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CORRECTIVE ACTION PLAN FOR CHICORA TANK FARM CNC CHARLESTON SC
05/10/2002
TETRA TECH INC

Rev. 1
05/10/02

Active Corrective Action Plan
for
Chicora Tank Farm

Charleston Naval Complex
North Charleston, South Carolina

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order CTO-0174

May 2002

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May 10, 2002

Project Number 4015

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Reference: Clean Contract No. N62467-94-D0888
Contract Task Order No. 0174

Subject: Active Corrective Action Plan
Chicora Tank Farm
SCDHEC Site Identification #13350
Charleston Naval Complex
North Charleston, South Carolina

Dear Mr. Bishop:

On behalf of the Department of the Navy, Southern Division, Naval Facilities Engineering Command, Tetra Tech, NUS, Inc. (TtNUS) is pleased to submit the enclosed Active Corrective Action Plan for the subject site. If you have any questions regarding this submittal, please contact me by phone at (813) 806-0202 or via e-mail at calliganp@ttnus.com.

Sincerely,

Paul E. Calligan

Paul E. Calligan, P.G.
Task Order Manager

Enclosures

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Rev. 1
05/10/02

ACTIVE CORRECTIVE ACTION PLAN
FOR
CHICORA TANK FARM

CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Submitted to:
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Naval Facilities Engineering Command
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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0174

MAY 2002

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CERTIFICATION PAGE

I certify that the information contained in this report and on any attachments is true, accurate, and complete to the best of my knowledge, information, and belief.

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1.0 INTRODUCTION

This Active Corrective Action Plan (CAP) was prepared by Tetra Tech NUS, Inc. (TtNUS) for the United States Navy (Navy) Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) under Contract Task Order (CTO) 0174, for the Comprehensive Long-term Environmental Action Navy (CLEAN), Contract Number N62467-94-D-0888. TtNUS has prepared this CAP, in accordance with South Carolina Department of Health and Environmental Control (SDHEC) Corrective Action Guidance, to summarize the basis for and describe the proposed remediation alternative to be implemented at Charleston Naval Complex, Chicora Tank Farm, Charleston, South Carolina.

1.1 SITE DESCRIPTION

The Chicora Tank Farm is a 23-acre site located approximately 500 yards west of the Charleston Naval Shipyard. The tank farm formerly supplied fuel and lubricants to the Naval Shipyard. The tank farm is in the city of North Charleston, near the west bank of the Cooper River in Charleston County, South Carolina, as shown on Figure 1.

The area surrounding the former tank farm is “mature urban,” having long been developed with commercial, industrial, and residential land use. Residential areas lie to the south and east of the site and commercial areas are to the west of the property. A military magnet school is located immediately adjacent to the property to the northwest. A site layout map, which exhibits structures, vicinity roads, and current utilities, is included as Figure 2. The adjacent property ownership information is presented in Appendix A.

The Chicora Tank Farm consisted of six cut-and-cover fuel storage tanks. Five of the tanks had a capacity of 50,000 barrels (bbl), and one tank had a capacity of 27,000 bbl. The former locations are shown in Figure 2. Each tank interior was approximately 25 feet in height and was constructed of 24-inch reinforced concrete walls and a domed roof. Each tank was connected to a pump room and had an exterior coating of gunite to minimize infiltration of groundwater into the tanks.

A subsurface drainage system and containment pond controlled groundwater flow and spill collection within the tank farm area. The drainage system consisted of a series of “french drains” which consisted of a main drainage pipe underlying the long axis of the site which discharged to the spill containment pond. This main drainage pipe had a series of smaller diameter pipes connected to it. These smaller pipes extended around each tank and collected groundwater

during periods of fluctuations and channeled the water to the main drainage pipe and into the containment pond.

1.2 SITE HISTORY

The Chicora Tank Farm was formerly used to store Bunker “C” fuel, Navy special fuel, and diesel marine fuel. All of the tanks at this location were removed in 1999 and the facility is no longer in use. During closure assessment activities, petroleum contamination was discovered along a fuel transfer pipeline while exposing a valve pit to clean the fuel transfer line. A Tank Closure Assessment Report and Rapid Assessment Report (RAR) were submitted and approved by South Carolina Department of Health and Environmental Control (SCDHEC). The RAR reported that naphthalene was the only chemical of concern (CoC) detected above Risk Based Screening Levels (RBSLs) and was encountered in six well samples. Site-specific target levels (SSTLs) were calculated for construction worker and surface water receptors to evaluate the exposure pathway for groundwater CoCs. Even though naphthalene exceeded RBSLs in six groundwater samples, no concentrations of naphthalene exceeded the most conservative migration model for the onsite construction worker SSTL. The RAR recommended an Intrinsic CAP for monitoring natural attenuation of the groundwater.

Concurrent with the site investigation associated with the Rapid Assessment (RA), the Environmental Detachment Charleston (DET) performed soil excavation activities to remove contaminated soil that was discovered during the assessment. Approximately 2,887 tons of soil were removed from four excavated areas at the site.

In May 2001, Tetra Tech NUS, Inc. (TtNUS) personnel conducted a groundwater sampling event to provide baseline analytical data for preparation of the Intrinsic CAP. During the sampling event, a thick, viscous petroleum free product was found in two on-site wells (CNC42-M07 and CNC42-M13) and later in a third well (CNC42-M01). The free product is believed to be Bunker “C” fuel. Due to viscosity of the free product found at Chicora Tank Farm, the thickness of the layer of free product could not be accurately determined; however, a layer approximately 0.5 foot was observed at monitoring well CNC42-M01. SCDHEC guidance requires the implementation of an Active CAP when free phase product is present with a thickness greater than 0.01 feet.

TtNUS personnel returned to the facility in August, September and October 2001, and conducted four free-product recovery events using a vacuum extraction truck at monitoring wells CNC42-M01, CNC42-M07 and CNC42-M13. A total of 1900 gallons of water/petroleum mixture were extracted over the course of four events. In December 2001, during the installation of three

additional monitoring wells, free product was found to have returned in two existing wells. The well completion diagrams and boring logs are presented in Appendix B.

1.3 GEOLOGY/HYDROGEOLOGY

1.3.1 Regional Geology

The Chicora Tank Farm is located in Charleston County, South Carolina, in the Lower South Carolina Coastal Plain Physiographic Province on the Cooper River side of the Charleston Peninsula. The peninsula is formed by the confluence of the Cooper and Ashley Rivers. Topography in the area is typical of the South Carolina lower coastal plain and is characterized by having low-relief plains broken by the meandering streams and rivers, flowing toward the coast past occasional marine terrace escarpments (E/A&H, 1996).

The geology of the Charleston area is typical of the southern Atlantic Coastal Plain. Cretaceous-age and younger sediments thicken seaward and are underlain by older igneous and metamorphic basement rock. Surface exposures consist of recent or Pleistocene sands, silts, and clays of high organic content referred to as the Wando Formation (E/A&H, 1996). Underlying the Wando Formation, increasing with age, are the Oligocene-age Cooper Group and the Eocene-age Santee Limestone. The Cooper Group is comprised of the Parkers Ferry, Ashley, and Harleyville formations. The formation of particular importance in the Cooper Group is the Ashley Formation, which was formerly referred to as the Cooper Marl in most regional geologic literature. In more recent geologic nomenclature, the name “Cooper” has been given to a group of formations which includes the Ashley Formation, a pale green to olive-brown, sandy phosphoric limestone or marl, which is locally muddy and/or sandy. The Ashley Formation in the vicinity of Charleston is encountered at a depth of approximately 30 to 70 feet bls. The top of the Ashley Formation has been reported to be associated with an erosional basin, and the entire Cooper Unit, including the Ashley Formation, is indicated to be approximately 300 feet thick (E/A&H, 1996).

Groundwater occurs under water table or poorly confined conditions within the recent or Pleistocene deposits overlying the Ashley Formation of the Cooper Group. Transmissivity in the Pleistocene aquifer is generally less than 1,000 feet per day, and well yields are variable, ranging from 0 to 200 gallons per minute (gpm). This groundwater contains high concentrations of iron and is commonly acidic at shallow depths (E/A&H, 1996).

The Cooper Group is hydrogeologically significant mainly because of its low permeability. In most locales, its sandy, finely granular limestone produces little or no water, but instead acts as

confining material causing artesian conditions in the underlying Santee Limestone. Yields from wells in the Santee are usually less than 300 gpm (E/A&H, 1996).

1.3.2 Site Geology

Based on lithologic descriptions from soil borings and monitoring wells, the subsurface soil generally consists of silty sand and clayey sand to 6 feet bls. Underlying these deposits, clayey sand, silty sand, silty clay, and sandy clay were encountered to a depth of 35 feet bls.

1.3.3 Site Hydrogeology

Groundwater level measurements collected from the shallow monitoring wells indicate groundwater generally occurs under unconfined conditions at depths of approximately 5 to 8 feet bls in the site area. A complete round of groundwater elevation measurements were recorded from the site monitoring wells on May 7, 2001 and August 30, 2001, and are presented in Tables 1 and 2. Figure 3 presents the groundwater potentiometric surface for groundwater elevation measurements collected during the August 30, 2001 field event. Based on the potentiometric map, it appears that groundwater flow is toward the north-northeast, toward the Cooper River.

2.0 FATE AND TRANSPORT MODELING

The Fate and Transport Modeling presented in this section is based on data collected during field activities conducted during the RA and the CAP. Since no soil samples were collected during the CAP field activities, soil data collected during the RA are used to determine the Chemicals of Concern (CoCs) in the soil. Groundwater data collected during the CAP field activities are used to determine the CoCs in the groundwater.

2.1 CHEMICALS OF CONCERN IN SOIL AND GROUNDWATER

2.1.1 Chemicals of Concern in Soil

Twenty-five subsurface soil samples were collected at the Chicora Tank Farm site for fixed-base laboratory analysis during the RA. Twenty-one samples were collected from sampling points in the walls of the soil source area excavations, and four soil samples were collected from soil borings installed during the Direct Push Technology (DPT) investigation. Table 3 summarizes the CoCs detected in the soil samples. Although toluene, ethylbenzene, xylenes, chrysene, and naphthalene were detected in four of the soil samples above laboratory detection limits, none of the samples contained hydrocarbon constituents above the applicable SCDHEC Risk-Based Screening Levels (RBSLs).

2.1.2 Chemicals of Concern in Groundwater

Groundwater samples were collected at the site on May 10, 2001. Groundwater samples were collected from all wells except CNC42M-07 and CNC42M-13. Free product was detected in wells CNC42M-07 and CNC42M-13. After the analytical data was reviewed, three additional groundwater monitoring wells, CNC42M-19, CNC42M-20, and CNC42M-21 were installed in December 2001 to delineate the extent of the groundwater plume. The new wells were then sampled, along with wells CNC42M-01, CNC42M-07 and CNC42M-13 during the week of December 19, 2001. The groundwater laboratory analytical reports for the field event are presented in Appendix C. Table 4 presents the analytical results for CoCs detected in the groundwater samples.

Naphthalene was the only groundwater CoC that was detected above the RBSL of 10 ug/L in three of the groundwater samples. Concentrations of naphthalene ranged from 1.1 µg/L to 113.0 µg/L. Benzene, ethylbenzene, toluene and total xylenes were also detected in the samples below the RBSL for groundwater. Figure 4 presents the detected concentrations of naphthalene for the

May/December 2001 sampling events. None of the CoCs were detected above the applicable reporting limits in the onsite deep monitoring wells.

2.2 SITE CONCEPTUAL EXPOSURE MODEL

TtNUS conducted a survey of potential receptors in the vicinity of the Chicora Tank Farm facility to identify potable water supplies, adjacent property owners, site workers, subsurface utilities, and any other pathway receptors that could be impacted by or could influence constituent migration. The site is the former fuel storage facility located in an area considered to be “mature urban,” having long been developed with commercial, industrial, and residential land use. Residential areas lie to the south and east of the site and commercial areas are to the west of the property. A military magnet school is located immediately adjacent to the property to the northwest. The future use of the property is expected to be commercial for the foreseeable future after the property is made available for redevelopment as part of the Defense BRAC Act. Future development of the site may also include a parking lot for a local school.

Drinking water at the site and surrounding properties is provided by the city of Charleston water treatment plants. A survey of groundwater users within a 7-mile radius of the Charleston Naval Complex performed during the RA identified no drinking water wells that are screened in the shallow aquifer within a 4-mile radius of the Chicora Tank Farm.

The groundwater elevation data from the groundwater gauging events in May and August 2001 are provided in Tables 1 and 2, respectively. The groundwater potentiometric map constructed from the August 2001 groundwater elevation data is provided as Figure 3. Groundwater from the three tank areas generally flows to the north-northeast toward the Cooper River, which discharges into Charleston Harbor. Surface water drains into the storm sewer drainage system located to the northeast of the Chicora Tank Farm. The nearest storm drain is located approximately 40 feet northeast of the tank farm.

2.3 EXPOSURE PATHWAY ANALYSIS

A Site Conceptual Exposure Model for all potential exposure pathways is illustrated on flow charts in Appendix D. This model presents the receptor characterizations of the potentially exposed populations in the vicinity of the site and identifies the potentially complete exposure pathways for those receptors. SCDHEC requires that only those exposure pathways with CoC concentrations exceeding Tier 1 RBSL concentrations are examined in a Tier 2 Risk-Based Corrective Action Report. No complete exposure pathways have been identified at this site at the present time. The

Site Conceptual Exposure Model presents the exposure pathway assessments for current and future use scenarios.

2.3.1 On-Site Commercial/Industrial Worker

An on-site commercial or industrial worker is defined as a business employee who works in a commercial/industrial capacity at the site. The future use of the property is expected to be commercial for the foreseeable future; therefore, an on-site worker was considered as a potential receptor. Incidental ingestion and dermal contact with impacted soil are expected to be negligible for commercial/industrial workers because they are located inside a building. Drinking water at this site is provided by the city; therefore, ingestion of groundwater is not a complete exposure pathway. The building foundation is assumed to be sufficient to prevent volatilization from both soil and groundwater into a commercial building, and there is no history of vapors in the commercial building. It is unlikely that any additional exposure pathways will exist for future on-site workers; therefore, no complete pathways exist for either current or future commercial/ industrial workers.

2.3.2 On-Site Visitor

An on-site visitor is defined as any person other than a worker who might come on site. On-site visitors would have the same exposure pathways as commercial workers, but their exposure duration would be much shorter. This receptor does not have to be quantified because a potential on-site visitor's chemical intake would not drive risk or cleanup levels at the site.

2.3.3 On-Site Construction Worker

An on-site construction worker is defined as a laborer who would be involved in intrusive activities on or around the site, particularly in the area of subsurface utilities. On-site construction workers could be exposed to constituents in soil by the following pathways: inhalation of volatiles from soil, dermal contact with soil, and incidental ingestion of soil. There is no soil impact above RBSLs at the site. On-site construction workers could be exposed to constituents in groundwater by the following pathways: inhalation of volatiles from groundwater, dermal contact with groundwater, and incidental ingestion of groundwater. There are several utilities in the areas surrounding the source plumes. These utilities include water, storm sewer drains and electrical conduits. Therefore, the point of exposure location for the on-site construction worker was considered to be at the source.

2.3.4 On-Site Resident

An on-site resident is defined as any person making his or her home at the site. This site is expected to remain a commercial facility; therefore, the on-site resident receptor was not considered further.

2.3.5 Off-Site Resident

An off-site resident is defined as any person making his or her home near the site. This receptor's location is either an actual current residence near the site or is a vacant lot or property on which a residence could be built. A residential area lies to the east of the Chicora Tank Farm across Chicora Parkway. This residential area is hydraulically downgradient of the facility. However, it is currently serviced by city water; therefore, it was not considered as a potential receptor for contamination from the Chicora Tank Farm.

2.3.6 Surface Water

A retention pond is located at the northwestern end of the property and is the nearest surface water body to the site. The retention pond is approximately 600 feet, 1,200 feet, and 1,350 feet from the source areas for Tanks L, M, and O, respectively. Based on the groundwater flow directions calculated during the RA field investigation, the retention pond appears to be lateral to the hydraulic gradient. However, since groundwater flow data taken from the previous Kemron CAR report indicates that groundwater flow has historically been to the northwest, this exposure pathway was considered for ingestion of surface water. The retention pond was used as the potential receptor to determine the SSTLs for the site.

2.4 FATE AND TRANSPORT MODEL

The Domenico model was the fate and transport model used to determine groundwater site-specific target levels (SSTLs) in the risk analysis. The Domenico dilution/attenuation model is presented in the SCDHEC guidance document, *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC 2001). This model is very conservative in that it assumes an infinite mass source area condition through which groundwater flows. The model incorporates biological decay effects through a first-order decay process; however, this mechanism was ignored because SCDHEC guidance specifies that the decay rate must be assumed to be zero if site-specific decay rates have not been determined.

The impacted groundwater source areas were modeled separately for Tank Areas L, M, and O. The sizes of the source areas were kept the same as the source areas determined during the RAR, although the most recent sampling data indicates that the groundwater plumes are slightly smaller than originally determined. The source areas from the RAR were used to provide the most conservative values. Tank Area L was 130 feet (39.6 meters) wide and 6.89 feet (2.1 meters) deep, Tank Area M was 200 feet (61 meters) wide and 6.17 feet (1.88 meters) deep, and Tank Area O was 40 feet (12 meters) wide and 5.26 feet (1.6 meters) deep. The maximum source concentrations, as determined from fixed-base laboratory analysis of groundwater for each tank area, are assumed to exist throughout the source area, further compounding the conservatism of the estimate. The source concentrations used are based on the highest historical concentrations detected at each Tank Area.

Site-specific data were used for saturated hydraulic conductivity, hydraulic gradient, and fraction of organic carbon in soil (1.7E-05 m/sec, 0.002 ft/ft, and 0.15 g-C/g-soil, respectively for Tank Area L), based on information obtained during the RAR. The soil bulk density (1.55 g/cm^3) and effective porosity (0.30 cm^3/cm^3) were determined using Figures C1 and C3 given in SCDHEC (1998), based on the sieve test results for sample 42SLB090304, 86.1% sand and 3.8% clay. The site-specific data for all of the tank areas are presented in the Domenico model of Appendix E.

The following estimates of dispersivity were used in the Domenico model as given in SCDHEC (1998):

Parameter	Estimate
Longitudinal Dispersivity, α_x	x/10, where x= distance between the point of exposure and the source or compliance point
Transverse Dispersivity, α_y	$\alpha_x/3$
Vertical Dispersivity, α_z	$\alpha_x/20$

2.5 PREDICTED MIGRATION AND ATTENUATION OF CHEMICALS OF CONCERN

The most recent groundwater-gauging event shows that groundwater flow is primarily toward the north-northeast. The current extent of impact is limited to wells CNC42M-01, CNC42M-02 and CNC42M-03 in Tank Area L, CNC42M-07, CNC42M-11 and CNC42M-10 in Tank Area M, and CNC42M-13 in Tank Area O. Naphthalene was the only compound detected above RBSLs in the

groundwater collected from these source wells. Benzene, toluene, ethylbenzene, and xylenes were detected at Site 42 but not at levels which exceed the RBSLs.

The Domenico model was used to predict the distance at which the tip of each source plume is attenuated to SCDHEC RBSLs in 10 and 20 years without using degradation due to biological decay. This was done by adjusting the time to 10 years (3.15 x1 0^8 second) and 20 years (6.31 x 10^8 second) and solving for distance (x) by trial and error. The source area was assumed to be a conservative area, which encompassed the wells that contained naphthalene above RBSLs. The distance from the plume source to the point of exposure was changed for naphthalene until the required distance that is necessary for the concentration to attenuate to the RBSLs was determined. Only the calculated concentrations of naphthalene at the source were greater than their respective RBSLs; therefore, this was the only chemical for which plume distances were calculated. The model estimates that after 10 years, the concentrations of naphthalene will be 0.010 mg/L (RBSL) at distances of 0.202 feet, 0.063 foot, and 0.086 foot, for Tank Areas L, M, and O, respectively. Furthermore, after 20 years, the concentrations of naphthalene are 0.010 mg/L (RBSL) at distances of 0.405 foot, 0.126 foot, and 0.172 foot, for Tank Areas L, M, and O, respectively. The Domenico 10-year and 20-year simulation spreadsheets are presented in Appendix E.

2.6 SITE-SPECIFIC TARGET LEVELS

Soil SSTLs were submitted to SDHEC in the Rapid Assessment and approved by SDHEC in a letter dated December 7, 1999.

Two future scenarios were considered to calculate SSTLs: on-site construction worker exposure to groundwater and the groundwater flow into the retention pond located at the northwestern corner of the property. The minimum SSTL for the two scenarios was selected as the site SSTL for each CoC.

2.6.1 SSTLs Protective of the On-Site Construction Worker

Municipal water is supplied to the base, so shallow groundwater is not used for drinking water. Groundwater RBSLs for the construction worker were calculated for three pathways: dermal contact, incidental ingestion, and inhalation of volatiles. A target cancer risk of 1 x 10^{-6} and a target hazard quotient of 1 were used in the calculations. Where possible, site-specific parameters were used for site conditions. Standard defaults were used when available and applicable to a construction worker. When no standard parameters were available, conservative

assumptions were used. For all pathways, the exposure frequency was assumed to be 90 days/year, and the exposure duration was assumed to be 1 year. These assumptions were considered conservative based on the nature of utility work.

The dermal contact RBSLs were calculated using procedures *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance* (USEPA Peer Consultation Workshop Draft, 1998). Based on expected limited contact with groundwater, the event frequency was assumed to be 1 event/day, and the event duration was assumed to be 1 hour/event. The skin surface area available for contact was 4500 cm^2, based on one-fourth the skin surface area given in the risk assessment guidance document for a swimming adult.

The incidental ingestion RBSLs were calculated using the equation given in *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Interim Final)*, (USEPA 1989). An incidental ingestion rate of 0.01 L/day was assumed based on a fraction (12.5%) of the incidental ingestion rate for a wading adult (0.01 L/hr), considered for an 8-hour work day. The incidental ingestion rate for wading adults is given in *Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment* (USEPA Region 4, 1995).

Utility lines in the area are typically 2 to 6 feet deep. The average depth to groundwater at the points of exposure (source areas near Tanks L, M, and O) averages 6.78 feet below top of casing (BTOC) (Tank L), 6.17 feet BTOC (Tank M), and 5.26 feet BTOC (Tank O). It was assumed that a construction worker might be exposed to chemicals volatilizing from standing groundwater. The inhalation RBSLs were calculated using Henry's Law:

$$RBSL_{WATER} = RBSL_{AIR}/H$$

Where H = Henry's Law constant [mg/L-air/mg/L-water]

The $RBSL_{AIR}$ for each chemical was calculated using the equation given in the ASTM *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (1997). SCDHEC values were used for Henry's Law constants.

Several utilities are located within 10 feet of the source contaminant areas. The point of exposure location for the on-site construction worker was considered to be at the source, and no fate and transport calculations were performed to determine the SSTL protective of the construction worker. The minimum RBSL for the three pathways was chosen as the SSTL for the construction worker.

The following table shows the calculated RBSLs for each pathway and the SSTL for the construction worker:

Chemical of Concern	Dermal	Incidental Ingestion	Inhalation	SSTL
	RBSL	RBSL	RBSL	(Minimum RBSL)
	mg/L	mg/L	mg/L	mg/L
Benzene	0.85	68.52	0.15	0.15
Toluene	23.98	5677.78	5.38	5.38
Ethylbenzene	6.05	2838.89	14.50	6.05
Xylenes	102.33	56777.78	NA*	102.33
Naphthalene	1.63	1135.56	2.63	1.63

*No inhalation reference dose is available for xylenes; therefore, no inhalation RBSL can be calculated.

Appendix E provides the parameters and results of the RBSL and SSTL calculations.

2.6.2 SSTLs Protective of Surface Water

SSTLs were developed which would protect the retention pond located at the northwestern end of the property from potential impact from discharge of impacted groundwater. The Domenico model as described in Section 2.4 was used to determine the groundwater SSTLs for BTEX and naphthalene under steady state conditions.

2.6.2.1 SSTLs – Tank Area L

The groundwater flow is primarily toward the northeast. The retention pond is located approximately 600 feet northwest of the Tank L source area. Monitoring wells CNC42M-02 and CNC42M-03 historically contained naphthalene in exceedance of its RBSL at concentrations of 198 µg/L and 30 µg/L, respectively; therefore, the area surrounding these monitoring wells was used as the source for predicted migration. All other wells in the Tank L area had no detections of any compounds of interest above the applicable RBSLs.

The highest detected naphthalene concentration was used in the Domenico model as the source concentration. BTEX constituents were not detected above laboratory detection limits; therefore the detection limit for each constituent (5 µg/L) was used as the source concentration for each of the BTEX constituents. The distance from CNC42M-02 and CNC42M-03 (source area) to the retention pond, which is the nearest point of exposure other than construction worker, was estimated to be 600 feet. Using the values of RBSLs (0.005 mg/L for benzene, 1 mg/L for

toluene, 0.7 mg/L for ethylbenzene, 10.0 mg/L for xylenes, and 0.01 mg/L for naphthalene) at the point of exposure, the SSTLs at the source area were calculated and compared with the source concentrations as determined by the fixed-base laboratory. The SSTLs at the compliance well (CNC42M-05) were also calculated using the values of the RBSLs at the point of exposure. The distance from the compliance well to the point of exposure was estimated to be 540 feet.

Groundwater SSTLs were determined to be:

Chemical of Concern	Source SSTL [mg/L]	Compliance Point SSTL [mg/L]
Benzene	0.168	0.137
Toluene	33.656	27.459
Ethylbenzene	23.559	19.221
Xylenes	336.56	274.59
Naphthalene	0.337	0.275

Appendix E provides the Domenico model calculations generating SSTLs.

2.6.2.2 SSTLs – Tank Area M

The groundwater flow is primarily toward the north-northeast. The retention pond is located approximately 1,200 feet northwest of the Tank M source area. Monitoring wells CNC42M-07 and CNC42M-10 historically contained naphthalene in exceedance of its RBSL at concentrations of 17 μg/L and 865 μg/L, respectively; therefore, the area surrounding these monitoring wells was used as the source area for predicted migration, and the highest historical naphthalene concentration was used in the model as the source concentration. The distance from CNC42M-07 and CNC42M-10 (source area) to the retention pond, which is the nearest point of exposure other than construction worker, was estimated to be 1,200 feet. Using the values of RBSLs (0.005 mg/L for benzene, 1 mg/L for toluene, 0.7 mg/L for ethylbenzene, 10.0 mg/L for xylenes, and 0.01 mg/L for naphthalene) at the point of exposure, the SSTLs at the source area were calculated and compared with the source concentrations as determined by the fixed-base laboratory. The SSTLs at the compliance well (CNC42M-20) were also calculated using the values of the RBSLs at the point of exposure. The distance from the compliance well to the point of exposure was estimated to be 1,120 feet.

Groundwater SSTLs were determined to be:

Chemical of Concern	Source SSTL [mg/L]	Compliance Point SSTL [mg/L]
Benzene	0.482	0.421
Toluene	96.318	84.122
Ethylbenzene	67.423	58.886
Xylenes	1169.45	975.79
Naphthalene	6.60	4.54

Appendix E provides the Domenico model calculations generating SSTLs.

2.6.2.3 SSTLs – Tank Area O

The groundwater flow is primarily toward the north. The retention pond is approximately 1,350 feet northwest of the Tank O source area. Monitoring well CNC42M-13 historically contained naphthalene in exceedance of its RBSL at a concentration of 46 µg/L; therefore, the area surrounding CNC42M-13 was used as the source for predicted migration. The highest historical BTEX and naphthalene concentrations detected in CNC42M-13 were used in the Domenico model as the source concentrations. The distance from CNC42M-13 (source area) to the retention pond, which is the nearest point of exposure other than construction worker, was estimated to be 1,350 feet. Using the values of RBSLs (0.005 mg/L for benzene, 1 mg/L for toluene, 0.7 mg/L for ethylbenzene, 10.0 mg/L for xylenes, and 0.01 mg/L for naphthalene) at the point of exposure, the SSTLs at the source area were calculated and compared with the source concentrations as determined by the fixed-base laboratory. The SSTLs at the compliance well (CNC42M-17) were also calculated using the values of the RBSLs at the point of exposure. The distance from the compliance well to the point of exposure was estimated to be 1,310 feet.

Groundwater SSTLs were determined to be:

Chemical of Concern	Source SSTL [mg/L]	Compliance Point SSTL [mg/L]
Benzene	3.58	3.37
Toluene	715.90	674.14
Ethylbenzene	501.13	471.90
Xylenes	7171.16	6750.08
Naphthalene	9.12	8.38

Appendix E provides the Domenico model calculations generating SSTLs.

2.6.3 Selected SSTLs

For each chemical, the SSTL calculated for the construction worker was less than the SSTL calculated for the retention pond scenario; therefore, the construction worker scenario SSTLs were selected as the site SSTLs. The selected SSTLs and the source concentrations are:

Chemical of Concern	SSTL (mg/L)	Source Concentration (mg/L)		
		Tank L	Tank M	Tank O
Benzene	0.15	0.004	0.005	0.003
Toluene	5.38	0.005	0.003	0.010
Ethylbenzene	6.05	0.005	0.005	0.020
Xylenes	102.33	0.005	0.005	0.045
Naphthalene	1.63	0.198	0.865	0.046

The concentrations of benzene, toluene, ethylbenzene, xylenes, and naphthalene at each tank area do not exceed the SSTLs. Appendix E provides a summary of groundwater SSTLs. Comparisons of the construction worker RBSLs and groundwater SSTLs to the calculated dissolved constituents in groundwater are presented in Table 4.

2.7 RECOMMENDATIONS

The downgradient extent of hydrocarbon impact to groundwater has been delineated in all of the tank areas. The concentrations of BTEX and naphthalene in the source wells at each of the tank areas do not exceed the site SSTLs as calculated in Section 2.6. No concentrations of any compound of interest in the compliance wells exceed their SSTLs.

Since the dissolved hydrocarbon concentrations at the source wells of Tank Areas L, M, and O are below the SSTLs, corrective action will not be required according to SCDHEC guidelines. However, due to the levels of naphthalene above RBSLs, it is recommended that a groundwater monitoring program be implemented to verify intrinsic remediation that appears to be occurring at this facility.

3.0 REMEDIATION TECHNOLOGY FOR FREE PRODUCT REMOVAL

TtNUS conducted a screening of available technologies in order to determine the best remedial alternative for free product removal at the subject site. Potential remedial technologies and process options for soil and free product removal have been identified and evaluated based on their ability to meet clean-up objectives (effectiveness), applicability based on site conditions, feasibility of implementation, reliability, and anticipated duration. Due to the high viscosity and low volatile nature of “Bunker C” fuel, excavation, off-site disposal of soil, and dewatering during excavation is the chosen technology for this facility. A brief discussion of the chosen technology is presented in the following sections.

