationID	FU22GW006		FU22GW006		FU22GW006	
	SampleID	U22GW006L3		U22GW006M1		U22GW006M3	
	DateCollected	11/12/2001		6/3/2002		12/4/2002	
	DateExtracted	11/14/2001		6/4/2002		12/6/2002	
	DateAnalyzed	11/14/2001		6/4/2002		12/6/2002	
	SDGNumber	51883		61380		71534	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L						
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L	1	U	1	U	1	U
m+p Xylene	ug/L	2	U	2	U	2	U
o-Xylene	ug/L	1	U	1	U	1	U
Xylenes, Total	ug/L	3	U	3	U	3	U
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	FU22GW006		FU22GW007		FU22GW007	
	SampleID	U22GW006M5		U22GW007L2		U22GW007L3	
	DateCollected	10/31/2002		5/21/2001		11/12/2001	
	DateExtracted	11/6/2002		5/29/2001		11/14/2001	
	DateAnalyzed	11/6/2002		5/29/2001		11/14/2001	
	SDGNumber	69740		CNC18		51883	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L	0.44	J	5	U		
Dibromochloromethane	ug/L			5	U		
Chlorobenzene	ug/L			5	U		
Ethylbenzene	ug/L			5	U	1	U
m+p Xylene	ug/L			5	U	2	U
o-Xylene	ug/L			5	U	1	U
Xylenes, Total	ug/L			5	U	3	U
Styrene	ug/L			1	J		
Bromoform	ug/L			5	U		
1,1,2,2-Tetrachloroethane	ug/L			5	U		

Groundwater VOCs

	StationID	FU22GW007		FU22GW007		FU22GW007	
	SampleID	U22GW007M1		U22GW007M2		U22GW007M3	
	DateCollected	6/3/2002		7/1/2002		12/4/2002	
	DateExtracted	6/4/2002		7/9/2002		12/6/2002	
	DateAnalyzed	6/4/2002		7/9/2002		12/6/2002	
	SDGNumber	61380		63057		71534	
Parameter	**Units**						
Tetrachloroethylene (PCE)	ug/L			5	UJ		
Dibromochloromethane	ug/L						
Chlorobenzene	ug/L						
Ethylbenzene	ug/L	1	U			1	U
m+p Xylene	ug/L	2	U			2	U
o-Xylene	ug/L	1	U			1	U
Xylenes, Total	ug/L	3	U			3	U
Styrene	ug/L						
Bromoform	ug/L						
1,1,2,2-Tetrachloroethane	ug/L						

Groundwater VOCs

	StationID	FU22GW007	
	SampleID	U22GW007M5	
	DateCollected	10/31/2002	
	DateExtracted	11/6/2002	
	DateAnalyzed	11/6/2002	
	SDGNumber	69740	
Parameter	**Units**		
Tetrachloroethylene (PCE)	ug/L	5	U
Dibromochloromethane	ug/L		
Chlorobenzene	ug/L		
Ethylbenzene	ug/L		
m+p Xylene	ug/L		
o-Xylene	ug/L		
Xylenes, Total	ug/L		
Styrene	ug/L		
Bromoform	ug/L		
1,1,2,2-Tetrachloroethane	ug/L		

Groundwater Metals	StationID	F613GW004		F613GW004		F613GW004		F613GW009	
	SampleID	613GW004M2		613GW004M5		613HW004M5		613GW009M2	
	DateCollected	7/1/2002		10/31/2002		10/31/2002		7/1/2002	
	DateExtracted	7/3/2002		10/31/2002		10/31/2002		7/3/2002	
	DateAnalyzed	7/3/2002		10/31/2002		10/31/2002		7/3/2002	
	SDGNumber	63056		69740		69740		63057	
Parameter	**Units**								
Iron (Ferrous)	mg/L	3.62	J	0.875	UJ	1.22	J	20.7	J
Silica	ug/L								
Strontium	ug/L								
Aluminum	ug/L								
Arsenic	ug/L								
Barium	ug/L								
Cadmium	ug/L								
Calcium	ug/L								
Chromium, Total	ug/L								
Copper	ug/L								
Iron	mg/L								
Iron	ug/L								
Lead	ug/L								
Magnesium	ug/L								
Manganese	ug/L								
Nickel	ug/L								
Potassium	ug/L								
Selenium	ug/L								
Silver	ug/L								
Sodium	ug/L								
Zinc	ug/L								
Mercury	ug/L								

Groundwater Metals	StationID	F613GW009		F613GW010		F613GW011		FGELGW008	
	SampleID	613GW009M5		613GW010M3		613GW011M3		GELGW008M5	
	DateCollected	10/31/2002		8/5/2002		8/5/2002		10/31/2002	
	DateExtracted	10/31/2002		8/5/2002		8/5/2002		10/31/2002	
	DateAnalyzed	10/31/2002		8/5/2002		8/5/2002		10/31/2002	
	SDGNumber	69740		64813		64813		69740	
Parameter	Units								
Iron (Ferrous)	mg/L	13.7	J	11.5	=	16.7	=	0.964	J
Silica	ug/L								
Strontium	ug/L								
Aluminum	ug/L								
Arsenic	ug/L								
Barium	ug/L								
Cadmium	ug/L								
Calcium	ug/L								
Chromium, Total	ug/L								
Copper	ug/L								
Iron	mg/L								
Iron	ug/L								
Lead	ug/L								
Magnesium	ug/L								
Manganese	ug/L								
Nickel	ug/L								
Potassium	ug/L								
Selenium	ug/L								
Silver	ug/L								
Sodium	ug/L								
Zinc	ug/L								
Mercury	ug/L								

Groundwater Metals	StationID	FGELGW011		FGELGW011		FGELGW011		FGELGW012	
	SampleID	GELGW011M2		GELGW011M3		GELGW011M3		GELGW012M2	
	DateCollected	7/1/2002		11/5/2002		11/5/2002		7/1/2002	
	DateExtracted	7/3/2002		11/6/2002		11/13/2002		7/3/2002	
	DateAnalyzed	7/3/2002		11/9/2002		11/14/2002		7/3/2002	
	SDGNumber	63057		69978		69978		63057	
Parameter	**Units**								
Iron (Ferrous)	mg/L	23.1	J					7.76	J
Silica	ug/L			19300	=				
Strontium	ug/L			806	=				
Aluminum	ug/L			124	U				
Arsenic	ug/L			8.13	=				
Barium	ug/L			56.1	J				
Cadmium	ug/L			0.3	U				
Calcium	ug/L			281000	=				
Chromium, Total	ug/L			10.6	U				
Copper	ug/L			1.3	U				
Iron	mg/L								
Iron	ug/L			27500	=				
Lead	ug/L			1.24	U				
Magnesium	ug/L			203000	=				
Manganese	ug/L			1480	=				
Nickel	ug/L			16.2	=				
Potassium	ug/L			49300	=				
Selenium	ug/L			2.67	U				
Silver	ug/L			23	U				
Sodium	ug/L			2310000	=				
Zinc	ug/L			82.1	U				
Mercury	ug/L					0.039	U		

Groundwater Metals	StationID	FGELGW012		FU22GW001		FU22GW002		FU22GW002	
	SampleID	GELGW012M5		U22GW001L3		U22GW002L2		U22GW002L3	
	DateCollected	10/31/2002		11/12/2001		5/21/2001		11/12/2001	
	DateExtracted	10/31/2002		11/13/2001		5/29/2001		11/13/2001	
	DateAnalyzed	10/31/2002		11/14/2001		5/30/2001		11/14/2001	
	SDGNumber	69740		51883		CNC18		51883	
Parameter	**Units**								
Iron (Ferrous)	mg/L	8.25	J						
Silica	ug/L								
Strontium	ug/L								
Aluminum	ug/L								
Arsenic	ug/L								
Barium	ug/L								
Cadmium	ug/L								
Calcium	ug/L								
Chromium, Total	ug/L								
Copper	ug/L								
Iron	mg/L					16	=		
Iron	ug/L			8930	=			9780	=
Lead	ug/L								
Magnesium	ug/L								
Manganese	ug/L								
Nickel	ug/L								
Potassium	ug/L								
Selenium	ug/L								
Silver	ug/L								
Sodium	ug/L								
Zinc	ug/L								
Mercury	ug/L								

Groundwater Metals	StationID	FU22GW002		FU22GW002		FU22GW002		FU22GW003	
	SampleID	U22GW002M2		U22GW002M5		U22HW002M2		U22GW003L2	
	DateCollected	7/1/2002		10/31/2002		7/1/2002		5/21/2001	
	DateExtracted	7/3/2002		10/31/2002		7/3/2002		5/29/2001	
	DateAnalyzed	7/3/2002		10/31/2002		7/3/2002		5/30/2001	
	SDGNumber	63057		69740		63057		CNC18	
Parameter	Units								
Iron (Ferrous)	mg/L	20.3	J	3.21	J	2.82	J		
Silica	ug/L								
Strontium	ug/L								
Aluminum	ug/L								
Arsenic	ug/L								
Barium	ug/L								
Cadmium	ug/L								
Calcium	ug/L								
Chromium, Total	ug/L								
Copper	ug/L								
Iron	mg/L							49	=
Iron	ug/L								
Lead	ug/L								
Magnesium	ug/L								
Manganese	ug/L								
Nickel	ug/L								
Potassium	ug/L								
Selenium	ug/L								
Silver	ug/L								
Sodium	ug/L								
Zinc	ug/L								
Mercury	ug/L								

Groundwater Metals	StationID	FU22GW003		FU22GW003		FU22GW003		FU22GW003	
	SampleID	U22GW003L3		U22GW003M5		U22HW003L2		U22HW003L2a	
	DateCollected	11/12/2001		10/31/2002		5/21/2001		5/21/2001	
	DateExtracted	11/13/2001		10/31/2002		5/29/2001		11/13/2001	
	DateAnalyzed	11/14/2001		10/31/2002		5/30/2001		11/14/2001	
	SDGNumber	51883		69740		CNC18		51883	
Parameter	**Units**								
Iron (Ferrous)	mg/L			20	J				
Silica	ug/L								
Strontium	ug/L								
Aluminum	ug/L								
Arsenic	ug/L								
Barium	ug/L								
Cadmium	ug/L								
Calcium	ug/L								
Chromium, Total	ug/L								
Copper	ug/L								
Iron	mg/L					48	=		
Iron	ug/L	37900	=					38100	=
Lead	ug/L								
Magnesium	ug/L								
Manganese	ug/L								
Nickel	ug/L								
Potassium	ug/L								
Selenium	ug/L								
Silver	ug/L								
Sodium	ug/L								
Zinc	ug/L								
Mercury	ug/L								

Groundwater Metals	StationID	FU22GW004		FU22GW005		FU22GW006		FU22GW006	
	SampleID	U22GW004L3		U22GW005L3		U22GW006L3		U22GW006M5	
	DateCollected	11/12/2001		11/12/2001		11/12/2001		10/31/2002	
	DateExtracted	11/13/2001		11/13/2001		11/13/2001		10/31/2002	
	DateAnalyzed	11/14/2001		11/14/2001		11/14/2001		10/31/2002	
	SDGNumber	51883		51883		51883		69740	
Parameter	**Units**								
Iron (Ferrous)	mg/L							13.5	J
Silica	ug/L								
Strontium	ug/L								
Aluminum	ug/L								
Arsenic	ug/L								
Barium	ug/L								
Cadmium	ug/L								
Calcium	ug/L								
Chromium, Total	ug/L								
Copper	ug/L								
Iron	mg/L								
Iron	ug/L	12200	=	11400	=	19100	=		
Lead	ug/L								
Magnesium	ug/L								
Manganese	ug/L								
Nickel	ug/L								
Potassium	ug/L								
Selenium	ug/L								
Silver	ug/L								
Sodium	ug/L								
Zinc	ug/L								
Mercury	ug/L								

Groundwater Metals	StationID	FU22GW007		FU22GW007	
	SampleID	U22GW007L3		U22GW007M2	
	DateCollected	11/12/2001		7/1/2002	
	DateExtracted	11/13/2001		7/3/2002	
	DateAnalyzed	11/14/2001		7/3/2002	
	SDGNumber	51883		63057	
Parameter	**Units**				
Iron (Ferrous)	mg/L			3.8	J
Silica	ug/L				
Strontium	ug/L				
Aluminum	ug/L				
Arsenic	ug/L				
Barium	ug/L				
Cadmium	ug/L				
Calcium	ug/L				
Chromium, Total	ug/L				
Copper	ug/L				
Iron	mg/L				
Iron	ug/L	9110	=		
Lead	ug/L				
Magnesium	ug/L				
Manganese	ug/L				
Nickel	ug/L				
Potassium	ug/L				
Selenium	ug/L				
Silver	ug/L				
Sodium	ug/L				
Zinc	ug/L				
Mercury	ug/L				

Groundwater Metals, Filtered	StationID	FGELGW011		FGELGW011		FU22GW001		FU22GW002	
	SampleID	GELGW011M3		GELGW011M3		U22GW001L2		U22GW002L2	
	DateCollected	11/5/2002		11/5/2002		5/21/2001		5/21/2001	
	DateExtracted	11/6/2002		11/13/2002		11/13/2001		11/13/2001	
	DateAnalyzed	11/9/2002		11/14/2002		11/14/2001		11/14/2001	
	SDGNumber	69980		69980		51883B		51883B	
Parameter	**Units**								
Aluminum, Dissolved	ug/L	124	U						
Arsenic, Dissolved	ug/L	8.24	=						
Barium, Dissolved	ug/L	56.9	J						
Cadmium, Dissolved	ug/L	0.402	U						
Calcium, Dissolved	ug/L	286000	=						
Chromium, Dissolved	ug/L	10.6	U						
Copper, Dissolved	ug/L	1.3	U						
Iron, Dissolved	ug/L	27800	=			2990	=	2470	=
Lead, Dissolved	ug/L	1.24	U						
Magnesium, Dissolved	ug/L	208000	=						
Manganese, Dissolved	ug/L	1500	=						
Mercury, Dissolved	ug/L			0.039	U				
Nickel, Dissolved	ug/L	16.1	=						
Potassium, Dissolved	ug/L	50100	=						
Selenium, Dissolved	ug/L	2.67	U						
Silica, Dissolved	ug/L	19600	=						
Silver, Dissolved	ug/L	23	U						
Sodium, Dissolved	ug/L	2360000	=						
Strontium, Dissolved	ug/L	811	=						
Zinc, Dissolved	ug/L	52.5	U						

Groundwater Metals, Filtered	StationID	FU22GW003		FU22GW003		FU22GW004		FU22GW005	
	SampleID	U22GW003L2		U22HW003L2a		U22GW004L2		U22GW005L2	
	DateCollected	5/21/2001		5/21/2001		5/21/2001		5/21/2001	
	DateExtracted	11/13/2001		11/13/2001		11/13/2001		11/13/2001	
	DateAnalyzed	11/14/2001		11/14/2001		11/14/2001		11/14/2001	
	SDGNumber	51883B		51883B		51883B		51883B	
Parameter	**Units**								
Aluminum, Dissolved	ug/L								
Arsenic, Dissolved	ug/L								
Barium, Dissolved	ug/L								
Cadmium, Dissolved	ug/L								
Calcium, Dissolved	ug/L								
Chromium, Dissolved	ug/L								
Copper, Dissolved	ug/L								
Iron, Dissolved	ug/L	23000	=	24800	=	11100	=	184	=
Lead, Dissolved	ug/L								
Magnesium, Dissolved	ug/L								
Manganese, Dissolved	ug/L								
Mercury, Dissolved	ug/L								
Nickel, Dissolved	ug/L								
Potassium, Dissolved	ug/L								
Selenium, Dissolved	ug/L								
Silica, Dissolved	ug/L								
Silver, Dissolved	ug/L								
Sodium, Dissolved	ug/L								
Strontium, Dissolved	ug/L								
Zinc, Dissolved	ug/L								