3.1 EXCAVATION AND OFF-SITE DISPOSAL OF SOIL

Excavation and off-site disposal of contaminated soil is the chosen remediation for this facility. This remedial activity consists of the physical removal and off-site disposal of potentially impacted soils with hydrocarbon constituents.

3.1.1 Excavation

Prior to complete excavation of potentially impacted soils, removal of approximately three 100-ft^2 areas of soil to the depth of approximately 3 to 4 feet bls in Tank Areas L, M, and O would be required to access the potentially contaminated zones. Additionally, due to the depth of the excavations, a 1 foot horizontal step-out for every 2 feet of vertical excavation is required to provide a slope for safety measures and in accordance with Occupational Health and Safety Administration (OSHA) regulations (29 CFR 1926 Subpart P). The slope would require an additional area of soil be removed surrounding the excavation. The contaminated soil assumed to be located in the 4- to 8-foot smear zone would be removed. Excavation below the water table (approximately 5 to 6 ft bls) will require dewatering with collection, treatment, and disposal of collected water.

Removal operations can be accomplished using standard equipment. Following removal and stockpiling of the potentially impacted soil, analysis of samples collected from the excavation sidewalls and bottom will be performed to confirm achievement of the target cleanup levels. Applicable OSHA regulations pertaining to excavations (29 CFR 1926 Subpart P) and confined space entry (29 CFR 1910 Subpart J) will be implemented during sampling activities. Once confirmatory sampling is complete, the excavation will be back-filled with clean fill material and the site restored to its original condition.

3.1.2 Off-Site Disposal

The stockpiled soil and other debris generated during excavation will be characterized, loaded, and transported off site to a permitted facility for treatment and/or disposal. It is assumed that since the soil may be petroleum impacted, the soil can be disposed of in a landfill that accepts non-hazardous solid bulk waste, as opposed to a hazardous waste landfill regulated by Resource Conservation and Recovery Act land disposal restrictions. Water collected during dewatering would need to be contained, sampled, and disposed of in accordance with regulatory guidelines.

The primary advantage of excavation and off-site disposal is the complete removal of contaminants from the site over a short time duration. Impacted soils can be physically removed from the site in a matter of days, as opposed to the months or years that are required using in-situ treatment alternatives, thus eliminating the potential for dispersion of hydrocarbon constituents to unaffected soil or groundwater during the remedial process.

3.2 DEWATERING DURING SOIL EXCAVATION

Free product may be recovered prior to and during the excavation dewatering using trash pumps or conventional vacuum trucks. During excavation activities, recovered free product and groundwater in the excavation will be removed. Due to the viscous nature of the aged Bunker C fuel oil, it is expected that most free product will be recovered during excavation activities. The removed product and water from dewatering activities will be treated by or disposed of at an off-site facility.

Free product dewatering is expected during soil excavation activities; therefore, the duration of the excavation phase of the project would determine the time limit for free product removal.

3.3 RATIONALE FOR SELECTION

Excavation and disposal provides the highest degree of overall protection to human health and the environment by providing an immediate reduction in risk and hydrocarbon concentrations. The equipment and controls needed for excavation and disposal are reliable, easily operated, commonly available, and typically require minimal O&M cost. Minimal permitting is required for the implementation and operation of soil excavation and disposal. In addition, excavation and disposal will provide a shorter duration to achieve cleanup standards and goals compared to other alternatives. It is also the only technology that provides a short-term reduction in risk.

4.0 TECHNOLOGY DESCRIPTION

Major components of soil excavation and disposal include the following:

- Site preparation (pre-excavation activities)
- Excavation and transportation to off-site location
- Backfill and compaction
- Site restoration and/or grading

Figure 5 presents the boundaries of three excavation areas. These excavation areas are located in Tank Areas L, M, and O. As indicated on Figure 5, the soil located between 4 to 8 ft bls within the inner boundary marked (soil to be excavated and disposed), should be considered potentially petroleum-impacted soil. Since the potentially contaminated soil is located at 4 to 8 ft bls, only soil found to be contaminated will be disposed off-site. The uncontaminated soil above should be returned to the excavation as backfill. Additional soil should be excavated to provide the safety sloping required to achieve the required depth. The estimated volume of soil to be disposed is 90 yd^3.

4.1 SITE PREPARATION (PRE-EXCAVATION ACTIVITIES)

Prior to excavation activities, the limits of excavations in Tank Areas L, M, and O should be surveyed and staked in the field. The designated areas should be flagged and boundaries will be established by florescent yellow caution tape to define the exclusion zone.

Prior to beginning any excavation activities or any intrusive work, the designated areas should be checked for any substructures, utility lines, and other potential interference. A professional survey to verify locations of site utilities was not conducted for this report; however, active or inactive subsurface obstructions may include electric lines, piping for sewer, gas distribution, etc.

Monitoring wells within the limits of the excavation areas at Tank Areas L, M, and O are to be abandoned prior to excavation or removed during excavation activities. If the monitoring wells are abandoned, they should be abandoned by grouting from the bottom of the well to approximately 2 feet bls with bentonite-cement grout. The grout should be pumped from the bottom of the borehole to the top by pressure grouting using a tremie pipe. The total depth of the well should be sounded prior to sealing, and the level of grout should be monitored during pumping with a weighted tape to insure complete placement of the grout. The grout level should

be checked 24 hours after emplacement and refilled to replace any losses due to settling. In addition, all local and state regulations shall be followed for well abandonment.

The following wells are to be removed and properly abandoned: CNC42-M01, CNC42-M06D, CNC42-M07, CNC42-12D, CNC42-M13 and CNC42-M18D.

The contractor shall prepare all required planning documents, such as an erosion and sediment control plan, Health and Safety Plan, Removal Action Plan, and Soil Disposal Plan, and also obtain all necessary permits.

4.2 EXCAVATION AND OFF-SITE TRANSPORTATION

Soil excavation should be within the areas shown on Figure 5. Soil excavated from 4 to 8 feet bls in the depicted areas should be handled as petroleum contaminated soil. Additional excavation will be necessary to provide the two-to-one slope as required by OSHA. However, shoring may be used in lieu of the two-to-one slope. Excavation will be conducted using standard earthmoving equipment. All operators should be certified to be in compliance with 29 Code of Federal Regulations 1910.120 health and safety requirements. In addition, an excavation competent person will be present at all times during excavation activities. Visual and OVA headspace analysis should be used to determine the soil contamination extent at set intervals during the excavation. It is assumed that due to the age of the petroleum that visual observation of the petroleum impacted soil may be necessary. Excavation to a depth approximately 1 foot below the groundwater table may be required to implement free product removal where free product is encountered. Free product that is exposed in the open excavation should be recovered to the extent practicable by using high vacuum suction, product absorbing socks, and over excavation.

The excavation should have sides sloped or be shored in accordance with applicable standards to prevent unstable conditions during excavation that could pose hazards to personnel. Stormwater run-on and run-off controls should be implemented to prevent migration of sediment or contaminated stormwater during site activities.

The soil in the excavation area is described as silty sand and the sides of the excavation should naturally slope. Excavations shall be cut back and sloped to allow for safe entry into the excavation in accordance with OSHA regulations. Open excavations shall be protected with suitable barriers, such as, temporary fences. The tops of the excavation shall be provided with a berm of clean soil to minimize the amount of run-on that can enter the excavation.

Since it is assumed that OVA headspace analysis and visual observations will not accurately confirm the complete removal of potentially contaminated soils, it is recommended that a mobile lab be set up on site during the excavation of potentially contaminated soil. The soil analysis by the mobile lab should be used to screen excavated soils during removal of the contaminated area to assure the complete removal of petroleum-impacted soil. Confirmatory soil samples should be provided to the lab from the sidewalls of the excavation to confirm the removal of petroleum-impacted soil. Final confirmatory soil samples should be shipped to a fixed-base laboratory and analyzed for the gasoline and kerosene analytical group. At a minimum, confirmatory soil sampling should be performed in accordance with the South Carolina regulatory guidelines provided for UST removals.

Free product floating on the groundwater table at the bottom of the excavation shall be removed. Collected water, free product, and materials will be disposed of off site.

If it is necessary to temporally stockpile contaminated soil, the stockpile will be provided with erosion and sedimentation control such as silt fences or hay bails. Captured sediment from the contaminated soil stockpiles must be treated. Contaminated soil and treated soil stockpiles will be placed on an impermeable surface, or liner, 5-mil thickness minimum. Stockpiles will be graded to promote flow toward the excavation. Water and free product seeping out of stockpiles of contaminated soil must be captured for treatment or disposal. Stockpile locations selected by the contractor are subject to review and approval.

The total volume to be excavated to allow sloping and removal of contaminated soil is estimated to be 375 yd^3. Based on the actual water table at the time of excavation, these volumes may vary.

4.3 SITE RESTORATION

Backfill of excavated areas may be performed simultaneously with excavation if the confirmatory sampling has determined that the excavation in the particular area is complete. All water from the excavation during soil replacement should be removed as necessary to accommodate compaction. To minimize recontamination of the backfill soil by groundwater, a low (i.e., less than 0.5 percent) organic content soil will be used as backfill material. Backfill material will be well-graded granular soil consisting of silica sand or other approved materials. Backfill will contain less than 0.5 percent organic carbon as measured in accordance with American Society for Testing and Materials (ASTM) D2074-87. Moisture-density testing will be in accordance with ASTM D698-91. Certification that the borrow source is free of petroleum hydrocarbon

contamination is required from the borrow source prior to delivery. Backfill material will be placed in 12-inch lifts and compacted to 90 percent standard Proctor density. Compactive effort should be no less than four passes of the earth moving equipment. Density test results shall be provided in the completion report. Approximately 90 yd^3 of backfill material should be required. If excavation and backfill operations are performed simultaneously, a separation distance should be maintained between the toe of the slope for excavation and the toe of the slope for backfill to prevent or minimize cross-contamination by direct contact with free product or excessively contaminated soil.

After all disturbed areas of excavation have been successfully backfilled, the site should be graded to drain. The excavation should be graded to match surrounding elevations, and the grade will be sloped from the center outward so that runoff will flow away from the backfilled area. The slope should be blended into the surrounding areas, and the grade changes should be gradual. If necessary, prior to backfilling an appropriate amount of 1½- to 2-inch diameter crushed stone may be provided as a bottom layer in order to stabilize saturated material resulting from groundwater encroachment into the open excavation.

Following completion of the excavation, backfill, and site restoration, groundwater monitoring wells that were abandoned or destroyed during remedial activities should be replaced as determined necessary to complete the post-remedial groundwater monitoring. A final survey shall be performed to identify the limits of excavation, final grading elevations, and new monitoring well locations. An as-built site plan should be prepared for the excavation project area.

5.0 SAMPLING PLAN

Groundwater sampling will be conducted on a semi-annual basis to monitor the levels of dissolved hydrocarbons. In general, one water sample will be collected from each well, unless free-phase hydrocarbons are encountered, for each sampling event and analyzed for the chemicals of concern. An initial sampling event will occur prior to starting any remedial activities.

- Static groundwater levels will be measured prior to purging for sample collection. This data will be used to determine groundwater elevations, calculate the flow gradient and confirm groundwater flow direction.
- All purge water will be containerized for later transport and off-site disposal, if necessary. If laboratory analyses indicate that the hydrocarbon concentrations are below risk-based screening levels, arrangements will be made to dispose of the water on site.
- All wells will be checked for the presence of free-phase hydrocarbons using an electronic interface probe (IP). If present, the free-phase hydrocarbon thickness will be recorded. If free-phase hydrocarbon is detected with the IP, field confirmation will be performed using a bailer.
- Groundwater samples will be collected from each monitoring well unless free-phase hydrocarbon is present.
- The wells will be purged and sampled using a dedicated bailer for each well.

Results of each sampling event will be prepared and submitted in the SDHEC Corrective Action Monitoring Plan format.

6.0 REMEDIATION SYSTEM ABANDONMENT

Upon successful completion of this project, and at the direction of SDHEC, The wells should be properly abandon. The abandonment will be in accordance with South Carolina Well Standards and Regulations R.61-71. The site should be returned to as near the condition it was in prior to corrective action activities.

7.0 CONCLUSION

A Rapid Assessment was conducted at the Chicora Tank Farm in 1999 and recommended that an Intrinsic CAP be prepared to conduct natural attenuation monitoring. TtNUS returned to the facility in May and December 2001 to collect groundwater sample data necessary to determine groundwater site-specific target levels (SSTLs) in the risk analysis. Three additional wells were installed to provide delineation of naphthalene concentrations in the groundwater. Fate and Transport Modeling using the most recent data has been presented in this CAP report.

During the baseline sampling for the Intrinsic CAP, an indeterminable amount of free product was found in three monitoring wells. Therefore, it became necessary to prepare an Active CAP to address the removal of the free product. This report presents TtNUS' recommendations for groundwater monitoring, excavation and off-site disposal of potentially contaminated soils, and dewatering of the excavation to remove the free product.

Subsequent to completion of the soil excavation, TtNUS recommends that groundwater monitoring be initiated to verify that intrinsic remediation is occurring.

8.0 REFERENCES

ASTM (American Society for Testing and Materials), 1970. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites.

SCDHEC (South Carolina Department of Health and Environmental Control), 1997. South Carolina Standard Limited Assessment, June 1997.

SCDHEC (South Carolina Department of Health and Environmental Control), 1998. South Carolina Risk Based Corrective Action for Petroleum Releases, May 2001.

Tetra Tech NUS, Inc. 1999, Rapid Assessment Report for Site 42, Chicora Tank Farm, Charleston Naval Complex, North Charleston, South Carolina, October 25, 1999.

USEPA (U.S. Environmental Protection Agency), 1989. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (interim Final), EPA/540/1-89/002.

USEPA (U.S. Environmental Protection Agency), 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Region 4.

USEPA (U.S. Environmental Protection Agency), 1998. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance.

APPENDIX A
ADJACENT PROPERTY OWNERSHIP

County of Charleston
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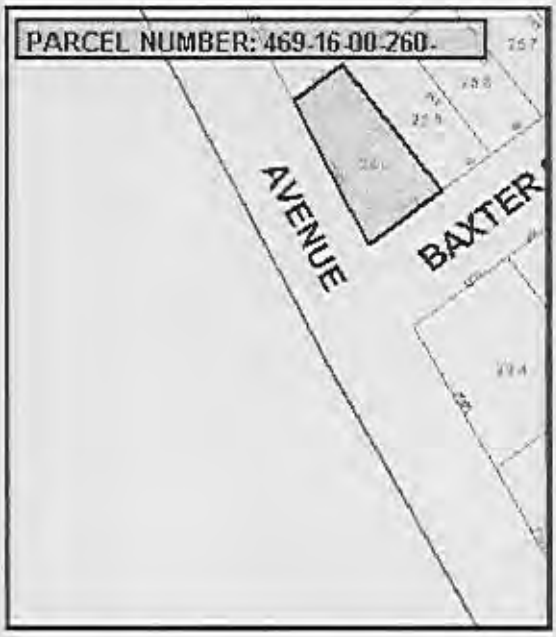

PARCEL NUMBER: 469-16-00-260-

PARCEL NUMBER:	469-16-00-260-
ADDRESS:	1938 BAXTER ST
PROP SITE NM:	
GENERAL USE:	SNGL-FAM-RES
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 36 BLK K
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	HARPER JOHNNY
CURRENT OWNER 1ST:	
SALE DATE:	03/02/1992
DEED BOOK:	G211512
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	PO BOX 245 HARLEYVILLE SC 29448-0245
SALE PRICE:	21000
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	28600
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1955
NUM BEDROOMS:	4
FULL BATHS:	2
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1184
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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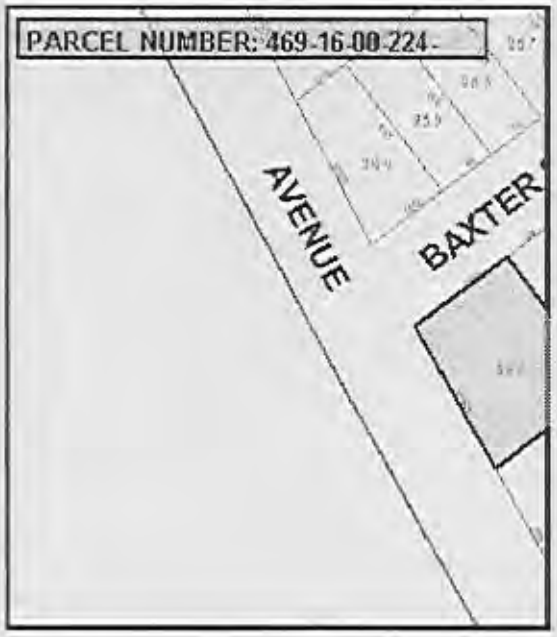
County of Charleston
property information system



PARCEL NUMBER: 469-16-00-224-

PARCEL NUMBER:	469-16-00-224-
ADDRESS:	BAXTER ST
PROP SITE NM:	
GENERAL USE:	VACANT-RES
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 61 BLK L
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	CHARLES REALTY CO
CURRENT OWNER 1ST:	MIDDLETON TOMMY H
SALE DATE:	02/27/2001
DEED BOOK:	L365562
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	3429 COCHISE ST NORTH CHARLESTON SC 29405
SALE PRICE:	2750
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	5000
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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property information system

PARCEL NUMBER: 469-16-00-223-

PARCEL NUMBER:	469-16-00-223-
ADDRESS:	1938 TOKEN ST
PROP SITE NM:	
GENERAL USE:	VACANT-RES
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 60 62 & 64 BLK L
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	ULICHNIE LISLE AJR AND TERRI BALL
CURRENT OWNER 1ST:	
SALE DATE:	08/29/1991
DEED BOOK:	O206816
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	1265 CORNWALLIS DR CHARLESTON SC 29412-9203
SALE PRICE:	30000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	11900
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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property information system

PARCEL NUMBER: 469-16-00-181-

PARCEL NUMBER:	469-16-00-181-
ADDRESS:	1937 TOKEN ST
PROP SITE NM:	
GENERAL USE:	SNGL-FAM-RES
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 59 & 61 BLK M
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	POPE JAMES E ETAL
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	2006 CARLTON ST NORTH CHARLESTON SC 29405-7816
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	7000
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1940
NUM BEDROOMS:	2
FULL BATHS:	1
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1024
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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PARCEL NUMBER: 469-16-00-180-

PARCEL NUMBER:	469-16-00-180-
ADDRESS:	2924 CHICORA AVE
PROP SITE NM:	
GENERAL USE:	SNGL-FAM-RES
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	PTS LT 62 & 64 BLK M
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	Y48-117
OWNER ON 1ST:	JENKINS GERALD
CURRENT OWNER 1ST:	
SALE DATE:	11/10/1999
DEED BOOK:	U337149
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	12397 HWY 6 EUTAWVILLE SC 29048
SALE PRICE:	40000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	39300
BUILD COUNT:	2
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1945
NUM BEDROOMS:	3
FULL BATHS:	1
THREE QTR BATHS:	0
HALF BATHS:	1
TOTL FN AREA:	1129
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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PARCEL NUMBER: 469-16-00-179-

PARCEL NUMBER:	469-16-00-179-
ADDRESS:	2920 NORWOOD STREET
PROP SITE NM:	CORNER
GENERAL USE:	DUPLEX
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	PTS LT 62 & 64 BLK M
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	G-8A
OWNER ON 1ST:	BUTLER KATURA
CURRENT OWNER 1ST:	
SALE DATE:	03/08/1995
DEED BOOK:	B254776
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	ANDREW DUPRE
MAILING ADDRESS:	PO BOX 12687 CHARLESTON SC 29422-2687
SALE PRICE:	5000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	29900
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1945
NUM BEDROOMS:	4
FULL BATHS:	2
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1692
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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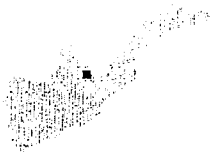

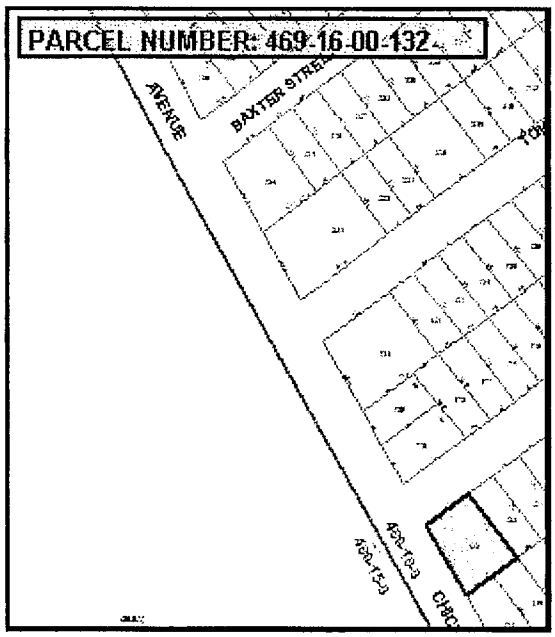

PARCEL NUMBER: 469-16-00-132-

PARCEL NUMBER:	469-16-00-132-
ADDRESS:	1939 NORWOOD ST
PROP SITE NM:	
GENERAL USE:	SNGL-FAM-RES
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 65 BLK N
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	JONES NEIL
CURRENT OWNER 1ST:	
SALE DATE:	03/03/1995
DEED BOOK:	C253519
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	1939 NORWOOD ST N CHARLESTON SC 29405-8007
SALE PRICE:	7500
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	33400
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	YES
YEAR BUILT:	1940
NUM BEDROOMS:	2
FULL BATHS:	2
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1319
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	33400
CAP ASSESMENT:	1340

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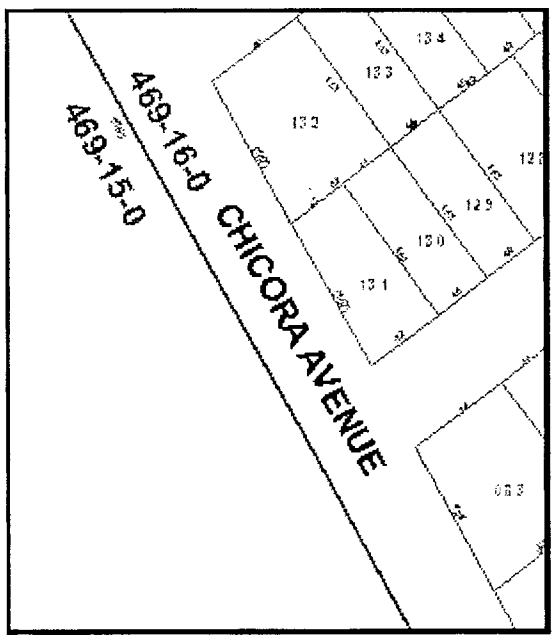

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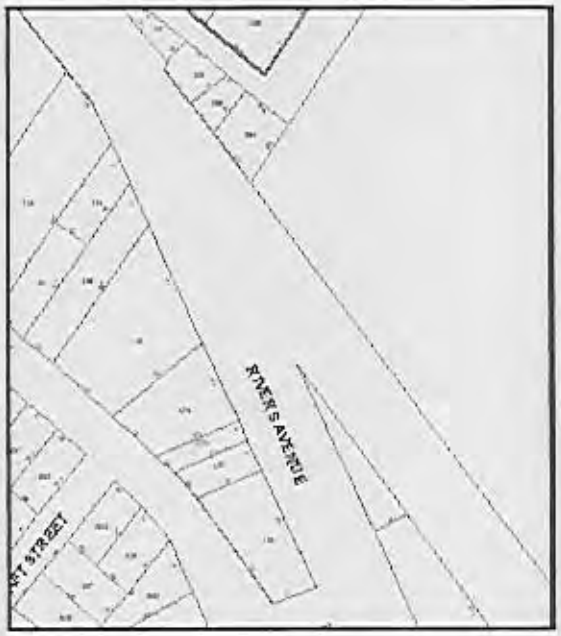

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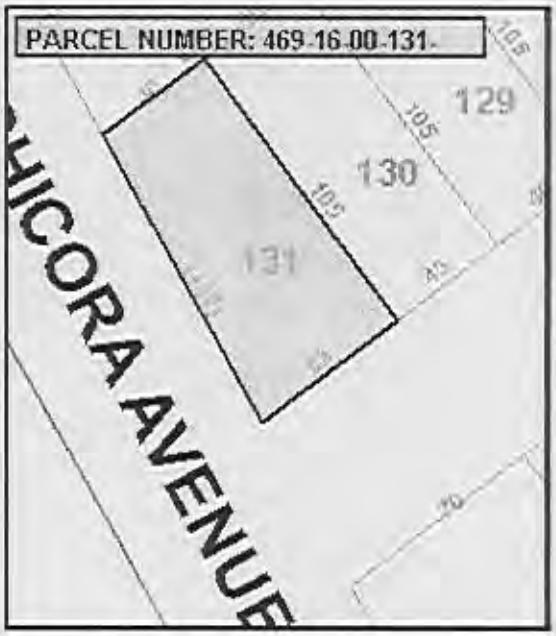

PARCEL NUMBER: 469-16-00-131-

PARCEL NUMBER:	469-16-00-131-
ADDRESS:	1938 ENGLISH ST
PROP SITE NM:	
GENERAL USE:	SNGL-FAM-RES
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 68 BLK N
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	FORD WILLIAM J AND JAMES W
CURRENT OWNER 1ST:	
SALE DATE:	12/01/1988
DEED BOOK:	Z179637
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	PO BOX 31897 CHARLESTON SC 29417-1897
SALE PRICE:	40000
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	26300
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1955
NUM BEDROOMS:	3
FULL BATHS:	1
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1344
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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PARCEL NUMBER: 469-16-00-083-

PARCEL NUMBER:	469-16-00-083-
ADDRESS:	1937 ENGLISH ST
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 65 BLK O
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	DEW JAMES EDWARD
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	F124029
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	1937 ENGLISH ST CHARLESTON SC 29405-8042
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	17600
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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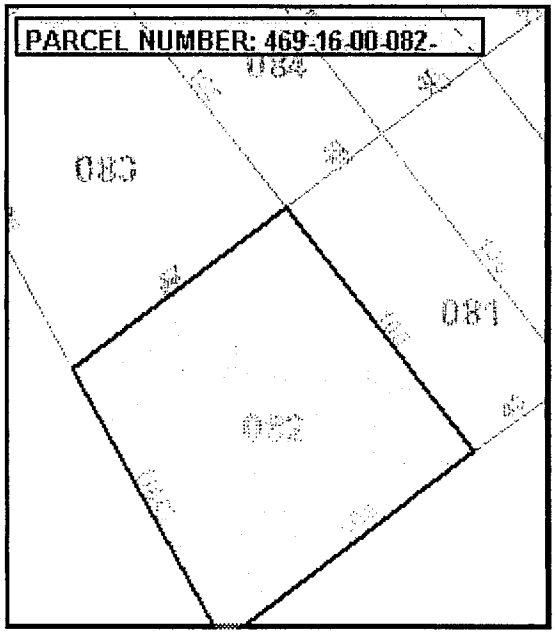

PARCEL NUMBER: 469-16-00-082-

PARCEL NUMBER:	469-16-00-082-
ADDRESS:	1938 REDWOOD ST
PROP SITE NM:	
GENERAL USE:	VACANT-RES
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 68 & 70 BLK O
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	DEW JAMES EDWARD
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	B86198
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	1937 ENGLISH ST CHARLESTON SC 29405-8042
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	5000
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	YES
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	3000
CAP ASSESMENT:	120

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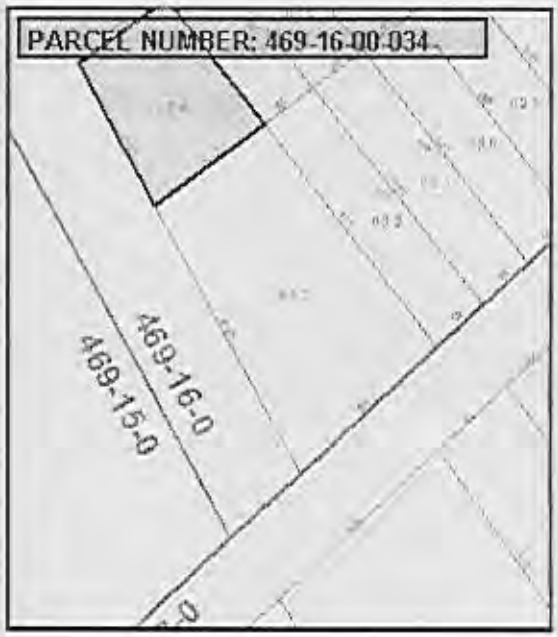

PARCEL NUMBER: 469-16-00-034-

PARCEL NUMBER:	469-16-00-034-
ADDRESS:	1937 REDWOOD ST
PROP SITE NM:	
GENERAL USE:	VACANT-RES
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 69 BLK P
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	BURNETT STEPHEN R AND NANCY M
CURRENT OWNER 1ST:	
SALE DATE:	04/29/1983
DEED BOOK:	F132031
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	15327 CAPE DR S JACKSONVILLE FL 32226-1273
SALE PRICE:	42001
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	5000
BUILD COUNT:	2
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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PARCEL NUMBER: 469-12-00-130-

PARCEL NUMBER:	469-12-00-130-
ADDRESS:	3100 IVORY AVE
PROP SITE NM:	
GENERAL USE:	SNGL-FAM-RES
SUBDIVISION:	CHAS HEIGHTS
LEGAL DESC:	LT 1 DIV C
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-64
OWNER ON 1ST:	HARPER MARY YOUNG F/K/A MARY YOUNG TURNER
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	
TITL WILL CD:	RETURN
TITL WILL DT:	11/22/1999

C O NAME:	
MAILING ADDRESS:	3100 IVORY AVE NORTH CHARLESTON SC 29405-7857
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	57600
BUILD COUNT:	2
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	YES
YEAR BUILT:	1971
NUM BEDROOMS:	2
FULL BATHS:	1
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	900
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	39200
CAP ASSESMENT:	1570

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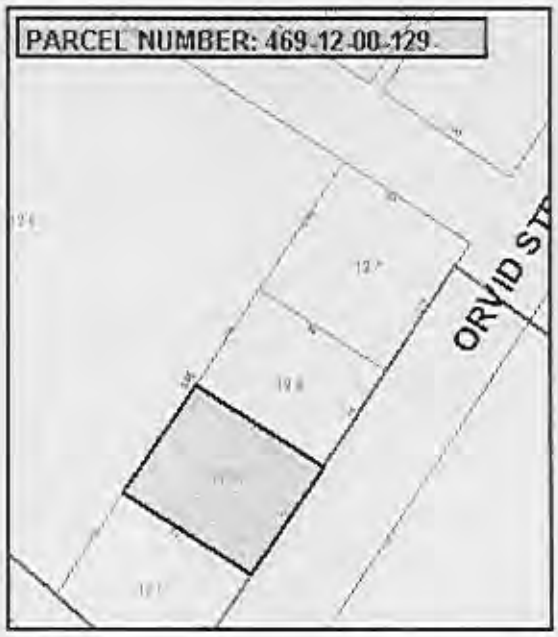