Groundwater Metals, Filtered	StationID	FU22GW006		FU22GW007	
	SampleID	U22GW006L2		U22GW007L2	
	DateCollected	5/21/2001		5/21/2001	
	DateExtracted	11/13/2001		11/13/2001	
	DateAnalyzed	11/14/2001		11/14/2001	
	SDGNumber	51883B		51883B	
Parameter	Units				
Aluminum, Dissolved	ug/L				
Arsenic, Dissolved	ug/L				
Barium, Dissolved	ug/L				
Cadmium, Dissolved	ug/L				
Calcium, Dissolved	ug/L				
Chromium, Dissolved	ug/L				
Copper, Dissolved	ug/L				
Iron, Dissolved	ug/L	17800	=	1270	=
Lead, Dissolved	ug/L				
Magnesium, Dissolved	ug/L				
Manganese, Dissolved	ug/L				
Mercury, Dissolved	ug/L				
Nickel, Dissolved	ug/L				
Potassium, Dissolved	ug/L				
Selenium, Dissolved	ug/L				
Silica, Dissolved	ug/L				
Silver, Dissolved	ug/L				
Sodium, Dissolved	ug/L				
Strontium, Dissolved	ug/L				
Zinc, Dissolved	ug/L				

Groundwater General Chemistry	StationID	F613GW004		F613GW004		F613GW004	
	SampleID	613GW004M2		613GW004M2		613GW004M5	
	DateCollected	7/1/2002		7/1/2002		10/31/2002	
	DateExtracted						
	DateAnalyzed	7/5/2002		7/9/2002		11/1/2002	
	SDGNumber	63056		63056		69737	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L			463	=		
Chloride	mg/L	284	=				
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L					0.1	U
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L					89.8	=
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	F613GW004		F613GW009		F613GW009	
	SampleID	613HW004M5		613GW009M2		613GW009M2	
	DateCollected	10/31/2002		7/1/2002		7/1/2002	
	DateExtracted						
	DateAnalyzed	11/1/2002		7/5/2002		7/12/2002	
	SDGNumber	69737		63057		63057	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L					108	U
Chloride	mg/L			3000	=		
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L	0.1	U				
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	86.1	=				
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	F613GW009		F613GW010		F613GW010	
	SampleID	613GW009M5		613GW010M3		613GW010M3	
	DateCollected	10/31/2002		8/5/2002		8/5/2002	
	DateExtracted						
	DateAnalyzed	11/1/2002		8/6/2002		8/12/2002	
	SDGNumber	69737		64813		64813	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L					158	U
Chloride	mg/L			2980	=		
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L	0.1	U	0.1	U		
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	216	=	293	=		
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	F613GW011		F613GW011		FGELGW008	
	SampleID	613GW011M3		613GW011M3		GELGW008M5	
	DateCollected	8/5/2002		8/5/2002		10/31/2002	
	DateExtracted						
	DateAnalyzed	8/6/2002		8/12/2002		11/1/2002	
	SDGNumber	64813		64813		69737	
Parameter	Units						
Alkalinity, Total (as CaCO3)	mg/L			386	=		
Chloride	mg/L	5990	=				
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L	0.1	U			0.1	U
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	459	=			0.4	U
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	FGELGW011		FGELGW011		FGELGW011	
	SampleID	GELGW011M2		GELGW011M2		GELGW011M3	
	DateCollected	7/1/2002		7/1/2002		11/5/2002	
	DateExtracted						
	DateAnalyzed	7/5/2002		7/12/2002		11/5/2002	
	SDGNumber	63057		63057		69978	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L			88.7	U		
Chloride	mg/L	3610	=				
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L						
pH	SU					6.07	=
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L						
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	FGELGW011		FGELGW011		FGELGW011	
	SampleID	GELGW011M3		GELGW011M3		GELGW011M3	
	DateCollected	11/5/2002		11/5/2002		11/5/2002	
	DateExtracted						
	DateAnalyzed	11/6/2002		11/7/2002		11/7/2002	
	SDGNumber	69978		69978		69978	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L						
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L	0.955	=				
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L						
Sulfide	mg/L					0.05	UJ
Total Dissolved Solids (Residue, filterable)	mg/L			6620	=		
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FGELGW011		FGELGW011		FGELGW011	
	SampleID	GELGW011M3		GELGW011M3		GELGW011M3	
	DateCollected	11/5/2002		11/5/2002		11/5/2002	
	DateExtracted					11/7/2002	
	DateAnalyzed	11/8/2002		11/12/2002		11/7/2002	
	SDGNumber	69978		69978		69978	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L			135	J		
Chloride	mg/L	4000	=				
Fluoride	mg/L	0.26	=				
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L	0.1	U				
Nitrogen, Ammonia (as N)	mg/L					0.51	=
Nitrogen, Nitrate (as N)	mg/L	0.1	U				
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	407	=				
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	FGELGW011		FGELGW011		FGELGW012	
	SampleID	GELGW011M3		GELGW011M3		GELGW012M2	
	DateCollected	11/5/2002		11/5/2002		7/1/2002	
	DateExtracted	11/8/2002		11/13/2002			
	DateAnalyzed	11/8/2002		11/15/2002		7/5/2002	
	SDGNumber	69978		69978		63057	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L						
Chloride	mg/L					638	=
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L			1.19	=		
Sulfate (as SO4)	mg/L						
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L	13.7	=				

Groundwater General Chemistry

	StationID	FGELGW012		FGELGW012		FU22GW001	
	SampleID	GELGW012M2		GELGW012M5		U22GW001L3	
	DateCollected	7/1/2002		10/31/2002		11/12/2001	
	DateExtracted						
	DateAnalyzed	7/12/2002		11/1/2002		11/12/2001	
	SDGNumber	63057		69737		51883	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L	29.6	U				
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L			0.1	U		
Ortho-phosphate	mg/L						
pH	SU					6.72	=
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L			226	=		
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	FU22GW001		FU22GW001		FU22GW002	
	SampleID	U22GW001L3		U22GW001L3		U22GW002L2	
	DateCollected	11/12/2001		11/12/2001		5/21/2001	
	DateExtracted					5/29/2001	
	DateAnalyzed	11/13/2001		11/20/2001		5/29/2001	
	SDGNumber	51883		51883		CNC18	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L			237	J	120	=
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L	0.05	U				
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	685	=				
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FU22GW002		FU22GW002		FU22GW002	
	SampleID	U22GW002L2		U22GW002L2DL		U22GW002L3	
	DateCollected	5/21/2001		5/21/2001		11/12/2001	
	DateExtracted	5/29/2001		5/29/2001			
	DateAnalyzed	5/29/2001		5/29/2001		11/12/2001	
	SDGNumber	CNC18		CNC18		51883	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L						
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L	0.1	UJ				
Ortho-phosphate	mg/L						
pH	SU					6.57	=
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	380	R	250	=		
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	FU22GW002		FU22GW002		FU22GW002	
	SampleID	U22GW002L3		U22GW002L3		U22GW002M2	
	DateCollected	11/12/2001		11/12/2001		7/1/2002	
	DateExtracted						
	DateAnalyzed	11/13/2001		11/20/2001		7/5/2002	
	SDGNumber	51883		51883		63057	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L			446	J		
Chloride	mg/L					639	=
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L	0.05	U				
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	42.4	=				
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FU22GW002		FU22GW002		FU22GW002	
	SampleID	U22GW002M2		U22GW002M5		U22HW002M2	
	DateCollected	7/1/2002		10/31/2002		7/1/2002	
	DateExtracted						
	DateAnalyzed	7/12/2002		11/1/2002		7/5/2002	
	SDGNumber	63057		69737		63057	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L	296	=				
Chloride	mg/L					637	=
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L			0.1	U		
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L			39.3	=		
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FU22GW002		FU22GW003		FU22GW003	
	SampleID	U22HW002M2		U22GW003L2		U22GW003L2	
	DateCollected	7/1/2002		5/21/2001		5/21/2001	
	DateExtracted			5/29/2001		5/29/2001	
	DateAnalyzed	7/12/2002		5/29/2001		5/29/2001	
	SDGNumber	63057		CNC18		CNC18	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L	286	=	200	=		
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L					0.1	UJ
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L					910	R
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FU22GW003		FU22GW003		FU22GW003	
	SampleID	U22GW003L2DL		U22GW003L3		U22GW003L3	
	DateCollected	5/21/2001		11/12/2001		11/12/2001	
	DateExtracted	5/29/2001					
	DateAnalyzed	5/29/2001		11/12/2001		11/13/2001	
	SDGNumber	CNC18		51883		51883	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L						
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L					0.115	=
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L						
pH	SU			6.71	=		
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	730	=			679	=
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	FU22GW003		FU22GW003		FU22GW003	
	SampleID	U22GW003L3		U22GW003M5		U22HW003L2	
	DateCollected	11/12/2001		10/31/2002		5/21/2001	
	DateExtracted					5/29/2001	
	DateAnalyzed	11/20/2001		11/1/2002		5/29/2001	
	SDGNumber	51883		69737		CNC18	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L	194	J			190	=
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L			0.1	U		
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L			386	=		
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FU22GW003		FU22GW003		FU22GW003	
	SampleID	U22HW003L2		U22HW003L2a		U22HW003L2a	
	DateCollected	5/21/2001		5/21/2001		5/21/2001	
	DateExtracted	5/29/2001					
	DateAnalyzed	5/29/2001		11/12/2001		11/13/2001	
	SDGNumber	CNC18		51883		51883	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L						
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L					0.145	=
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L	0.1	UJ				
Ortho-phosphate	mg/L						
pH	SU			6.21	=		
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	900	R			665	=
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FU22GW003		FU22GW003		FU22GW004	
	SampleID	U22HW003L2a		U22HW003L2DL		U22GW004L3	
	DateCollected	5/21/2001		5/21/2001		11/12/2001	
	DateExtracted			5/29/2001			
	DateAnalyzed	11/20/2001		5/29/2001		11/12/2001	
	SDGNumber	51883		CNC18		51883	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L	204	J				
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L						
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L						
pH	SU					6.13	=
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L			720	=		
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	FU22GW004		FU22GW004		FU22GW005	
	SampleID	U22GW004L3		U22GW004L3		U22GW005L3	
	DateCollected	11/12/2001		11/12/2001		11/12/2001	
	DateExtracted						
	DateAnalyzed	11/13/2001		11/20/2001		11/12/2001	
	SDGNumber	51883		51883		51883	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L			12.8	J		
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L	0.05	U				
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L						
pH	SU					4.92	=
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	373	=				
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry	StationID	FU22GW005		FU22GW005		FU22GW006	
	SampleID	U22GW005L3		U22GW005L3		U22GW006L3	
	DateCollected	11/12/2001		11/12/2001		11/12/2001	
	DateExtracted						
	DateAnalyzed	11/13/2001		11/20/2001		11/12/2001	
	SDGNumber	51883		51883		51883	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L			459	J		
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L	0.221	=				
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L						
pH	SU					6.69	=
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	75	=				
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FU22GW006		FU22GW006		FU22GW006	
	SampleID	U22GW006L3		U22GW006L3		U22GW006M5	
	DateCollected	11/12/2001		11/12/2001		10/31/2002	
	DateExtracted						
	DateAnalyzed	11/13/2001		11/20/2001		11/1/2002	
	SDGNumber	51883		51883		69737	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L			115	J		
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L	0.115	=				
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L					0.1	U
Ortho-phosphate	mg/L						
pH	SU						
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L	299	=			283	=
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FU22GW007		FU22GW007		FU22GW007	
	SampleID	U22GW007L3		U22GW007L3		U22GW007L3	
	DateCollected	11/12/2001		11/12/2001		11/12/2001	
	DateExtracted						
	DateAnalyzed	11/12/2001		11/13/2001		11/20/2001	
	SDGNumber	51883		51883		51883	
Parameter	**Units**						
Alkalinity, Total (as CaCO3)	mg/L					413	J
Chloride	mg/L						
Fluoride	mg/L						
Nitrate as Nitrous Oxide	mg/L			0.066	=		
Nitrite (as N)	mg/L						
Nitrogen, Ammonia (as N)	mg/L						
Nitrogen, Nitrate (as N)	mg/L						
Ortho-phosphate	mg/L						
pH	SU	5.84	=				
Phosphorus	mg/L						
Sulfate (as SO4)	mg/L			86.4	=		
Sulfide	mg/L						
Total Dissolved Solids (Residue, filterable)	mg/L						
Total Suspended Solids (TSS)	mg/L						

Groundwater General Chemistry

	StationID	FU22GW007		FU22GW007	
	SampleID	U22GW007M2		U22GW007M2	
	DateCollected	7/1/2002		7/1/2002	
	DateExtracted				
	DateAnalyzed	7/5/2002		7/12/2002	
	SDGNumber	63057		63057	
Parameter	**Units**				
Alkalinity, Total (as CaCO3)	mg/L			483	=
Chloride	mg/L	2000	=		
Fluoride	mg/L				
Nitrate as Nitrous Oxide	mg/L				
Nitrite (as N)	mg/L				
Nitrogen, Ammonia (as N)	mg/L				
Nitrogen, Nitrate (as N)	mg/L				
Ortho-phosphate	mg/L				
pH	SU				
Phosphorus	mg/L				
Sulfate (as SO4)	mg/L				
Sulfide	mg/L				
Total Dissolved Solids (Residue, filterable)	mg/L				
Total Suspended Solids (TSS)	mg/L				

Groundwater Cyanide	StationID	FGELGW011	
	SampleID	GELGW011M3	
	DateCollected	11/5/2002	
	DateExtracted	11/8/2002	
	DateAnalyzed	11/11/2002	
	SDGNumber	69978	
Parameter	Units		
Cyanide	ug/L	5	U

Groundwater Dissolved Gases	StationID	F613GW004		F613GW004		F613GW004		F613GW009	
	SampleID	613GW004M2		613GW004M5		613HW004M5		613GW009M2	
	DateCollected	7/1/2002		10/31/2002		10/31/2002		7/1/2002	
	DateExtracted	7/10/2002		11/11/2002		11/11/2002		7/10/2002	
	DateAnalyzed	7/10/2002		11/14/2002		11/14/2002		7/10/2002	
	SDGNumber	CNC124		69740		69740		CNC125	
Parameter	**Units**								
Carbon Dioxide	ug/l	72000	=					150000	R
Ethane	ug/L	0.35	U	25	U	25	U	0.35	U
Ethene	ug/l	0.33	U	25	U	25	U	0.33	U
Methane	ug/l	36	J	174	=	158	=	53	J

Groundwater Dissolved Gases	StationID	F613GW009		F613GW009		F613GW010		F613GW011	
	SampleID	613GW009M2DL		613GW009M5		613GW010M3		613GW011M3	
	DateCollected	7/1/2002		10/31/2002		8/5/2002		8/5/2002	
	DateExtracted	7/11/2002		11/11/2002		8/19/2002		8/19/2002	
	DateAnalyzed	7/11/2002		11/14/2002		8/19/2002		8/19/2002	
	SDGNumber	CNC125		69740		CNC138		CNC138	
Parameter	Units								
Carbon Dioxide	ug/l	220000	=			45000	=	140000	R
Ethane	ug/L	3.5	R	25	U	0.35	U	0.35	U
Ethene	ug/l	3.3	R	25	U	0.33	U	0.33	U
Methane	ug/l	82	R	146	=	2.2	J	0.49	UJ

Groundwater Dissolved Gases	StationID	F613GW011		FGELGW008		FGELGW011		FGELGW012	
	SampleID	613GW011M3DL		GELGW008M5		GELGW011M2		GELGW012M2	
	DateCollected	8/5/2002		10/31/2002		7/1/2002		7/1/2002	
	DateExtracted	8/19/2002		11/11/2002		7/10/2002		7/11/2002	
	DateAnalyzed	8/19/2002		11/14/2002		7/10/2002		7/11/2002	
	SDGNumber	CNC138		69740		CNC125		CNC125	
Parameter	Units								
Carbon Dioxide	ug/l	110000	=			100000	=	99000	=
Ethane	ug/L			1250	U	0.35	U	0.35	U
Ethene	ug/l			1250	U	0.33	U	0.33	U
Methane	ug/l			23900	=	8.7	J	22	J

Groundwater Dissolved Gases	StationID	FGELGW012		FU22GW001		FU22GW002		FU22GW002	
	SampleID	GELGW012M5		U22GW001L4		U22GW002L2		U22GW002L4	
	DateCollected	10/31/2002		11/12/2001		5/21/2001		11/12/2001	
	DateExtracted	11/11/2002		11/15/2001		6/1/2001		11/15/2001	
	DateAnalyzed	11/14/2002		11/15/2001		6/1/2001		11/15/2001	
	SDGNumber	69740		CNC46		CNC18		CNC46	
Parameter	**Units**								
Carbon Dioxide	ug/l								
Ethane	ug/L	25	U						
Ethene	ug/l	25	U						
Methane	ug/l	15.5	J	780	=	390	=	990	=

Groundwater Dissolved Gases	StationID	FU22GW002		FU22GW002		FU22GW002		FU22GW003	
	SampleID	U22GW002M2		U22GW002M5		U22HW002M2		U22GW003L2	
	DateCollected	7/1/2002		10/31/2002		7/1/2002		5/21/2001	
	DateExtracted	7/10/2002		11/11/2002		7/10/2002		6/1/2001	
	DateAnalyzed	7/10/2002		11/14/2002		7/10/2002		6/1/2001	
	SDGNumber	CNC125		69740		CNC125		CNC18	
Parameter	**Units**								
Carbon Dioxide	ug/l	120000	=			130000	=		
Ethane	ug/L	0.35	U	250	U	0.35	U		
Ethene	ug/l	0.33	U	250	U	0.33	U		
Methane	ug/l	180	J	1880	=	180	J	990	=

Groundwater Dissolved Gases	StationID	FU22GW003		FU22GW003		FU22GW003		FU22GW003	
	SampleID	U22GW003L4		U22GW003M5		U22HW003L2		U22HW003L4a	
	DateCollected	11/12/2001		10/31/2002		5/21/2001		11/12/2001	
	DateExtracted	11/15/2001		11/11/2002		6/1/2001		11/15/2001	
	DateAnalyzed	11/15/2001		11/14/2002		6/1/2001		11/15/2001	
	SDGNumber	CNC46		69740		CNC18		CNC46	
Parameter	**Units**								
Carbon Dioxide	ug/l								
Ethane	ug/L			250	U				
Ethene	ug/l			250	U				
Methane	ug/l	440	=	1460	=	1100	=	490	=

Groundwater Dissolved Gases	StationID	FU22GW004		FU22GW005		FU22GW006		FU22GW006	
	SampleID	U22GW004L4		U22GW005L4		U22GW006L4		U22GW006M5	
	DateCollected	11/12/2001		11/12/2001		11/12/2001		10/31/2002	
	DateExtracted	11/15/2001		11/15/2001		11/15/2001		11/11/2002	
	DateAnalyzed	11/15/2001		11/15/2001		11/15/2001		11/14/2002	
	SDGNumber	CNC46		CNC46		CNC46		69740	
Parameter	**Units**								
Carbon Dioxide	ug/l								
Ethane	ug/L							25	U
Ethene	ug/l							25	U
Methane	ug/l	61	=	130	=	97	=	399	=

Groundwater Dissolved Gases	StationID	FU22GW007		FU22GW007	
	SampleID	U22GW007L4		U22GW007M2	
	DateCollected	11/12/2001		7/1/2002	
	DateExtracted	11/15/2001		7/10/2002	
	DateAnalyzed	11/15/2001		7/10/2002	
	SDGNumber	CNC46		CNC125	
Parameter	**Units**				
Carbon Dioxide	ug/l			53000	=
Ethane	ug/L			0.35	U
Ethene	ug/l			0.33	U
Methane	ug/l	880	=	980	=

Appendix E

Data Validation Summary - Charleston Naval Complex - Zone F, AOC 613

TO: Louise Palmer/CH2M HILL/CLT

FROM: Amy Juchem/CH2M HILL/GNA
Herb Kelly/CH2M HILL/GNA

DATE: January 9, 2003

The purpose of this memorandum is to present the results of the data validation process for the samples collected in Zone F, AOC 613. The samples were collected between the dates of May 21, 2001 and December 4, 2002.

The specific samples and analytical fractions reviewed are summarized below in Table 1 and Table 2.

The Quality Control areas that were reviewed and the resulting findings are documented within each subsection that follows. This data was validated for compliance with the analytical method requirements. This process also included a review of the data to assess the accuracy, precision, and completeness based upon procedures described in the guidance documents such as the Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review (EPA 2002) and National Functional Guidelines for Organic Data Review (EPA 1999)*. Quality assurance/quality control (QA/QC) summary forms and data reports were reviewed.

Samples were submitted to Severn Trent Services, STL Savannah Laboratories, Inc., in Savannah, Georgia, for the following analyses: SW-846 8260 Volatile Organic Compounds (VOC), RSKSOP-175 Dissolved Gasses, SW-846 6010 Total and Dissolved Iron, E150.1 pH, E300 Anions, and A2320 Alkalinity.

Samples were submitted to General Engineering Laboratories, Inc., in Charleston, South Carolina, for the following analyses: SW-846 8260 Volatile Organic Compounds (VOC), SW-846 8015 Dissolved Gasses, SW-846 6010 Total and Dissolved Iron, E150.1 pH, E300 Anions, E310.1 Alkalinity, and SM3500 Ferrous Iron.

Sample results that were not within the acceptance limits were appended with a qualifying flag, which consisted of a single- or double-letter code that indicated a possible problem with the data. The qualifying flags originated during the data review and validation processes. These also include the secondary, or the two-digit "sub-qualifier" flags. The secondary qualifiers provide the reasoning behind the assignment of a qualifier flag to the data. The secondary qualifiers are presented and defined below.

Attachment 1 lists the changes in data qualifiers, due to the validation process.

The following primary flags were used to qualify the data:

[=] Detected. The analyte was analyzed for and detected at the concentration shown.

[J] Estimated. The analyte was present but the reported value may not be accurate or precise.

[U] Undetected. The analyte was analyzed for but not detected above the method detection limit.

[UJ] Detection limit estimated. The analyte was analyzed for but qualified as not detected; the result is estimated.

[R] Rejected. The data is not useable.

Secondary Data Validation Qualifiers

Code	Definition
2S	Second Source
BL	Blank
BD	Blank Spike/Blank Spike Duplicate or (LCS/LCSD) Precision
BS	Blank Spike/LCS
CC	Continuing Calibration Verification
DL	Dilution
FD	Field Duplicate
HT	Holding Time
IB	In-Between (metals – B's → J's)
IC	Initial Calibration
IS	Internal Standard
LD	Lab Duplicate
LR	Concentration exceeded Linear Range
MD	MS/MSD or LCS/LCSD Precision
MS	Matrix Spike/Matrix Spike Duplicate
OT	Other (see DV worksheet)
PD	Pesticide Degradation
PS	Post Spike
RE	Re-extraction/Re-analysis
SD	Serial Dilution
SS	Spiked Surrogate
TD	Total vs. Dissolved
TN	Tune

Table 1 - Chemical Analytical Methods – Field and Quality Control Samples – Organic Parameters

TABLE 1
Chemical Analytical Methods – Field and Quality Control Samples – Organic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

51883	FIELDQC	U22TW001L2	51883001	WQ	TB		11/12/01	X		
51883	FU22GW001	U22GW001L3	51883002	WG	N		11/12/01	X		
51883	FU22GW002	U22GW002L3	51883003	WG	N		11/12/01	X		
51883	FU22GW003	U22GW003L3	51883004	WG	N		11/12/01	X		
51883	FU22GW003	U22HW003L2a	51883005	WG	FD		05/21/01	X		
51883	FU22GW004	U22GW004L3	51883006	WG	N		11/12/01	X		
51883	FU22GW005	U22GW005L3	51883007	WG	N		11/12/01	X		
51883	FU22GW006	U22GW006L3	51883008	WG	N		11/12/01	X		
51883	FU22GW007	U22GW007L3	51883009	WG	N		11/12/01	X		
51883	FIELDQC	U22EW001L2	51883010	WQ	EB		05/21/01	X		
51883	LABQC	1200108949	1200108949	WQ	LB			X		
51883	LABQC	1200108950	1200108950	WQ	BS			X		
61380	FU22GW007	U22GW007M1	61380001	WG	N		06/03/02	X		
61380	FU22GW001	U22GW001M1	61380002	WG	N		06/03/02	X		
61380	FU22GW002	U22GW002M1	61380003	WG	N		06/03/02	X		
61380	FU22GW003	U22GW003M1	61380004	WG	N		06/03/02	X		
61380	FU22GW003	U22HW003M1	61380005	WG	FD		06/03/02	X		
61380	FU22GW004	U22GW004M1	61380006	WG	N		06/03/02	X		
61380	FU22GW005	U22GW005M1	61380007	WG	N		06/03/02	X		
61380	FU22GW006	U22GW006M1	61380008	WG	N		06/03/02	X		
61380	FIELDQC	U22EW001M1	61380009	WQ	EB		06/03/02	X		
61380	FIELDQC	U22TW001M1	61380010	WQ	TB		06/03/02	X		
61380	LABQC	1200227831	1200227831	WQ	LB			X		
61380	FU22GW007	U22GW007M1MS	1200227832	WG	MS		06/03/02	X		
61380	FU22GW007	U22GW007M1SD	1200227833	WG	SD		06/03/02	X		
61380	LABQC	1200227834	1200227834	WQ	BS			X		
63056	F613GW004	613GW004M2	63056001	WG	N		07/01/02	X		

TABLE 1
Chemical Analytical Methods – Field and Quality Control Samples – Organic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

63056	LABQC	1200259245	1200259245	WQ	LB			X		
63056	LABQC	1200259246	1200259246	WQ	BS			X		
63057	FU22GW002	U22GW002M2	63057001	WG	N		07/01/02	X		
63057	FU22GW002	U22HW002M2	63057002	WG	FD		07/01/02	X		
63057	FU22GW007	U22GW007M2	63057003	WG	N		07/01/02	X		
63057	FGELGW011	GELGW011M2	63057004	WG	N		07/01/02	X		
63057	FGELGW012	GELGW012M2	63057005	WG	N		07/01/02	X		
63057	F613GW009	613GW009M2	63057006	WG	N		07/01/02	X		
63057	FIELDQC	613EW004M2	63057007	WQ	EB		07/02/02	X		
63057	FIELDQC	613TW004M2	63057008	WQ	TB		07/02/02	X		
63057	LABQC	1200259245	1200259245	WQ	LB			X		
63057	LABQC	1200259246	1200259246	WQ	BS			X		
63058	FGELGW014	GELGW014M2	63058001	WG	N		07/02/02	X		
63058	LABQC	1200259245	1200259245	WQ	LB			X		
63058	LABQC	1200259246	1200259246	WQ	BS			X		
63483	F613GP072	613GP07224	63483001	WG	N		07/10/02	X		
63483	FIELDQC	613EP069M2	63483002	WG	EB		07/10/02	X		
63483	F613GP069	613GP06912	63483003	WG	N		07/10/02	X		
63483	F613GP069	613GP06924	63483004	WG	N		07/10/02	X		
63483	F613GP070	613GP07024	63483005	WG	N		07/10/02	X		
63483	F613GP071	613GP07124	63483006	WG	N		07/10/02	X		
63483	F613GP073	613GP07324	63483007	WG	N		07/10/02	X		
63483	F613GP073	613HP07324	63483008	WG	N		07/10/02	X		
63483	FIELDQC	613TP069M2	63483009	WQ	TB		07/10/02	X		
63483	F613GP072	613GP07224MS	1200262477	WG	MS		07/10/02	X		
63483	F613GP072	613GP07224SD	1200262478	WG	SD		07/10/02	X		
63483	LABQC	1200263478	1200263478	WQ	LB			X		
63483	LABQC	1200263479	1200263479	WQ	LB			X		
63483	LABQC	1200263480	1200263480	WQ	BS			X		
63483	LABQC	1200263481	1200263481	WQ	BS			X		

TABLE 1
Chemical Analytical Methods – Field and Quality Control Samples – Organic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

64813	FIELDQC	613TW010M3	64813001	WQ	TB		06/06/02	X		
64813	F613GW010	613GW010M3	64813002	WG	N		08/05/02	X		
64813	F613GW011	613GW011M3	64813003	WG	N		08/05/02	X		
64813	FIELDQC	613EW010M3	64813004	WQ	EB		08/05/02	X		
64813	LABQC	1200279408	1200279408	WQ	LB			X		
64813	LABQC	VBLK01	1200279408	WQ	LB			X		
64813	LABQC	1200279409	1200279409	WQ	BS			X		
64813	LABQC	VBLK01LCS	1200279409	WQ	BS			X		
64813	LABQC	1200280582	1200280582	WQ	LB			X		
64813	LABQC	VBLK02	1200280582	WQ	LB			X		
64813	LABQC	1200280583	1200280583	WQ	BS			X		
64813	LABQC	VBLK02LCS	1200280583	WQ	BS			X		
69740	F613GW010	613GW010M5	69740001	WG	N		10/31/02	X		
69740	FU22GW001	U22GW001M5	69740002	WG	N		10/31/02	X		
69740	FU22GW004	U22GW004M5	69740003	WG	N		10/31/02	X		
69740	FU22GW005	U22GW005M5	69740004	WG	N		10/31/02	X		
69740	FU22GW007	U22GW007M5	69740005	WG	N		10/31/02	X		
69740	F613GW011	613GW011M5	69740006	WG	N		10/31/02	X		
69740	FGELGW007	GELGW007M5	69740007	WG	N		10/31/02	X		
69740	FIELDQC	613TW004M5	69740008	WQ	TB		10/31/02	X		
69740	FU22GW002	U22GW002M5	69740009	WG	N		10/31/02	X	X	
69740	FU22GW003	U22GW003M5	69740010	WG	N		10/31/02	X	X	
69740	FU22GW006	U22GW006M5	69740011	WG	N		10/31/02	X	X	
69740	F613GW004	613GW004M5	69740012	WG	N		10/31/02	X	X	
69740	F613GW004	613HW004M5	69740013	WG	FD		10/31/02	X	X	
69740	F613GW009	613GW009M5	69740014	WG	N		10/31/02	X	X	
69740	FGELGW008	GELGW008M5	69740015	WG	N		10/31/02	X	X	
69740	FGELGW012	GELGW012M5	69740016	WG	N		10/31/02	X	X	
69740	FIELDQC	613EW004M5	69740017	WQ	EB		10/31/02	X	X	
69740	F613GW010	613GW010M5MS	1200327878	WG	MS		10/31/02	X		

TABLE 1
Chemical Analytical Methods – Field and Quality Control Samples – Organic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