PARCEL NUMBER: 469-12-00-129-

PARCEL NUMBER:	469-12-00-129-
ADDRESS:	2020 ORVID ST
PROP SITE NM:	
GENERAL USE:	SNGL-FAM-RES
SUBDIVISION:	CHAS HEIGHTS
LEGAL DESC:	LT 2 & PT LT 3 DIV C
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-64
OWNER ON 1ST:	REYNOLDS THOMAS JR
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	P54261
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	2020 ORVID ST NORTH CHARLESTON SC 29405-6002
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	27200
BUILD COUNT:	2
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	YES
YEAR BUILT:	1956
NUM BEDROOMS:	2
FULL BATHS:	1
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1026
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	27200
CAP ASSESMENT:	1090

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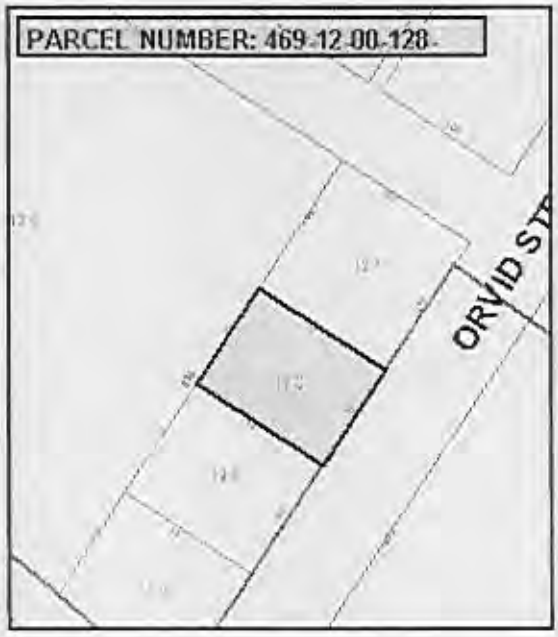

PARCEL NUMBER: 469-12-00-128-

PARCEL NUMBER:	469-12-00-128-
ADDRESS:	2014 ORVID ST
PROP SITE NM:	
GENERAL USE:	SNGL-FAM-RES
SUBDIVISION:	CHAS HEIGHTS
LEGAL DESC:	LT 4 & PT 3 DIV C
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-64
OWNER ON 1ST:	INGRAHAM TERESA A
CURRENT OWNER 1ST:	
SALE DATE:	06/02/2000
DEED BOOK:	X348677
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	243 ALLMAN FARM RD KANNAPOLIS NC 28081-9072
SALE PRICE:	28900
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	30000
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1940
NUM BEDROOMS:	3
FULL BATHS:	1
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1284
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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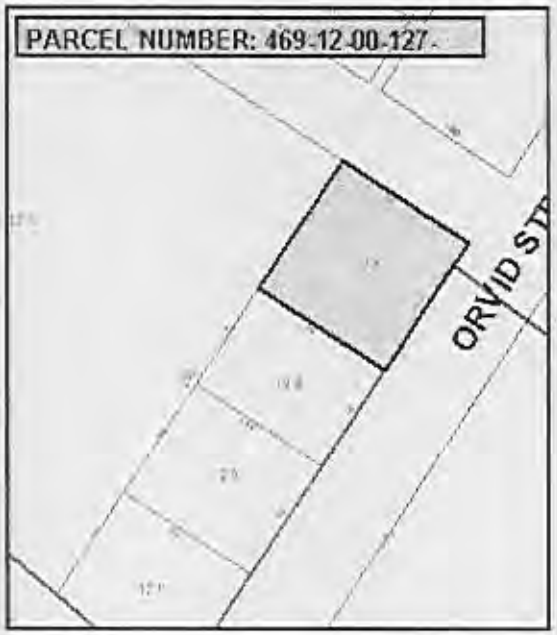

PARCEL NUMBER: 469-12-00-127-

PARCEL NUMBER:	469-12-00-127-
ADDRESS:	2012 ORVID ST
PROP SITE NM:	
GENERAL USE:	SNGL-FAM-RES
SUBDIVISION:	CHAS HEIGHTS
LEGAL DESC:	LT 5 & 6 DIV C
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-64
OWNER ON 1ST:	BYRD JAMES H AND PATRICIA F
CURRENT OWNER 1ST:	FRASIER PATRICIA A
SALE DATE:	02/09/2001
DEED BOOK:	Y363033
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	2012 ORVID ST NORTH CHARLESTON SC 29405-6002
SALE PRICE:	1
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	34500
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1940
NUM BEDROOMS:	3
FULL BATHS:	1
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1272
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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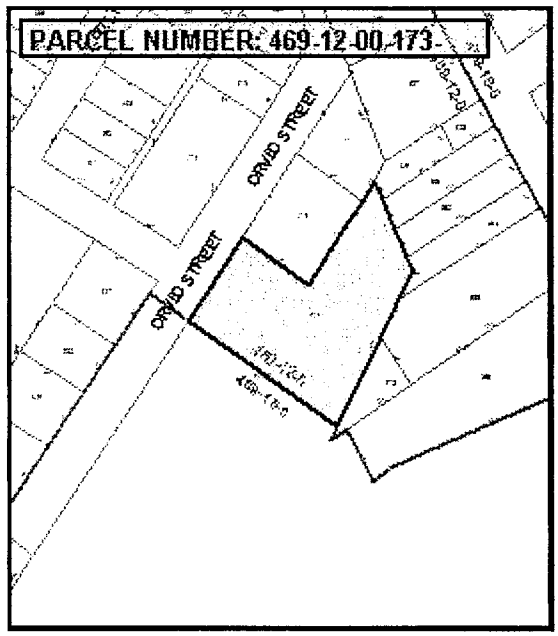

PARCEL NUMBER: 469-12-00-173-

PARCEL NUMBER:	469-12-00-173-
ADDRESS:	TROY AVE
PROP SITE NM:	DRAINAGE CANAL
GENERAL USE:	AGRICULTURAL
SUBDIVISION:	CHAS HEIGHTS
LEGAL DESC:	LOT 22 BLK A DIV B
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	MUNIC-EXEMPT
PLAT DB PAG:	F50-91
OWNER ON 1ST:	CITY OF NORTH CHARLESTON
CURRENT OWNER 1ST:	
SALE DATE:	09/29/1980
DEED BOOK:	O123084
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	P O BOX 10100 NORTH CHARLESTON SC 29411
SALE PRICE:	5100
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	0
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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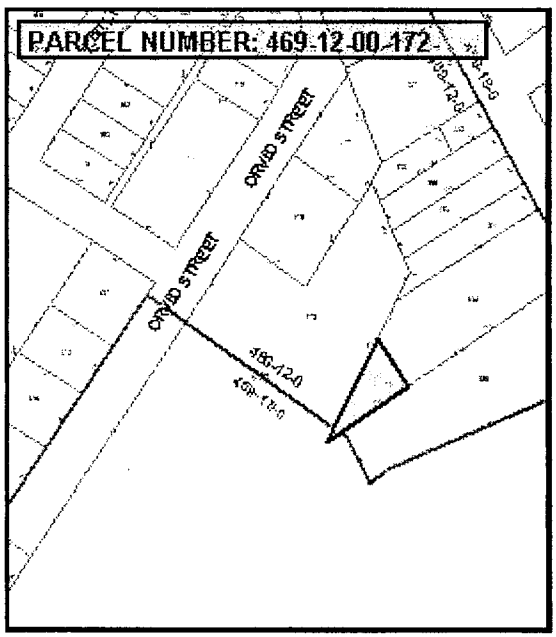

PARCEL NUMBER: 469-12-00-172-

PARCEL NUMBER:	469-12-00-172-
ADDRESS:	TROY AVE
PROP SITE NM:	EASEMENT
GENERAL USE:	UNDEVELOPABL
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 19 BLK Q
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	COUNTY-EXMPT
PLAT DB PAG:	D-197
OWNER ON 1ST:	COOPER RIVER PARK AND PLAYGROUND COMMISSION
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	O99158
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	PO BOX 5247 NORTH CHARLESTON SC 29405-1001
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	0
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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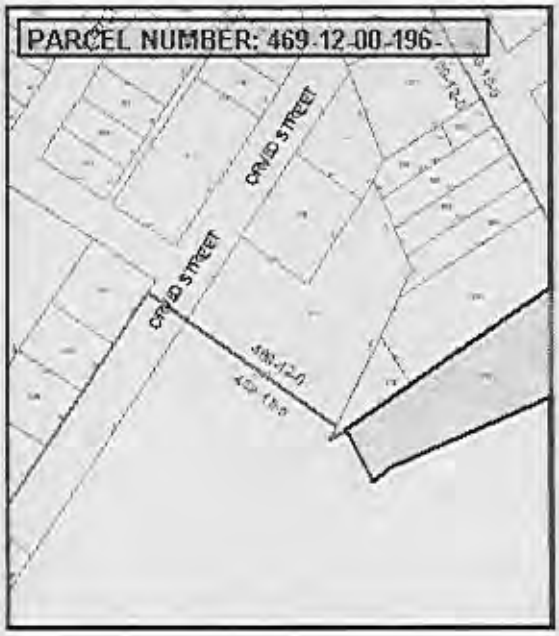

PARCEL NUMBER: 469-12-00-196-

PARCEL NUMBER:	469-12-00-196-
ADDRESS:	CHICORA AVE
PROP SITE NM:	DRAINAGE CANAL
GENERAL USE:	UNDEVELOPABL
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	PARCEL 19 BLK Q
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	MUNIC-EXEMPT
PLAT DB PAG:	D-197
OWNER ON 1ST:	CITY OF NORTH CHARLESTON
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	T123202
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	P O BOX 10100 NORTH CHAS SC 29411
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	0
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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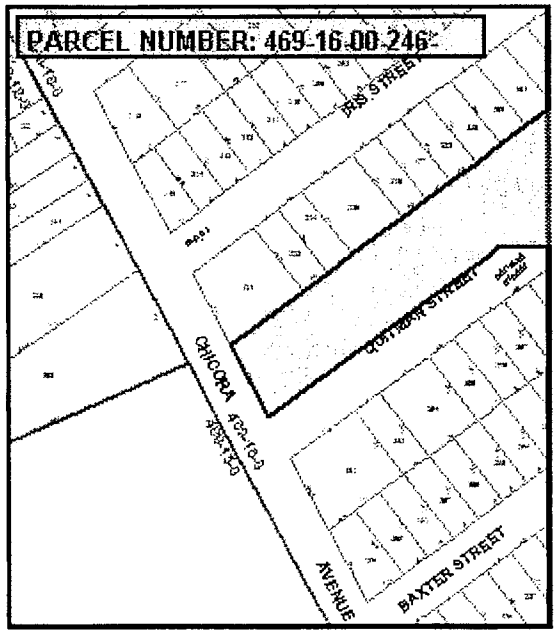

PARCEL NUMBER: 469-16-00-246-

PARCEL NUMBER:	469-16-00-246-
ADDRESS:	SPRUILL AVE
PROP SITE NM:	DRAINAGE CANAL
GENERAL USE:	UNDEVELOPABL
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	BLK K PARCEL 12 THRU 17 PART PROPOSED LAKE
LGL HI ACRS:	3
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	3
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	MUNIC-EXEMPT
PLAT DB PAG:	G-29A
OWNER ON 1ST:	CITY OF NORTH CHARLESTON
CURRENT OWNER 1ST:	
SALE DATE:	09/27/1980
DEED BOOK:	Y123051
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	P O BOX 10100 NORTH CHARLESTON SC 29411
SALE PRICE:	7000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	0
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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PARCEL NUMBER: 469-16-00-246-

PARCEL NUMBER:	469-16-00-246-
ADDRESS:	SPRUILL AVE
PROP SITE NM:	DRAINAGE CANAL
GENERAL USE:	UNDEVELOPABL
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	BLK K PARCEL 12 THRU 17 PART PROPOSED LAKE
LGL HI ACRS:	3
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	3
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	MUNIC-EXEMPT
PLAT DB PAG:	G-29A
OWNER ON 1ST:	CITY OF NORTH CHARLESTON
CURRENT OWNER 1ST:	
SALE DATE:	09/27/1980
DEED BOOK:	Y123051
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	P O BOX 10100 NORTH CHARLESTON SC 29411
SALE PRICE:	7000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	0
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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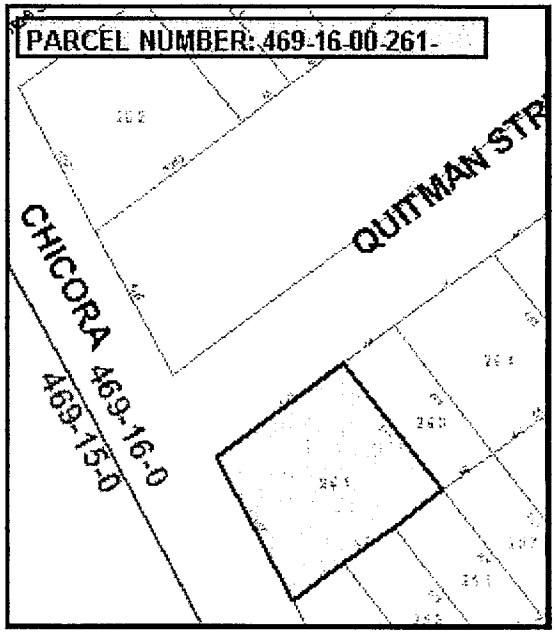

PARCEL NUMBER: 469-16-00-261-

PARCEL NUMBER:	469-16-00-261-
ADDRESS:	3008 CHICORA AVE
PROP SITE NM:	
GENERAL USE:	SMALL-APTS
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LTS 31 & 33 BLK K
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	HARDEE G DOUGLAS
CURRENT OWNER 1ST:	SINGLETARY PHILIP SINGLETARY MELINDA J
SALE DATE:	03/16/2001
DEED BOOK:	N366660
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	100 FIELDFARE WAY CHARLESTON SC 29414
SALE PRICE:	70000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	91500
BUILD COUNT:	5
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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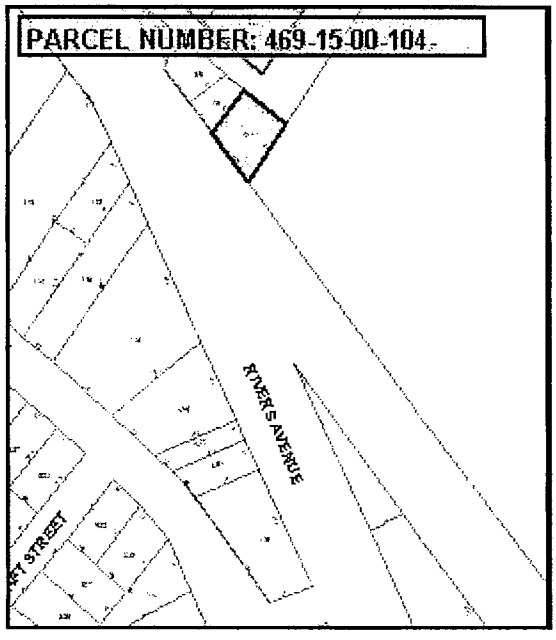

PARCEL NUMBER: 469-15-00-104-

PARCEL NUMBER:	469-15-00-104-
ADDRESS:	CARNER AVE
PROP SITE NM:	BETWEEN ORVID ST
GENERAL USE:	VACANT-COM
SUBDIVISION:	CHARLESTON HEIGHTS
LEGAL DESC:	PT LT 14 DIVISION C
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	E-89
OWNER ON 1ST:	M & J PROPERTIES
CURRENT OWNER 1ST:	
SALE DATE:	12/29/2000
DEED BOOK:	D361767
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	PO BOX 11688 ATLANTA GA 30355-1688
SALE PRICE:	10
MULT LOT:	7
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	20100
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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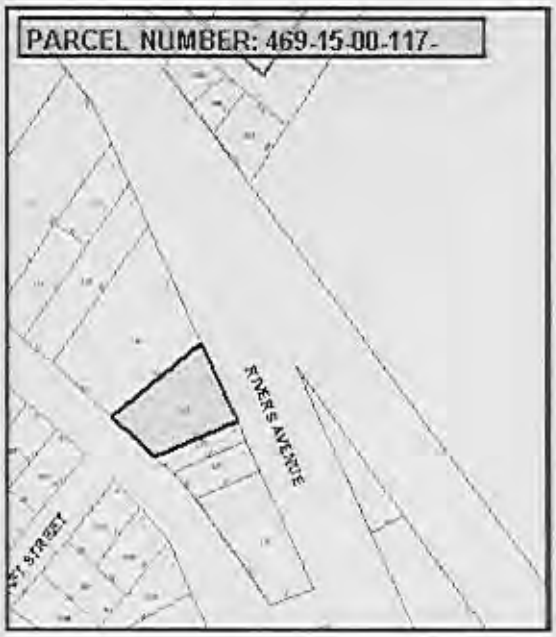

PARCEL NUMBER: 469-15-00-117-

PARCEL NUMBER:	469-15-00-117-
ADDRESS:	3027 RIVERS AVE
PROP SITE NM:	KNIGHT PRESS
GENERAL USE:	COMMERCIAL
SUBDIVISION:	
LEGAL DESC:	LOT Y
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	A59-633
OWNER ON 1ST:	RASK GEORGE AND DEANNA
CURRENT OWNER 1ST:	
SALE DATE:	09/24/1996
DEED BOOK:	N274805
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	3027 RIVERS AVE NORTH CHARLESTON SC 29405-8033
SALE PRICE:	160000
MULT LOT:	3
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	90100
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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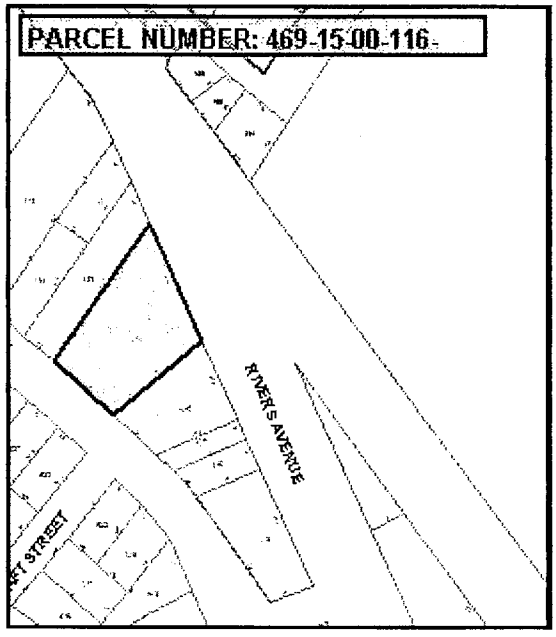

PARCEL NUMBER: 469-15-00-116-

PARCEL NUMBER:	469-15-00-116-
ADDRESS:	3035 RIVERS AVE US HWY 52
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	CHARLESTON HEIGHTS
LEGAL DESC:	PT LT 14 DIVISION C
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	K68-70
OWNER ON 1ST:	HULSEBOS HANS
CURRENT OWNER 1ST:	
SALE DATE:	05/17/1989
DEED BOOK:	O184301
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	3035 RIVERS AVE NORTH CHARLESTON SC 29405-8033
SALE PRICE:	115000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	132600
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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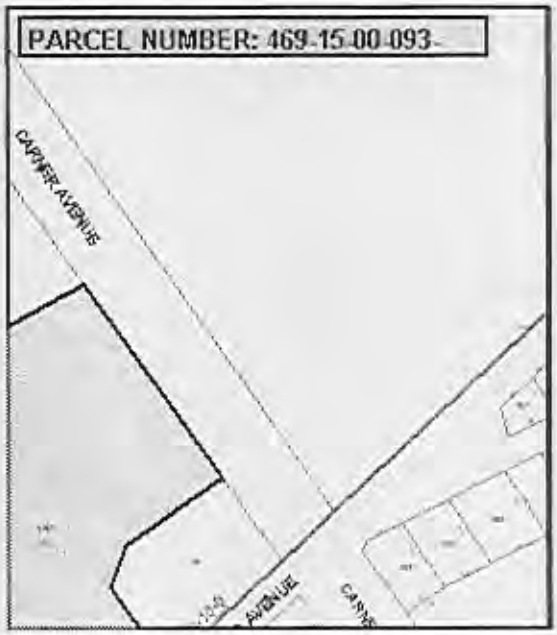

PARCEL NUMBER: 469-15-00-093-

PARCEL NUMBER:	469-15-00-093-
ADDRESS:	2830 RIVERS AVE
PROP SITE NM:	INFINGER TRANS. CO.(2831 CARNER AVE)
GENERAL USE:	COMMERCIAL
SUBDIVISION:	MCALISTER
LEGAL DESC:	
LGL HI ACRS:	4.39
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	4.39
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	DB-688
OWNER ON 1ST:	INFINGER TRANSPORTATION COMPANY INC
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	B185390
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	RICHARD INFINGER
MAILING ADDRESS:	PO BOX 70698 NORTH CHARLESTON SC 29415-0698
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	303000
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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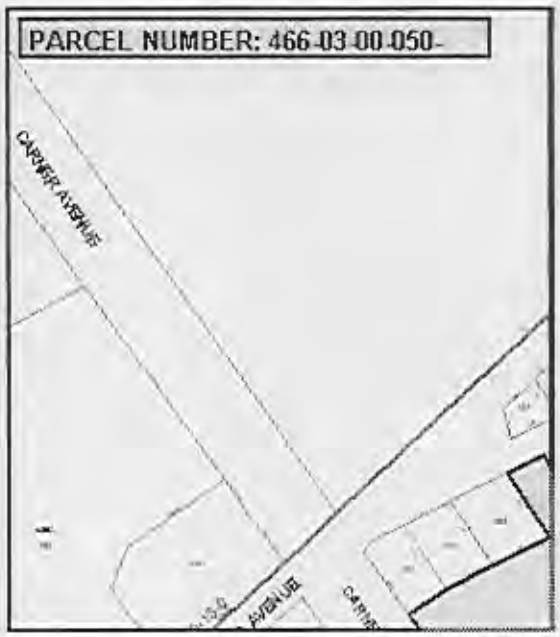

PARCEL NUMBER: 466-03-00-050-

PARCEL NUMBER:	466-03-00-050-
ADDRESS:	2736 CARNER AVE
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	
LEGAL DESC:	LT 7 PTS 2 5 6 8 9 10 STROMBOLI
LGL HI ACRS:	2.16
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	2.16
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	K-192
OWNER ON 1ST:	RHODES C ANTHONY
CURRENT OWNER 1ST:	
SALE DATE:	04/24/1985
DEED BOOK:	G146675
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	P.O. BOX 70902 CHARLESTON SC 29415-0902
SALE PRICE:	90000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	309000
BUILD COUNT:	3
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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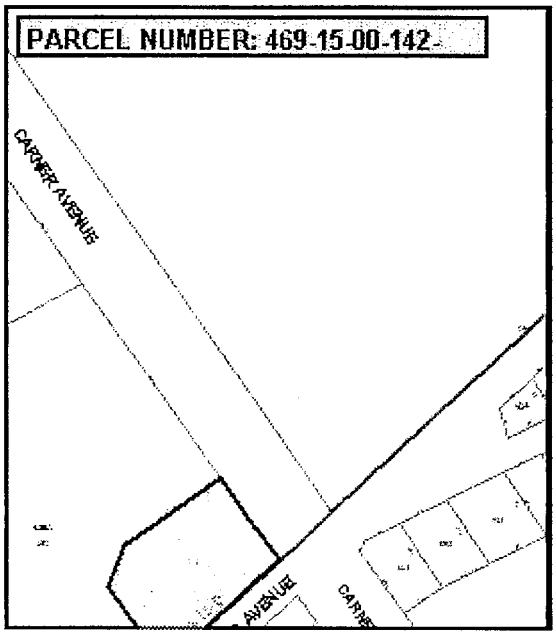

PARCEL NUMBER: 469-15-00-142-

PARCEL NUMBER:	469-15-00-142-
ADDRESS:	2803 CARNER AVE
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	CARNER AVE
LEGAL DESC:	LOT 1-A
LGL HI ACRS:	0.66
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	0.66
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	DB-688
OWNER ON 1ST:	INFINGER TRANSPORTATION CO INC
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	B185390
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	PO BOX 70698 NORTH CHARLESTON SC 29415-0698
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	335100
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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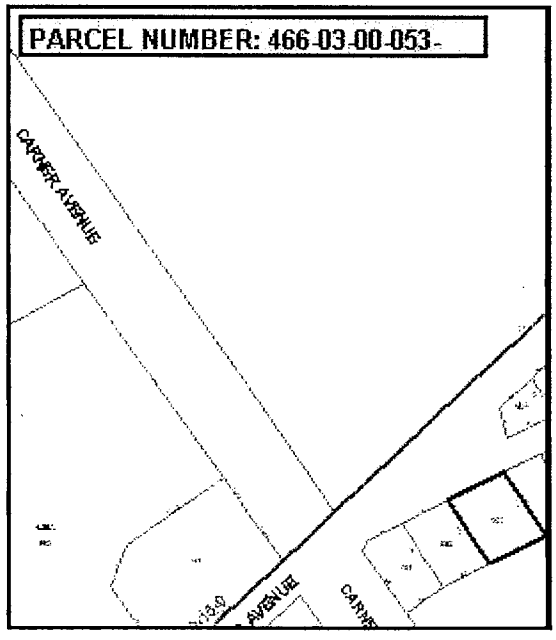

PARCEL NUMBER: 466-03-00-053-

PARCEL NUMBER:	466-03-00-053-
ADDRESS:	BURTON LN
PROP SITE NM:	
GENERAL USE:	VACANT-COM
SUBDIVISION:	
LEGAL DESC:	PT LTS 6 AND 8 STROMBOLI
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	L-172
OWNER ON 1ST:	JENKINS MOSES E AND EVELINA
CURRENT OWNER 1ST:	
SALE DATE:	
DEED BOOK:	P49345
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	60 JETER RD BURTON SC 29906-8334
SALE PRICE:	0
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	13700
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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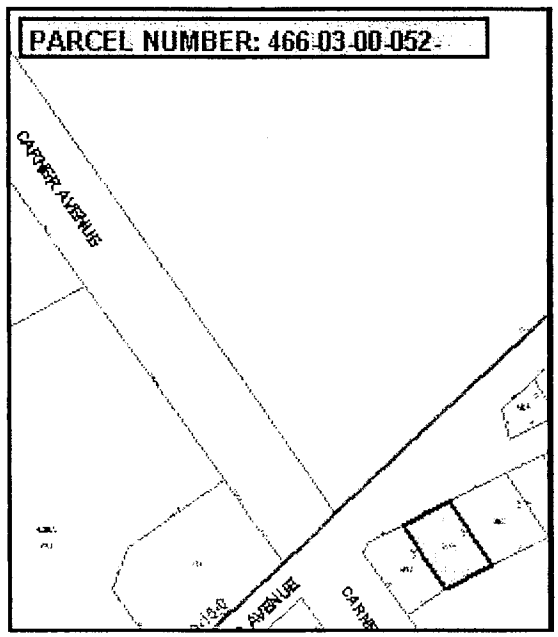

PARCEL NUMBER: 466-03-00-052-

PARCEL NUMBER:	466-03-00-052-
ADDRESS:	BURTON LN
PROP SITE NM:	
GENERAL USE:	VACANT-COM
SUBDIVISION:	
LEGAL DESC:	PT LT 6 STROMBOLI FMS
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	K-192
OWNER ON 1ST:	RHODES C ANTHONY
CURRENT OWNER 1ST:	
SALE DATE:	01/16/1987
DEED BOOK:	F162551
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	P O BOX 70902 CHARLESTON SC 29415-0902
SALE PRICE:	12000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	12100
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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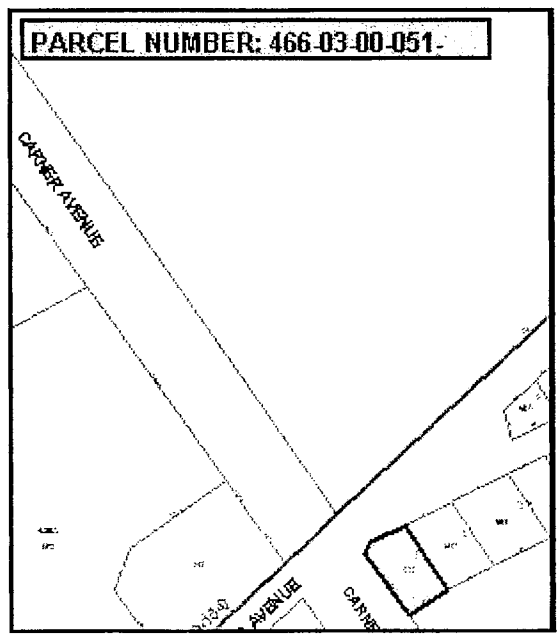

PARCEL NUMBER: 466-03-00-051-

PARCEL NUMBER:	466-03-00-051-
ADDRESS:	2035 BURTON LN
PROP SITE NM:	
GENERAL USE:	VACANT-COM
SUBDIVISION:	
LEGAL DESC:	PT LT 6 CLEMENTS
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	K-192
OWNER ON 1ST:	RHODES C ANTHONY
CURRENT OWNER 1ST:	
SALE DATE:	02/08/1995
DEED BOOK:	M252255
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	PO BOX 70902 NORTH CHARLESTON SC 29415-0902
SALE PRICE:	12500
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	12000
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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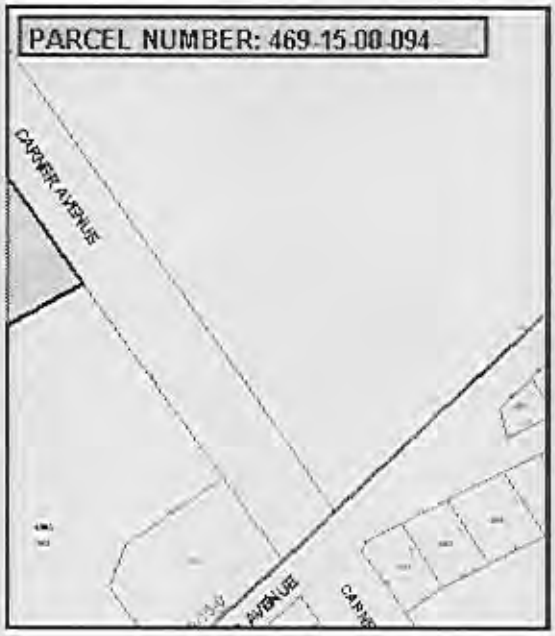