69740	F613GW010	613GW010M5SD	1200327879	WG	SD		10/31/02	X		
69740	LABQC	1200329380	1200329380	WQ	LB			X		
69740	LABQC	1200329381	1200329381	WQ	BS			X		
69740	LABQC	1200331041	1200331041	WQ	LB			X		
69740	LABQC	1200331042	1200331042	WQ	BS			X		
69740	LABQC	1200334379	1200334379	WQ	LB				X	
69740	LABQC	1200334380	1200334380	WQ	BS				X	
69740	LABQC	1200334381	1200334381	WQ	BD				X	
71534	FIELDQC	U22EW001M3	71534001	WQ	EB		12/04/02	X		
71534	FIELDQC	U22TW001M3	71534002	WQ	TB		11/27/02	X		
71534	FU22GW007	U22GW007M3	71534003	WG	N		12/04/02	X		
71534	FU22GW001	U22GW001M3	71534004	WG	N		12/03/02	X		
71534	FU22GW002	U22GW002M3	71534005	WG	N		12/03/02	X		
71534	FU22GW003	U22GW003M3	71534006	WG	N		12/04/02	X		
71534	FU22GW003	U22HW003M3	71534007	WG	FD		12/04/02	X		
71534	FU22GW004	U22GW004M3	71534008	WG	N		12/03/02	X		
71534	FU22GW005	U22GW005M3	71534009	WG	N		12/04/02	X		
71534	FU22GW006	U22GW006M3	71534010	WG	N		12/04/02	X		
71534	LABQC	1200346160	1200346160	WQ	LB			X		
71534	LABQC	1200346161	1200346161	WQ	BS			X		
71534	LABQC	1200346162	1200346162	WQ	LB			X		
71534	LABQC	1200346163	1200346163	WQ	BS			X		
71534	FU22GW007	U22GW007M3MS	1200346164	WG	MS		12/04/02	X		
71534	FU22GW007	U22GW007M3SD	1200346165	WG	SD		12/04/02	X		
CNC18	FU22GW002	U22GW002L2	S113230*1	WG	N		05/21/01	X		X
CNC18	FU22GW003	U22GW003L2	S113230*2	WG	N		05/21/01	X		X
CNC18	FU22GW003	U22HW003L2	S113230*3	WG	FD		05/21/01	X		X
CNC18	FU22GW001	U22GW001L2	S113230*4	WG	N		05/21/01	X		
CNC18	FU22GW004	U22GW004L2	S113230*5	WG	N		05/21/01	X		
CNC18	FU22GW005	U22GW005L2	S113230*6	WG	N		05/21/01	X		

TABLE 1
Chemical Analytical Methods – Field and Quality Control Samples – Organic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

CNC18	FU22GW005	U22KW005L2	S113230*7	WG	N		05/21/01	X		
CNC18	FU22GW005	U22XW005L2	S113230*8	WG	N		05/21/01	X		
CNC18	FU22GW006	U22GW006L2	S113230*9	WG	N		05/21/01	X		
CNC18	FU22GW007	U22GW007L2	S113230*10	WG	N		05/21/01	X		
CNC18	FIELDQC	U22EMW01L2	S113230*11	WQ	EB		05/21/01	X		
CNC18	FIELDQC	U22TMW01L2	S113230*12	WQ	TB		05/21/01	X		
CNC18	LABQC	1323013LB	S113230*13	WQ	LB			X		X
CNC18	LABQC	1323014BS	S113230*14	WQ	BS			X		X
CNC18	LABQC	1323020LB	S113230*20	WQ	LB			X		
CNC18	LABQC	1323021BS	S113230*21	WQ	BS			X		
CNC46	FU22GW001	U22GW001L4	S117377*1	WG	N		11/12/01			X
CNC46	FU22GW002	U22GW002L4	S117377*2	WG	N		11/12/01			X
CNC46	FU22GW003	U22GW003L4	S117377*2	WG	N		11/12/01			X
CNC46	FU22GW003	U22HW003L4a	S117377*4	WG	FD		11/12/01			X
CNC46	FU22GW004	U22GW004L4	S117377*5	WG	N		11/12/01			X
CNC46	FU22GW005	U22GW005L4	S117377*6	WG	N		11/12/01			X
CNC46	FU22GW006	U22GW006L4	S117377*7	WG	N		11/12/01			X
CNC46	FU22GW007	U22GW007L4	S117377*8	WG	N		11/12/01			X
CNC46	FIELDQC	U22EW001L4	S117377*9	WQ	EB		11/12/01			X
CNC46	LABQC	1737710LB	S117377*10	WQ	LB					X
CNC46	LABQC	1737711BS	S117377*11	WQ	BS					X
CNC124	F613GW004	613GW004M2	S244769A*1	WG	N		07/01/02			X
CNC124	LABQC	44769A2LB	S244769A*2	WQ	LB					X
CNC124	LABQC	44769A3BS	S244769A*3	WQ	BS					X
CNC125	FU22GW002	U22GW002M2	S244769*1	WG	N		07/01/02			X
CNC125	FU22GW002	U22HW002M2	S244769*2	WG	FD		07/01/02			X
CNC125	FU22GW007	U22GW007M2	S244769*3	WG	N		07/01/02			X
CNC125	FGELGW011	GELGW011M2	S244769*4	WG	N		07/01/02			X
CNC125	FGELGW012	GELGW012M2	S244769*5	WG	N		07/01/02			X
CNC125	F613GW009	613GW009M2	S244769*6	WG	N		07/01/02			X

TABLE 1
Chemical Analytical Methods – Field and Quality Control Samples – Organic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

CNC125	F613GW009	613GW009M2DL	S244769*6*DL	WG	LR	DL	07/01/02			X
CNC125	FIELDQC	613EW004M2	S244769*7	WQ	EB		07/02/02			X
CNC125	LABQC	447698LB	S244769*8	WQ	LB					X
CNC125	LABQC	447699BS	S244769*9	WQ	BS					X
CNC138	F613GW010	613GW010M3	S245548*1	WG	N		08/05/02			X
CNC138	F613GW011	613GW011M3	S245548*2	WG	N		08/05/02			X
CNC138	F613GW011	613GW011M3DL	S245548*2*DL	WG	LR	DL	08/05/02			X
CNC138	FIELDQC	613EW010M3	S245548*3	WQ	EB		08/05/02			X
CNC138	LABQC	455484LB	S245548*4	WQ	LB					X
CNC138	LABQC	455485BS	S245548*5	WQ	BS					X

MATRIX CODE

WG – Groundwater
WQ – Water QC Sample

SAMPLE TYPE CODE

BS - Blank Spike (LCS)
BD – Blank Spike Duplicate (LCSD)
EB - Equipment Blank
TB – Trip Blank
N - Native Sample
FD – Field Duplicate
LB - Laboratory Blank
LR – Laboratory Replicate
MS – Matrix Spike
SD – Matrix Spike Duplicate

LR TYPE CODE

DL - Dilution

ANALYSIS CODE

VOC - Volatile Organic Compounds

Table 2 - Chemical Analytical Methods – Field and Quality Control Samples – Inorganic Parameters

TABLE 2
Chemical Analytical Methods – Field and Quality Control Samples – inorganic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

51883	FU22GW001	U22GW001L3	51883002	WG	N		11/12/01	X		X	X	X		
51883	FU22GW002	U22GW002L3	51883003	WG	N		11/12/01	X		X	X	X		
51883	FU22GW003	U22GW003L3	51883004	WG	N		11/12/01	X		X	X	X		
51883	FU22GW003	U22HW003L2a	51883005	WG	FD		05/21/01	X		X	X	X		
51883	FU22GW004	U22GW004L3	51883006	WG	N		11/12/01	X		X	X	X		
51883	FU22GW005	U22GW005L3	51883007	WG	N		11/12/01	X		X	X	X		
51883	FU22GW006	U22GW006L3	51883008	WG	N		11/12/01	X		X	X	X		
51883	FU22GW007	U22GW007L3	51883009	WG	N		11/12/01	X		X	X	X		
51883	FIELDQC	U22EW001L2	51883010	WQ	EB		05/21/01	X			X	X		
51883	FU22GW001	U22GW001L3LR	1200108337	WG	LR	DL	11/12/01			X				
51883	LABQC	1200108339	1200108339	WQ	BS					X				
51883	LABQC	1200108386	1200108386	WQ	LB						X			
51883	FU22GW004	U22GW004L3LR	1200108387	WG	LR	DL	11/12/01				X			
51883	FU22GW004	U22GW004L3MS	1200108388	WG	MS		11/12/01				X			
51883	LABQC	1200108389	1200108389	WQ	BS						X			
51883	LABQC	1200108427	1200108427	WQ	LB			X						
51883	LABQC	1200108428	1200108428	WQ	BS			X						

TABLE 2
Chemical Analytical Methods – Field and Quality Control Samples – inorganic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

SDG	Station ID	Sample ID	Lab sample ID	Matrix	Sample type	Dilution	Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
51883	FU22GW001	U22GW001L3MS	1200108429	WG	MS		11/12/01	X						
51883	FU22GW001	U22GW001L3SD	1200108430	WG	SD		11/12/01	X						
51883	LABQC	1200111989	1200111989	WQ	BS							X		
51883	FIELDQC	U22EW001L2LR	1200112012	WQ	EB		11/12/01					X		
51883	FIELDQC	U22EW001L2MS	1200112013	WQ	MS		11/12/01					X		
51884	FIELDQC	U22EW001L2	51884001	WQ	EB		05/21/01		X					
51884	FU22GW001	U22GW001L2	51884002	WG	N		05/21/01		X					
51884	FU22GW002	U22GW002L2	51884003	WG	N		05/21/01		X					
51884	FU22GW003	U22GW003L2	51884004	WG	N		05/21/01		X					
51884	FU22GW003	U22HW003L2a	51884005	WG	FD		05/21/01		X					
51884	FU22GW004	U22GW004L2	51884006	WG	N		05/21/01		X					
51884	FU22GW005	U22GW005L2	51884007	WG	N		05/21/01		X					
51884	FU22GW006	U22GW006L2	51884008	WG	N		05/21/01		X					
51884	FU22GW007	U22GW007L2	51884009	WG	N		05/21/01		X					
51884	LABQC	1200108427	1200108427	WQ	LB			X						
51884	LABQC	1200108428	1200108428	WQ	BS			X						
63056	F613GW004	613GW004M2	63056001	WG	N		07/01/02				X	X		X
63056	LABQC	1200255452	1200255452	WQ	LB									X
63056	F613GW004	613GW004M2LR	1200255453	WG	LR	DL	07/01/02							X

TABLE 2
Chemical Analytical Methods – Field and Quality Control Samples – inorganic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
63056	F613GW004	613GW004M2MS	1200255454	WG	MS		07/01/02							X
63056	LABQC	1200255455	1200255455	WQ	BS									X
63056	LABQC	1200255572	1200255572	WQ	LB						X			
63056	F613GW004	613GW004M2LR	1200255573	WG	LR	DL	07/01/02				X			
63056	F613GW004	613GW004M2MS	1200255574	WG	MS		07/01/02				X			
63056	LABQC	1200255575	1200255575	WQ	BS						X			
63056	F613GW004	613GW004M2LR	1200257005	WG	LR	DL	07/01/02					X		
63056	F613GW004	613GW004M2MS	1200257007	WG	MS		07/01/02					X		
63056	LABQC	1200257009	1200257009	WQ	BS							X		
63056	F613GW004	613GW004M2SD	1200257486	WG	SD		07/01/02					X		
63057	FU22GW002	U22GW002M2	63057001	WG	N		07/01/02				X	X		X
63057	FU22GW002	U22HW002M2	63057002	WG	FD		07/01/02				X	X		X
63057	FU22GW007	U22GW007M2	63057003	WG	N		07/01/02				X	X		X
63057	FGELGW011	GELGW011M2	63057004	WG	N		07/01/02				X	X		X
63057	FGELGW012	GELGW012M2	63057005	WG	N		07/01/02				X	X		X
63057	F613GW009	613GW009M2	63057006	WG	N		07/01/02				X	X		X
63057	FIELDQC	613EW004M2	63057007	WQ	EB		07/02/02				X	X		X
63057	LABQC	1200255452	1200255452	WQ	LB									X
63057	LABQC	1200255455	1200255455	WQ	BS									X

TABLE 2
Chemical Analytical Methods – Field and Quality Control Samples – inorganic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

SDG	Station ID	Sample ID	Laboratory ID	Matrix	Sample Type	Dilution	Sample Date	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
63057	LABQC	1200255572	1200255572	WQ	LB						X			
63057	LABQC	1200255575	1200255575	WQ	BS						X			
63057	FIELDQC	613EW004M2LR	1200260783	WQ	LR	DL	07/02/02					X		
63057	FIELDQC	613EW004M2MS	1200260786	WQ	MS		07/02/02					X		
63057	FIELDQC	613EW004M2SD	1200260788	WQ	SD		07/02/02					X		
63057	LABQC	1200260789	1200260789	WQ	BS							X		
64813	F613GW010	613GW010M3	64813002	WG	N		08/05/02				X	X		X
64813	F613GW011	613GW011M3	64813003	WG	N		08/05/02				X	X		X
64813	FIELDQC	613EW010M3	64813004	WQ	EB		08/05/02				X	X		X
64813	LABQC	1200278031	1200278031	WQ	LB									X
64813	F613GW010	613GW010M3LR	1200278032	WG	LR	DL	08/05/02							X
64813	F613GW010	613GW010M3MS	1200278033	WG	MS		08/05/02							X
64813	LABQC	1200278034	1200278034	WQ	BS									X
64813	LABQC	1200278108	1200278108	WQ	LB						X			
64813	F613GW011	613GW011M3LR	1200278109	WG	LR	DL	08/05/02				X			
64813	F613GW011	613GW011M3MS	1200278110	WG	MS		08/05/02				X			
64813	LABQC	1200278111	1200278111	WQ	BS						X			
64813	F613GW010	613GW010M3SD	1200279359	WG	SD		08/05/02							X
64813	F613GW010	613GW010M3LR	1200281412	WG	LR	DL	08/05/02					X		

TABLE 2
Chemical Analytical Methods – Field and Quality Control Samples – inorganic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
64813	F613GW010	613GW010M3MS	1200281414	WG	MS		08/05/02					X		
64813	F613GW010	613GW010M3SD	1200281415	WG	SD		08/05/02					X		
64813	LABQC	1200281416	1200281416	WQ	BS							X		
69737	FU22GW002	U22GW002M5	69737001	WG	N		10/31/02				X			
69737	FU22GW003	U22GW003M5	69737002	WG	N		10/31/02				X			
69737	FU22GW006	U22GW006M5	69737003	WG	N		10/31/02				X			
69737	F613GW004	613GW004M5	69737004	WG	N		10/31/02				X			
69737	F613GW004	613HW004M5	69737005	WG	FD		10/31/02				X			
69737	F613GW009	613GW009M5	69737006	WG	N		10/31/02				X			
69737	FGELGW008	GELGW008M5	69737007	WG	N		10/31/02				X			
69737	FGELGW012	GELGW012M5	69737008	WG	N		10/31/02				X			
69737	FIELDQC	613EW0004M5	69737009	WQ	EB		10/31/02				X			
69737	LABQC	1200327369	1200327369	WQ	LB						X			
69737	FU22GW002	U22GW002M5LR	1200327371	WG	LR	DL	10/31/02				X			
69737	FU22GW002	U22GW002M5MS	1200327373	WG	MS		10/31/02				X			
69737	FU22GW002	U22GW002M5SD	1200327374	WG	SD		10/31/02				X			
69737	LABQC	1200327375	1200327375	WQ	BS						X			
69740	FU22GW002	U22GW002M5	69740009	WG	N		10/31/02							X
69740	FU22GW003	U22GW003M5	69740010	WG	N		10/31/02							X