PARCEL NUMBER: 469-15-00-094-

PARCEL NUMBER:	469-15-00-094-
ADDRESS:	2840 RIVERS AVE
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	
LEGAL DESC:	TRACT C
LGL HI ACRS:	1.08
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	1.08
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-74
OWNER ON 1ST:	CARP LLC
CURRENT OWNER 1ST:	
SALE DATE:	10/20/2000
DEED BOOK:	B357820
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	1181 CHERSONESE ROUND MT PLEASANT SC 29464
SALE PRICE:	95000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	175200
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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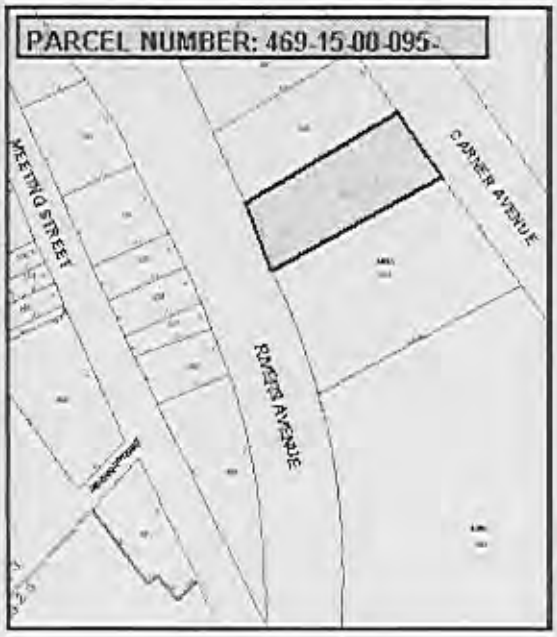

PARCEL NUMBER: 469-15-00-095-

PARCEL NUMBER:	469-15-00-095-
ADDRESS:	2866 RIVERS AVE
PROP SITE NM:	
GENERAL USE:	VACANT-COM
SUBDIVISION:	
LEGAL DESC:	LT 7 MCALISTER
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-74
OWNER ON 1ST:	RHODES C ANTHONY
CURRENT OWNER 1ST:	
SALE DATE:	01/09/1990
DEED BOOK:	F190842
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	PO BOX 70902 CHARLESTON SC 29415-0902
SALE PRICE:	60000
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	61700
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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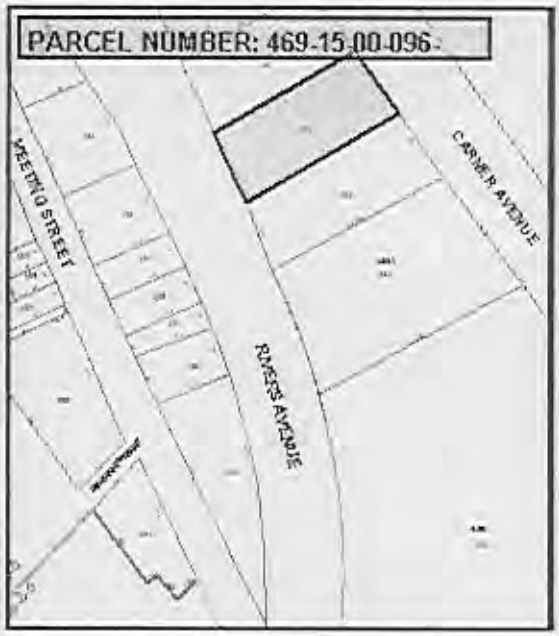

PARCEL NUMBER: 469-15-00-096-

PARCEL NUMBER:	469-15-00-096-
ADDRESS:	2872 RIVERS AVE
PROP SITE NM:	
GENERAL USE:	VACANT-COM
SUBDIVISION:	
LEGAL DESC:	LT 6 MCALISTER
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-74
OWNER ON 1ST:	RHODES C ANTHONY
CURRENT OWNER 1ST:	
SALE DATE:	01/09/1990
DEED BOOK:	F190842
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	P O BOX 70902 CHARLESTON SC 29415-0902
SALE PRICE:	60000
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	54500
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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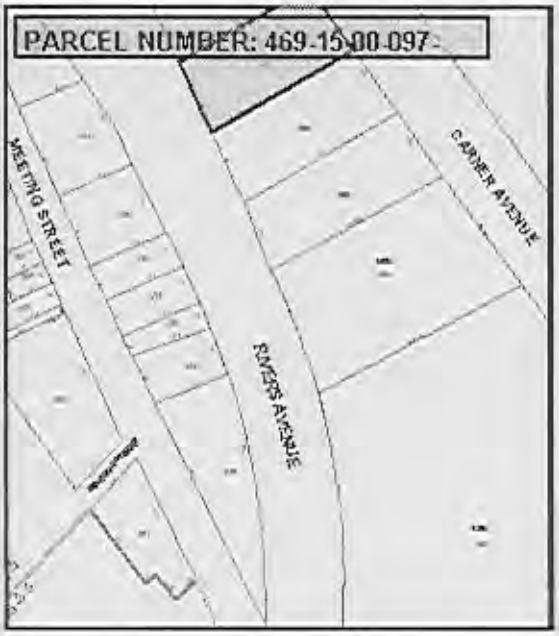

PARCEL NUMBER: 469-15-00-097-

PARCEL NUMBER:	469-15-00-097-
ADDRESS:	2900 RIVERS AVE
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	
LEGAL DESC:	LT 5 MCALISTER
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-74
OWNER ON 1ST:	RHODES C ANTHONY
CURRENT OWNER 1ST:	
SALE DATE:	01/09/1990
DEED BOOK:	F190789
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	P O BOX 70902 CHARLESTON SC 29415-0902
SALE PRICE:	60000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	65400
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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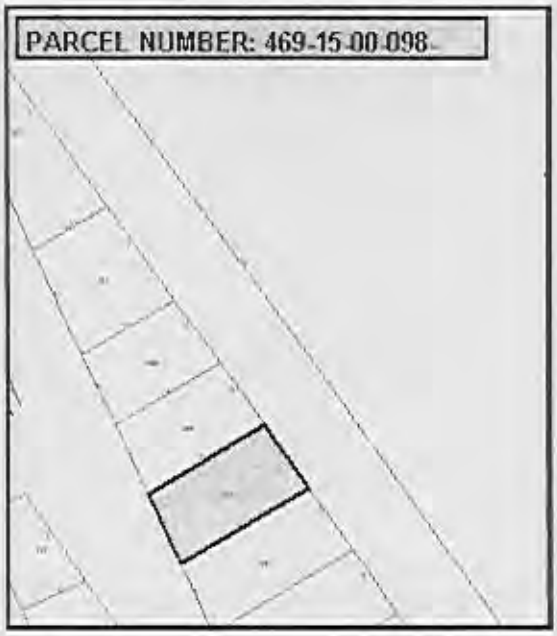

PARCEL NUMBER: 469-15-00-098-

PARCEL NUMBER:	469-15-00-098-
ADDRESS:	2910 RIVERS AVE
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	
LEGAL DESC:	LT 4 MCALISTER
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-74
OWNER ON 1ST:	KIRCHNER MARTHA C SEYLE CINDA LEE CO TRUSTEES
CURRENT OWNER 1ST:	
SALE DATE:	01/27/2000
DEED BOOK:	Y341694
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	1839 FALLING CREEK CIR MT PLEASANT SC 29464-7415
SALE PRICE:	9
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	119600
BUILD COUNT:	2
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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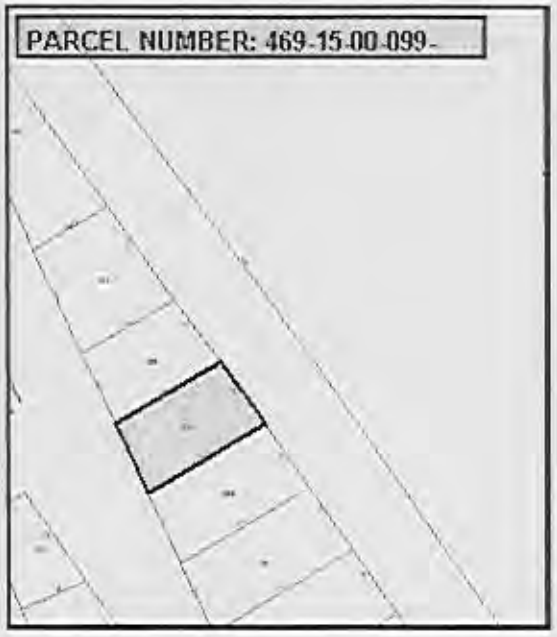

PARCEL NUMBER: 469-15-00-099-

PARCEL NUMBER:	469-15-00-099-
ADDRESS:	RIVERS AVE
PROP SITE NM:	NEXT TO 2910
GENERAL USE:	VACANT-COM
SUBDIVISION:	
LEGAL DESC:	LT 3 MCALISTER
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-74
OWNER ON 1ST:	KIRCHNER MARTHA C SEYLE CINDA LEE CO TRUSTEES
CURRENT OWNER 1ST:	
SALE DATE:	01/27/2000
DEED BOOK:	Y341694
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	1839 FALLING CREEK CIR MT PLEASANT SC 29464-7415
SALE PRICE:	9
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	40300
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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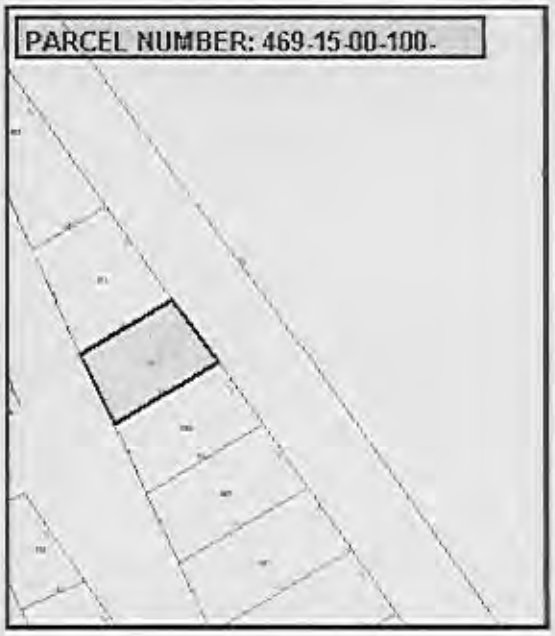

PARCEL NUMBER: 469-15-00-100-

PARCEL NUMBER:	469-15-00-100-
ADDRESS:	2928 RIVERS AVE
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	
LEGAL DESC:	LT 2 MCALISTERS
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-74
OWNER ON 1ST:	ZIDLICK ALBERT J AND GAIL P
CURRENT OWNER 1ST:	
SALE DATE:	04/07/1989
DEED BOOK:	M183669
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	2940 RIVERS AVE CHARLESTON SC 29405-8032
SALE PRICE:	150000
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	145800
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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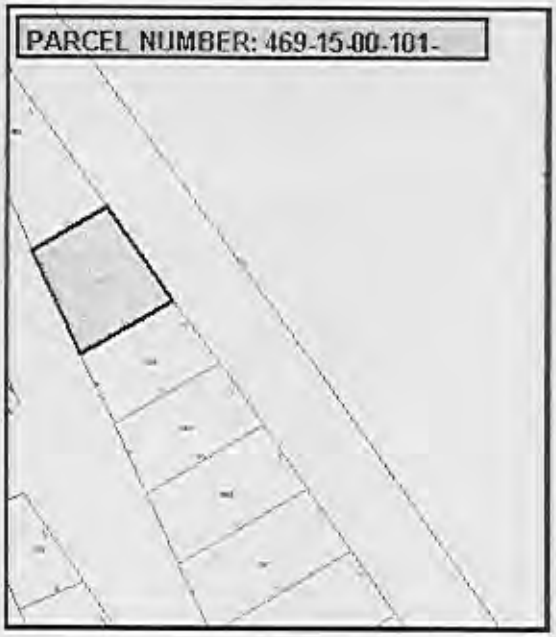

PARCEL NUMBER: 469-15-00-101-

PARCEL NUMBER:	469-15-00-101-
ADDRESS:	2940 RIVERS AVE
PROP SITE NM:	NEXT TO 2928
GENERAL USE:	COMMERCIAL
SUBDIVISION:	
LEGAL DESC:	PT LT 1 MCALISTER
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	P54-385
OWNER ON 1ST:	ZIDLICK ALBERT J AND GAIL P
CURRENT OWNER 1ST:	
SALE DATE:	04/07/1989
DEED BOOK:	M183669
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	2940 RIVERS AVE NORTH CHARLESTON SC 29405-8032
SALE PRICE:	150000
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	142000
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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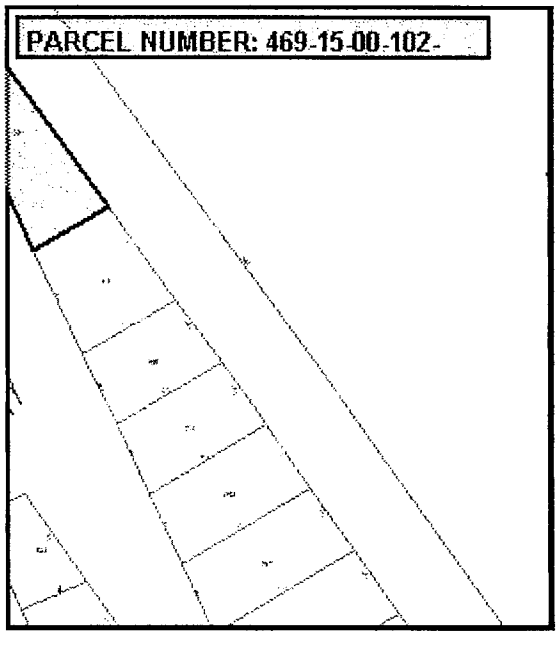

PARCEL NUMBER: 469-15-00-102-

PARCEL NUMBER:	469-15-00-102-
ADDRESS:	2960 RIVERS AVE
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	
LEGAL DESC:	PT LT 1 MCALISTER
LGL HI ACRS:	0.55
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	0.55
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	F-74
OWNER ON 1ST:	SCOTT PAUL B JR
CURRENT OWNER 1ST:	
SALE DATE:	03/09/1987
DEED BOOK:	N164096
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	PO BOX 28 KINGSPORT TN 37662-0028
SALE PRICE:	14483
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	141000
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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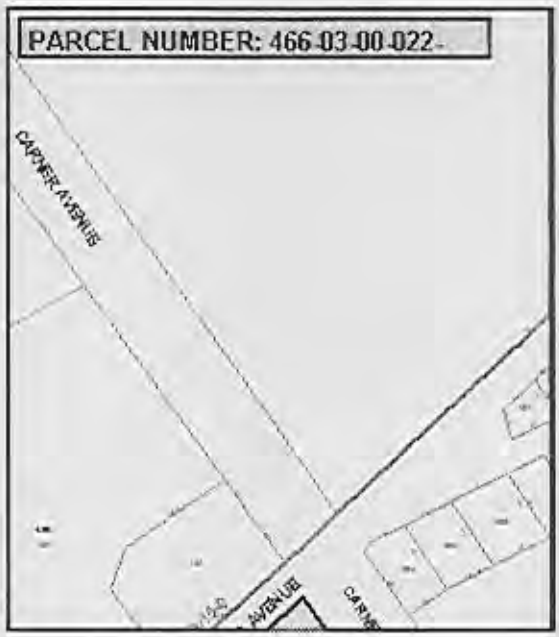

PARCEL NUMBER: 466-03-00-022-

PARCEL NUMBER:	466-03-00-022-
ADDRESS:	CLEMENT AVE
PROP SITE NM:	
GENERAL USE:	COMMERCIAL
SUBDIVISION:	
LEGAL DESC:	LT B FIVE MILE
LGL HI ACRS:	1.2
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	1.2
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	O-154
OWNER ON 1ST:	RHODES C ANTHONY AND KAREN STOKES
CURRENT OWNER 1ST:	
SALE DATE:	12/06/1990
DEED BOOK:	X198057
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	PO BOX 70902 NORTH CHARLESTON SC 29415-0902
SALE PRICE:	55000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	57700
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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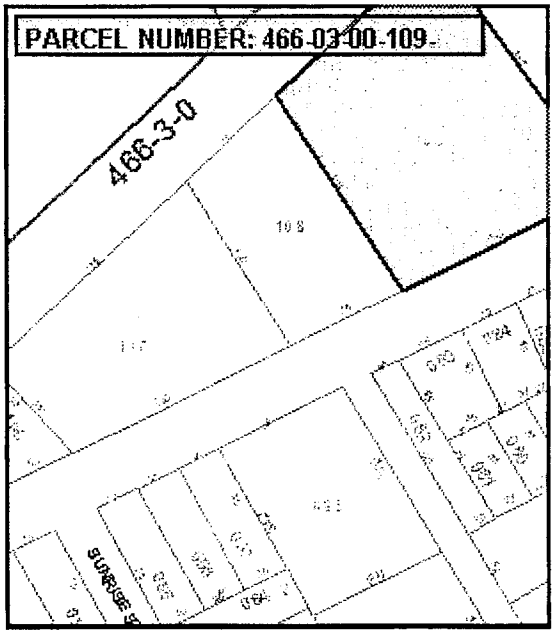

PARCEL NUMBER: 466-03-00-109-

PARCEL NUMBER:	466-03-00-109-
ADDRESS:	1049 CLEMENT AVE
PROP SITE NM:	
GENERAL USE:	VACANT-COM
SUBDIVISION:	HARLEY
LEGAL DESC:	LT 6 7 AND 8
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	H-107
OWNER ON 1ST:	MIDDLETON TOMMY H
CURRENT OWNER 1ST:	
SALE DATE:	02/14/2000
DEED BOOK:	M342288
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	3429 COCHISE ST NORTH CHARLESTON SC 29405-7752
SALE PRICE:	30000
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	27000
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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PARCEL NUMBER: 466-03-00-108-

PARCEL NUMBER:	466-03-00-108-
ADDRESS:	2019 CLEMENT AVE
PROP SITE NM:	
GENERAL USE:	APARTMNT-BLD
SUBDIVISION:	HARLEY
LEGAL DESC:	LT 9
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	H-107
OWNER ON 1ST:	PATEL KAMINI
CURRENT OWNER 1ST:	
SALE DATE:	04/09/1999
DEED BOOK:	G324012
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	3245 RIVERS AVE NORTH CHARLESTON SC 29405-7738
SALE PRICE:	4800
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	41800
BUILD COUNT:	2
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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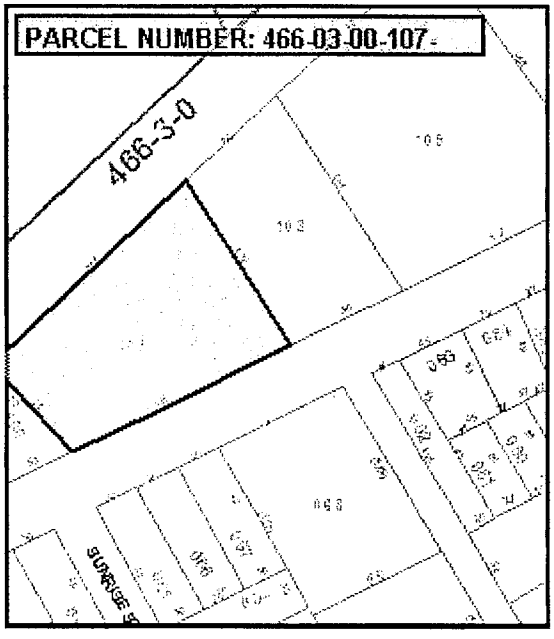

PARCEL NUMBER: 466-03-00-107-

PARCEL NUMBER:	466-03-00-107-
ADDRESS:	2023 CLEMENT AVE
PROP SITE NM:	
GENERAL USE:	SMALL-APTS
SUBDIVISION:	
LEGAL DESC:	CLEMENTS FERRY
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	A53-355
OWNER ON 1ST:	PATEL KAMINI
CURRENT OWNER 1ST:	
SALE DATE:	04/09/1999
DEED BOOK:	G324008
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	3245 RIVERS AVE NORTH CHARLESTON SC 29405-7738
SALE PRICE:	6171
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	20800
BUILD COUNT:	3
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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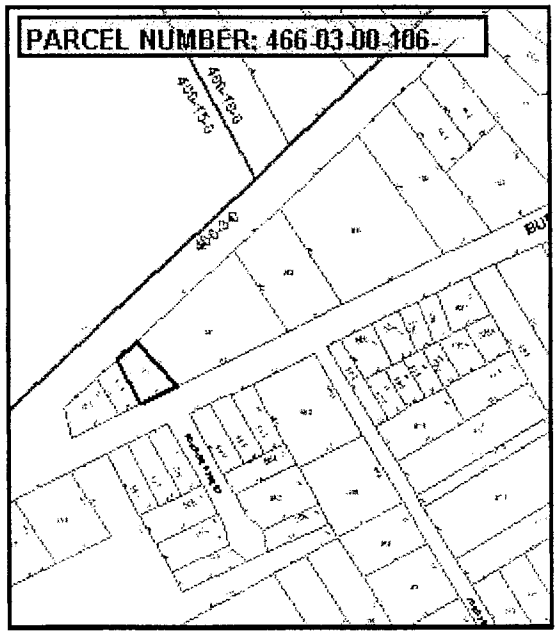
County of Charleston
property information system



PARCEL NUMBER: 466-03-00-106-

PARCEL NUMBER:	466-03-00-106-
ADDRESS:	2025 CLEMENT AVE
PROP SITE NM:	2025-A
GENERAL USE:	TRIPLEX
SUBDIVISION:	
LEGAL DESC:	LOT 1 AND PT 2 E. PT LT ON CLEMENTS FERRY RD
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	A/P
OWNER ON 1ST:	WILLIAMS WILLIE
CURRENT OWNER 1ST:	
SALE DATE:	06/03/1996
DEED BOOK:	A270630
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	3427 APACHE ST N CHARLESTON SC 29405-7726
SALE PRICE:	15000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	23400
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1950
NUM BEDROOMS:	6
FULL BATHS:	3
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1521
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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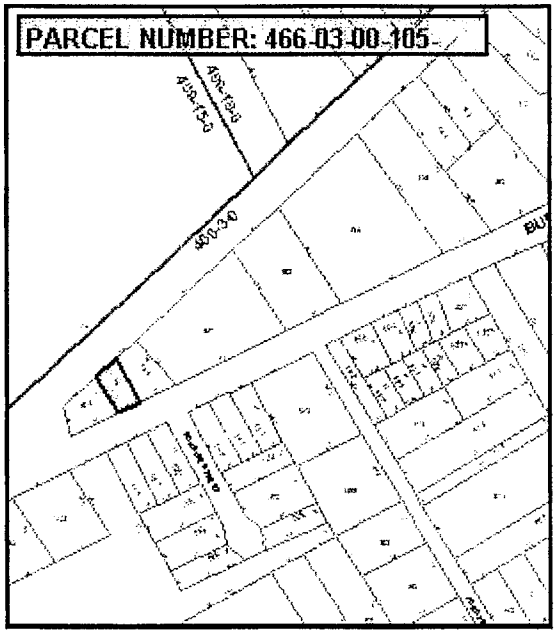
County of Charleston
property information system



PARCEL NUMBER: 466-03-00-105-

PARCEL NUMBER:	466-03-00-105-
ADDRESS:	2026 CLEMENT AVE
PROP SITE NM:	2026-B
GENERAL USE:	DUPLEX
SUBDIVISION:	
LEGAL DESC:	PT 2 WESTERN PT OF LT ON CHAS NECK
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	A/P
OWNER ON 1ST:	LUNDIN ELDON J SR AND GRACE T
CURRENT OWNER 1ST:	
SALE DATE:	10/28/1986
DEED BOOK:	D159790
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	100 PINECREST BLVD SUMMERVILLE SC 29483-4060
SALE PRICE:	30000
MULT LOT:	2
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	17700
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1960
NUM BEDROOMS:	0
FULL BATHS:	0
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	648
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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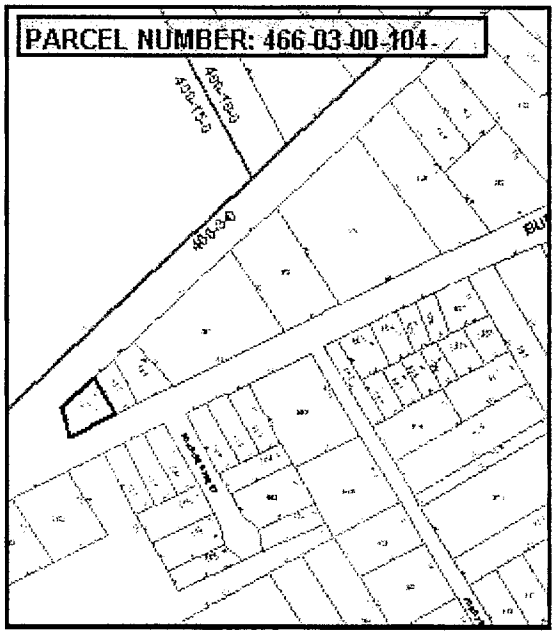

PARCEL NUMBER: 466-03-00-104-

PARCEL NUMBER:	466-03-00-104-
ADDRESS:	2027 CLEMENT AVE
PROP SITE NM:	
GENERAL USE:	VACANT-RES
SUBDIVISION:	
LEGAL DESC:	NEAR 5 MILE
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	E-49
OWNER ON 1ST:	SCOTT DOROTHY D SCOTT GEORGE E
CURRENT OWNER 1ST:	
SALE DATE:	01/12/1998
DEED BOOK:	V295433
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	634 YALE DR CHARLESTON SC 29412-2945
SALE PRICE:	5000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	2400
BUILD COUNT:	0
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	
NUM BEDROOMS:	
FULL BATHS:	
THREE QTR BATHS:	
HALF BATHS:	
TOTL FN AREA:	
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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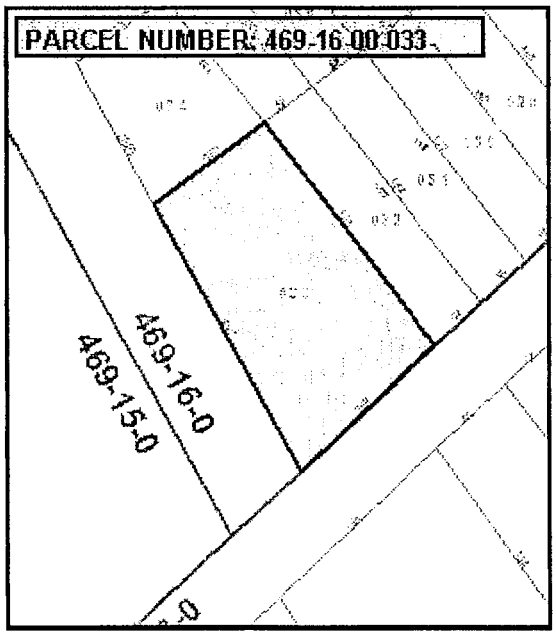
property information system



PARCEL NUMBER: 469-16-00-033-

PARCEL NUMBER:	469-16-00-033-
ADDRESS:	1964 CLEMENTS AVE
PROP SITE NM:	
GENERAL USE:	COMCL/RESIDN
SUBDIVISION:	CHICORA PLACE
LEGAL DESC:	LT 58 & 60 BLK P
LGL HI ACRS:	
LGL MAR ACRS:	
LGL WATER ACRS:	
LGL SWP ACRS:	
LGL TOT ACRS:	
TAX DISTRICT:	T.D. 4-3 N-CHARLESTON
JURISDTN COD:	CNTY-ASSESSR
PLAT DB PAG:	D-197
OWNER ON 1ST:	CONNOR KENNETH
CURRENT OWNER 1ST:	
SALE DATE:	09/08/1995
DEED BOOK:	C260370
TITL WILL CD:	
TITL WILL DT:	

C O NAME:	
MAILING ADDRESS:	1587 SEACROFT RD CHARLESTON SC 29412-8125
SALE PRICE:	20000
MULT LOT:	0
SPLIT CODE:	
MLOD GROUP:	
FINAL VALUE:	36200
BUILD COUNT:	1
AG USE VAL:	0
AG MARKT TOTAL:	0
LR APPROVE:	NO
YEAR BUILT:	1930
NUM BEDROOMS:	0
FULL BATHS:	0
THREE QTR BATHS:	0
HALF BATHS:	0
TOTL FN AREA:	1169
FIN LIV AREA:	
FULL BEDROOM:	
FULL BATHS:	
HALF BATHS:	
YEAR BUILT:	
CAP VALUE:	0
CAP ASSESMENT:	0

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APPENDIX B
MONITORING WELL DIAGRAMS AND SOIL BORING LOGS

Tetra Tech NUS, Inc.

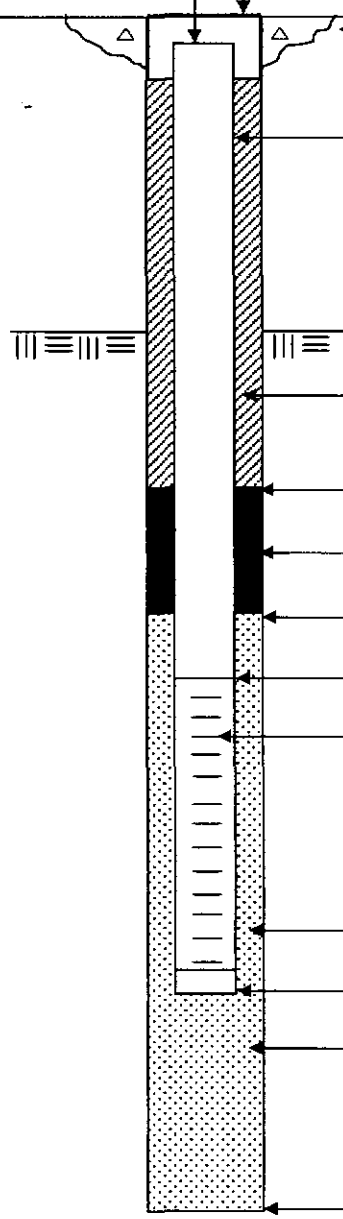
WELL No. MW-19

MONITORING WELL SHEET

PROJECT:	N4015	DRILLING Co.:	Gregg	BORING No.:	MW-19
PROJECT No.:		DRILLER:	Mike Davis	DATE COMPLETED:	12/19/01
SITE:	Chicora Tank Farm	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:		DEV. METHOD:	purge & bail	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	
Type of Surface Casing:	flushmount
Type of Surface Seal:	portland cement
I.D. of Riser:	2"
Type of Riser:	PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	/ N/A
Type of Backfill:	bentonite
Elevation / Depth of Seal:	/ 1'
Type of Seal:	bentonite
Elevation / Depth of Top of Filter Pack:	/ 2'
Elevation / Depth of Top of Screen:	/ 4'
Type of Screen:	PVC
Slot Size x Length:	0.010"
I.D. of Screen:	2"
Type of Filter Pack:	sand
Elevation / Depth of Bottom of Screen:	/ 14
Elevation / Depth of Bottom of Filter Pack:	/ 14
Type of Backfill Below Well:	
Elevation / Total Depth of Borehole:	/ 14

Tetra Tech NUS, Inc.