TABLE 2
Chemical Analytical Methods – Field and Quality Control Samples – inorganic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
69740	FU22GW006	U22GW006M5	69740011	WG	N		10/31/02							X
69740	F613GW004	613GW004M5	69740012	WG	N		10/31/02							X
69740	F613GW004	613HW004M5	69740013	WG	FD		10/31/02							X
69740	F613GW009	613GW009M5	69740014	WG	N		10/31/02							X
69740	FGELGW008	GELGW008M5	69740015	WG	N		10/31/02							X
69740	FGELGW012	GELGW012M5	69740016	WG	N		10/31/02							X
69740	FIELDQC	613EW004M5	69740017	WQ	EB		10/31/02							X
69740	LABQC	1200327703	1200327703	WQ	LB									X
69740	FU22GW002	U22GW002M5LR	1200327704	WG	LR	DL	10/31/02							X
69740	FU22GW002	U22GW002M5MS	1200327705	WG	MS		10/31/02							X
69740	LABQC	1200327706	1200327706	WQ	BS									X
CNC18	FU22GW002	U22GW002L2	S113230*1	WG	N		05/21/01	X	X	X	X		X	
CNC18	FU22GW002	U22GW002L2DL	S113230*1*DL	WG	LR	DL	05/21/01				X			
CNC18	FU22GW003	U22GW003L2	S113230*2	WG	N		05/21/01	X	X	X	X		X	
CNC18	FU22GW003	U22GW003L2DL	S113230*2*DL	WG	LR	DL	05/21/01				X			
CNC18	FU22GW003	U22HW003L2	S113230*3	WG	FD		05/21/01	X	X	X	X		X	
CNC18	FU22GW003	U22HW003L2DL	S113230*3*DL	WG	FD	DL	05/21/01				X			
CNC18	LABQC	1323013LB	S113230*13	WQ	LB			X			X		X	
CNC18	LABQC	1323014BS	S113230*14	WQ	BS			X	X	X	X		X	

TABLE 2
Chemical Analytical Methods – Field and Quality Control Samples – inorganic Parameters
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

Site	Sample	Sample ID	Sample Id	Matrix	Type									
CNC18	LABQC	1323020LB	S113230*20	WQ	LB						X			
CNC18	LABQC	1323021BS	S113230*21	WQ	BS						X			
CNC18	LABQC	1323023LB	S113230*23	WQ	LB						X			
CNC18	LABQC	1323024BS	S113230*24	WQ	BS						X			

MATRIX CODE

WG – Groundwater
WQ – Water QC Sample

SAMPLE TYPE CODE

BS - Blank Spike
EB - Equipment Blank
N - Native Sample
FD – Field Duplicate
LB - Laboratory Blank
LR – Laboratory Replicate
MS – Matrix Spike
SD – Matrix Spike Duplicate

LR TYPE CODE

DL - Dilution

Organic Parameters

Quality Control Review

The following list represents the QA/QC measures that were reviewed during the data quality evaluation procedure for organic data.

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Method blanks, equipment blanks, and trip blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Surrogate Recoveries** – Surrogate Compounds are added to each sample and the recoveries are used to monitor lab performance and possible matrix interference.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", either laboratory reagent water or Ottawa sand, in which target compounds have been added prior to extraction/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **Field Duplicate Samples** – These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **GC/MS Tuning** – The mass spectrum of the tuning compound is evaluated for method compliance. The criteria are established to verify the proper mass assignment and mass resolution.
- **Initial Calibration** – The initial calibration ensures that the instrument is capable of producing acceptable qualitative and quantitative data for the compounds of interest.
- **Continuing Calibration** – The continuing calibration checks satisfactory performance of the instrument and its predicted response to the target compounds.
- **Internal Standards** – The internal standards (retention time and response) are evaluated for method compliance. The internal standards are used in quantitation of the target parameters and monitor the instrument sensitivity and response for stability during each analysis.

Volatile Organic Compounds (VOC) Analyses

The QA/QC parameters for VOC analyses for all of the samples were within acceptable control limits, except as noted below:

Blanks

The VOC target parameters detected in blank samples are listed in [redacted].

TABLE 3
Blank Contamination: VOCs
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

51883	U22EW001L2	51883010	EB	Benzene	0.3	µg/L	1.5 µg/L
64813	613EW010M3	64813004	EB	1,1-Dichloroethylene	3.0	µg/L	15.0 µg/L
71534	1200346160	1200346160	LB	Naphthalene	0.3	µg/L	1.5 µg/L
71534	U22EW001M3	71534001	EB	Toluene	0.48	µg/L	2.4 µg/L
CNC18	U22EMW01L2	S113230*11	EB	Acetone	29	µg/L	290 µg/L

If a target parameter determined to be a common contaminant was reported in a field sample, and the concentration was below the level determined to be due to blank contamination, the following actions were taken:

- If the concentration was above the reporting limit, the numeric result was unchanged, but it was flagged "U", as undetected.
- If the concentration was below the reporting limit, the numeric result was changed to the value of the reporting limit, and it was flagged "U", as undetected.

The results qualified due to blank contamination are listed in Attachment 1.

Recoveries - Surrogate, MS/MSD and LCS

All Surrogate, Matrix Spike (MS), Matrix Spike Duplicate (MSD), and Laboratory Control Sample (LCS) recoveries were within acceptable quality control limits, except as noted in Table 4 below.

TABLE 4
Surrogate, MS/MSD, and LCS Recoveries Out of QC Limits: VOC
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

63056	613GW004M2	Dibromofluoromethane (surrogate)	72*	80-120	613GW004M2	Detects-J, non-detects-UJ
		Toluene-d8 (surrogate)	76*	88-110		
		Bromofluorobenzene (surrogate)	75*	86-115		
63057	U22GW002M2	Dibromofluoromethane (surrogate)	70*	80-120	U22GW002M2	Detects-J, non-detects-UJ
		Toluene-d8 (surrogate)	75*	88-110		
		Bromofluorobenzene (surrogate)	76*	86-115		
63057	U22HW002M2	Dibromofluoromethane (surrogate)	72*	80-120	U22HW002M2	Detects-J, non-detects-UJ
		Toluene-d8 (surrogate)	76*	88-110		
		Bromofluorobenzene (surrogate)	76*	86-115		
63057	U22GW007M2	Dibromofluoromethane (surrogate)	75*	80-120	U22GW007M2	Detects-J, non-detects-UJ
		Toluene-d8 (surrogate)	78*	88-110		
		Bromofluorobenzene (surrogate)	80*	86-115		
63057	GELGW011M2	Dibromofluoromethane (surrogate)	76*	80-120	GELGW011M2	Detects-J, non-detects-UJ
		Toluene-d8 (surrogate)	79*	88-110		
		Bromofluorobenzene (surrogate)	78*	86-115		
63057	GELGW012M2	Dibromofluoromethane (surrogate)	74*	80-120	GELGW012M2	Detects-J, non-detects-UJ
		Toluene-d8 (surrogate)	78*	88-110		
		Bromofluorobenzene (surrogate)	79*	86-115		
63057	613GW009M2	Dibromofluoromethane (surrogate)	71*	80-120	613GW009M2	Detects-J, non-detects-UJ
		Toluene-d8 (surrogate)	75*	88-110		

TABLE 4
Surrogate, MS/MSD, and LCS Recoveries Out of QC Limits: VOC
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

63057	613GW009M2	Bromofluorobenzene (surrogate)	79*	86-115	613GW009M2	Detects-J, non-detects-UJ
63057	613EW004M2	Dibromofluoromethane (surrogate)	74*	80-120	613EW004M2	No Flags Applied (field blank)
		Toluene-d8 (surrogate)	77*	88-110		
		Bromofluorobenzene (surrogate)	78*	86-115		
63057	613TW004M2	Dibromofluoromethane (surrogate)	74*	80-120	613TW004M2	No Flags Applied (field blank)
		Toluene-d8 (surrogate)	77*	88-110		
		Bromofluorobenzene (surrogate)	80*	86-115		
63058	GELGW014M2	Dibromofluoromethane (surrogate)	70*	80-120	GELGW014M2	Detects-J, non-detects-UJ
		Toluene-d8 (surrogate)	74*	88-110		
		Bromofluorobenzene (surrogate)	73*	86-115		
69740	U22GW001M5	Toluene-d8 (surrogate)	81*	88-110	U22GW001M5	Detects-J, non-detects-UJ
		Bromofluorobenzene (surrogate)	84*	86-115		

* - out of control limits

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in Table 5.

TABLE 5
Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: VOC
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

MSA5973-ICAL-05/24/01, 1849	Bromomethane	15.2%RSD	CNC18 - All

Flags were applied to the compounds in the associated samples in the following manner:

- When the percent Relative Standard Deviation (%RSD) or correlation coefficient (R^2) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.

Dissolved Gasses Analyses

The QA/QC parameters for the Dissolved Gasses analyses for all of the samples were within acceptable control limits, except as noted below.

Blanks

The Dissolved Gasses target parameters detected in blank samples are listed in Table 6.

TABLE 6
Blank Contamination: Dissolved Gasses
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

CNC46	U22EW001L4	S117377*9	EB	Methane	1.4	µg/L	7.0 µg/L
CNC125	613EW004M2	S244769*7	EB	Methane	0.61	µg/L	3.1 µg/L
CNC138	613EW010M3	S245548*3	EB	Methane	0.24	µg/L	1.2 µg/L
				Carbon disulfide	9200	µg/L	46000 µg/L

If a target parameter determined to be a common contaminant was reported in a field sample, and the concentration was below the level determined to be due to blank contamination, the following actions were taken:

- If the concentration was above the reporting limit, the numeric result was unchanged, but it was flagged "U", as undetected.
- If the concentration was below the reporting limit, the numeric result was changed to the value of the reporting limit, and it was flagged "U", as undetected.

The results qualified due to blank contamination are listed in Attachment 1.

Initial and Continuing Calibration Criteria

All initial calibration criteria and continuing calibration criteria were met, except as listed in Table 7.

TABLE 7
Exceptions to Initial Calibration Criteria and Continuing Calibration Criteria: Dissolved Gasses
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

VMTFID1-ICAL-06/12/02, 1014	Methane	R^2 =0.981	CNC124 - All
VMTFID1-ICAL-06/12/02, 1131	Methane	R^2 =0.986	CNC125 – All CNC138 - All

Flags were applied to the compounds in the associated samples in the following manner:

- When the percent Relative Standard Deviation (%RSD) or correlation coefficient (R^2) was out in the initial calibration, all associated samples were qualified. Detected compounds were flagged "J" and non-detected compounds were flagged "UJ", as estimated.

Inorganic Parameters

Quality Control Review

The following list represents the QA/QC measures that are typically reviewed during the data quality evaluation procedure for inorganic parameters.

- **Holding Times** – The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples** – Sample preparation, initial calibration blanks/continuing calibration blanks, and equipment blanks were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Lab Control Sample (LCS)** – This sample is a "controlled matrix", in which target parameters have been added prior to digestion/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- **Field Duplicate Samples** – These samples are collected to determine precision between a native and its duplicate. This information can only be determined when target compounds are detected.
- **Pre/Post Digestion Spike (MS/MSD)** – Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **ICP Interference Check Sample** – This sample verifies the lab's interelement and background correction factors.
- **Initial Calibration Verification** – This parameter ensures that the instrument is capable of producing acceptable quantitative data for the target analyte list to be measured.
- **Continuing Calibration Verification** – This one-point, mid-range parameter establishes that the initial calibration is still valid by checking the performance of the instrument on a continual basis.
- **ICP Serial Dilution** – The serial dilution of samples quantitated by ICP determines whether or not significant physical or chemical interferences exist due to the sample matrix.

Metals Analyses

The QA/QC parameters for the Metals analyses for all of the samples were within acceptable control limits, except as noted below.

Blanks

The Metals target parameters detected in blank samples are listed in Table 8.

TABLE 8
Blank Contamination: Metals
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

51883	CCB		CCB	Iron	17.6	ug/L	88 ug/L
51883	1200108427	1200108427	MB	Iron	7.38	ug/L	36.9 ug/L
51883	51883010	U22EW001L2	EB	Iron	17.1	ug/L	85.5 ug/L
51884	CCB		CCB	Iron	10.6	ug/L	53 ug/L
51884	1200108427	1200108427	MB	Iron	7.38	ug/L	36.9 ug/L
51884	51884001	U22EW001L2	EB	Iron, dissolved	3.410	ug/L	17.05 ug/L
CNC18	CCB		CCB	Iron	22.7	ug/L	0.1135 mg/L

If a target parameter was reported in a field sample, and the concentration was below the level determined to be due to blank contamination (5 times the concentration in the associated QC blank samples), it was flagged as "U", not detected. Initial and continuing calibration blanks were also evaluated for possible contamination.

No results were qualified due to blank contamination.

General Chemistry Analyses

The QA/QC parameters for the General Chemistry analyses for all of the samples were within acceptable control limits, except as noted below.

- The Ferrous Iron result for sample U22HW002M2 (63057002) was just above the highest calibration point. Due to laboratory error, the over-range sample was thought to be a lab QC sample and was not rerun. When the lab realized that the sample was actually a field sample, it was too late to rerun the sample. The sample value was reported and qualified, "J".

- The Ferrous Iron samples in SDG 69740 were unpreserved when they were received by the lab. They were preserved by the analyst prior to analysis. Samples were preserved between 3-9 hours after collection. Since ferrous iron quickly oxidizes to ferric iron if not preserved, all sample results were qualified. (detects: J, non-detects: UJ)

Holding Times

- All samples in SDG's 63056 and 63057 were logged in by the laboratory past the 24 hour holding time for Ferrous Iron. All samples were analyzed within 3 days of collection. All samples were qualified for holding time. (detects: J, non-detects: UJ)

- All samples in SDG CNC18 were received by the lab past the 48 hour holding time for Nitrate. All samples were analyzed within 8 days of collection. All samples were qualified for holding time. (detects: J, non-detects: UJ)

Blanks

The General Chemistry target parameters detected in blank samples are listed in Table 9.

TABLE 9
Blank Contamination: General Chemistry
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

63056	63057007	613EW004M2	EB	Chloride	24.2	mg/L	121 mg/L
				Ferrous iron	0.063	mg/L	0.315 mg/L
				Alkalinity	34.5	mg/L	172.5 mg/L
63057	63057007	613EW004M2	EB	Chloride	24.2	mg/L	121 mg/L
				Ferrous iron	0.063	mg/L	0.315 mg/L
				Alkalinity	34.5	mg/L	172.5 mg/L
64813	64813004	613EW010M3	EB	Nitrate	0.334	mg/L	1.67 mg/L
				Sulfate	27.5	mg/L	137.5 mg/L
				Chloride	19.7	mg/L	98.5 mg/L
				Ferrous iron	0.206	mg/L	1.03 mg/L
				Alkalinity	44.6	mg/L	223 mg/L
69737	69740017	613EW004M5	EB	Ferrous iron	0.179	mg/L	0.895 mg/L
69740	69740017	613EW004M5	EB	Ferrous iron	0.179	mg/L	0.895 mg/L

If a target parameter was reported in a field sample, and the concentration was below the level determined to be due to blank contamination (5 times the concentration in the associated QC blank samples), it was flagged as "U", not detected. Initial and continuing calibration blanks were also evaluated for possible contamination.

The results qualified due to blank contamination are listed in Attachment 1.

Field Duplicate Samples

All Field Duplicate Samples were within acceptable quality control limits, except as noted in Table 10 below. No flags are applied due to Field Duplicate precision.

TABLE 10
Field Duplicate RPDs Out of QC Limits: General Chemistry
Charleston Naval Complex, , Zone F, AOC 613, Charleston, SC

63057	U22GW002M2 / U22HW002M2	Ferrous iron	20.3 mg/L	2.82 mg/L	151.2*	20
69737	613GW004M5 / 613HW004M5	Ferrous iron	0.875 mg/L	1.22 mg/L	32.9*	20
* - out of control limits						

Recoveries – Matrix Spike/Matrix Spike Duplicate (MS/MSD) and Laboratory Control Sample (LCS)

All Matrix Spike (MS), Matrix Spike Duplicate (MSD) and Laboratory Control Sample (LCS) recoveries were within acceptable quality control limits, except as noted in Table 11 below.

TABLE 11
MS/MSD Recoveries Out of QC Limits: General Chemistry
Charleston Naval Complex, Zone F, AOC 613, Charleston, SC

51883	U22GW004L2 MS	Alkalinity	66*	80-120	51883 – All	Detects-J, non-detects-UJ
69740	U22GW002M5 MS	Ferrous iron	72*	80-120	69740 – All	Detects-J, non-detects-UJ
* - out of control limits						

Rejected Data

All of the rejected data listed in [redacted] were associated with re-runs and dilutions (There can only be a single valid result per parameter per sample). No other data was rejected such that there is not a valid result for that parameter in each sample.

Conclusion

A review of the analytical data submitted regarding the investigation of Zone F, AOC 613 at the Charleston Naval Complex, Charleston, South Carolina by CH2M HILL has been completed. An overall evaluation of the data indicates that the sample handling, shipment, and analytical procedures have been adequately completed, and that the analytical results should be considered usable as qualified.

The analytical data had minor QC concerns as indicated above, however, it did not affect data usability for those specific results. The validation review demonstrated that the analytical systems were generally in control and the data results can be used in the decision making process.

Parameter Class	Analytical Method	Parameter	Sample	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dissolved Gasses	RSKSOP-175	Carbon Dioxide	CNC125	613GW009M2	S244769*6	WG	150000	E	150000	R	ug/l	LR
Dissolved Gasses	RSKSOP-175	Carbon Dioxide	CNC138	613GW011M3	S245548*2	WG	140000	E	140000	R	ug/l	LR
Dissolved Gasses	RSKSOP-175	Ethane	CNC125	613GW009M2DL	S244769*6*DL	WG	3.5	U	3.5	R	ug/l	DL
Dissolved Gasses	RSKSOP-175	Ethene	CNC125	613GW009M2DL	S244769*6*DL	WG	3.3	U	3.3	R	ug/l	DL
Dissolved Gasses	RSKSOP-175	Methane	CNC125	U22GW002M2	S244769*1	WG	180	=	180	J	ug/l	IC
Dissolved Gasses	RSKSOP-175	Methane	CNC125	U22HW002M2	S244769*2	WG	180	=	180	J	ug/l	IC
Dissolved Gasses	RSKSOP-175	Methane	CNC125	GELGW011M2	S244769*4	WG	8.7	=	8.7	J	ug/l	IC
Dissolved Gasses	RSKSOP-175	Methane	CNC125	GELGW012M2	S244769*5	WG	22	=	22	J	ug/l	IC
Dissolved Gasses	RSKSOP-175	Methane	CNC125	613GW009M2	S244769*6	WG	53	=	53	J	ug/l	IC
Dissolved Gasses	RSKSOP-175	Methane	CNC125	613GW009M2DL	S244769*6*DL	WG	82	D	82	R	ug/l	DL
Dissolved Gasses	RSKSOP-175	Methane	CNC124	613GW004M2	S244769A*1	WG	36	=	36	J	ug/l	IC
Dissolved Gasses	RSKSOP-175	Methane	CNC138	613GW010M3	S245548*1	WG	2.2	=	2.2	J	ug/l	IC
Dissolved Gasses	RSKSOP-175	Methane	CNC138	613GW011M3	S245548*2	WG	0.49	=	0.49	UJ	ug/l	BL,IC
GENCHEM	E310.1	ALKALINITY	51883	U22GW001L3	51883002	WG	237	=	237	J	mg/L	MS
GENCHEM	E310.1	ALKALINITY	51883	U22GW002L3	51883003	WG	446	=	446	J	mg/L	MS
GENCHEM	E310.1	ALKALINITY	51883	U22GW003L3	51883004	WG	194	=	194	J	mg/L	MS
GENCHEM	E310.1	ALKALINITY	51883	U22HW003L2a	51883005	WG	204	=	204	J	mg/L	MS
GENCHEM	E310.1	ALKALINITY	51883	U22GW004L3	51883006	WG	12.8	=	12.8	J	mg/L	MS
GENCHEM	E310.1	ALKALINITY	51883	U22GW005L3	51883007	WG	459	=	459	J	mg/L	MS
GENCHEM	E310.1	ALKALINITY	51883	U22GW006L3	51883008	WG	115	=	115	J	mg/L	MS
GENCHEM	E310.1	ALKALINITY	51883	U22GW007L3	51883009	WG	413	=	413	J	mg/L	MS
GENCHEM	E310.1	ALKALINITY	63057	GELGW011M2	63057004	WG	88.7	=	88.7	U	mg/L	BL
GENCHEM	E310.1	ALKALINITY	63057	GELGW012M2	63057005	WG	29.6	=	29.6	U	mg/L	BL
GENCHEM	E310.1	ALKALINITY	63057	613GW009M2	63057006	WG	108	=	108	U	mg/L	BL
GENCHEM	E310.1	ALKALINITY	64813	613GW010M3	64813002	WG	158	=	158	U	mg/L	BL
GENCHEM	E300	NITRATE (AS N)	CNC18	U22GW002L2	S113230*1	WG	0.1	UX	0.1	UJ	mg/L	HT
GENCHEM	E300	NITRATE (AS N)	CNC18	U22GW003L2	S113230*2	WG	0.1	UX	0.1	UJ	mg/L	HT
GENCHEM	E300	NITRATE (AS N)	CNC18	U22HW003L2	S113230*3	WG	0.1	UX	0.1	UJ	mg/L	HT
GENCHEM	E300	SULFATE (AS SO4)	CNC18	U22GW002L2	S113230*1	WG	380	E	380	R	mg/L	LR
GENCHEM	E300	SULFATE (AS SO4)	CNC18	U22GW003L2	S113230*2	WG	910	E	910	R	mg/L	LR

Attachment 1 - Changed Qualifiers and Results
Zone F, AOC 613 - Data Validation

Parameter class	Analytical method	Parameter	Station	Sample	Sample ID	Matrix	Result	Lab qual	Final result	Final qual	Unit	Reason
GENCHEM	E300	SULFATE (AS SO4)	CNC18	U22HW003L2	S113230*3	WG	900	E	900	R	mg/L	LR
GENCHEM	SM3500	Ferrous Iron	63056	613GW004M2	63056001	WG	3.62	H	3.62	J	mg/L	HT
GENCHEM	SM3500	Ferrous Iron	63057	U22GW002M2	63057001	WG	20.3	H	20.3	J	mg/L	HT
GENCHEM	SM3500	Ferrous Iron	63057	U22HW002M2	63057002	WG	2.82	H	2.82	J	mg/L	HT,LR
GENCHEM	SM3500	Ferrous Iron	63057	U22GW007M2	63057003	WG	3.8	H	3.8	J	mg/L	HT
GENCHEM	SM3500	Ferrous Iron	63057	GELGW011M2	63057004	WG	23.1	H	23.1	J	mg/L	HT
GENCHEM	SM3500	Ferrous Iron	63057	GELGW012M2	63057005	WG	7.76	H	7.76	J	mg/L	HT
GENCHEM	SM3500	Ferrous Iron	63057	613GW009M2	63057006	WG	20.7	H	20.7	J	mg/L	HT
GENCHEM	SM3500	Ferrous Iron	69740	U22GW002M5	69740009	WG	3.21	=	3.21	J	mg/L	PS,OT
GENCHEM	SM3500	Ferrous Iron	69740	U22GW003M5	69740010	WG	20	=	20	J	mg/L	PS,OT
GENCHEM	SM3500	Ferrous Iron	69740	U22GW006M5	69740011	WG	13.5	=	13.5	J	mg/L	PS,OT
GENCHEM	SM3500	Ferrous Iron	69740	613GW004M5	69740012	WG	0.875	=	0.875	UJ	mg/L	BL,PS,OT
GENCHEM	SM3500	Ferrous Iron	69740	613HW004M5	69740013	WG	1.22	=	1.22	J	mg/L	PS,OT
GENCHEM	SM3500	Ferrous Iron	69740	613GW009M5	69740014	WG	13.7	=	13.7	J	mg/L	PS,OT
GENCHEM	SM3500	Ferrous Iron	69740	GELGW008M5	69740015	WG	0.964	=	0.964	J	mg/L	PS,OT
GENCHEM	SM3500	Ferrous Iron	69740	GELGW012M5	69740016	WG	8.25	=	8.25	J	mg/L	PS,OT
VOC	SW8260B	1,1-DICHLOROETHANE	69740	U22GW001M5	69740002	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	1,2-Dichloroethene (total)	63056	613GW004M2	63056001	WG	75.5	=	75.5	J	ug/L	SS
VOC	SW8260B	1,2-Dichloroethene (total)	63057	U22GW002M2	63057001	WG	3.8	J	3.8	J	ug/L	SS
VOC	SW8260B	1,2-Dichloroethene (total)	63057	U22HW002M2	63057002	WG	3.6	J	3.6	J	ug/L	SS
VOC	SW8260B	1,2-Dichloroethene (total)	63057	U22GW007M2	63057003	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	1,2-Dichloroethene (total)	63057	GELGW011M2	63057004	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	1,2-Dichloroethene (total)	63057	GELGW012M2	63057005	WG	0.57	J	0.57	J	ug/L	SS
VOC	SW8260B	1,2-Dichloroethene (total)	63057	613GW009M2	63057006	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	1,2-Dichloroethene (total)	69740	U22GW001M5	69740002	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260	ACETONE	CNC18	U22GW002L2	S113230*1	WG	16	=	16	U	ug/L	BL
VOC	SW8260	ACETONE	CNC18	U22GW007L2	S113230*10	WG	19	=	19	U	ug/L	BL
VOC	SW8260	ACETONE	CNC18	U22GW003L2	S113230*2	WG	17	=	17	U	ug/L	BL
VOC	SW8260	ACETONE	CNC18	U22HW003L2	S113230*3	WG	10	=	10	U	ug/L	BL
VOC	SW8260	ACETONE	CNC18	U22GW001L2	S113230*4	WG	16	=	16	U	ug/L	BL

Parameter Class	Analytical Method	Parameter	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
VOC	SW8260	ACETONE	CNC18	U22GW005L2	S113230*6	WG	17	=	17	U	ug/L	BL
VOC	SW8260	ACETONE	CNC18	U22KW005L2	S113230*7	WG	20	=	20	U	ug/L	BL
VOC	SW8260	ACETONE	CNC18	U22XW005L2	S113230*8	WG	13	=	13	U	ug/L	BL
VOC	SW8260	ACETONE	CNC18	U22GW006L2	S113230*9	WG	11	=	11	U	ug/L	BL
VOC	SW8260	BENZENE	51883	U22GW004L3	51883006	WG	0.63	J	1	U	ug/L	BL
VOC	SW8260	BENZENE	51883	U22GW006L3	51883008	WG	0.98	J	1	U	ug/L	BL
VOC	SW8260	BROMOMETHANE	CNC18	U22GW002L2	S113230*1	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260	BROMOMETHANE	CNC18	U22GW007L2	S113230*10	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260	BROMOMETHANE	CNC18	U22GW003L2	S113230*2	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260	BROMOMETHANE	CNC18	U22HW003L2	S113230*3	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260	BROMOMETHANE	CNC18	U22GW001L2	S113230*4	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260	BROMOMETHANE	CNC18	U22GW004L2	S113230*5	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260	BROMOMETHANE	CNC18	U22GW005L2	S113230*6	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260	BROMOMETHANE	CNC18	U22KW005L2	S113230*7	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260	BROMOMETHANE	CNC18	U22XW005L2	S113230*8	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260	BROMOMETHANE	CNC18	U22GW006L2	S113230*9	WG	10	U	10	UJ	ug/L	IC
VOC	SW8260B	cis-1,2-DICHLOROETHYLENE	63056	613GW004M2	63056001	WG	74.6	=	74.6	J	ug/L	SS
VOC	SW8260B	cis-1,2-DICHLOROETHYLENE	63057	U22GW002M2	63057001	WG	3.8	J	3.8	J	ug/L	SS
VOC	SW8260B	cis-1,2-DICHLOROETHYLENE	63057	U22HW002M2	63057002	WG	3.6	J	3.6	J	ug/L	SS
VOC	SW8260B	cis-1,2-DICHLOROETHYLENE	63057	U22GW007M2	63057003	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	cis-1,2-DICHLOROETHYLENE	63057	GELGW011M2	63057004	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	cis-1,2-DICHLOROETHYLENE	63057	GELGW012M2	63057005	WG	0.57	J	0.57	J	ug/L	SS
VOC	SW8260B	cis-1,2-DICHLOROETHYLENE	63057	613GW009M2	63057006	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	cis-1,2-DICHLOROETHYLENE	69740	U22GW001M5	69740002	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	METHYLENE CHLORIDE	63058	GELGW014M2	63058001	WG	1.9	J	1.9	J	ug/L	SS
VOC	SW8260B	TETRACHLOROETHYLENE(PCE)	63056	613GW004M2	63056001	WG	0.42	J	0.42	J	ug/L	SS
VOC	SW8260B	TETRACHLOROETHYLENE(PCE)	63057	U22GW002M2	63057001	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TETRACHLOROETHYLENE(PCE)	63057	U22HW002M2	63057002	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TETRACHLOROETHYLENE(PCE)	63057	U22GW007M2	63057003	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TETRACHLOROETHYLENE(PCE)	63057	GELGW011M2	63057004	WG	5	U	5	UJ	ug/L	SS