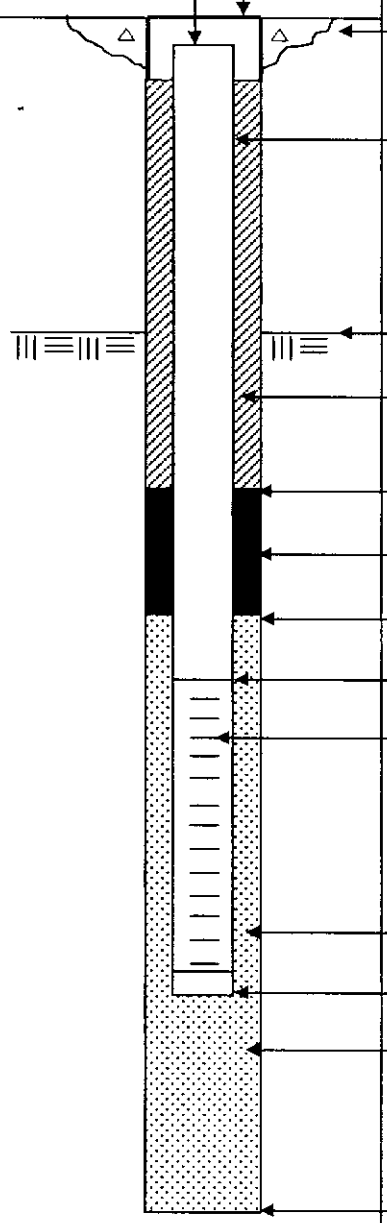
WELL No.: MW-020

MONITORING WELL SHEET

PROJECT:	N4015	DRILLING Co.:	Gregg	BORING No.:	MW-020
PROJECT No.:		DRILLER:	Mike Davis	DATE COMPLETED:	12/19/02
SITE:	Chicora Tank	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:		DEV. METHOD:	purge & bail	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/ 0
I.D. of Surface Casing:	
Type of Surface Casing:	flush mount
Type of Surface Seal:	portland cement
I.D. of Riser:	2"
Type of Riser:	PVC
Borehole Diameter:	
Elevation / Depth Top of Rock:	NA /
Type of Backfill:	bentonite
Elevation / Depth of Seal:	/ 0.5
Type of Seal:	bentonite
Elevation / Depth of Top of Filter Pack:	/ 1'
Elevation / Depth of Top of Screen:	/ 3'
Type of Screen:	PVC
Slot Size x Length:	0.010"
I.D. of Screen:	2"
Type of Filter Pack:	sand
Elevation / Depth of Bottom of Screen:	/ 13'
Elevation / Depth of Bottom of Filter Pack:	/ 13'
Type of Backfill Below Well:	
Elevation / Total Depth of Borehole:	/ 13'

Tetra Tech NUS, Inc.

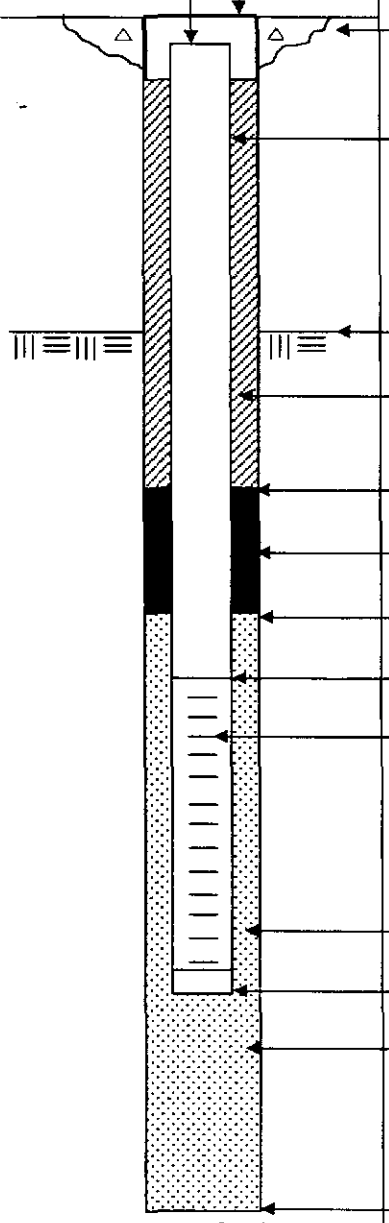
WELL No. MW-21

MONITORING WELL SHEET

PROJECT:	Chicora Bank Farm	DRILLING Co.:	Gregg	BORING No.:	MW21
PROJECT No.:	N4015	DRILLER:	Mike Davis	DATE COMPLETED:	12/19/01
SITE:		DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:		DEV. METHOD:	purge & bail	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	
Type of Surface Casing:	
Type of Surface Seal:	portland cement
I.D. of Riser:	2"
Type of Riser:	PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	/NA
Type of Backfill:	
Elevation / Depth of Seal:	/0.5'
Type of Seal:	
Elevation / Depth of Top of Filter Pack:	/ 1
Elevation / Depth of Top of Screen:	/ 3
Type of Screen:	PVC
Slot Size x Length:	2"
I.D. of Screen:	0.010"
Type of Filter Pack:	Sand
Elevation / Depth of Bottom of Screen:	/ 13
Elevation / Depth of Bottom of Filter Pack.	/ 13
Type of Backfill Below Well:	
Elevation / Total Depth of Borehole:	/ 13

TETRA TECH NUS Inc. FIELD LOG OF BORING

WELL NO. MW-19

SHEET _____ OF _____

PROJECT: Chicora Tank Farm	JOB NO.: N4015 ~~N4050.079A~~		BORING NO.: MW-19
	LOGGED BY:	P. Fritsch	TOTAL DEPTH: 14'

DRILLING CONTRACTOR: Gregg ~~Piedmont~~		SURFACE ELEV.:	DATUM:
DRILLER'S NAME: Mike Davis		START, TIME: 0800	DATE: 12/19/01
DRILL RIG TYPE: Track ATV		FINISH, TIME: 0830	DATE: 12/19/01
BORING METHOD: HSA	HSA	WATER DEPTH:	
HOLE DIAMETER:	8"	DATE:	
SAMPLING METHOD: N/A	~~Split Spoons~~	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME:	DATE:

CONDITIONS:

LOCATION OF BORING:

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	DENSITY	HEADSPACE (ppm)	FID READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
										1		brown silty sand
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		gray silty sand w/ clay inclusions
										10		

no samples

NOTES:

EDITED BY/DATE

TETRA TECH NUS Inc.

FIELD LOG OF BORING

WELL NO. MW-19

SHEET ____ OF ____

PROJECT: JOB NO.: BORING NO.:

DEPTH	TYPE	BLOWS	DRIVEN	RECOVERED	MOISTURE	DENSITY	HEADSPACE (ppm)	FID READING (ppm)	LAB SAMPLE	DEPTH	LITH.	
										11		↓
										12		Light brown sand
										13		↓
										14		end of boring
										15		
										16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

NOTES

EDITED BY DATE

TETRA TECH NUS Inc.

FIELD LOG OF BORING

WELL NO. MW-020 PK

SHEET 1 OF 2

PROJECT: Chicora Tank Farm	JOB NO.: N4015 ~~N4090.070A~~	BORING NO.: MW-020
	LOGGED BY: P. Fritsch	TOTAL DEPTH: 13'

DRILLING CONTRACTOR: Gregg ~~Pleasant~~		SURFACE ELEV.:	DATUM:
DRILLER'S NAME: Mike Davis		START, TIME: ~~0820~~ 0845	DATE: 12/19/02
DRILL RIG TYPE: ATV Track		FINISH, TIME: ~~0830~~ 0930	DATE: 12/19/02
BORING METHOD: HSA	HSA	WATER DEPTH:	
HOLE DIAMETER:	8"	DATE:	
SAMPLING METHOD: N/A	~~Split Spoons~~	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME:	DATE:
CONDITIONS:		LOCATION OF BORING:	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	DENSITY	HEADSPACE (ppm)	FID READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
										1		Silty Sand (Brown)
										2		
										3		
										4		
										5		
										6		
										7		
										8		gray silty sand w/ clay Very moist
										9		
										10		

No Sampler

NOTES:

EDITED BY/DATE:

TETRA TECH NUS Inc.

FIELD LOG OF BORING

WELL NO. MW-020

SHEET 2 OF 2

PROJECT: Chucora Tank Farm

JOB NO.: N4015

BORING NO.: MW-19

DEPTH	TYPE	BLOWS	DRIVEN	RECOVERED	MOISTURE	DENSITY	HEADSPACE (ppm)	FID READING (ppm)	LAB SAMPLE	DEPTH	LITH.	
										11		Light brown sand
										12		
										13		end of boring
										14		
										15		
										16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

NOTES

EDITED BY/DATE

TETRA TECH NUS Inc.

FIELD LOG OF BORING

WELL NO. MW-21

SHEET 1 OF 2

PROJECT: Chicora Tank Farm	JOB NO.: N4015 ~~N1030.079A~~	BORING NO.: MW-21
	LOGGED BY: P. Fritsch	TOTAL DEPTH: 13'

DRILLING CONTRACTOR: Gregg ~~Piedmont~~		SURFACE ELEV.:	DATUM:
DRILLER'S NAME: Mike Davis		START, TIME: 0955	DATE: 12/19/01
DRILL RIG TYPE:		FINISH, TIME: 1015	DATE: 12/19/01
BORING METHOD:	HSA	WATER DEPTH:	
HOLE DIAMETER:	8"	DATE:	
SAMPLING METHOD: N/A	~~Split Spoons~~	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME:	DATE:

CONDITIONS:

LOCATION OF BORING:

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	DENSITY	HEADSPACE (ppm)	FID READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
										1		Brown silty sand
										2		
										3		
										4		
										5		
										6		
										7		
										8		Gray silty sand w/ clay inclusions
										9		
										10		

No Samples

NOTES:

EDITED BY/DATE:

TETRA TECH NUS Inc.

FIELD LOG OF BORING

WELL NO. MW-21

SHEET 2 OF 2

PROJECT Chicora Tank Farm

JOB NO.: 4015

BORING NO.: MW-21

DEPTH	TYPE	BLOWS	DRIVEN	RECOVERED	MOISTURE	DENSITY	HEADSPACE (ppm)	FID READING (ppm)	LAB SAMPLE	DEPTH	LITH.	
										11		brown sand
										12		↓
										13		end of boring
										14		
										15		
										16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

NOTES

EDITED BY/DATE

APPENDIX C
LABORATORY DATA SHEETS

Tetra Tech NUS, Inc. **Internal Correspondence**

TO:	Mr. Paul Calligan	DATE:	January 31, 2002
FROM:	Michael T. Akers	CC:	File
SUBJECT:	Organic Data Validation – VOC, and PAHs CTO174 – CNC Charleston SDG 53835		
SAMPLES:	9/Aqueous		

42GLM1302	42GLM1302D	42GLM2001	42GLM1901
42GLM2101	42EL00301	42GLM0103	42GLM0702
42TL00301			

OVERVIEW

The sample set for CTO174 SDG 53835, Charleston Naval Complex Charleston; Charleston, South Carolina consists of seven (7) aqueous environmental samples, one (1) rinsate blank and one (1) trip blank. The environmental samples and rinsate blank were analyzed for Volatile Organic Compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (PAHs). The trip blank was only analyzed for VOCs. One set of duplicates was analyzed in conjunction with this SDG: 42GLM1302/42GLM1302D.

The samples were collected by Tetra Tech NUS on December 19 and December 20, 2001, and analyzed by General Engineering Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 Method 8260B (VOCs) and SW-846 Method 8270C (PAHs) reporting protocols. The data in this SDG was validated with regard to the following parameters:

- * Data Completeness
- Holding Times
- Laboratory method/field quality control blank results
- * Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter.

Volatiles Fraction

Blank Analysis
Affected samples: 42GLM0103, 42GLM0702, and 42GLM1302

Analyte	Maximum Concentration (ug/L)	Action Level (ug/L)
Toluene	2.8	14

An action level of 5x the maximum concentration has been used to evaluate the sample for contamination in the method blank. Dilution factors and sample aliquots were taken into consideration when evaluating for blank contamination. Positive results less than the action level were qualified as nondetects "U" due to blank contamination.

All other quality control criteria were met for this fraction.

Polycyclic Aromatic Hydrocarbons Fraction

The following samples were extracted outside of seven-day holding time as agreed upon by the Project Manager, Paul Calligan:

42GLM0103 42GLM0702 42GLM1302 42GLM1302D

All other quality criteria were met for this fraction.

Field Duplicate Summary

Analyte	42GLM1302	42GLM1302D	%RPD
Benzene	2.4J	1.1J	74
Ethylbenzene	0.34J	0.25J	31
MTBE	0.67J	0.72J	7.2
Toluene	0.18J	ND	N/A
Xylenes, Total	1.1J	0.32J	110

Because all data quantification between duplicates is already estimated, no data qualifiers were added based on field duplicate data.

Executive Summary

Laboratory performance: Samples 42GLM0103, 42GLM0702, 42GLM1302, and 42GLM1302D were qualified as estimated "J" due to holding time noncompliance. The results for toluene for samples 42GLM0103, 42GLM0702, and 42GLM1302 were reported as nondetects "U" due to field blank contamination.

Other factors affecting data quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1996), and the NFESC guidelines "Navy Installation Restoration

Chemical Data Quality Manual" (September, 1999). The text of the report has been formulated to address only those problems affecting data quality.

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

Michael T. Akers
Project Chemist
Tetra Tech NUS, Inc.

CTO174-CNC CHARLESTON
WATER DATA
GENERAL ENGINEERING LAB
SDG: 53835

SAMPLE NUMBER:	42EL00301			42GLM0103			42GLM0702			42GLM1302		
SAMPLE DATE:	12/20/01			12/19/01			12/19/01			12/19/01		
LABORATORY ID:	53835008			53835007			53835006			53835001		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,2-DIBROMOETHANE	5	U		5	U		5	U		5	U	
BENZENE	5	U		0.4	J	P	5	U		2.4	J	P
ETHYLBENZENE	5	U		0.42	J	P	5	U		0.34	J	P
METHYL TERT-BUTYL ETHER	40	U		40	U		40	U		0.67	J	P
NAPHTHALENE	5	U		1.1	J	P	5	U		5	U	
TOLUENE	5	U		~~2~~ 5	U	B	~~2~~ 5	U	B	~~0.18~~ 5	U	B
TOTAL XYLENES	5	U		5	U		5	U		1.1	J	P

Fax:8503859860 Mar 12 2002 10:24 P.05

CTO174-CNC CHARLESTON
WATER DATA
GENERAL ENGINEERING LAB
SDG: 53835

SAMPLE NUMBER:	42GLM1302D			42GLM1901			42GLM2001			42GLM2101			42TL00301
SAMPLE DATE:	12/19/01			12/20/01			12/20/01			12/20/01			12/17/01
LABORATORY ID:	53835002			53835004			53835003			53835005			53835009
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL			NORMAL
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %			0.0 %
UNITS:	UG/L			UG/L			UG/L			UG/L			UG/L
FIELD DUPLICATE OF:													
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	
VOLATILES													
1,2-DIBROMOETHANE	5 •	U		5	U		5	U		5	U		5 U
BENZENE	1.1 •	J	P	5	U		5	U		0.35 •	J	P	5 U
ETHYLBENZENE	0.25 •	J	P	5	U		5	U		5	U		5 U
METHYL TERT-BUTYL ETHER	0.72 •	J	P	0.13 •	J	P	40	U		40	U		40 U
NAPHTHALENE	5 •	U		5	U		5	U		5	U		5 U
TOLUENE	5 •	U		5	U		5	U		5	U		2.8 J P
TOTAL XYLENES	0.32 •	J	P	5	U		5	U		5	U		5 U

CTO174-CNC CHARLESTON
WATER DATA
GENERAL ENGINEERING LAB
SDG: 53835

SAMPLE NUMBER	42ELD0301			42GLM0103			42GLM0702			42GLM1302		
SAMPLE DATE	12/20/01			12/19/01			12/19/01			12/19/01		
LABORATORY ID:	53815008			53835007			53835008			53835001		
QC_TYPE	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	10.1	U		0.27	J	HP	0.64	J	HP	10	UJ	H
2-METHYLNAPHTHALENE	10.1	U		9.8	UJ	H	9.9	UJ	H	10	UJ	H
BENZO(A)ANTHRACENE	10.1	U		9.8	UJ	H	9.9	UJ	H	10	UJ	H
BENZO(B)FLUORANTHENE	10.1	U		9.8	UJ	H	9.9	UJ	H	10	UJ	H
BENZO(K)FLUORANTHENE	10.1	U		9.8	UJ	H	9.9	UJ	H	10	UJ	H
CHRYSENE	10.1	U		9.8	UJ	H	9.9	UJ	H	10	UJ	H
DIBENZO(A,H)ANTHRACENE	10.1	U		9.8	UJ	H	9.9	UJ	H	10	UJ	H
NAPHTHALENE	10.1	U		9.8	UJ	H	9.9	UJ	H	10	UJ	H

CT0174-CNC CHARLESTON
WATER DATA
GENERAL ENGINEERING LAB
SDG: 53835

SAMPLE NUMBER:	42GLM1302D			42GLM1901			42GLM2001			42GLM2101		
SAMPLE DATE:	12/18/01			12/20/01			12/20/01			12/20/01		
LABORATORY ID:	53835002			53835004			53835003			53836005		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	10.3	UJ	H	10.3	U		10	U		10.3	U	
2-METHYLNAPHTHALENE	10.3	UJ	H	10.3	U		10	U		10.3	U	
BENZO(A)ANTHRACENE	10.3	UJ	H	10.3	U		10	U		10.3	U	
BENZO(B)FLUORANTHENE	10.3	UJ	H	10.3	U		10	U		10.3	U	
BENZO(K)FLUORANTHENE	10.3	UJ	H	10.3	U		10	U		10.3	U	
CHRYSENE	10.3	UJ	H	10.3	U		10	U		10.3	U	
DIBENZO(A,H)ANTHRACENE	10.3	UJ	H	10.3	U		10	U		10.3	U	
NAPHTHALENE	10.3	UJ	H	10.3	U		10	U		10.3	U	

SAMPLE DATA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0103

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835007

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5P523

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: not dec. _____ Date Analyzed: 12/28/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	0.40	J
108-88-3	Toluene	2.2	J
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	0.42	J
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	1.1	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0702

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835008

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5P524

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: not dec. _____ Date Analyzed: 12/28/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	2.7	J
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1302

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5P517

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: not dec. _____ Date Analyzed: 12/28/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	0.67	J
71-43-2	Benzene	2.4	J
108-88-3	Toluene	0.18	J
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	0.34	J
1330-20-7	Xylenes (total)	1.1	J
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1302D

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835002

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5P518

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: not dec. _____ Date Analyzed: 12/28/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	0.72	J
71-43-2	Benzene	1.1	J
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	0.25	J
1330-20-7	Xylenes (total)	0.32	J
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1901

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835004

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5P520

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: not dec. _____ Date Analyzed: 12/28/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	0.13	J
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM2001

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835003

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 7Q412

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: not dec. _____ Date Analyzed: 01/03/02

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM2101

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835005

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5P521

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: not dec. _____ Date Analyzed: 12/28/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	0.35	J
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0103

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835007

Sample wt/vol: 1015 (g/mL) ML Lab File ID: S2A0840

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 12/27/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 01/09/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	9.8	U
91-57-6	2-Methylnaphthalene	9.8	U
90-12-0	1-Methylnaphthalene	0.27	J
56-55-3	Benzo(a)anthracene	9.8	U
218-01-9	Chrysene	9.8	U
205-99-2	Benzo(b)fluoranthene	9.8	U
207-08-9	Benzo(k)fluoranthene	9.8	U
53-70-3	Dibenzo(a,h)anthracene	9.8	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0702

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835008

Sample wt/vol: 1010 (g/mL) ML Lab File ID: S2A0841

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:12/27/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 01/09/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS. (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	9.9	U
91-57-6	2-Methylnaphthalene	9.9	U
90-12-0	1-Methylnaphthalene	0.64	J
56-55-3	Benzo(a)anthracene	9.9	U
218-01-9	Chrysene	9.9	U
205-99-2	Benzo(b)fluoranthene	9.9	U
207-08-9	Benzo(k)fluoranthene	9.9	U
53-70-3	Dibenzo(a,h)anthracene	9.9	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1302

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S2A0832

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:12/27/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 01/08/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS. (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.0	U
91-57-6	2-Methylnaphthalene	10.0	U
90-12-0	1-Methylnaphthalene	10.0	U
56-55-3	Benzo(a)anthracene	10.0	U
218-01-9	Chrysene	10.0	U
205-99-2	Benzo(b)fluoranthene	10.0	U
207-08-9	Benzo(k)fluoranthene	10.0	U
53-70-3	Dibenzo(a,h)anthracene	10.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1302D

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835002

Sample wt/vol: 970.0 (g/mL) ML Lab File ID: S2A0835

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:12/27/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 01/08/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.3	U
91-57-6	2-Methylnaphthalene	10.3	U
90-12-0	1-Methylnaphthalene	10.3	U
56-55-3	Benzo(a)anthracene	10.3	U
218-01-9	Chrysene	10.3	U
205-99-2	Benzo(b)fluoranthene	10.3	U
207-08-9	Benzo(k)fluoranthene	10.3	U
53-70-3	Dibenzo(a,h)anthracene	10.3	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1901

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835004

Sample wt/vol: 970.0 (g/mL) ML Lab File ID: S2A0837

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:12/27/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 01/09/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.3	U
91-57-6	2-Methylnaphthalene	10.3	U
90-12-0	1-Methylnaphthalene	10.3	U
56-55-3	Benzo(a)anthracene	10.3	U
218-01-9	Chrysene	10.3	U
205-99-2	Benzo(b)fluoranthene	10.3	U
207-08-9	Benzo(k)fluoranthene	10.3	U
53-70-3	Dibenzo(a,h)anthracene	10.3	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM2001

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835003

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S2A0836

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:12/27/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 01/08/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.0	U
91-57-6	2-Methylnaphthalene	10.0	U
90-12-0	1-Methylnaphthalene	10.0	U
56-55-3	Benzo(a)anthracene	10.0	U
218-01-9	Chrysene	10.0	U
205-99-2	Benzo(b)fluoranthene	10.0	U
207-08-9	Benzo(k)fluoranthene	10.0	U
53-70-3	Dibenzo(a,h)anthracene	10.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM2101

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 53835

Matrix: (soil/water) WATER Lab Sample ID: 53835005

Sample wt/vol: 970.0 (g/mL) ML Lab File ID: S2A0838

Level: (low/med) LOW Date Received: 12/20/01

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 12/27/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 01/09/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.3	U
91-57-6	2-Methylnaphthalene	10.3	U
90-12-0	1-Methylnaphthalene	10.3	U
56-55-3	Benzo(a)anthracene	10.3	U
218-01-9	Chrysene	10.3	U
205-99-2	Benzo(b)fluoranthene	10.3	U
207-08-9	Benzo(k)fluoranthene	10.3	U
53-70-3	Dibenzo(a,h)anthracene	10.3	U

Tetra Tech NUS, Inc. **Internal Correspondence**

TO:	Mr. Paul Calligan	DATE:	June 21, 2001
FROM:	Suzanne I. Smith	CC:	File

SUBJECT: **Organic Data Validation – VOC, Methane, PAH, Nitrate, and Sulfate**
CTO174 – CNC Charleston
SDG 42127

SAMPLES: **8/Aqueous**

42GLM1402	42GLM1502	42GLM1602	42GLM1702
42GLM1702D	42GLM1802	42RL0102	42TL00302

OVERVIEW

The sample set for CTO174 SDG 42127, Charleston Naval Complex Charleston; Charleston, South Carolina consists of six (6) aqueous environmental samples, one (1) rinsate blank and one (1) trip blank. The environmental samples and rinsate blank were analyzed for Volatile Organic Compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (PAHs). The trip blank was only analyzed for VOCs. Samples 42GLM1502 and 42GLM1702 were also analyzed for Methane, Nitrate, and Sulfate. One set of duplicates was analyzed in conjunction with this SDG : 42GLM1702/42GLM1702D.

The samples were collected by Tetra Tech NUS on May 10, 2001 and analyzed by General Engineering Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 Method 8260B (VOCs), GEL SOP-based Method (Methane), SW-846 Method 8270C (PAHs), and EPA Method 300.0 (Nitrate and Sulfate) analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

- * Data Completeness
- * Holding Times
- Laboratory method/field quality control blank results
- * Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter.

Volatiles Fraction

Laboratory Blank Analysis

Affected samples : 42GLM1802

Analyte	Maximum Concentration (ug/L)	Action Level (ug/L)
Toluene	0.26	1.3

An action level of 5x the maximum concentration has been used to evaluate the sample for contamination in the method blank. Dilution factors and sample aliquots were taken into consideration when evaluating for blank contamination. Positive results less than the action level were qualified as nondetects "U" due to blank contamination.

All other quality control criteria were met for this fraction.

Methane Fraction

Laboratory Blank Analysis

Affected samples : none

Analyte	Maximum Concentration (ug/L)	Action Level (ug/L)
Methane	33.5	167.5

An action level of 5x the maximum concentration has been used to evaluate the sample for contamination in the method blank. Dilution factors and sample aliquots were taken into consideration when evaluating for blank contamination. Positive results less than the action level were qualified as nondetects "U" due to blank contamination.

All other quality control criteria were met for this fraction.

Polycyclic Aromatic Hydrocarbons Fraction

All quality control criteria were met for this fraction.

Nitrate and Sulfate Fraction

All quality control criteria were met for this fraction.

Field Duplicate Summary

Analyte	42GLM1702(ug/L)	42GLM1702D(ug/L)	%RPD
Benzene	2.2	2.0	9.5
MTBE	0.53	0.51	3.8

No data qualifiers were applied due to field duplicates.

Executive Summary

Laboratory performance:	Toluene was reported as a nondetect "U" due to laboratory blank contamination for sample 42GLM1802.
Other factors affecting data quality	None

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1996), and the NFESC guidelines "Navy Installation Restoration Chemical Data Quality Manual" (September, 1999). The text of the report has been formulated to address only those problems affecting data quality.

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

Suzanne I. Smith

Project Chemist
Tetra Tech NUS, Inc.

WATER DATA
GENEI ENGINEERING LAB
SDG: 42127

SAMPLE NUMBER:	42GLM1402~~MS/MSD~~			42GLM1502			42GLM1602			42GLM1702		
SAMPLE DATE:	05/10/01			05/10/01			05/10/01			05/10/01		
LABORATORY ID:	42127008			42127002			42127005			42127001		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/l			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,2-DIBROMOETHANE	~~47~~ 5.0	U		5	U		5	U		5	U	
~~4-BROMOFLUOROBENZENE~~	~~114~~			~~118~~			~~118~~			~~111~~		
BENZENE	~~86~~ 0.48	J	P	5	U		5	U		2.2	J	P
ETHYLBENZENE	~~83~~ 5.0	U		5	U		5	U		5	U	
~~FLUORODIBROMOMETHANE~~	~~124~~			~~118~~			~~127~~			~~119~~		
METHYL TERT-BUTYL ETHER	~~68.1~~ 0.51	J	P	40	U		40	U		0.53	J	P
NAPHTHALENE	~~66.8~~ 5.0	U		5	U		5	U		5	U	
TOLUENE	~~78~~ 5.0 ~~B~~	U		5	U		5	U		5	U	
TOTAL XYLENES	~~78~~ 5.0	U		5	U		5	U		5	U	

crossed out compounds are surrogates, not targets

WATER DATA
GENERAL ENGINEERING LAB
SDG: 42127

SAMPLE NUMBER:	42GLM1702D			42GLM1802			42RL0102			42TL00302		
SAMPLE DATE:	05/10/01			05/10/01			05/10/01			05/04/01		
LABORATORY ID:	42127003			42127004			42127006			42127007		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,2-DIBROMOETHANE	5	U		5	U		5	U		5	U	
~~4-BROMOFLUOROBENZENE~~	~~115~~			~~113~~			~~112~~			~~100~~		
BENZENE	2	J	P	5	U		5	U		5	U	
ETHYLBENZENE	5	U		0.23	J	P	5	U		5	U	
~~FLUORODIBROMOMETHANE~~	~~120~~			~~123~~			~~122~~			~~114~~		
METHYL TERT-BUTYL ETHER	0.51	J	P	40	U		40	U		40	U	
NAPHTHALENE	5	U		5	U		5	U		5	U	
TOLUENE	5	U		~~0.67~~ 5	~~J~~ U	A	5	U		5	U	
TOTAL XYLENES	5	U		0.24	J	P	5	U		5	U	

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WATEF TA
GENER. ENGINEERING LAB
SDG: 42127

SAMPLE NUMBER:	42GLM1402~~MS/MSD~~			42GLM1502			42GLM1602			42GLM1702		
SAMPLE DATE:	05/10/01			05/10/01			05/10/01			05/10/01		
LABORATORY ID:	42127008			42127002			42127005			42127001		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	9.7	U		10	U		9.7	U		10	U	
~~3-FLUORODIPHENYL~~	~~76~~			~~78~~			~~76~~			~~71~~		
2-METHYLNAPHTHALENE	9.7	U		10	U		9.7	U		10	U	
BENZO(A)ANTHRACENE	9.7	U		10	U		9.7	U		10	U	
BENZO(B)FLUORANTHENE	9.7	U		10	U		9.7	U		10	U	
BENZO(K)FLUORANTHENE	9.7	U		10	U		9.7	U		10	U	
CHRYSENE	9.7	U		10	U		9.7	U		10	U	
DIBENZO(A,H)ANTHRACENE	9.7	U		10	U		9.7	U		10	U	
NAPHTHALENE	9.7	U		10	U		9.7	U		10	U	

WATER DATA
GENEF ENGINEERING LAB
SDG: 42127

SAMPLE NUMBER:	42GLM1702D			42GLM1802			42RL0102					
SAMPLE DATE:	05/10/01			05/10/01			05/10/01			/ /		
LABORATORY ID:	42127003			42127004			42127006					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	0.0 %			0.0 %			0.0 %			100.0 %		
UNITS:	UG/L			UG/L			UG/L					
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	10	U		0.74	J	P	10	U				
~~2-FLUOROBIPHENYL~~	~~70~~			~~66~~			~~77~~					
2-METHYLNAPHTHALENE	10	U		0.88	J	P	10	U				
BENZO(A)ANTHRACENE	10	U		10	U		10	U				
BENZO(B)FLUORANTHENE	10	U		10	U		10	U				
BENZO(K)FLUORANTHENE	10	U		10	U		10	U				
CHRYSENE	10	U		10	U		10	U				
DIBENZO(A,H)ANTHRACENE	10	U		10	U		10	U				
NAPHTHALENE	10	U		3.4	J	P	10	U				

WATER DATA
GENERAL ENGINEERING LAB
SDG: 42127

SAMPLE NUMBER:	42GLM1502	42GLM1702		
SAMPLE DATE:	05/10/01	05/10/01	/ /	/ /
LABORATORY ID:	42127002	42127001		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	0.0 %	0.0 %	100.0 %	100.0 %
UNITS:	UG/L	UG/L		
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
DISSOLVED GASES												
METHANE	1830	B		2050	B							

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Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	42GLM1502	42127002	NORMAL	42127	METH	05/10/01	05/15/01	05/22/01	5	7	12
UG/L	42GLM1702	42127001	NORMAL	42127	METH	05/10/01	05/15/01	05/22/01	5	7	12
MG/L	42GLM1502	42127002	NORMAL	42127	NTA	05/10/01	05/11/01	05/11/01	1	0	1
MG/L	42GLM1702	42127001	NORMAL	42127	NTA	05/10/01	05/11/01	05/11/01	1	0	1
UG/L	42GLM1402MS/MSD	42127008	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1502	42127002	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1602	42127005	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1702	42127001	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1702D	42127003	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1802	42127004	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42RL0102	42127006	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42TL00302	42127007	NORMAL	42127	OV	05/04/01	05/15/01	05/15/01	11	0	11
UG/L	42GLM1402MS/MSD	42127008	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1502	42127002	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1602	42127005	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1702	42127001	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1702D	42127003	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1802	42127004	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42RL0102	42127006	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
MG/L	42GLM1502	42127002	NORMAL	42127	SO4	05/10/01	05/11/01	05/11/01	1	0	1
MG/L	42GLM1702	42127001	NORMAL	42127	SO4	05/10/01	05/11/01	05/11/01	1	0	1

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GENE. ENGINEERING LAB
SDG: 42127

SAMPLE NUMBER	42GLM1502			42GLM1702								
SAMPLE DATE:	05/10/01			05/10/01			/ /			/ /		
LABORATORY ID:	42127002			42127001								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANIC PARAMETERS												
~~NITRATE(%)~~												
NITRATE(MG/L)	0.05	U		0.101								
~~SULFATE(%)~~												
SULFATE(MG/L)	59.1			54.7								

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Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	42GLM1502	42127002	NORMAL	42127	METH	05/10/01	05/15/01	05/22/01	5	7	12
UG/L	42GLM1702	42127001	NORMAL	42127	METH	05/10/01	05/15/01	05/22/01	5	7	12
MG/L	42GLM1502	42127002	NORMAL	42127	NTA	05/10/01	05/11/01	05/11/01	1	0	1
MG/L	42GLM1702	42127001	NORMAL	42127	NTA	05/10/01	05/11/01	05/11/01	1	0	1
UG/L	42GLM1402MS/MSD	42127008	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1502	42127002	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1602	42127005	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1702	42127001	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1702D	42127003	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42GLM1802	42127004	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42RL0102	42127006	NORMAL	42127	OV	05/10/01	05/15/01	05/15/01	5	0	5
UG/L	42TL00302	42127007	NORMAL	42127	OV	05/04/01	05/15/01	05/15/01	11	0	11
UG/L	42GLM1402MS/MSD	42127008	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1502	42127002	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1602	42127005	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1702	42127001	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1702D	42127003	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42GLM1802	42127004	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
UG/L	42RL0102	42127006	NORMAL	42127	PAH	05/10/01	05/11/01	05/14/01	1	3	4
MG/L	42GLM1502	42127002	NORMAL	42127	SO4	05/10/01	05/11/01	05/11/01	1	0	1
MG/L	42GLM1702	42127001	NORMAL	42127	SO4	05/10/01	05/11/01	05/11/01	1	0	1

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1402

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127008

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 8J215

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	0.51	J
71-43-2	Benzene	0.48	J
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1502

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127002

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 8J210

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1602

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127005

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 8J213

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1702

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 8J209

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____ (uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	0.53	J
71-43-2	Benzene	2.2	J
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1702D

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127003

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 8J211

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	0.51	J
71-43-2	Benzene	2.0	J
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1802

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127004

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 8J212

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	0.57	JB
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	0.23	J
1330-20-7	Xylenes (total)	0.24	J
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42RL0102

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127006

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 8J214

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO:	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42TL00302

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127007

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 8J207

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1402MS/MSD

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127008

Sample wt/vol: 1030 (g/mL) ML Lab File ID: 5U115

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	9.7	U
91-57-6	2-Methylnaphthalene	9.7	U
90-12-0	1-Methylnaphthalene	9.7	U
56-55-3	Benzo(a)anthracene	9.7	U
218-01-9	Chrysene	9.7	U
205-99-2	Benzo(b)fluoranthene	9.7	U
207-08-9	Benzo(k)fluoranthene	9.7	U
53-70-3	Dibenzo(a,h)anthracene	9.7	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1502

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127002

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 5U110

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.0	U
91-57-6	2-Methylnaphthalene	10.0	U
90-12-0	1-Methylnaphthalene	10.0	U
56-55-3	Benzo(a)anthracene	10.0	U
218-01-9	Chrysene	10.0	U
205-99-2	Benzo(b)fluoranthene	10.0	U
207-08-9	Benzo(k)fluoranthene	10.0	U
53-70-3	Dibenzo(a,h)anthracene	10.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1602

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127005

Sample wt/vol: 1030 (g/mL) ML Lab File ID: 5U113

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	9.7	U
91-57-6	2-Methylnaphthalene	9.7	U
90-12-0	1-Methylnaphthalene	9.7	U
56-55-3	Benzo(a)anthracene	9.7	U
218-01-9	Chrysene	9.7	U
205-99-2	Benzo(b)fluoranthene	9.7	U
207-08-9	Benzo(k)fluoranthene	9.7	U
53-70-3	Dibenzo(a,h)anthracene	9.7	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1702

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127001

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 5U109

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.0	U
91-57-6	2-Methylnaphthalene	10.0	U
90-12-0	1-Methylnaphthalene	10.0	U
56-55-3	Benzo(a)anthracene	10.0	U
218-01-9	Chrysene	10.0	U
205-99-2	Benzo(b)fluoranthene	10.0	U
207-08-9	Benzo(k)fluoranthene	10.0	U
53-70-3	Dibenzo(a,h)anthracene	10.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1702D

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127003

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 5U111

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.0	U
91-57-6	2-Methylnaphthalene	10.0	U
90-12-0	1-Methylnaphthalene	10.0	U
56-55-3	Benzo(a)anthracene	10.0	U
218-01-9	Chrysene	10.0	U
205-99-2	Benzo(b)fluoranthene	10.0	U
207-08-9	Benzo(k)fluoranthene	10.0	U
53-70-3	Dibenzo(a,h)anthracene	10.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1802

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127004

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 5U112

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	3.4	J
91-57-6	2-Methylnaphthalene	0.88	J
90-12-0	1-Methylnaphthalene	0.74	J
56-55-3	Benzo(a)anthracene	10.0	U
218-01-9	Chrysene	10.0	U
205-99-2	Benzo(b)fluoranthene	10.0	U
207-08-9	Benzo(k)fluoranthene	10.0	U
53-70-3	Dibenzo(a,h)anthracene	10.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42RL0102

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42127

Matrix: (soil/water) WATER Lab Sample ID: 42127006

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 5U114

Level: (low/med) LOW Date Received: 05/10/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.0	U
91-57-6	2-Methylnaphthalene	10.0	U
90-12-0	1-Methylnaphthalene	10.0	U
56-55-3	Benzo(a)anthracene	10.0	U
218-01-9	Chrysene	10.0	U
205-99-2	Benzo(b)fluoranthene	10.0	U
207-08-9	Benzo(k)fluoranthene	10.0	U
53-70-3	Dibenzo(a,h)anthracene	10.0	U

Tetra Tech NUS, Inc. **Internal Correspondence**

TO:	**Mr. Paul Calligan**	**DATE:**	**June 21, 2001**
FROM:	**Suzanne I. Smith**	**CC:**	**File**

SUBJECT: **Organic Data Validation – VOC, Methane, PAH, Nitrate, and Sulfate**
CTO174 – CNC Charleston
SDG 41928

SAMPLES: **6/Aqueous**

42GLM0102 42GLM0202 42GLM0302 42GLM0502
42GLM0602 42TL00102

OVERVIEW

The sample set for CTO174 SDG 41928, Charleston Naval Complex Charleston; Charleston, South Carolina consists of five (5) aqueous environmental samples and one (1) trip blank. The environmental samples were analyzed for Volatile Organic Compounds (VOCs), Methane, Polycyclic Aromatic Hydrocarbons (PAHs), Nitrate, and Sulfate. The trip blank was only analyzed for VOCs. Sample 42GLM0602 was only analyzed for VOCs and PAHs.

The samples were collected by Tetra Tech NUS on May 8, 2001 and analyzed by General Engineering Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 Method 8260B (VOCs), GEL SOP-based Method (Methane), SW-846 Method 8270C (PAHs), and EPA Method 300.0 (Nitrate and Sulfate) analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

* • Data Completeness
* • Holding Times
  • Laboratory method/field quality control blank results
* • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter.

Volatiles Fraction

All quality control criteria were met for this fraction.

Methane Fraction

Laboratory Blank Analysis

Affected samples : 42GLM0302

Analyte	Maximum Concentration (ug/L)	Action Level (ug/L)
Methane	33.5	167.5

An action level of 5x the maximum concentration has been used to evaluate the sample for contamination in the method blank. Dilution factors and sample aliquots were taken into consideration when evaluating for blank contamination. Positive results less than the action level were qualified as nondetects "U" due to blank contamination.

All other quality control criteria were met for this fraction.

Polycyclic Aromatic Hydrocarbons Fraction

All quality control criteria were met for this fraction.

Nitrate and Sulfate Fraction

All quality control criteria were met for this fraction.

Executive Summary

Laboratory performance: The methane result for sample 42GLM0302 was reported as a nondetect "U" due to laboratory blank contamination.

Other factors affecting data quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1996), and the NFESC guidelines "Navy Installation Restoration Chemical Data Quality Manual" (September, 1999). The text of the report has been formulated to address only those problems affecting data quality.

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

Suzanne J. Smith

Project Chemist
Tetra Tech NUS, Inc.

CTO174-[illegible]IC CHARLESTON
WATER D[illegible]
GENERAL ENGINEERING LAB
SDG: 41928

SAMPLE NUMBER:	42GLM0102			42GLM0202			42GLM0302			42GLM0502		
SAMPLE DATE:	05/08/01			05/08/01			05/08/01			05/08/01		
LABORATORY ID	41928001			41928003			41928002			41928004		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,2-DIBROMOETHANE	5	U		5	U		5	U		5	U	
~~4-BROMOFLUOROBENZENE~~	~~84~~			~~87~~			~~87~~			~~87~~		
BENZENE	0.22	J	P	0.14	J	P	5	U		5	U	
ETHYLBENZENE	0.19	J	P	0.30	J	P	5	U		5	U	
~~FLUORODIBROMOMETHANE~~	~~84~~			~~85~~			~~87~~			~~85~~		
METHYL TERT-BUTYL ETHER	40	U		40	U		40	U		40	U	
NAPHTHALENE	0.5	J	P	89.9			5	U		1.3	J	P
TOLUENE	5	U		5	U		5	U		5	U	
TOTAL XYLENES	5	U		0.23	J	P	5	U		5	U	

Crossed out compounds are surrogates, not target compounds

CTO174-CNC CHARLESTON
WATER A
GENERAL ENGINEERING LAB
SDG: 41928

SAMPLE NUMBER:	42GLM0602			42TL00102								
SAMPLE DATE:	05/08/01			05/04/01			/ /			/ /		
LABORATORY ID:	41928005			41928006								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,2-DIBROMOETHANE	5	U		5	U							
~~4-BROMOFLUOROBENZENE~~	~~87~~			~~86~~								
BENZENE	5	U		5	U							
ETHYLBENZENE	5	U		5	U							
~~FLUORODIBROMOMETHANE~~	~~86~~			~~89~~								
METHYL TERT-BUTYL ETHER	40	U		40	U							
NAPHTHALENE	0.66	J	P	5	U							
TOLUENE	5	U		5	U							
TOTAL XYLENES	5	U		5	U							

CTO174-CNC CHARLESTON
WATEF TA
GENERAL ENGINEERING LAB
SDG: 41928

SAMPLE NUMBER:	42GLM0102			42GLM0202			42GLM0302			42GLM0502		
SAMPLE DATE:	05/08/01			05/08/01			05/08/01			05/08/01		
LABORATORY ID:	41928001			41928003			41928002			41928004		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
DISSOLVED GASES												
METHANE	16000	~~B~~		5370	~~B~~		156	~~B~~ U	A	187	~~B~~	

CTO174-CNC CHARLESTON
WATER 'A
GENERAL ENGINEERING LAB
SDG: 41928

SAMPLE NUMBER:	42GLM0102			42GLM0202			42GLM0302			42GLM0502		
SAMPLE DATE:	05/08/01			05/08/01			05/08/01			05/08/01		
LABORATORY ID:	41928001			41928003			41928002			41928004		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	11.1	U		11.8	U		11.1	U		11.8	U	
~~2-FLUOROBIPHENYL~~	~~57~~			~~52~~			~~54~~			~~43~~		
2-METHYLNAPHTHALENE	11.1	U		11.8	U		11.1	U		11.8	U	
BENZO(A)ANTHRACENE	11.1	U		11.8	U		11.1	U		11.8	U	
BENZO(B)FLUORANTHENE	11.1	U		11.8	U		11.1	U		11.8	U	
BENZO(K)FLUORANTHENE	11.1	U		11.8	U		11.1	U		11.8	U	
CHRYSENE	11.1	U		11.8	U		11.1	U		11.8	U	
DIBENZO(A,H)ANTHRACENE	11.1	U		11.8	U		11.1	U		11.8	U	
NAPHTHALENE	11.1	U		66.9			11.1	U		11.8	U	

crossed out compound is a surrogate, not a target

CTO174-CNC CHARLESTON

WATEF TA

GENERAL ENGINEERING LAB

SDG: 41928

SAMPLE NUMBER:	42GLM0602											
SAMPLE DATE:	05/08/01			/ /			/ /			/ /		
LABORATORY ID:	41928005											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	11.1	U										
~~2-FLUOROBIPHENYL~~	~~55~~											
2-METHYLNAPHTHALENE	11.1	U										
BENZO(A)ANTHRACENE	11.1	U										
BENZO(B)FLUORANTHENE	11.1	U										
BENZO(K)FLUORANTHENE	11.1	U										
CHRYSENE	11.1	U										
DIBENZO(A,H)ANTHRACENE	11.1	U										
NAPHTHALENE	11.1	U										

41928

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06/08/01

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	42GLM0102	41928001	NORMAL	41928	METH	05/08/01	05/15/01	05/22/01	7	7	14
UG/L	42GLM0202	41928003	NORMAL	41928	METH	05/08/01	05/15/01	05/22/01	7	7	14
UG/L	42GLM0302	41928002	NORMAL	41928	METH	05/08/01	05/15/01	05/22/01	7	7	14
UG/L	42GLM0502	41928004	NORMAL	41928	METH	05/08/01	05/15/01	05/22/01	7	7	14
.0000	42GLM0102	41928001	NORMAL	41928	NTA	05/08/01	05/09/01	05/09/01	1	0	1
.0000	42GLM0202	41928003	NORMAL	41928	NTA	05/08/01	05/09/01	05/09/01	1	0	1
.0000	42GLM0302	41928002	NORMAL	41928	NTA	05/08/01	05/09/01	05/09/01	1	0	1
.0000	42GLM0502	41928004	NORMAL	41928	NTA	05/08/01	05/09/01	05/09/01	1	0	1
UG/L	42GLM0102	41928001	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42GLM0202	41928003	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42GLM0302	41928002	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42GLM0502	41928004	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42GLM0602	41928005	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42TL00102	41928006	NORMAL	41928	OV	05/04/01	05/11/01	05/11/01	7	0	7
UG/L	42GLM0102	41928001	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
UG/L	42GLM0202	41928003	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
UG/L	42GLM0302	41928002	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
UG/L	42GLM0502	41928004	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
UG/L	42GLM0602	41928005	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
.0000	42GLM0102	41928001	NORMAL	41928	SO4	05/08/01	05/09/01	05/09/01	1	0	1
.0000	42GLM0202	41928003	NORMAL	41928	SO4	05/08/01	05/09/01	05/09/01	1	0	1
.0000	42GLM0302	41928002	NORMAL	41928	SO4	05/08/01	05/09/01	05/09/01	1	0	1
.0000	42GLM0502	41928004	NORMAL	41928	SO4	05/08/01	05/09/01	05/09/01	1	0	1

CTO174-CNC CHARLESTON
WATER ;A
GENERAL ENGINEERING LAB
SDG: 41928

SAMPLE NUMBER:	42GLM0102			42GLM0202			42GLM0302			42GLM0502		
SAMPLE DATE:	05/08/01			05/08/01			05/08/01			05/08/01		
LABORATORY ID:	41928001			41928003			41928002			41928004		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
FIELD DUPLICATE OF:												
units	mg/L			mg/L			mg/L			mg/L		
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANIC PARAMETERS												
NITRATE(~~0000)~~	0.05	U		0.05	U		0.05	U		0.952		
SULFATE(~~0000)~~	33.5			19.4			22.6			22		

41928

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06/08/01

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	42GLM0102	41928001	NORMAL	41928	METH	05/08/01	05/15/01	05/22/01	7	7	14
UG/L	42GLM0202	41928003	NORMAL	41928	METH	05/08/01	05/15/01	05/22/01	7	7	14
UG/L	42GLM0302	41928002	NORMAL	41928	METH	05/08/01	05/15/01	05/22/01	7	7	14
UG/L	42GLM0502	41928004	NORMAL	41928	METH	05/08/01	05/15/01	05/22/01	7	7	14
mg/L ~~.0000~~	42GLM0102	41928001	NORMAL	41928	NTA	05/08/01	05/09/01	05/09/01	1	0	1
~~.0000~~	42GLM0202	41928003	NORMAL	41928	NTA	05/08/01	05/09/01	05/09/01	1	0	1
~~.0000~~	42GLM0302	41928002	NORMAL	41928	NTA	05/08/01	05/09/01	05/09/01	1	0	1
~~.0000~~	42GLM0502	41928004	NORMAL	41928	NTA	05/08/01	05/09/01	05/09/01	1	0	1
UG/L	42GLM0102	41928001	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42GLM0202	41928003	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42GLM0302	41928002	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42GLM0502	41928004	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42GLM0602	41928005	NORMAL	41928	OV	05/08/01	05/12/01	05/12/01	4	0	4
UG/L	42TL00102	41928006	NORMAL	41928	OV	05/04/01	05/11/01	05/11/01	7	0	7
UG/L	42GLM0102	41928001	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
UG/L	42GLM0202	41928003	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
UG/L	42GLM0302	41928002	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
UG/L	42GLM0502	41928004	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
UG/L	42GLM0602	41928005	NORMAL	41928	PAH	05/08/01	05/09/01	05/10/01	1	1	2
mg/L ~~.0000~~	42GLM0102	41928001	NORMAL	41928	SO4	05/08/01	05/09/01	05/09/01	1	0	1
~~.0000~~	42GLM0202	41928003	NORMAL	41928	SO4	05/08/01	05/09/01	05/09/01	1	0	1
~~.0000~~	42GLM0302	41928002	NORMAL	41928	SO4	05/08/01	05/09/01	05/09/01	1	0	1
~~.0000~~	42GLM0502	41928004	NORMAL	41928	SO4	05/08/01	05/09/01	05/09/01	1	0	1

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0102

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I539

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	0.22	J
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	0.19	J
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	0.50	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0202

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928003

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I541

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	0.14	J
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	0.30	J
1330-20-7	Xylenes (total)	0.23	J
91-20-3	Naphthalene	89.9	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0302

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928002

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I540

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0502

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928004

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I542

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	1.3	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0602

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928005

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I543

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	0.66	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42TL00102

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928006

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I537

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: not dec. _____ Date Analyzed: 05/11/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0102

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928001

Sample wt/vol: 900.0 (g/mL) ML Lab File ID: 4T416

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/09/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/10/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	11.1	U
91-57-6	2-Methylnaphthalene	11.1	U
90-12-0	1-Methylnaphthalene	11.1	U
56-55-3	Benzo(a)anthracene	11.1	U
218-01-9	Chrysene	11.1	U
205-99-2	Benzo(b)fluoranthene	11.1	U
207-08-9	Benzo(k)fluoranthene	11.1	U
53-70-3	Dibenzo(a,h)anthracene	11.1	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0202

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928003

Sample wt/vol: 850.0 (g/mL) ML Lab File ID: 4T418

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:05/09/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/10/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	66.9	
91-57-6	2-Methylnaphthalene	11.8	U
90-12-0	1-Methylnaphthalene	11.8	U
56-55-3	Benzo(a)anthracene	11.8	U
218-01-9	Chrysene	11.8	U
205-99-2	Benzo(b)fluoranthene	11.8	U
207-08-9	Benzo(k)fluoranthene	11.8	U
53-70-3	Dibenzo(a,h)anthracene	11.8	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0302

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928002

Sample wt/vol: 900.0 (g/mL) ML Lab File ID: 4T417

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:05/09/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/10/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	11.1	U
91-57-6	2-Methylnaphthalene	11.1	U
90-12-0	1-Methylnaphthalene	11.1	U
56-55-3	Benzo(a)anthracene	11.1	U
218-01-9	Chrysene	11.1	U
205-99-2	Benzo(b)fluoranthene	11.1	U
207-08-9	Benzo(k)fluoranthene	11.1	U
53-70-3	Dibenzo(a,h)anthracene	11.1	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0502

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928004

Sample wt/vol: 850.0 (g/mL) ML Lab File ID: 4T419

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/09/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/10/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	11.8	U
91-57-6	2-Methylnaphthalene	11.8	U
90-12-0	1-Methylnaphthalene	11.8	U
56-55-3	Benzo(a)anthracene	11.8	U
218-01-9	Chrysene	11.8	U
205-99-2	Benzo(b)fluoranthene	11.8	U
207-08-9	Benzo(k)fluoranthene	11.8	U
53-70-3	Dibenzo(a,h)anthracene	11.8	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0602

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 41928

Matrix: (soil/water) WATER Lab Sample ID: 41928005

Sample wt/vol: 900.0 (g/mL) ML Lab File ID: 4T420

Level: (low/med) LOW Date Received: 05/08/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:05/09/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/10/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	11.1	U
91-57-6	2-Methylnaphthalene	11.1	U
90-12-0	1-Methylnaphthalene	11.1	U
56-55-3	Benzo(a)anthracene	11.1	U
218-01-9	Chrysene	11.1	U
205-99-2	Benzo(b)fluoranthene	11.1	U
207-08-9	Benzo(k)fluoranthene	11.1	U
53-70-3	Dibenzo(a,h)anthracene	11.1	U

Tetra Tech NUS, Inc. **Internal Correspondence**

TO:	**Mr. Paul Calligan**	**DATE:**	**June 21, 2001**
FROM:	**Suzanne I. Smith**	**CC:**	**File**

SUBJECT: **Organic Data Validation – VOC, Methane, PAH, Nitrate, and Sulfate**
CTO174 – CNC Charleston
SDG 42028

SAMPLES: **8/Aqueous**

42GLM0402	**42GLM0802**	**42GLM0902**	**42GLM1002**
42GLM1102	**42GLM1102D**	**42GLM1202**	**42TL00202**

OVERVIEW

The sample set for CTO174 SDG 42028, Charleston Naval Complex Charleston; Charleston, South Carolina consists of seven (7) aqueous environmental samples and one (1) trip blank. The environmental samples were analyzed for Volatile Organic Compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (PAHs). The trip blank was only analyzed for VOCs. Samples 42GLM0902, 42GLM1002, and 42GLM1102 were also analyzed for Methane, Nitrate, and Sulfate. One set of duplicates was analyzed in conjunction with this SDG : 42GLM1102/42GLM1102D.

The samples were collected by Tetra Tech NUS on May 9, 2001 and analyzed by General Engineering Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 Method 8260B (VOCs), GEL SOP-based Method (Methane), SW-846 Method 8270C (PAHs), and EPA Method 300.0 (Nitrate and Sulfate) analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

* • Data Completeness
* • Holding Times
  • Laboratory method/field quality control blank results
* • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter.

Volatiles Fraction

All quality control criteria were met for this fraction.

Methane Fraction

Laboratory Blank Analysis

Affected samples : none

Analyte	Maximum Concentration (ug/L)	Action Level (ug/L)
Methane	33.5	167.5

An action level of 5x the maximum concentration has been used to evaluate the sample for contamination in the method blank. Dilution factors and sample aliquots were taken into consideration when evaluating for blank contamination. Positive results less than the action level were qualified as nondetects "U" due to blank contamination.

All otner quality control criteria were met for this fraction.

Polycyclic Aromatic Hydrocarbons Fraction

All quality control criteria were met for this fraction.

Nitrate and Sulfate Fraction

All quality control criteria were met for this fraction.

Field Duplicate Summary

Analyte	42GLM1102(ug/L)	42GLM1102D(ug/L)	%RPD
Benzene	0.2	0.17	16
Ethylbenzene	0.41	0.35	16
Naphthalene (8260B)	26.2	23.4	12
Toluene	0.44	0.38	15
Xylenes, total	1.5	1.2	22
1-Methylnaphthalene	0.89	0.92	3.3
Naphthalene (8270C)	15.1	15.3	1.3

No data qualifiers were applied due to field duplicates.

Executive Summary

Laboratory performance: No data modifications were made.

Other factors affecting data quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1996), and the NFESC guidelines "Navy Installation Restoration Chemical Data Quality Manual" (September, 1999). The text of the report has been formulated to address only those problems affecting data quality.

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

Suzanne J. Smith

Project Chemist
Tetra Tech NUS, Inc.

CTO174-CNC CHARLESTON
WATER A
GENERAL ENGINEERING LAB
SDG: 42028

SAMPLE NUMBER:	42GLM0402			42GLM0802			42GLM0902			42GLM1002		
SAMPLE DATE:	05/09/01			05/09/01			05/09/01			05/09/01		
LABORATORY ID:	42028005			42028003			42028006			42028007		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,2-DIBROMOETHANE	5	U		5	U		5	U		5	U	
BENZENE	5	U		5	U		5	U		0.4	J	P
ETHYLBENZENE	5	U		5	U		5	U		0.71	J	P
METHYL TERT-BUTYL ETHER	40	U		40	U		40	U		40	U	
NAPHTHALENE	5	U		0.53	J	P	5	U		~~107~~ 113	~~E~~	
TOLUENE	5	U		5	U		5	U		0.25	J	P
TOTAL XYLENES	5	U		5	U		5	U		1.7	J	P

CTO174 ^NC CHARLESTON
WATER . A
GENERAL ENGINEERING LAB
SDG: 42028

SAMPLE NUMBER:	42GLM1102			42GLM1102D			42GLM1202			42TL00202		
SAMPLE DATE:	05/09/01			05/09/01			05/09/01			05/04/01		
LABORATORY ID:	42028008			42028002			42028004			42028001		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAI		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,2-DIBROMOETHANE	5	U		5	U		5	U		5	U	
BENZENE	0.2	J	P	0.17	J	P	5	U		5	U	
ETHYLBENZENE	0.41	J	P	0.35	J	P	5	U		5	U	
METHYL TERT-BUTYL ETHER	40	U		40	U		40	U		40	U	
NAPHTHALENE	26.2			23.4			5	U		5	U	
TOLUENE	0.44	J	P	0.38	J	P	5	U		5	U	
TOTAL XYLENES	1.5	J	P	1.2	J	P	5	U		5	U	

CTO17/ NC CHARLESTON
WATER L A
GENERAL ENGINEERING LAB
SDG: 42028

SAMPLE NUMBER:	42GLM0902			42GLM1002			42GLM1102					
SAMPLE DATE:	05/09/01			05/09/01			05/09/01			/ /		
LABORATORY ID:	42028006			42028007			42028008					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	0.0 %			0.0 %			0.0 %			100.0 %		
UNITS:	UG/L			UG/L			UG/L					
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
DISSOLVED GASES												
METHANE	2880	B		23900	B		206	B				

CTO174 NC CHARLESTON
WATER L A
GENERAL ENGINEERING LAB
SDG: 42028

SAMPLE NUMBER:	42GLM0402			42GLM0802			42GLM0902			42GLM1002		
SAMPLE DATE:	05/09/01			05/09/01			05/09/01			05/09/01		
LABORATORY ID:	42028005			42028003			42028006			42028007		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	10.1	U		10.1	U		10.1	U		12.4		
2-METHYLNAPHTHALENE	10.1	U		10.1	U		10.1	U		10.1	U	
BENZO(A)ANTHRACENE	10.1	U		10.1	U		10.1	U		10.1	U	
BENZO(B)FLUORANTHENE	10.1	U		10.1	U		10.1	U		10.1	U	
BENZO(K)FLUORANTHENE	10.1	U		10.1	U		10.1	U		10.1	U	
CHRYSENE	10.1	U		10.1	U		10.1	U		10.1	U	
DIBENZO(A,H)ANTHRACENE	10.1	U		10.1	U		10.1	U		10.1	U	
NAPHTHALENE	10.1	U		10.1	U		10.1	U		61.1		

CTO174-CNC CHARLESTON
WATEF ΓA
GENERAL ENGINEERING LAB
SDG: 42028

SAMPLE NUMBER:	42GLM1102			42GLM1102D			42GLM1202					
SAMPLE DATE:	05/09/01			05/09/01			05/09/01			/ /		
LABORATORY ID:	42028008			42028002			42028004					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	0.0 %			0.0 %			0.0 %			100.0 %		
UNITS:	UG/L			UG/L			UG/L					
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	0.89	J	P	0.92	J	P	13.3	U				
2-METHYLNAPHTHALENE	10.1	U		10.1	U		13.3	U				
BENZO(A)ANTHRACENE	10.1	U		10.1	U		13.3	U				
BENZO(B)FLUORANTHENE	10.1	U		10.1	U		13.3	U				
BENZO(K)FLUORANTHENE	10.1	U		10.1	U		13.3	U				
CHRYSENE	10.1	U		10.1	U		13.3	U				
DIBENZO(A,H)ANTHRACENE	10.1	U		10.1	U		13.3	U				
NAPHTHALENE	15.1			15.3			13.3	U				