Attachment 1 - Changed Qualifiers and Results
Zone F, AOC 613 - Data Validation

Parameter Class	Analytical Method	Parameter	SDG	Sample ID	Sample ID	Matrix	Result	Qual	Final Result	Final Qual	Units	Reason
VOC	SW8260B	TETRACHLOROETHYLENE(PCE)	63057	GELGW012M2	63057005	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TETRACHLOROETHYLENE(PCE)	63057	613GW009M2	63057006	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TETRACHLOROETHYLENE(PCE)	69740	U22GW001M5	69740002	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TOLUENE	71534	U22GW001M3	71534004	WG	0.4	J	1	U	ug/L	BL
VOC	SW8260B	trans-1,2-DICHLOROETHENE	63056	613GW004M2	63056001	WG	0.9	J	0.9	J	ug/L	SS
VOC	SW8260B	trans-1,2-DICHLOROETHENE	63057	U22GW002M2	63057001	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	trans-1,2-DICHLOROETHENE	63057	U22HW002M2	63057002	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	trans-1,2-DICHLOROETHENE	63057	U22GW007M2	63057003	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	trans-1,2-DICHLOROETHENE	63057	GELGW011M2	63057004	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	trans-1,2-DICHLOROETHENE	63057	GELGW012M2	63057005	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	trans-1,2-DICHLOROETHENE	63057	613GW009M2	63057006	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	trans-1,2-DICHLOROETHENE	69740	U22GW001M5	69740002	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TRICHLOROETHYLENE (TCE)	63056	613GW004M2	63056001	WG	3.4	J	3.4	J	ug/L	SS
VOC	SW8260B	TRICHLOROETHYLENE (TCE)	63057	U22GW002M2	63057001	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TRICHLOROETHYLENE (TCE)	63057	U22HW002M2	63057002	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TRICHLOROETHYLENE (TCE)	63057	U22GW007M2	63057003	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TRICHLOROETHYLENE (TCE)	63057	GELGW011M2	63057004	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TRICHLOROETHYLENE (TCE)	63057	GELGW012M2	63057005	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TRICHLOROETHYLENE (TCE)	63057	613GW009M2	63057006	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	TRICHLOROETHYLENE (TCE)	69740	U22GW001M5	69740002	WG	5	U	5	UJ	ug/L	SS
VOC	SW8260B	VINYL CHLORIDE	63056	613GW004M2	63056001	WG	10.2	=	10.2	J	ug/L	SS
VOC	SW8260B	VINYL CHLORIDE	63057	U22GW002M2	63057001	WG	3.8	J	3.8	J	ug/L	SS
VOC	SW8260B	VINYL CHLORIDE	63057	U22HW002M2	63057002	WG	3.5	J	3.5	J	ug/L	SS
VOC	SW8260B	VINYL CHLORIDE	63057	U22GW007M2	63057003	WG	10	U	10	UJ	ug/L	SS
VOC	SW8260B	VINYL CHLORIDE	63057	GELGW011M2	63057004	WG	10	U	10	UJ	ug/L	SS
VOC	SW8260B	VINYL CHLORIDE	63057	GELGW012M2	63057005	WG	10	U	10	UJ	ug/L	SS
VOC	SW8260B	VINYL CHLORIDE	63057	613GW009M2	63057006	WG	10	U	10	UJ	ug/L	SS
VOC	SW8260B	VINYL CHLORIDE	69740	U22GW001M5	69740002	WG	10	U	10	UJ	ug/L	SS

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE: CNC 093	PROJECT NO.: 093	PROJECT LOCATION (STATE): SC	PAGE 1 OF 1
STL (LAB) PROJECT MANAGER:	P.O. NUMBER:	CONTRACT NO.:	STANDARD REPORT DELIVERY ✓
CLIENT (SITE) PM: Gary Fosther	CLIENT PHONE: 843 740 2780	CLIENT FAX: 740 2285	DATE DUE:
CLIENT NAME: Brian Crawford	CLIENT E-MAIL: BCRAWFEX@JAJMS.COM		EXPEDITED REPORT DELIVERY (SURCHARGE)
CLIENT ADDRESS: 849 Ave F. Chas. SC.			DATE DUE:
COMPANY CONTRACTING THIS WORK (if applicable): CH2M-JONES LLC			NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS / PRESERVATIVE

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	VOC's (SW8260) 3-40mL vial (HCL)	Total Fe (SW 6010) (HNO3)	Diss Iron (SW 6010) (HNO3)	Sulfate/Nitrate (E 300.0)	Alkalinity/pH	Methane (SW 8015M) (HCL)					REMARKS
5-21-01	1010	242GMW01L2		X				3	~~1~~	~~1~~	~~1~~	~~1~~	~~3~~					
5-21-01	1320	242GMW02L2		X				3	1	1	1	1	3					
5-21-01	1110	242GMW03L2		X				3	1	1	1	1	3					#MW3 odor.
5-21-01	1115	242HMW03L2		X				3	1	1	1	1	3					
5-21-01	1400	242GMW04L2		X				3	~~1~~	~~1~~	~~1~~	~~1~~	~~3~~					
5-21-01	1430	242GMW05L2		X				3	~~1~~	~~1~~	~~1~~	~~1~~	~~3~~					
5-21-01	1435	242KMW05L2		X				3	~~1~~	~~1~~	~~1~~		~~3~~					
5-21-01	1440	242XMW05L2		X				3	~~1~~	~~1~~	~~1~~		~~3~~					
5-21-01	1040	242GMW06L2		X				3	~~1~~	~~1~~	~~1~~	~~1~~	~~3~~					
5-21-01	1355	242GMW07L2		X				3	~~1~~	~~1~~	~~1~~	~~1~~	~~3~~					
5-21-01	1445	242EMW01L2		X				3										
–	–	242TMW01L2		X				3										

5-23-01

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	5/8/01		[signature]	5/23/01	900			

RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
[signature]	5/2/01							

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
[signature]	5/24/01	9:30	YES ✓ NO		513230	

ORIGINAL – RETURN TO LABORATORY WITH SAMPLE(S)

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZF642-110701-01** page 1 of 2

Laboratory:	GEL, Charleston, SC
Project Name:	Charleston Navy Complex
Site Name:	Zone F, Bldg. 242
Project Number:	
TAT:	21 day
Project Manager:	Gary Foster/ATL/CCI
Level:	Level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605
	CHS: 2470 Mall Dr. Suite B, N. Charleston, SC 29406
Send Report To:	see back of COC
EDD:	CNC format

Lab Batch/SDG: 51883, 51884

Sample ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	VOCs (SW8260) (3 - 40ml vial, HCl)	Total Iron (SW6010) (1 - 500mL HDPE, HNO3)	Diss. Iron (SW6010) (1 - 500mL HDPE)	Sulfate (e300.0) (1 - 250mL HDPE)	Nitrate (E300.0) (1 - 250mL HDPE)	Alkalinity (E310.1) (1 - 500mL HDPE)	pH (E150.1) (1 - 250mL HDPE)	alias	Comments
242GW001L2	F242GW001			11-12-01/1430	WG	8	X	X	X	X	X	X	X	242GMW01	
242GW002L2	F242GW002			11-12-01/0835	WG	8	X	X	X	X	X	X	X	242GMW02	
242GW003L2	F242GW003			11-12-01/0915	WG	8	X	X	X	X	X	X	X	242GMW03	
242HW003L2	F242GW003			11-12-01/0925	WG	8	X	X	X	X	X	X	X	242HMW03	
242GW004L2	F242GW004			11-12-01/1100	WG	8	X	X	X	X	X	X	X	242GMW04	
242GW005L2	F242GW005			11-12-01/1000	WG	8	X	X	X	X	X	X	X	242GMW05	
242GW006L2	F242GW006			11-12-01/1150	WG	8	X	X	X	X	X	X	X	242GMW06	
242GW007L2	F242GW007			11-12-01/1500	WG	8	X	X	X	X	X	X	X	242GMW07	
242EW001L2	F242EW001			11-12-01/1050	WQ	8	X	X	X	X	X	X		242EMW01	
242TW001L2	F242TW001			Lab Supplied	WQ	~~3~~ 2	X							242TMW01	
															End of Job
															UST Site

Sampled By: Chris Blundy Date/Time: 11-12-01

Relinquished by: [signature] Date/Time: 11-12-01/1555

Additional Samplers: Brian Crawford

Received By Lab: [signature] Date/Time: 11/12/01 1700

Relinquished by: Date/Time

Rec( ) xceptions: ( )

Serial Number 024293

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Savannah

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location
Phone:
Fax:

ECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)	PAGE	OF
T Zone F Bldg 242	093	SC		

LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.

NT (SITE) PM	CLIENT PHONE	CLIENT FAX
843 7402780 BRIAN CRAWFORD	843 7402780	843 7402785

NT NAME	CLIENT E-MAIL
CH2M-Jacobs	

NT ADDRESS
824 NE. F N. Charleston SC 29405

PANY CONTRACTING THIS WORK (if applicable)

STANDARD REPORT DELIVERY (X)
DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE)
DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	Methane	REMARKS
-01	~~0835~~ 1430	242GW001LZ		X				3	Sample time 1430
2-01	0835	242GW002LZ		X				3	
-12-01	0915	242GW003LZ		X				3	
-12-01	0925	242GW003LZ		X				3	
12-01	1100	242GW004LZ		X				3	
12-01	1000	242GW005LZ		X				3	
12-01	1150	242GW006LZ		X				3	
12-01	1500	242GW007LZ		X				3	
2-01	1050	242EW001LZ		X				3	
									End of Job UST Site

QUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
F Swafford	11/7/01	2:50	Chi Blandy	11/12/01	1600			
VED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**

LABORATORY USE ONLY

VED FOR LABORATORY BY: (TURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
F Swafford	11/13/01	9:40	YES (✓) NO ( )		511377	

ORIGINAL RETURN TO LABORATORY WITH SAMPLE(S)

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZFU22-051002-01** page 1 of 2

613809

Laboratory:	~~OTL~~ GEL
Project Name:	Charleston Navy Complex
Site Name:	Zone F, UST Site 22 (Bldg. 242)
Project Number:	158814.PM.04
TAT:	ASAP
Project Manager:	Tom Beisel
QA Level:	level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278
Send Report To:	see last page of COC
EDD:	CNC format

Lab Batch/SDG:

Sample ID	Station ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	VOCs (SW8260B) * 3 - 40mL vial, HCl							ALIAS	Comments
U22GW001M1	FU22GW001	CNC22MW01			6-3-02 / 1215	WG	3	X							F242GW001	samples complete
U22GW002M1	FU22GW002	CNC22MW02			6-3-02 / 1105	WG	3	X							F242GW002	
U22GW003M1	FU22GW003	CNC22MW03			6-3-02 / 1015	WG	3	X							F242GW003	
U22HW003M1	FU22GW003	CNC22MW03			6-3-02 / 1020	WG	3	X							F242GW003	UST
U22GW004M1	FU22GW004	CNC22MW04			6-3-02 / 1240	WG	3	X							F242GW004	
U22GW005M1	FU22GW005	CNC22MW05			6-3-02 / 1140	WG	3	X							F242GW005	
U22GW006M1	FU22GW006	CNC22MW06			6-3-02 / 1200	WG	3	X							F242GW006	
U22GW007M1	FU22GW007	CNC22MW07			6-3-02 / 1110	WG	3	X							F242GW007	
U22GW007M1MS	FU22GW007	CNC22MW07			6-3-02 / 1115	WG	3	X								MS
U22GW007M1SD	FU22GW007	CNC22MW07			6-3-02 / 1120	WG	3	X								MSD
U22EW001M1	FU22EW001				6-3-02 / 1245	WQ	3	X								EB
U22TW001M1	FU22TW001				LAB Supplied	WQ	3	X								TB

Sampled By ANDREW O'CONOR Date/Time 6-3-02 / 1353 Relinquished by: [signature] Date/Time 6-3-02 / 1353

Additional Samplers: C. DEAS

Received By Lab: [signature] Date/Time 6/3/02 1353 Relinquished by: Date/Time

Received By: Date/Time Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: Temperature

Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZF613-061002-02** page 1 of 2

Laboratory:	GEL
Project Name:	Charleston Navy Complex
Site Name:	Zone F, AOC 613
Project Number:	158814.PM.04
TAT:	SEE COMMENTS
Project Manager:	Tom Beisel
QA Level:	level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278
Send Report To:	see last page of COC
EDD:	CNC format

Lab Batch/SDG:

Sample ID	Station ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	VOCs (SW8260B) * (3 - 40mL vial, HCl)	VOCs (SW8260B) ** (3 - 40mL vial, HCl)	MEE & CO2 (3 - 40mL vial)	Alkalinity (EPA 310) (1 - 250mL HDPE)	Chloride (EPA 325) (1 - 250mL HDPE)	Ferrour Iron (SM4500) (1 - 250mL HDPE)					Comments
U22GW002M2	FU22GW002	FCNC22-MW02			7-1-02/1300	WG	7	X		X	X	X	X					std TAT
U22HW002M2	FU22GW002	FCNC22-MW02			7-1-02/1305	WG	7	X		X	X	X	X					std TAT
U22GW007M2	FU22GW007	FCNC22-MW07D			7-1-02/1420	WG	7	X		X	X	X	X					std TAT
GELGW011M2	FGELGW011	FGELGW011			7-1-02/1030	WG	7	X		X	X	X	X					std TAT
GELGW012M2	FGELGW012	FGELGW012			7-1-02/1212	WG	7	X		X	X	X	X					std TAT
613GW004M2	F613GW004	F613GW004			7-1-02/1130	WG	7	X		X	X	X	X					1-QTAT-7
613GW009M2	F613GW009	F613GW009			7-1-02/1450	WG	7	X		X	X	X	X					std TAT
613GW010M2	F613GW010	F613GW010			WELL NOT INSTALLED	WG		X		X	X	X	X					std TAT NO SAMPLE
613GW011M2	F613GW011	F613GW011			WELL NOT INSTALLED	WG		X		X	X	X	X					std TAT NO SAMPLE
613GW011M2MS	F613GW011	F613GW011			"	WG		X										std TAT "
613GW011M2SD	F613GW011	F613GW011			"	WG		X										std TAT "
GELGW014M2	FGELGW014	FGELGW014			7-2-02/1205	WG	3		X									std TAT ODOR
613EW004M2	F613EW004				7-2-02/1215	WQ	7	X		X	X	X	X					std TAT EB
613TW004M2	F613TW004				LAB Supplied	WQ	3	X										std TAT TB

Sampled By: ANDREW O'CONOR Date/Time: 7-1 & 7-2-02 Relinquished by: Date/Time

Additional Samplers:

Received By Lab: John Harley Date/Time: 7/2/02 @ 1630 Relinquished by: Date/Time

Received By: Date/Time Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: Temperature: 3°C

Receipt Exceptions:

Page: 1 of 1
Project #:
GEL Quote #:
COC Number [1]:
SMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: CH2M Charleston Navy Complex
Client Name: GEL Phone #: 843-769-7380 Fax #: 843-766-1178
Address: 2040 Savage Rd. Charleston SC 29407
Collected by: CH2M Send Results To: Anna White

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	MEE + CO2											Remarks
										RUSH!										
013GW004M2	NO	070102	1130	—	—	—	WG	3	X											7day TAT
022GW002M2	NO	070102	1300	—	—	—	WG	3	X											Std TAT
022HW002M2	NO	070102	1305	—	—	—	WG	3	X											
022GW007M2	NO	070102	1420	—	—	—	WG	3	X											
0ELGW011M2	NO	070102	1030	—	—	—	WG	3	X											
0ELGW012M2	NO	070102	1212	—	—	—	WG	3	X											
013GW009M2	NO	070102	1450	—	—	—	WG	3	X											
013EW004M2	NO	070202	1215	—	—	—	WQ	3	X											EB

TAT Requested: _____ Normal: _____ Rush: _____ (Subject to Surcharge)
Fax Results: (Yes) / No see comments
Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)
MEE + CO2 to include Methane, Ethane, Ethene + Carbon Dioxide
7day fax results needed for 1 sample

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
[signature]	070202	1746	F. Bradford	7/3/02	9:44
			2.		
			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____
Method of Shipment: _____ Airbill #: _____
Analytical Lab: _____ Location: _____
Lab Recipient: _____ Date: _____ Time: _____

[1] Chain of Custody Number = Client Determined
[2] QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
[3] Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
[4] Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
[5] Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

5244769

For Lab Receiving Use Only
Cust[illegible] Seal Intact? YES / NO
Cooler Temp:

WHITE - LABORATORY YELLOW - [illegible]

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: ZF613-061002-01 page 1 of 3

Laboratory:	GEL		
Project Name:	Charleston Navy Complex	Site Name:	Zone F, AOC 613
Project Number:	158814.PM.04	TAT:	~~STANDARD~~ 7 day
Project Manager:	Tom Beisel	QA Level:	level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605		
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278		
Send Report To:	see last page of COC	EDD:	CNC format