42028

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06/11/01

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	42GLM0902	42028006	NORMAL	42028	METH	05/09/01	05/15/01	05/22/01	6	7	13
UG/L	42GLM1002	42028007	NORMAL	42028	METH	05/09/01	05/15/01	05/22/01	6	7	13
UG/L	42GLM1102	42028008	NORMAL	42028	METH	05/09/01	05/15/01	05/22/01	6	7	13
MG/L	42GLM0902	42028006	NORMAL	42028	NTA	05/09/01	05/10/01	05/10/01	1	0	1
MG/L	42GLM1002	42028007	NORMAL	42028	NTA	05/09/01	05/10/01	05/10/01	1	0	1
MG/L	42GLM1102	42028008	NORMAL	42028	NTA	05/09/01	05/10/01	05/10/01	1	0	1
UG/L	42GLM0402	42028005	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42GLM0802	42028003	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42GLM0902	42028006	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42GLM1002	42028007	NORMAL	42028	OV	05/09/01	05/15/01	05/15/01	6	0	6
UG/L	42GLM1102	42028008	NORMAL	42028	OV	05/09/01	05/15/01	05/15/01	6	0	6
UG/L	42GLM1102D	42028002	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42GLM1202	42028004	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42TL00202	42028001	NORMAL	42028	OV	05/04/01	05/12/01	05/12/01	8	0	8
UG/L	42GLM0402	42028005	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM0802	42028003	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM0902	42028006	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM1002	42028007	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM1102	42028008	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM1102D	42028002	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM1202	42028004	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
MG/L	42GLM0902	42028006	NORMAL	42028	SO4	05/09/01	05/10/01	05/10/01	1	0	1
MG/L	42GLM1002	42028007	NORMAL	42028	SO4	05/09/01	05/10/01	05/10/01	1	0	1
MG/L	42GLM1102	42028008	NORMAL	42028	SO4	05/09/01	05/10/01	05/10/01	1	0	1

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GENERAL ENGINEERING LAB
SDG: 42028

SAMPLE NUMBER:	42GLM0902			42GLM1002			42GLM1102					
SAMPLE DATE:	05/09/01			05/09/01			05/09/01			/ /		
LABORATORY ID:	42028006			42028007			42028008					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	0.0 %			0.0 %			0.0 %			100.0 %		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANIC PARAMETERS												
NITRATE(MG/L)	0.05	U		0.05	U		0.05	U				
SULFATE(MG/L)	18.5			18.2			46.7					

42028

HOLDING TIME
06/11/01

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	42GLM0902	42028006	NORMAL	42028	METH	05/09/01	05/15/01	05/22/01	6	7	13
UG/L	42GLM1002	42028007	NORMAL	42028	METH	05/09/01	05/15/01	05/22/01	6	7	13
UG/L	42GLM1102	42028008	NORMAL	42028	METH	05/09/01	05/15/01	05/22/01	6	7	13
MG/L	42GLM0902	42028006	NORMAL	42028	NTA	05/09/01	05/10/01	05/10/01	1	0	1
MG/L	42GLM1002	42028007	NORMAL	42028	NTA	05/09/01	05/10/01	05/10/01	1	0	1
MG/L	42GLM1102	42028008	NORMAL	42028	NTA	05/09/01	05/10/01	05/10/01	1	0	1
UG/L	42GLM0402	42028005	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42GLM0802	42028003	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42GLM0902	42028006	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42GLM1002	42028007	NORMAL	42028	OV	05/09/01	05/15/01	05/15/01	6	0	6
UG/L	42GLM1102	42028008	NORMAL	42028	OV	05/09/01	05/15/01	05/15/01	6	0	6
UG/L	42GLM1102D	42028002	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42GLM1202	42028004	NORMAL	42028	OV	05/09/01	05/12/01	05/12/01	3	0	3
UG/L	42TL00202	42028001	NORMAL	42028	OV	05/04/01	05/12/01	05/12/01	8	0	8
UG/L	42GLM0402	42028005	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM0802	42028003	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM0902	42028006	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM1002	42028007	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM1102	42028008	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM1102D	42028002	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
UG/L	42GLM1202	42028004	NORMAL	42028	PAH	05/09/01	05/11/01	05/14/01	2	3	5
MG/L	42GLM0902	42028006	NORMAL	42028	SO4	05/09/01	05/10/01	05/10/01	1	0	1
MG/L	42GLM1002	42028007	NORMAL	42028	SO4	05/09/01	05/10/01	05/10/01	1	0	1
MG/L	42GLM1102	42028008	NORMAL	42028	SO4	05/09/01	05/10/01	05/10/01	1	0	1

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0402

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028005

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I547

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0802

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028003

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I545

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	0.53	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0902

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028006

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I548

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1002

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028007

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I549

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	0.40	J
108-88-3	Toluene	0.25	J
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	0.71	J
1330-20-7	Xylenes (total)	1.7	J
91-20-3	Naphthalene	107	E

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1002DL

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028007

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5J217

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 2.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	80.0	U
71-43-2	Benzene	0.53	DJ
108-88-3	Toluene	10.0	U
106-93-4	1,2-Dibromoethane	10.0	U
100-41-4	Ethylbenzene	0.85	DJ
1330-20-7	Xylenes (total)	2.2	DJ
91-20-3	Naphthalene	113	D

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1102

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028008

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5J218

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: not dec. _____ Date Analyzed: 05/15/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	0.20	J
108-88-3	Toluene	0.44	J
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	0.41	J
1330-20-7	Xylenes (total)	1.5	J
91-20-3	Naphthalene	26.2	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1102D

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028002

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I544

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	0.17	J
108-88-3	Toluene	0.38	J
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	0.35	J
1330-20-7	Xylenes (total)	1.2	J
91-20-3	Naphthalene	23.4	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1202

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028004

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I546

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42TL00202

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 5I538

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: not dec. _____ Date Analyzed: 05/12/01

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
1634-04-4	tert-Butyl methyl ether	40.0	U
71-43-2	Benzene	5.0	U
108-88-3	Toluene	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
100-41-4	Ethylbenzene	5.0	U
1330-20-7	Xylenes (total)	5.0	U
91-20-3	Naphthalene	5.0	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0402

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028005

Sample wt/vol: 990.0 (g/mL) ML Lab File ID: 8U118

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.1	U
91-57-6	2-Methylnaphthalene	10.1	U
90-12-0	1-Methylnaphthalene	10.1	U
56-55-3	Benzo(a)anthracene	10.1	U
218-01-9	Chrysene	10.1	U
205-99-2	Benzo(b)fluoranthene	10.1	U
207-08-9	Benzo(k)fluoranthene	10.1	U
53-70-3	Dibenzo(a,h)anthracene	10.1	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0802

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028003

Sample wt/vol: 990.0 (g/mL) ML Lab File ID: 8U116

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.1	U
91-57-6	2-Methylnaphthalene	10.1	U
90-12-0	1-Methylnaphthalene	10.1	U
56-55-3	Benzo(a)anthracene	10.1	U
218-01-9	Chrysene	10.1	U
205-99-2	Benzo(b)fluoranthene	10.1	U
207-08-9	Benzo(k)fluoranthene	10.1	U
53-70-3	Dibenzo(a,h)anthracene	10.1	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM0902

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028006

Sample wt/vol: 990.0 (g/mL) ML Lab File ID: 8U119

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/14/01

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	10.1	U
91-57-6	2-Methylnaphthalene	10.1	U
90-12-0	1-Methylnaphthalene	10.1	U
56-55-3	Benzo(a)anthracene	10.1	U
218-01-9	Chrysene	10.1	U
205-99-2	Benzo(b)fluoranthene	10.1	U
207-08-9	Benzo(k)fluoranthene	10.1	U
53-70-3	Dibenzo(a,h)anthracene	10.1	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1002

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028007

Sample wt/vol: 990.0 (g/mL) ML Lab File ID: 8U120

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted:05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	61.1	
91-57-6	2-Methylnaphthalene	10.1	U
90-12-0	1-Methylnaphthalene	12.4	
56-55-3	Benzo(a)anthracene	10.1	U
218-01-9	Chrysene	10.1	U
205-99-2	Benzo(b)fluoranthene	10.1	U
207-08-9	Benzo(k)fluoranthene	10.1	U
53-70-3	Dibenzo(a,h)anthracene	10.1	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1102

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028008

Sample wt/vol: 990.0 (g/mL) ML Lab File ID: 8U121

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	15.1	
91-57-6	2-Methylnaphthalene	10.1	U
90-12-0	1-Methylnaphthalene	0.89	J
56-55-3	Benzo(a)anthracene	10.1	U
218-01-9	Chrysene	10.1	U
205-99-2	Benzo(b)fluoranthene	10.1	U
207-08-9	Benzo(k)fluoranthene	10.1	U
53-70-3	Dibenzo(a,h)anthracene	10.1	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1102D

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028002

Sample wt/vol: 990.0 (g/mL) ML Lab File ID: 8U115

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	15.3	
91-57-6	2-Methylnaphthalene	10.1	U
90-12-0	1-Methylnaphthalene	0.92	J
56-55-3	Benzo(a)anthracene	10.1	U
218-01-9	Chrysene	10.1	U
205-99-2	Benzo(b)fluoranthene	10.1	U
207-08-9	Benzo(k)fluoranthene	10.1	U
53-70-3	Dibenzo(a,h)anthracene	10.1	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

42GLM1202

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 42028

Matrix: (soil/water) WATER Lab Sample ID: 42028004

Sample wt/vol: 750.0 (g/mL) ML Lab File ID: 8U117

Level: (low/med) LOW Date Received: 05/09/01

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 05/11/01

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/14/01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

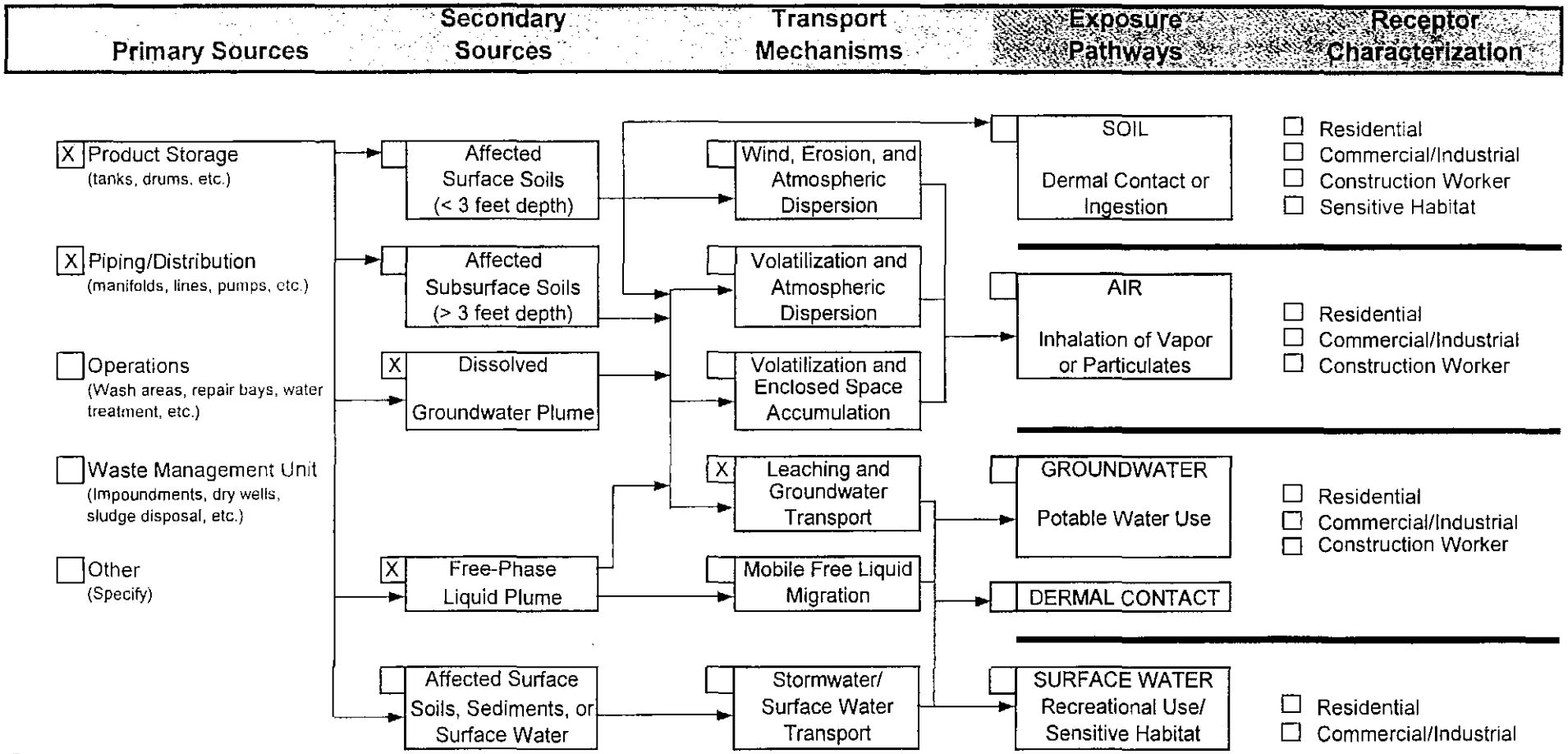
GPC Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	Naphthalene	13.3	U
91-57-6	2-Methylnaphthalene	13.3	U
90-12-0	1-Methylnaphthalene	13.3	U
56-55-3	Benzo(a)anthracene	13.3	U
218-01-9	Chrysene	13.3	U
205-99-2	Benzo(b)fluoranthene	13.3	U
207-08-9	Benzo(k)fluoranthene	13.3	U
53-70-3	Dibenzo(a,h)anthracene	13.3	U

APPENDIX D
SITE CONCEPTUAL MODEL

IDENTIFICATION OF POTENTIAL EXPOSURE PATHWAYS
Site 42, Chicora Tank Farm
Charleston Naval Complex
Charleston, South Carolina

TIME: CURRENT CONDITIONS

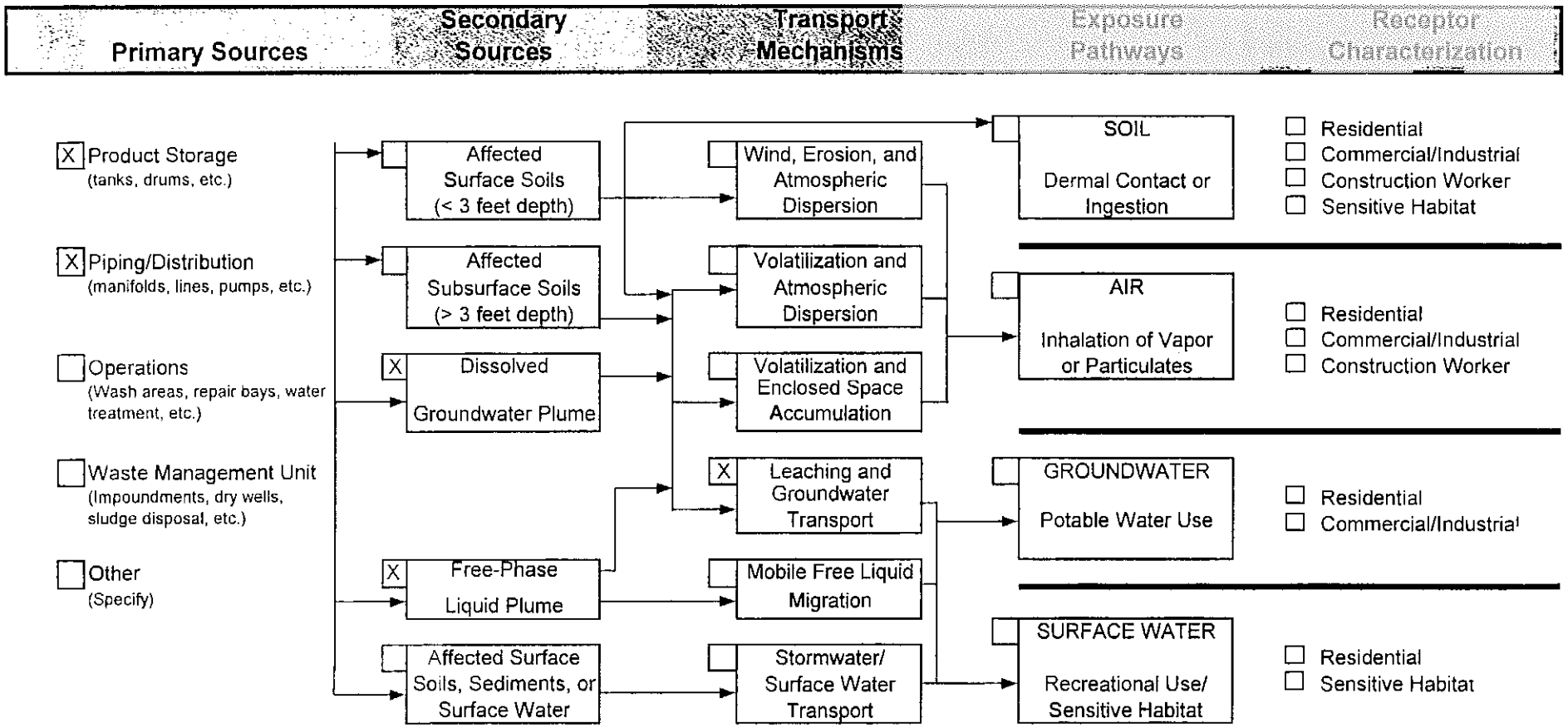


Summary

There are no complete migration pathways for this site at the present time.

IDENTIFICATION OF POTENTIAL EXPOSURE PATHWAYS
Site 42, Chicora Tank Farm
Charleston Naval Complex
Charleston, South Carolina

TIME: POTENTIAL FUTURE CONSTRUCTION PHASE



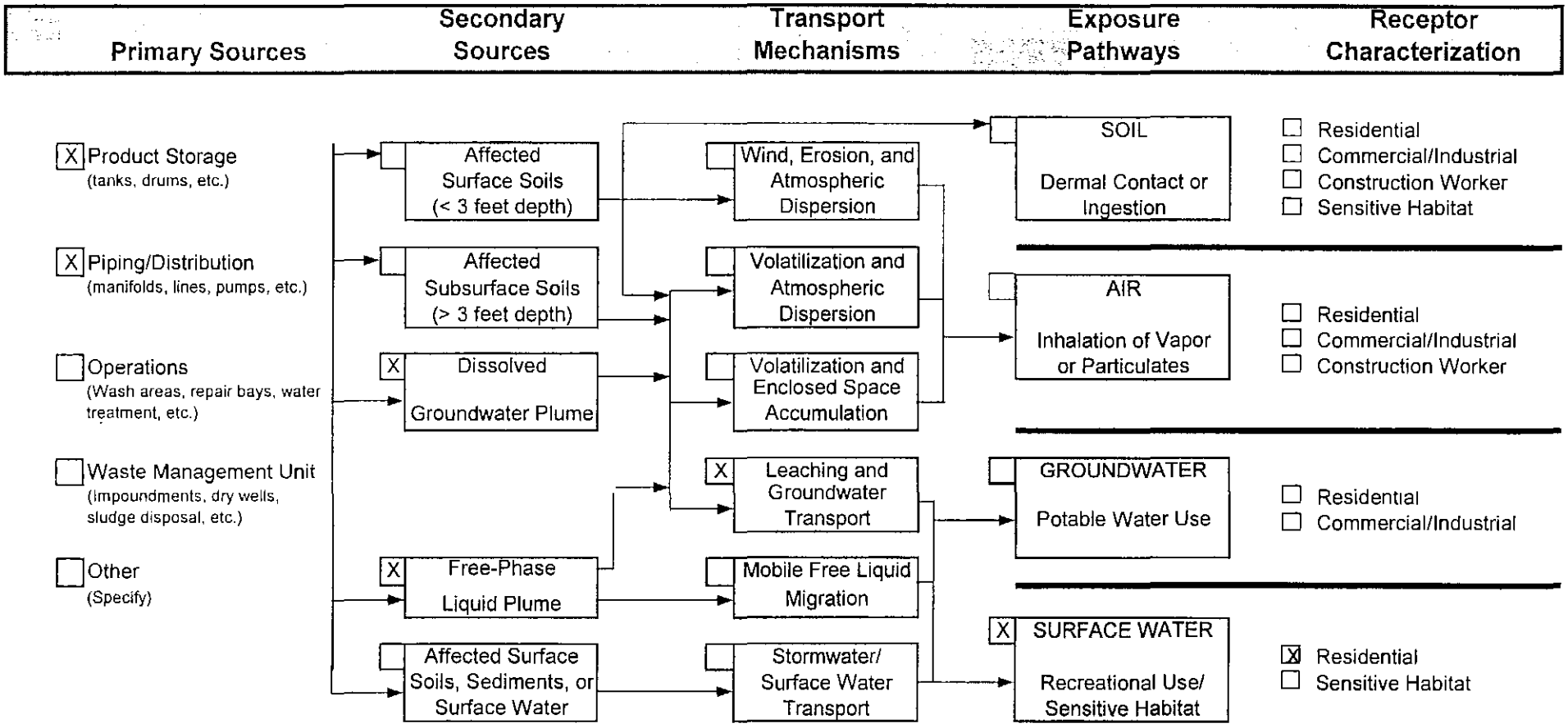
Summary

The site was evaluated with a possible future construction phase:

Construction Worker dermal contact of volatiles from soil is considered very unlikely, due to contaminated soil less than applicable RBSLs

IDENTIFICATION OF POTENTIAL EXPOSURE PATHWAYS
Site 42, Chicora Tank Farm
Charleston Naval Complex
Charleston, South Carolina

TIME: FUTURE CONDITIONS



Summary
A potential pathway to surface water was modelled as the most conservative pathway.

APPENDIX E
DOMENICO MODEL DATA SHEETS

GROUNDWATER SSTLS FOR RETENTION POND RECEPTOR
CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA
SCDHEG UST ID No. 13350

Groundwater SSTLs Summary

TANK L PLUME

Constituent	SSTLs Protective of Surface Water (Tank Farm Retention Pond)			SSTLs Protective of Construction Workers		Minimum On-Site SSTLs[a]	Source Concentration of Constituent
	RBSL [mg/L]	$SSTL_{SOURCE}$ [mg/L]	$SSTL_{COMP}$ [mg/L]	RBSL [mg/L]	$SSTL_{SOURCE}$ [mg/L]	[mg/L]	[mg/L]
Benzene	0.005	0.168	0.137	0.15	0.15	0.15	0.004
Toluene	1	33.656	27.459	5.38	5.38	5.38	0.005
Ethylbenzene	0.7	23.559	19.221	6.05	6.05	6.05	0.005
Xylenes	10	336.56	274.59	102.33	102.33	102.33	0.005
Naphthalene	0.01	0.337	0.275	1.63	1.63	1.63	0.198

TANK M PLUME

Constituent	SSTLs Protective of Surface Water (Tank Farm Retention Pond)			SSTLs Protective of Construction Workers		Minimum On-Site SSTLs[a]	Source Concentration of Constituent
	RBSL [mg/L]	$SSTL_{SOURCE}$ [mg/L]	$SSTL_{COMP}$ [mg/L]	RBSL [mg/L]	$SSTL_{SOURCE}$ [mg/L]	[mg/L]	[mg/L]
Benzene	0.005	0.482	0.421	0.15	0.15	0.15	0.005
Toluene	1	96.318	84.122	5.38	5.38	5.38	0.003
Ethylbenzene	0.7	67.423	58.886	6.05	6.05	6.05	0.005
Xylenes	10	1169.45	975.79	102.33	102.33	102.33	0.005
Naphthalene	0.01	6.6	4.54	1.63	1.63	1.63	0.865

TANK O PLUME

Constituent	SSTLs Protective of Surface Water (Tank Farm Retention Pond)			SSTLs Protective of Construction Workers		Minimum On-Site SSTLs[a]	Source Concentration of Constituent
	RBSL [mg/L]	$SSTL_{SOURCE}$ [mg/L]	$SSTL_{COMP}$ [mg/L]	RBSL [mg/L]	$SSTL_{SOURCE}$ [mg/L]	[mg/L]	[mg/L]
Benzene	0.005	3.58	3.37	0.15	0.15	0.15	0.003
Toluene	1	715.9	674.14	5.38	5.38	5.38	0.010
Ethylbenzene	0.7	501.13	471.9	6.05	6.05	6.05	0.020
Xylenes	10	7171.16	6750.18	102.33	102.33	102.33	0.045
Naphthalene	0.01	9.12	8.38	1.63	1.63	1.63	0.046

RBSLs - Groundwater RBSLs which are protective of exposure at the receptor point
$SSTL_{SOURCE}$ - Groundwater SSTLs in the source area protective of RBSLs at the POE
$SSTL_{COMP}$ - Groundwater SSTLs at the compliance well that are protective of RBSLs at the off-site POE. There are no compliance well SSTLs for the construction worker, because the construction worker is onsite.

(a) The mimimum on-site SSTLs are chosen as those SSTLs protective of both surface water (the Cooper River) and the on-site construction worker.

Prepared By: _____ Reviewed By: _____

Domenico "L"

CHICORA TANK FARM, RETENTION POND DOMENICO MODEL FOR TANK L PLUME
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
SCDHEC UST ID No. 13350

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Site-Specific Target Level Calculations for Groundwater: Potential Future Off-Site Ingestion

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
i = Groundwater Gradient	m/m
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = 0.1x	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s i)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm^3	ρ_s g/cm^3	α_x m	α_y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-s	V m/sec	R_c	C_{POE}/C_{SOURCE}
Benzene	600	182.882	39.6	2.1	1.00E+13	1.70E-05	0.0020	0.3	1.55	18.29	6.10	0.91	1.50E-01	81	12.15	1.13E-07	63.775	2.971E-02
Toluene	600	182.882	39.6	2.1	1.00E+13	1.70E-05	0.0020	0.3	1.55	18.29	6.10	0.91	1.50E-01	133	19.95	1.13E-07	104.075	2.971E-02
Ethylbenzene	600	182.882	39.6	2.1	1.00E+13	1.70E-05	0.0020	0.3	1.55	18.29	6.10	0.91	1.50E-01	176	26.4	1.13E-07	137.400	2.971E-02
Xylenes	600	182.882	39.6	2.1	1.00E+13	1.70E-05	0.0020	0.3	1.55	18.29	6.10	0.91	1.50E-01	639	95.85	1.13E-07	496.225	2.971E-02
Naphthalene	600	182.882	39.6	2.1	1.00E+13	1.70E-05	0.0020	0.3	1.55	18.29	6.10	0.91	1.50E-01	1543	231.45	1.13E-07	1196.825	2.971E-02

Constituent	X_{COMP} ft	X_{COMP} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm^3	ρ_s g/cm^3	α_x m	α_y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-s	V m/sec	R_c	C_{POE}/C_{COMP}
Benzene	540	164.594	39.6	2.1	1.00E+13	1.70E-05	0.002	0.3	1.55	16.46	5.49	0.82	1.50E-01	81	12.15	1.13E-07	63.775	3.642E-02
Toluene	540	164.594	39.6	2.1	1.00E+13	1.70E-05	0.002	0.3	1.55	16.46	5.49	0.82	1.50E-01	133	19.95	1.13E-07	104.075	3.642E-02
Ethylbenzene	540	164.594	39.6	2.1	1.00E+13	1.70E-05	0.002	0.3	1.55	16.46	5.49	0.82	1.50E-01	176	26.4	1.13E-07	137.400	3.642E-02
Xylenes	540	164.594	39.6	2.1	1.00E+13	1.70E-05	0.002	0.3	1.55	16.46	5.49	0.82	1.50E-01	639	95.85	1.13E-07	496.225	3.642E-02
Naphthalene	540	164.594	39.6	2.1	1.00E+13	1.70E-05	0.002	0.3	1.55	16.46	5.49	0.82	1.50E-01	1543	231.45	1.13E-07	1196.825	3.642E-02

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	POE RBSL mg/L	$SSTL_{SOURCE}$ mg/L	$SSTL_{COMP}$ mg/L
Benzene	0.005	0.168	0.137
Toluene	1.000	33.656	27.459
Ethylbenzene	0.700	23.559	19.221
Xylenes	10.000	336.56	274.59
Naphthalene	0.010	0.337	0.275

Prepared By: AJC

Reviewed By: _____

Domenico "M"

CHICORA TANK FARM, RETENTION POND DOMENICO MODEL FOR TANK M PLUME
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
SCDHEC UST ID No. 13350

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Site-Specific Target Level Calculations for Groundwater: Potential Future Off-Site Ingestion

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
i = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = 0.1x	m
α_Y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $a_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_C = Constituent Retardation Factor	
V/R_C = Maximum Transport Rate of Dissolved Constituent = $(K_s i)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm^3	ρ_s g/cm^3	α_x m	α_Y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-s	V m/sec	R_C	C_{POE}/C_{SOURCE}
Benzene	1200	365.764	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	36.58	12.19	1.83	1.50E-01	81	12.15	2.83E-08	65.800	1.038E-02
Toluene	1200	365.764	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	36.58	12.19	1.83	1.50E-01	133	19.95	2.83E-08	107.400	1.038E-02
Ethylbenzene	1200	365.764	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	36.58	12.19	1.83	1.50E-01	176	26.4	2.83E-08	141.800	1.038E-02
Xylenes	1200	365.764	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	36.58	12.19	1.83	1.50E-01	639	95.85	2.83E-08	512.200	8.557E-03
Naphthalene	1200	365.764	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	36.58	12.19	1.83	1.50E-01	1543	231.45	2.83E-08	1235.400	1.517E-03

Constituent	X_{COMP} ft	X_{COMP} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm^3	ρ_s g/cm^3	α_x m	α_Y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-s	V m/sec	R_C	C_{POE}/C_{COMP}
Benzene	1120	341.38	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	34.14	11.38	1.71	1.50E-01	81	12.15	2.83E-08	65.800	1.189E-02
Toluene	1120	341.38	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	34.14	11.38	1.71	1.50E-01	133	19.95	2.83E-08	107.400	1.189E-02
Ethylbenzene	1120	341.38	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	34.14	11.38	1.71	1.50E-01	176	26.4	2.83E-08	141.800	1.189E-02
Xylenes	1120	341.38	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	34.14	11.38	1.71	1.50E-01	639	95.85	2.83E-08	512.200	1.025E-02
Naphthalene	1120	341.38	61	1.88	1.00E+13	1.70E-05	0.0005	0.3	1.6	34.14	11.38	1.71	1.50E-01	1543	231.45	2.83E-08	1235.400	2.203E-03

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	POE RBSL mg/L	$SSTL_{SOURCE}$ mg/L	$SSTL_{COMP}$ mg/L
Benzene	0.005	0.482	0.421
Toluene	1.000	96.318	84.122
Ethylbenzene	0.700	67.423	58.886
Xylenes	10.000	1168.58	975.79
Naphthalene	0.010	5.59	4.54

Prepared By: _____

Reviewed By: _____

CHICORA TANK FARM, RETENTION POND DOMENICO MODEL FOR TANK O PLUME
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
SCDHEC UST ID No. 13350

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Site-Specific Target Level Calculations for Groundwater: Potential Future Off-Site Ingestion