Lab Batch/SDG: 63483%

63483% Sample ID	Station ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	VOCs (SW8260B) 3 - 40mL vial, HCl	Comments
F613GP069 12	F613GP069		8	12	7/10/02 16:40	WG	3	X	
F613GP069 24	F613GP069		20	24	7/10/02 17:07	WG	3	X	
F613GP069	F613GP069					WG		X	
F613GP070 24	F613GP070		20	24	7/10/02 16:10	WG	3	X	
F613GP070	F613GP070					WG		X	
F613GP070	F613GP070					WG		X	
F613HP070	F613GP070					WG		X	
F613GP071 24	F613GP071		20	24	7/10/02 15:38	WG	3	X	
F613GP071	F613GP071					WG		X	
F613GP071	F613GP071					WG		X	
F613GP072 24	F613GP072		20	24	7/10/02 15:00	WG	3	X	
613GP072 24 MS	F613GP072		20	24	7/10/02 15:00	WG	3	X	MS
613GP072 24 SD	F613GP072		20	24	7/10/02 15:00	WG	3	X	MSD
F613GP072	F613GP072					WG		X	
F613GP072	F613GP072					WG		X	
F613GP073 24	F613GP073		20	24	7/10/02 13:38	WG	3	X	
F613GP073	F613GP073					WG		X	
F613HP073 24	F613GP073		20	24	7/10/02 13:38	WG	3	X	DUP
F613GP073	F613GP073					WG		X	
F613EP069	F613EP069				7/10/02 17:30	WQ		X	EB

Sampled By: [signature] Date/Time: 7-10-02/ as noted

Relinquished by: [signature] Date/Time: 7-11-02/1735

Additional Samplers: [signature]

Received By Lab: [signature] Date/Time: 7-11-02 1735

Relinquished by: Date/Time

Received By: Date/Time

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: Temperature:

Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZF613-061002-01** page 2 of 3

Laboratory:	GEL		
Project Name:	Charleston Navy Complex	Site Name:	Zone F, AOC 613
Project Number:	158814.PM.04	TAT:	STANDARD
Project Manager:	Tom Beisel	QA Level:	level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605		
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278		
Send Report To:	see last page of COC	EDD:	CNC format

Lab Batch/SDG:

63483%

Sample ID	Station ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	VOCs (SW8260B) 3 - 40mL vial, HCl										Comments
613TP069M2	F613TP069				Lab Provided	WQ		X										TB

Sampled By: [signature] Date/Time:

Relinquished by: [signature] Date/Time 7-1-02 1735

Additional Samplers:

Received By Lab: [signature] Date/Time 7-1-02 1735

Relinquished by: Date/Time

Received By: Date/Time

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks:

Temperature:

Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZF613-080102-01** page 1 of 2

Laboratory:	GEL
Project Name:	Charleston Navy Complex
Site Name:	Zone F, AOC 613
Project Number:	158814.PM.04
TAT:	standad
Project Manager:	Tom Beisel
QA Level:	level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278
Send Report To:	see last page of COC
EDD:	CNC format

Lab Batch/SDG: 164813%

Sample ID	Station ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	VOCs (SW8260B) * (3 - 40mL vial, HCl)	VOCs (SW8260B) ** (3 - 40mL vial, HCl)	~~MEE & CO2 (3 - 40mL vial)~~	Alkalinity (EPA 310) (1 - 500mL HDPE)	Chloride (EPA 325) (1 - 500mL HDPE)	Sulfate (1 - 500mL HDPE)	Nitrate (1 - 500mL HDPE)	Ferrour Iron (SM4500) (1 - 250mL HDPE)			Comments
613GW010M3	F613GW010	F613GW010			8-5-02/1047	WG	8	X		X	X	X	X	X	X			
613GW011M3	F613GW011	F613GW011			8-5-02/1140	WG	8	X		X	X	X	X	X	X			RCRA
613EW010M3	F613EW010				8-5-02/1145	WQ	8	X		X	X	X	X	X	X			EB
613TW010M3	F613TW010				LAB supplied	WQ	3	X										TB

samples complete

Donny Smith was contacted B4 start of work

samples went to STL for pet/DG: TC

Sampled By: Andrew O'Connor Date/Time: 8-5-02/

Relinquished by: Date/Time:

Additional Samplers:

Received By Lab: Julie Robinson Date/Time: 08/05/02 1600

Relinquished by: Date/Time: 8-5-02 1600

Receipt Exceptions:

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZF613-102202-01** page 1 of 2

Laboratory: GEL

Project Name: Charleston Navy Complex

Site Name: Zone F, AOC 613

Project Number: 158814.PM.04

TAT: standad

Project Manager: Tom Beisel

QA Level: level 3

Address: GNV: 3011 SW Williston Rd., Gainesville, FL 32605

ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278

Send Report To: see last page of COC

EDD: CNC format

Lab Batch/SDG: 69740%/69737%

69740%

Sample ID	Station ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	VOCs (SW8260B) * (3 - 40mL vial, HCl)	VOCs (SW8260B) ** (3 - 40mL vial, HCl)	MEE (2 - 40mL vial)	Alkalinity (EPA 310) (1 - 250mL HDPE)	Chloride (EPA 325) (1 - 250mL HDPE)	Sulfate (1 - 250mL HDPE)	Nitrate (1 - 250mL HDPE)	Ferrour iron (SM4500) (1 - 250mL HDPE)			Comments
U22GW001M5	FU22GW001	CNC22-MW01			10-31-02 / 1112	WG	3	X										
U22GW002M5	FU22GW002	CNC22-MW02			10-31-02 / 1205	WG	7	X		X			X	X	X			
U22GW003M5	FU22GW003	CNC22-MW03			10-31-02 / 1305	WG	7	X		X			X	X	X			
U22GW004M5	FU22GW004	CNC22-MW04			10-31-02 / 1225	WG	3	X										
U22GW005M5	FU22GW005	CNC22-MW05			10-31-02 / 1425	WG	3	X										
U22GW006M5	FU22GW006	CNC22-MW06			10-31-02 / 1426	WG	7	X		X			X	X	X			
U22GW007M5	FU22GW007	CNC22-MW07			10-31-02 / 1350	WG	3	X										
613GW004M5	F613GW004	613GW004			10-31-02 / 1518	WG	7	X		X			X	X	X			
613HW004M5	F613GW004	613GW004			10-31-02 / 1518	WG	7	X		X			X	X	X			
613GW009M5	F613GW009	613GW009			10-31-02 / 0910	WG	7	X		X			X	X	X			
613GW010M5	F613GW010	613GW010			10-31-02 / 1545	WG	3	X										
613GW010M5MS	F613GW010	613GW010			10-31-02 / 1545	WG	3	X										MS
613GW010M5SD	F613GW010	613GW010			10-31-02 / 1545	WG	3	X										MSD
613GW011M5	F613GW011	613GW011			10-31-02 / 1140	WG	3	X										
GELGW007M5	FGELGW007	GELGW007			10-31-02 / 1025	WG	3	X										
GELGW008M5	FGELGW008	GELGW008			10-31-02 / 1015	WG	7	X		X			X	X	X			
GELGW012M5	FGELGW012	GELGW012			10-31-02 / 1457	WG	7	X		X			X	X	X			
613EW004M5	F613EW004				10-31-02 / 1600	WQ	7	X		X			X	X	X			EB
613TW004M5	F613TW004				lab provided	WQ	3	X										TB

Sampled By: Darryl Gates

Date/Time 10-31-02 / as noted

Relinquished by: Darryl Gates

Date/Time : 10-31-02 / 1630

Additional Samplers: Andrew Oconnor

Received By Lab: Paulette M Wendell

Date/Time 10/31/02 1705

Relinquished by:

Date/Time

Received By:

Date/Time

Shipped Via: UPS FedEx Hand Other Tracking

Remarks:

Temperature: 4°C

CH2M HILL Chain of Custody/ Laboratory Analysis Form

COC Tracking #: **ZFU22-112002-01** page 1 of 2

Laboratory:	GEL	**Site Name:**	Zone F, UST Site 22 (bldg. 242) SCDHEC No. 10645
Project Name:	Charleston Navy Complex		
Project Number:	158814.PM.04	**TAT:**	7 day results
Project Manager:	Tom Beisel	**QA Level:**	level 3
Address:	GNV: 3011 SW Williston Rd., Gainesville, FL 32605		
	ATL: 115 Perimeter Center Place NE, Suite 700, Atlanta, GA 30346-1278		
Send Report To:	see last page of COC	**EDD:**	CNC format

Lab Batch/SDG: 71534%

Sample ID 71534%	Station ID	Sample Description	Depth Begin	Depth End	Date & Time Collected	Matrix	# of containers	VOCs (SW8260B) * 3 - 40mL vial, HCl							ALIAS	Comments
U22GW001M3 ✓	FU22GW001	CNC22MW01			12-03-02/ 1510	WG	3	X							F242GW001	
U22GW002M3 ✓	FU22GW002	CNC22MW02			12-03-02/ 1535	WG	3	X							F242GW002	
U22GW003M3 ✓	FU22GW003	CNC22MW03			12-4-02/ 0725	WG	3	X							F242GW003	
U22HW003M3 ✓	FU22GW003	CNC22MW03			12-4-02/ 0730	WG	3	X							F242GW003	
U22GW004M3 ✓	FU22GW004	CNC22MW04			12-03-02/ 1445	WG	3	X							F242GW004	
U22GW005M3 ✓	FU22GW005	CNC22MW05			12/4 / 0925	WG		X							F242GW005	
U22GW006M3 ✓	FU22GW006	CNC22MW06			12/4 / 0855	WG	3	X							F242GW006	
U22GW007M3 ✓	FU22GW007	CNC22MW07			12/4 / 0830	WG	3	X							F242GW007	
U22GW007M3MS	FU22GW007	CNC22MW07			12/4 / 0830	WG	3	X								MS
U22GW007M3SD	FU22GW007	CNC22MW07			12/4 / 0830	WG	3	X								MSD
U22EW001M3 ✓	FU22EW001				12/4/02 0745	WQ	3	X								EB
U22TW001M3 ✓	FU22TW001				— —	WQ		X		LAB	Supplied					TB

FAX RESULTS TO PM BRIAN CRAWFORD 740 2785

SAMPLING COMPLETE

Sampled By: CHARLIE DEAS 12/3 Date/Time: 12/4/02

Relinquished by: Date/Time

Additional Samplers: RC 12/4

Received By Lab: J Mtlaley Date/Time: 12/4/02 1045

Relinquished by: Date/Time

Received By: Date/Time

Shipped Via: UPS FedEx Hand Other Tracking#:

Remarks: Results faxed to Brian Crawford 843-740-2785

Temperature: 4 C

Receipt Exceptions:

Appendix F

COMPARISON OF TOTAL COST OF REMEDIAL SOLUTIONS

Site: Charleston Naval Complex
Location: AOC 613
Phase: Corrective Measures Study
Base Year: 2003
Date: 01/10/03

	Alternative Number 1 **Monitoring/ Natural Attenuation**	Alternative Number 2 **In-Situ Bio Sparging**
Total Project Duration (Years)	5	2
Capital Cost	$12,300	$127,000
Annual O&M Cost	$5,900	$5,900
Total Present Worth of Solution	$39,000	$138,000

Disclaimer: The information in this cost estimate is based on the best available information regarding the anticipated scope of the remedial alternatives. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This is an order-of-magnitude cost estimate that is expected to be within -30 to +50 percent of the actual project costs.

Alternative 1: Monitoring/Natural Attenuation

COST ESTIMATE SUMMARY

Site: Charleston Naval Complex
Location: AOC 613
Phase: Corrective Measures Study
Base Year: 2002
Date: 01/02/03

Description:
Monitoring/natural attenuation of the surficial aquifer.

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
Monitoring/Natural Attenuation Work Plan				
Groundwater Contingency Plan				
Labor - Project Manager	12	HR	$125	$1,500
Labor - Engineer/Hydrogeologist	40	HR	$90	$3,600
Labor - Editor	16	HR	$65	$1,040
Labor - CAD Technician	16	HR	$65	$1,040
Initial Groundwater Sample Collection	1	EA	$2,547	$2,547
SUBTOTAL				**$9,727**
Project Management	5%	of	$9,727	$486
Technical Support	5%	of	$9,727	$486
SUBTOTAL				**$10,700**
Contingency	15%	of	$10,700	$1,605
TOTAL CAPITAL COST				**$12,300**

OPERATIONS AND MAINTENANCE COST

	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
yrs 1 - 5	Annual Groundwater Sample Collection	1	EA	$2,547	**$2,547**
	Annual Report				
	Labor - Project Manager	6	HR	$125	$750
	Labor - Engineer/Hydrogeologist	16	HR	$90	$1,440
	Labor - Editor	6	HR	$65	$390
	Labor - CAD Technician	12	HR	$65	$780
	SUBTOTAL				**$3,360**
yrs 1 - 5	**TOTAL ANNUAL O&M COST**				**$5,900**

PRESENT VALUE ANALYSIS

Discount Rate = 3.2%

End Year	COST TYPE	TOTAL COST	COST PER YEAR	TOTAL PRESENT WORTH
1	FIRST YEAR CAPITAL COST	$12,300	$12,300	$12,300
1 - 5	ANNUAL O&M COST (Year 1 - 5)	$29,500	$5,900	$26,867
				$39,167
	TOTAL PRESENT WORTH OF ALTERNATIVE			**$39,000**

SOURCE INFORMATION

1. United States Environmental Protection Agency. July 2000. A Guide to Preparing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002. (USEPA, 2000).

Alternative 2: **In Situ Bio Sparging** **COST ESTIMATE SUMMARY**

Site: Charleston Naval Complex
Location: AOC 613
Phase: Corrective Measures Study
Base Year: 2003
Date: 01/10/03

Description: Air sparging pilot test and monitoring
Assume remediation to MCSs after pilot test

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
Bio Sparge Pilot Test	1	EA	$112,200	$112,200
SUBTOTAL				**$112,200**
Baseline Groundwater Sample Collection	1	EA	$2,547	$2,547
Groundwater Sample during pilot test	2	EA	$2,547	$5,094
SUBTOTAL				**$7,641**
Bio Sparge Summary Report				
Labor - Project Manager	12	HR	$125	$1,500
Labor - Engineer/Hydrogeologist	32	HR	$90	$2,880
Labor - Editor	12	HR	$65	$780
Labor - CAD Technician	24	HR	$65	$1,560
SUBTOTAL				**$6,720**
TOTAL CAPITAL COST				**$127,000**

OPERATIONS AND MAINTENANCE COST - Monitoring

	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
yrs 1 - 2	annual Groundwater Sample Collection	1	EA	$2,547	**$2,547**
	Annual Report				
	Labor - Project Manager	6	HR	$125	$750
	Labor - Engineer/Hydrogeologist	16	HR	$90	$1,440
	Labor - Editor	6	HR	$65	$390
	Labor - CAD Technician	12	HR	$65	$780
	SUBTOTAL - Annual Report				**$3,360**
yrs 1 - 2	**TOTAL ANNUAL O&M COST**				**$5,900**

PRESENT VALUE ANALYSIS

Discount Rate = 3.2%

End Year	COST TYPE	TOTAL COST	TOTAL COST PER YEAR	TOTAL PRESENT VALUE
1	FIRST YEAR CAPITAL COST	$127,000	$127,000	$127,000
1 - 2	ANNUAL O&M COST (Year 1 - 2)	$11,800	$5,900	$11,257
	TOTAL PRESENT WORTH OF ALTERNATIVE			**$138,000**

SOURCE INFORMATION

1. United States Environmental Protection Agency. July 2000. A Guide to Preparing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002. (USEPA, 2000).