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
i = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = 0.1x	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s i)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm^3	ρ_s g/cm^3	α_x m	α_y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-s	V m/sec	R_c	C_{POE}/C_{SOURCE}
Benzene	1350	411.485	12	1.6	1.00E+13	2.10E-05	0.0010	0.3	1.55	41.15	13.72	2.06	1.50E-01	81	12.15	7.00E-08	63.775	1.397E-03
Toluene	1350	411.485	12	1.6	1.00E+13	2.10E-05	0.0010	0.3	1.55	41.15	13.72	2.06	1.50E-01	133	19.95	7.00E-08	104.075	1.397E-03
Ethylbenzene	1350	411.485	12	1.6	1.00E+13	2.10E-05	0.0010	0.3	1.55	41.15	13.72	2.06	1.50E-01	176	26.4	7.00E-08	137.400	1.397E-03
Xylenes	1350	411.485	12	1.6	1.00E+13	2.10E-05	0.0010	0.3	1.55	41.15	13.72	2.06	1.50E-01	639	95.85	7.00E-08	496.225	1.394E-03
Naphthalene	1350	411.485	12	1.6	1.00E+13	2.10E-05	0.0010	0.3	1.55	41.15	13.72	2.06	1.50E-01	1543	231.45	7.00E-08	1196.825	1.097E-03

Constituent	X_{COMP} ft	X_{COMP} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm^3	ρ_s g/cm^3	α_x m	α_y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-s	V m/sec	R_c	C_{POE}/C_{COMP}
Benzene	1310	399.293	12	1.6	1.00E+13	2.10E-05	0.001	0.3	1.55	39.93	13.31	2.00	1.50E-01	81	12.15	7.00E-08	63.775	1.483E-03
Toluene	1310	399.293	12	1.6	1.00E+13	2.10E-05	0.001	0.3	1.55	39.93	13.31	2.00	1.50E-01	133	19.95	7.00E-08	104.075	1.483E-03
Ethylbenzene	1310	399.293	12	1.6	1.00E+13	2.10E-05	0.001	0.3	1.55	39.93	13.31	2.00	1.50E-01	176	26.4	7.00E-08	137.400	1.483E-03
Xylenes	1310	399.293	12	1.6	1.00E+13	2.10E-05	0.001	0.3	1.55	39.93	13.31	2.00	1.50E-01	639	95.85	7.00E-08	496.225	1.481E-03
Naphthalene	1310	399.293	12	1.6	1.00E+13	2.10E-05	0.001	0.3	1.55	39.93	13.31	2.00	1.50E-01	1543	231.45	7.00E-08	1196.825	1.194E-03

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	POE RBSL mg/L	$SSTL_{SOURCE}$ mg/L	$SSTL_{COMP}$ mg/L
Benzene	0.005	3.58	3.37
Toluene	1.000	715.90	674.14
Ethylbenzene	0.700	501.13	471.90
Xylenes	10.000	7171.04	6750.08
Naphthalene	0.010	9.12	8.38

Prepared By: _____

Reviewed By: _____

TANK "L" PLUME, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 10-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
i = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_Y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s i)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm^3	ρ_s g/cm^3	α_X m	α_Y m	α_Z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-soil	V m/sec	R_c	C_{POE}/C_{SOURCE}
Naphthalene	0.202	0.06157	39.6	2.07	3.15E+08	1.70E-05	0.0020	0.3	1.55	0.01	0.00	0.00	1.50E-01	1543	231.45	1.13E-07	1196.825	4.912E-02

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_X mg/L
Naphthalene	0.198	0.010

Prepared By: [illegible]

Reviewed By:

TANK "M" PLUME, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 10-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
i = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_X = Longitudinal Dispersivity = x/10	m
α_Y = Transverse Dispersivity = $\alpha_X/3$	m
α_Z = Vertical Dispersivity = $\alpha_X/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_C = Constituent Retardation Factor	
V/R_C = Maximum Transport Rate of Dissolved Constituent = $(K_s i)/(\theta R_C)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm^3	ρ_s g/cm^3	α_X m	α_Y m	α_Z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-soil	V m/sec	R_C	C_{POE}/C_{SOURCE}
Naphthalene	0.063	0.0192	61	1.88	3.15E+08	1.70E-05	0.0005	0.3	1.6	0.00	0.00	0.00	1.50E-01	1543	231.45	2.83E-08	1235.400	1.157E-02

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_X mg/L
Naphthalene	0.865	0.010

Prepared By: [illegible]

Reviewed By:

TANK "O" PLUME, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 10-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
i = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s i)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm^3	ρ_s g/cm^3	α_x m	α_y m	α_z m	f_{oc} g-C/g-soil	k_{oc} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-soil	V m/sec	R_c	C_{POE}/C_{SOURCE}
Naphthalene	0.086	0.02621	12	1.6	3.15E+08	2.10E-05	0.0010	0.3	1.55	0.00	0.00	0.00	1.50E-01	1543	231.45	7.00E-08	1196.825	2.148E-01

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_X mg/L
Naphthalene	0.046	0.010

Prepared By: _____

Reviewed By: _____

TANK "L" PLUME, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 20-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
i = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{oc} = Fraction Organic Carbon in Soil	g-C/g-soil
α_X = Longitudinal Dispersivity = x/10	m
α_Y = Transverse Dispersivity = $\alpha_X/3$	m
α_Z = Vertical Dispersivity = $\alpha_X/20$	m
k_{oc} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_c = Constituent Retardation Factor	
V/R_c = Maximum Transport Rate of Dissolved Constituent = $(K_s i)/(\theta R_c)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm	ρ_s g/cm^3	α_X m	α_Y m	α_Z m	f_{OC} g-C/g-soil	k_{OC} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-soil	V m/sec	R_C	C_{POE}/C_{SOURCE}
Naphthalene	0.405	0.12345	39.6	2.07	6.31E+08	1.70E-05	0.0020	0.3	1.55	0.01	0.00	0.00	1.50E-01	1543	231.45	1.13E-07	1196.825	4.852E-02

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_X mg/L
Naphthalene	0.198	0.010

Prepared By: _____

Reviewed By: _____

TANK "M" PLUME, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 20-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
i = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{OC} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_y = Transverse Dispersivity = $\alpha_x/3$	m
α_z = Vertical Dispersivity = $\alpha_x/20$	m
k_{OC} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_C = Constituent Retardation Factor	
V/R_C = Maximum Transport Rate of Dissolved Constituent = $(K_s i)/(\theta R_C)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_S m/sec	i m/m	θ cm^3/cm	ρ_S g/cm^3	α_X m	α_Y m	α_Z m	f_{OC} g-C/g-soil	k_{OC} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-soil	V m/sec	R_C	C_{POE}/C_{SOURCE}
Naphthalene	0.126	0.03841	61	1.88	6.31E+08	1.70E-05	0.0005	0.3	1.6	0.00	0.00	0.00	1.50E-01	1543	231.45	2.83E-08	1235.400	1.157E-02

Source: South Caroline Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_X mg/L
Naphthalene	0.865	0.010

Prepared By: _____

Reviewed By: _____

TANK "O" PLUME, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

DOMENICO'S DILUTION/ATTENUATION EQUATION FOR GROUNDWATER TRANSPORT

Predicted 20-year Migration of Constituents in Groundwater

Parameter Descriptions:	Units
POE = Point of Exposure	
SSTL = Site-Specific Target Level	mg/L
$SSTL_{SOURCE}$ = Hydrocarbon Concentration in Plume Source Area protective of RBSLs at POE	mg/L
$SSTL_{COMP}$ = Hydrocarbon Concentration at Compliance Point protective of RBSLs at POE	mg/L
X_{POE} = x = Distance from Plume Source to POE (along Centerline)	m
X_{COMP} = x = Distance from POE to Compliance Point (along Centerline)	m
Y = Source Width (Perpendicular to Flow Direction)	m
Z = Source Depth (Perpendicular to Flow Direction in Vertical Plane)	m
K_s = Saturated Hydraulic Conductivity	m/sec
i = Groundwater Gradient	cm/cm
θ = Porosity in Saturated Zone	cm^3/cm^3

Parameter Descriptions:	Units
ρ_s = Soil Bulk Density	g/cm^3
f_{OC} = Fraction Organic Carbon in Soil	g-C/g-soil
α_x = Longitudinal Dispersivity = x/10	m
α_Y = Transverse Dispersivity = $\alpha_x/3$	m
α_Z = Vertical Dispersivity = $\alpha_x/20$	m
k_{OC} = Organic Carbon Partition Coefficient	cm^3-H_2O/g-C
k_D = Soil-Water Sorption Coefficient	cm^3-H_2O/g-soil
V = Pore Water Velocity	m/sec
R_C = Constituent Retardation Factor	
V/R_C = Maximum Transport Rate of Dissolved Constituent = $(K_s i)/(\theta R_C)$	m/sec
RBSL = Risk-Based Screening Level in Water Provided by SCDHEC (1998)	mg/L

Dilution & Attenuation without Biological Decay

Constituent	X_{POE} ft	X_{POE} m	Y m	Z m	t sec	K_s m/sec	i m/m	θ cm^3/cm	ρ_s g/cm^3	α_x m	α_Y m	α_Z m	f_{OC} g-C/g-soil	k_{OC} cm^3-H_2O/g-C	k_D cm^3-H_2O/g-soil	V m/sec	R_C	C_{POE}/C_{SOURCE}
Naphthalene	0.172	0.05243	12	1.6	6.31E+08	2.10E-05	0.0010	0.3	1.55	0.01	0.00	0.00	1.50E-01	1543	231.45	7.00E-08	1196.825	2.148E-01

Source: South Carolina Department of Health and Environmental Control (SCDHEC) 1998. *Risk-Based Corrective Action for Petroleum Releases*, Bureau of Underground Storage Tank Management.

DOMENICO DILUTION/ATTENUATION MODEL WITHOUT BIOLOGICAL DECAY

$$\frac{C_X}{C_{SOURCE}} = \frac{1}{2} erfc\left[\frac{\left(x - \frac{vt}{R_c}\right)}{2\sqrt{\alpha_X \frac{vt}{R_c}}}\right] \times erf\left[\frac{Y}{4\sqrt{\alpha_Y x}}\right] \times erf\left[\frac{Z}{2\sqrt{\alpha_Z x}}\right]$$

Constituent	C_{SOURCE} mg/L	C_x mg/L
Naphthalene	0.046	0.010

Prepared By: _____

Reviewed By: _____

TABLES

TABLE 1

GROUNDWATER ELEVATIONS - MAY 2001
SITE 42, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Well No.	Total Depth of Well (ft)	Top of Casing Elevation, ft (MSL)	Date Measured	Depth to Free Product (BTOC)	Depth to Water, ft (BTOC)	Groundwater Elevation, ft (MSL)
CNC42-M01	14.50	11.94	5/7/2001	Strong odor	5.95	5.99
CNC42-M02	14.00	12.90	5/7/2001	ND	7.00	5.90
CNC42-M03	14.32	12.57	5/7/2001	ND	6.41	6.16
CNC42-M04	13.37	11.22	5/7/2001	ND	6.11	5.11
CNC42-M05	15.10	13.11	5/7/2001	ND	7.27	5.84
CNC42-M06D	31.93	12.18	5/7/2001	ND	6.16	6.02
CNC42-M07	15.40	11.60	5/7/2001	5.89	unknown[1]	NA
CNC42-M08	13.10	10.34	5/7/2001	ND	4.62	5.72
CNC42-M09	15.50	14.36	5/7/2001	ND	8.55	5.81
CNC42-M10	14.50	12.25	5/7/2001	ND	6.49	5.76
CNC42-M11	13.50	10.79	5/7/2001	ND	5.14	5.65
CNC42-M12D	33.10	11.79	5/7/2001	ND	5.70	6.09
CNC42-M13	13.10	11.26	5/7/2001	4.95	unknown[1]	NA
CNC42-M14	13.20	11.41	5/7/2001	ND	5.11	6.30
CNC42-M15	14.10	15.07	5/7/2001	ND	8.48	6.59
CNC42-M16	13.50	10.92	5/7/2001	ND	4.58	6.34
CNC42-M17	14.50	10.53	5/7/2001	ND	4.50	6.03
CNC42-M18D	27.48	11.27	5/7/2001	ND	4.94	6.33

Notes:
MSL - Mean Sea Level
BTOC - Below Top of Casing
ft - feet
ND - Not Detected
NA - Not Available
[1] Due to viscosity of free product, interface probe could not accurately measure depth of product

TABLE 2

GROUNDWATER ELEVATIONS - AUGUST 2001
SITE 42, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Well No.	Total Depth of Well (ft)	Top of Casing Elevation, ft (MSL)	Date Measured	Depth to Free Product (BTOC)	Depth to Water, ft (BTOC)	Groundwater Elevation, ft (MSL)
CNC42-M01	14.50	11.94	8/30/2001	5.90	unknown[1]	NA
CNC42-M02	14.00	12.90	8/31/2001	ND	6.91	5.99
CNC42-M03	14.32	12.57	8/30/2001	NM	6.26	6.31
CNC42-M04	13.37	11.22	8/30/2001	ND	4.99	6.23
CNC42-M05	15.10	13.11	8/31/2001	ND	7.28	5.83
CNC42-M06D	31.93	12.18	8/30/2001	ND	6.54	5.64
CNC42-M07	15.40	11.60	8/30/2001	5.72	unknown[1]	NA
CNC42-M08	13.10	10.34	8/30/2001	ND	4.43	5.91
CNC42-M09	15.50	14.36	8/30/2001	ND	8.41	5.95
CNC42-M10	14.50	12.25	8/30/2001	ND	6.39	5.86
CNC42-M11	13.50	10.79	8/30/2001	ND	4.93	5.86
CNC42-M12D	33.10	11.79	8/30/2001	ND	5.59	6.20
CNC42-M13	13.10	11.26	8/30/2001	4.78	unknown[1]	NA
CNC42-M14	13.20	11.41	8/30/2001	ND	5.00	6.41
CNC42-M15	14.10	15.07	8/30/2001	ND	8.20	6.87
CNC42-M16	13.50	10.92	8/30/2001	ND	4.43	6.49
CNC42-M17	14.50	10.53	8/30/2001	ND	4.36	6.17
CNC42-M18D	27.48	11.27	8/30/2001	ND	4.48	6.79

Notes:
MSL - Mean Sea Level
BTOC - Below Top of Casing
ft - feet
ND - Not Detected
NA - Not Available
NM - Not Measured
[1] Due to viscosity of free product, interface probe could not accurately measure depth of product

TABLE 3

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOIL
SITE 42, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Soil Boring / Sample No.	Sample Date	Benzene (ug/kg)	Toluene (ug/kg)	Ethyl-benzene (ug/kg)	Xylenes (total) (ug/kg)	Benzo(a) anthracene (ug/kg)	Benzo(b) fluoranthene (ug/kg)	Benzo(k) fluoranthene (ug/kg)	Chrysene (ug/kg)	Dibenzo(a,h) anthracene (ug/kg)	Naphthalene (ug/kg)
RBSL [1]		5	1622	1260	42471	73084	29097	231109	12998	87866	210
CNC42-P01 / 42SLP010405	7/29/1999	< 5	< 5	< 5	< 5	< 36.8	< 36.8	< 36.8	< 36.8	< 36.8	< 5
CNC42-P02 / 42SLP020405	7/29/1999	< 6	< 6	< 6	< 6	< 36.8	< 36.8	< 36.8	< 36.8	< 36.8	< 6
CNC42-P03 / 42SLP030405	7/29/1999	< 6	< 6	< 6	< 6	< 37.2	< 37.2	< 37.2	< 37.2	< 37.2	< 6
CNC42-P04 / 42SLP040506	7/29/1999	< 6	< 6	< 6	< 6	< 37.6	< 37.6	< 37.6	< 37.6	< 37.6	< 6
CNC42-P05 / 42SLP050304	8/3/1999	< 6	< 6	< 6	< 6	< 383	< 383	< 383	< 383	< 383	< 6
CNC42-P06 / 42SLP060304	8/3/1999	< 6	< 6	< 6	< 6	< 392	< 392	< 392	< 392	< 392	< 6
CNC42-P07 / 42SLP070405	8/3/1999	< 6	< 6	< 6	< 6	< 392	< 392	< 392	< 392	< 392	< 6
CNC42-P08 / 42SLP080607	8/3/1999	< 6	< 6	< 6	< 6	< 1530	< 1530	< 1530	700 [J]	< 1530	380 [E]/<700
CNC42-P09 / 42SLP090405	8/3/1999	< 5	< 5	< 5	< 5	< 397	< 397	< 397	< 397	< 397	< 5
CNC42-P10 / 42SLP100304	8/3/1999	< 6	< 6	< 6	< 6	< 397	< 397	< 397	< 397	< 397	< 6

All concentrations are in micrograms per kilograms (ug/kg).
NA - Not Analyzed
[1] South Carolina Department of Health and Environmental Control Risk Based Screening Levels for sandy soils; depth to groundwater less than 5 feet.
[2] Trip blank
[J] Indicates the presence of an analyte at a concentration less than the reporting limit and greater than the detection limit.
[E] Estimated result. Quantity above instrument (GC/MS) calibration range.

TABLE 3

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOI
SITE 42, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Soil Boring / Sample No.	Sample Date	Benzene (ug/kg)	Toluene (ug/kg)	Ethyl-benzene (ug/kg)	Xylenes (total) (ug/kg)	Benzo(a) anthracene (ug/kg)	Benzo(b) fluoranthene (ug/kg)	Benzo(k) fluoranthene (ug/kg)	Chrysene (ug/kg)	Dibenzo(a,h) anthracene (ug/kg)	Naphthalene (ug/kg)
RBSL [1]		5	1622	1260	42471	73084	29097	231109	12998	87866	210
CNC42-P11 / 42SLP110405	8/3/1999	< 6	< 6	< 6	< 6	< 379	< 379	< 379	< 379	< 379	< 6
CNC42-P12 / 42SLP120304	3-Aug-99	< 5	< 5	< 5	< 5	< 383	< 383	< 383	< 383	< 383	< 5
CNC42-P13 / 42SLP130304	3-Aug-99	< 5	< 5	< 5	< 5	< 370	< 370	< 370	< 370	< 370	< 5
CNC42-P14 / 42SLP140506	3-Aug-99	< 5	< 5	< 5	< 5	< 374	< 374	< 374	< 374	< 374	< 5
CNC42-P15 / 42SLP150607	10-Aug-99	< 6	< 6	< 6	< 6	< 379	< 379	< 379	< 379	< 379	< 6
CNC42-P16 / 42SLP160304	20-Aug-99	< 6	5 [J]	< 6	< 6	< 400	< 400	< 400	< 400	< 400	< 6
CNC42-P17 / 42SLP170304	20-Aug-99	< 6	< 6	< 6	< 6	< 400	< 400	< 400	< 400	< 400	< 6
CNC42-P18 / 42SLP180304	20-Aug-99	< 5	4 [J]	8.00	33.00	< 1900	< 1900	< 1900	< 1900	< 1900	64.00
CNC42-P19 / 42SLP190304	20-Aug-99	< 5	4 [J]	< 5	< 5	< 400	< 400	< 400	< 400	< 400	< 5

All concentrations are in micrograms per kilograms (ug/kg).
NA - Not Analyzed
[1] South Carolina Department of Health and Environmental Control Risk Based Screening Levels for sandy soils; depth to groundwater less than 5 feet.
[2] Trip blank
[J] Indicates the presence of an analyte at a concentration less than the reporting limit and greater than the detection limit.

TABLE 3

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN SOI
SITE 42, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Soil Boring / Sample No.	Sample Date	Benzene (ug/kg)	Toluene (ug/kg)	Ethyl-benzene (ug/kg)	Xylenes (total) (ug/kg)	Benzo(a) anthracene (ug/kg)	Benzo(b) fluoranthene (ug/kg)	Benzo(k) fluoranthene (ug/kg)	Chrysene (ug/kg)	Dibenzo(a,h) anthracene (ug/kg)	Naphthalene (ug/kg)
RBSL [1]		5	1622	1260	42471	73084	29097	231109	12998	87866	210
CNC42-P20 / 42SLP200304	23-Aug-99	< 6	3 [J]	< 6	< 6	< 330	< 330	< 330	< 330	< 330	< 6
CNC42-P21 / 42SLP210304	23-Aug-99	< 5	< 5	< 5	< 5	< 330	< 330	< 330	< 330	< 330	< 5
CNC42-TL [2] / 42TL0101	7/29/1999	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	< 5
CNC42-TL [2] / 42TL00101	8/24/1999	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	< 5
CNC42-TL [2] / 42TL00101	20-Aug-99	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	< 5

All concentrations are in micrograms per kilograms (ug/kg).
NA - Not Analyzed
[1] South Carolina Department of Health and Environmental Control Risk Based Screening Levels for sandy soils; depth to groundwater less than 5 feet.
[2] Trip blank
[J] Indicates the presence of an analyte at a concentration less than the reporting limit and greater than the detection limit.

TABLE 4

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
SITE 42, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Monitoring Well No.	Sample No.	Sample Date	Benzene (ug/L)	Ethyl-benzene (ug/L)	Toluene (ug/L)	Xylenes (total) (ug/L)	Naphthalene (ug/L)	Benzo(a) anthracene (ug/L)	Benzo(b) fluoranthene (ug/L)	Benzo(k) fluoranthene (ug/L)	Chrysene (ug/L)	dibenzo(a,h) anthracene (ug/L)	MTBE (ug/L)
RBSL[1]			5	700	1000	10000	10 [2]	10 [2]	10 [2]	10 [2]	10 [2]	10 [2]	40
CNC42M-01	42GLM0101	12-Sep-99	< 5	< 5	< 5	< 5	< 5	< 11	< 11	< 11	< 11	< 11	< 5
	42GLM0102	8-May-01	0.22 [J]	0.19 [J]	< 5	< 5	0.5[J]	<11.1	<11.1	<11.1	<11.1	<11.1	< 40
	42GLM0103	19-Dec-01	0.4[J]	0.42[J]	<5	<5	1.1[J]	<9.8[J]	<9.8[J]	<9.8[J]	<9.8[J]	<9.8[J]	<40
CNC42M-01	42GLM0101D	12-Sep-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
CNC42M-02	42GLM0201	12-Sep-99	< 5	< 5	< 5	< 5	198 [J]	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM0202	8-May-01	0.14 [J]	0.30 [J]	< 5	0.23[J]	89.9	<11.8	<11.8	<11.8	<11.8	<11.8	< 40
CNC42M-03	42GLM0301	12-Sep-99	< 5	< 5	< 5	< 5	30	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM0302	8-May-01	< 5	< 5	< 5	< 5	< 5	<11.1	<11.1	<11.1	<11.1	<11.1	< 40
CNC42M-04	42GLM0401	12-Sep-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM0402	9-May-01	< 5	< 5	< 5	< 5	< 5	<10.1	<10.1	<10.1	<10.1	<10.1	< 40
CNC42M-05	42GLM0501	12-Sep-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM0502	8-May-01	< 5	< 5	< 5	< 5	1.3 [J]	<11.8	<11.8	<11.8	<11.8	<11.8	< 40
CNC42M-06	42GLM0601	12-Sep-99	4 [J]	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM0602	8-May-01	< 5	< 5	< 5	< 5	0.66 [J]	<11.1	<11.1	<11.1	<11.1	<11.1	< 40
CNC42M-07	42GLM0701	12-Sep-99	< 5	2 [J]	< 5	< 5	13 [J]	< 10	< 10	< 10	< 10	< 10	< 5
	No Sample	8-May-01	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
	42GLM0702	19-Dec-01	<5	<5	<5	<5	<5	<9.9[J]	<9.9[J]	<9.9[J]	<9.9[J]	<9.9[J]	<40
CNC42M-07	42GLM0701D	12-Sep-99	< 5	3 [J]	< 5	< 5	17 [J]	< 10	< 10	< 10	< 10	< 10	< 5
CNC42M-08	42GLM0801	12-Sep-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM0802	9-May-01	< 5	< 5	< 5	< 5	0.53 [J]	<10.1	<10.1	<10.1	<10.1	<10.1	< 40
CNC42M-09	42GLM0901	12-Sep-99	< 5	< 5	< 5	< 5	< 5	< 11	< 11	< 11	< 11	< 11	< 5
	42GLM0902	9-May-01	< 5	< 5	< 5	< 5	< 5	<10.1	<10.1	<10.1	<10.1	<10.1	< 40
CNC42M-10	42GLM1001	12-Sep-99	< 25	< 25	< 25	< 25	865	< 11	< 11	< 11	< 11	< 11	< 25
	42GLM1002	9-May-01	< 5	< 5	< 5	1.7[J]	113	<10.1	<10.1	<10.1	<10.1	<10.1	< 40
CNC42M-11	42GLM1101	12-Sep-99	< 5	< 5	< 5	< 5	< 5	< 11	< 11	< 11	< 11	< 11	< 5
	42GLM1102	9-May-01	0.20 [J]	0.41 [J]	0.44 [J]	1.5 [J]	26.2	<10.1	<10.1	<10.1	<10.1	<10.1	< 40
CNC42M-11	42GLM1102D	9-May-01	0.17 [J]	0.35 [J]	0.38 [J]	1.2 [J]	23.4	<10.1	<10.1	<10.1	<10.1	<10.1	< 40

All concentrations are in ug/L.
NA - Not analyzed
[1] South Carolina Department of Health and Environmental Control Risk Based Screening Levels for ground water.
[2] The Risk based screening level for individual PAH CoC is 10 ug/l or 25 ug/l for total PAHs.
[3] Trip blank
[J] Indicates presence of analyte at a concentration less than the reporting limit and greater than the detection limit.

TABLE 4

SUMMARY OF FIXED-BASE LABORATORY ANALYTICAL RESULTS FOR CHEMICALS OF CONCERN IN GROUNDWATER
SITE 42, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Monitoring Well No.	Sample No.	Sample Date	Benzene (ug/L)	Ethyl-benzene (ug/L)	Toluene (ug/L)	Xylenes (total) (ug/L)	Naphthalene (ug/L)	Benzo(a) anthracene (ug/L)	Benzo(b) fluoranthene (ug/L)	Benzo(k) fluoranthene (ug/L)	Chrysene (ug/L)	dibenzo(a,h) anthracene (ug/L)	MTBE (ug/L)
RBSL[1]			5	700	1000	10000	10 [2]	10 [2]	10 [2]	10 [2]	10 [2]	10 [2]	40
CNC42M-12	42GLM1201	12-Sep-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM1202	9-May-01	< 5	< 5	< 5	< 5	< 5	<13.3	<13.3	<13.3	<13.3	<13.3	< 40
CNC42M-13	42GLM1301	12-Sep-99	3 [J]	10	20	45	46	< 11	< 11	< 11	< 11	< 11	< 5
	NA	8-May-01	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
	42GLM1302	19-Dec-01	2.4[J]	0.34[J]	<5	1.1[J]	<5	<10[J]	<10[J]	<10[J]	<10[J]	<10[J]	0.67[J]
CNC42M-13	42GLM1302D	19-Dec-01	1.1[J]	0.25[J]	<5	0.32[J]	<5	<10.3[J]	<10.3[J]	<10.3[J]	<10.3[J]	<10.3[J]	0.72[J]
CNC42M-14	42GLM1401	11-Sep-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM1402	10-May-01	0.48 [J]	< 5	< 5	< 5	<5.0	<9.7	<9.7	<9.7	<9.7	<9.7	< 40
CNC42M-15	42GLM1501	11-Sep-99	< 5	< 5	< 5	< 5	< 5	< 11	< 11	< 11	< 11	< 11	< 5
	42GLM1502	10-May-01	< 5	< 5	< 5	< 5	< 5	<10	<10	<10	<10	<10	< 40
CNC42M-16	42GLM1601	11-Sep-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM1602	10-May-01	< 5	< 5	< 5	< 5	< 5	<9.7	<9.7	<9.7	<9.7	<9.7	< 40
CNC42M-17	42GLM1701	11-Sep-99	< 5	< 5	< 5	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 5
	42GLM1702	10-May-01	2.2 [J]	< 5	< 5	< 5	< 5	<10	<10	<10	<10	<10	0.5
CNC42M-17	42GLM1702D	10-May-01	2(J)	< 5	< 5	< 5	< 5	<10	<10	<10	<10	<10	0.51 [J]
CNC42M-18	42GLM1801	13-Sep-99	< 5	< 5	< 5	< 5	< 5	< 11	< 11	< 11	< 11	< 11	< 5
	42GLM1802	10-May-01	< 5	0.23 [J]	< 5	0.24 [J]	< 5	<10	<10	<10	<10	<10	< 40
CNC42M-19	42GLM1901	20-Dec-01	<5	<5	<5	<5	<5	<10.3[J]	<10.3[J]	<10.3[J]	<10.3[J]	<10.3[J]	0.13[J]
CNC42M-20	42GLM2001	20-Dec-01	<5	<5	<5	<5	<5	<10[J]	<10[J]	<10[J]	<10[J]	<10[J]	<40
CNC42M-21	42GLM2101	20-Dec-01	0.35[J]	<5	<5	<5	<5	<10.3[J]	<10.3[J]	<10.3[J]	<10.3[J]	<10.3[J]	<40

All concentrations are in ug/L.
NA - Not analyzed
[1] South Carolina Department of Health and Environmental Control Risk Based Screening Levels for ground water.
[2] The Risk based screening level for individual PAH CoC is 10 ug/l or 25 ug/l for total PAHs.
[3] Trip blank
[J] Indicates presence of analyte at a concentration less than the reporting limit and greater than the detection limit.
[3] Trip blank
[J] Indicates presence of analyte at a concentration less than the reporting limit and greater than the detection limit.

TABLE 5

COMPARISON OF MAXIMUM GROUNDWATER CONCENTRATIONS TO SSTLs
SITE 42, CHICORA TANK FARM
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Concern	Tank L Source Area Concentration (mg/L)	SSTLs Protective of Surface Water (Retention Pond)		SSTLs Protective of Construction Workers	Minimum On-Site SSTLs[a]
		$SSTL_{SOURCE}$ (mg/L)	$SSTL_{COMP}$ (mg/L)	$SSTL_{SOURCE}$ (mg/L)	(mg/L)
Benzene	0.004	0.168	0.137	0.15	0.15
Toluene	0.005	33.656	27.459	5.38	5.38
Ethylbenzene	0.005	23.559	19.221	6.05	6.05
Xylenes	0.005	336.56	274.59	102.33	102.33
Naphthalene	0.198	0.337	0.275	1.63	1.63

Chemical of Concern	Tank M Source Area Concentration (mg/L)	SSTLs Protective of Surface Water (Retention Pond)		SSTLs Protective of Construction Workers	Minimum On-Site SSTLs[a]
		$SSTL_{SOURCE}$ (mg/L)	$SSTL_{COMP}$ (mg/L)	$SSTL_{SOURCE}$ (mg/L)	(mg/L)
Benzene	0.005	0.482	0.421	0.15	0.15
Toluene	0.003	96.318	84.122	5.38	5.38
Ethylbenzene	0.005	67.423	58.886	6.05	6.05
Xylenes	0.005	1169.45	975.79	102.33	102.33
Naphthalene	0.865	6.6	4.54	1.63	1.63

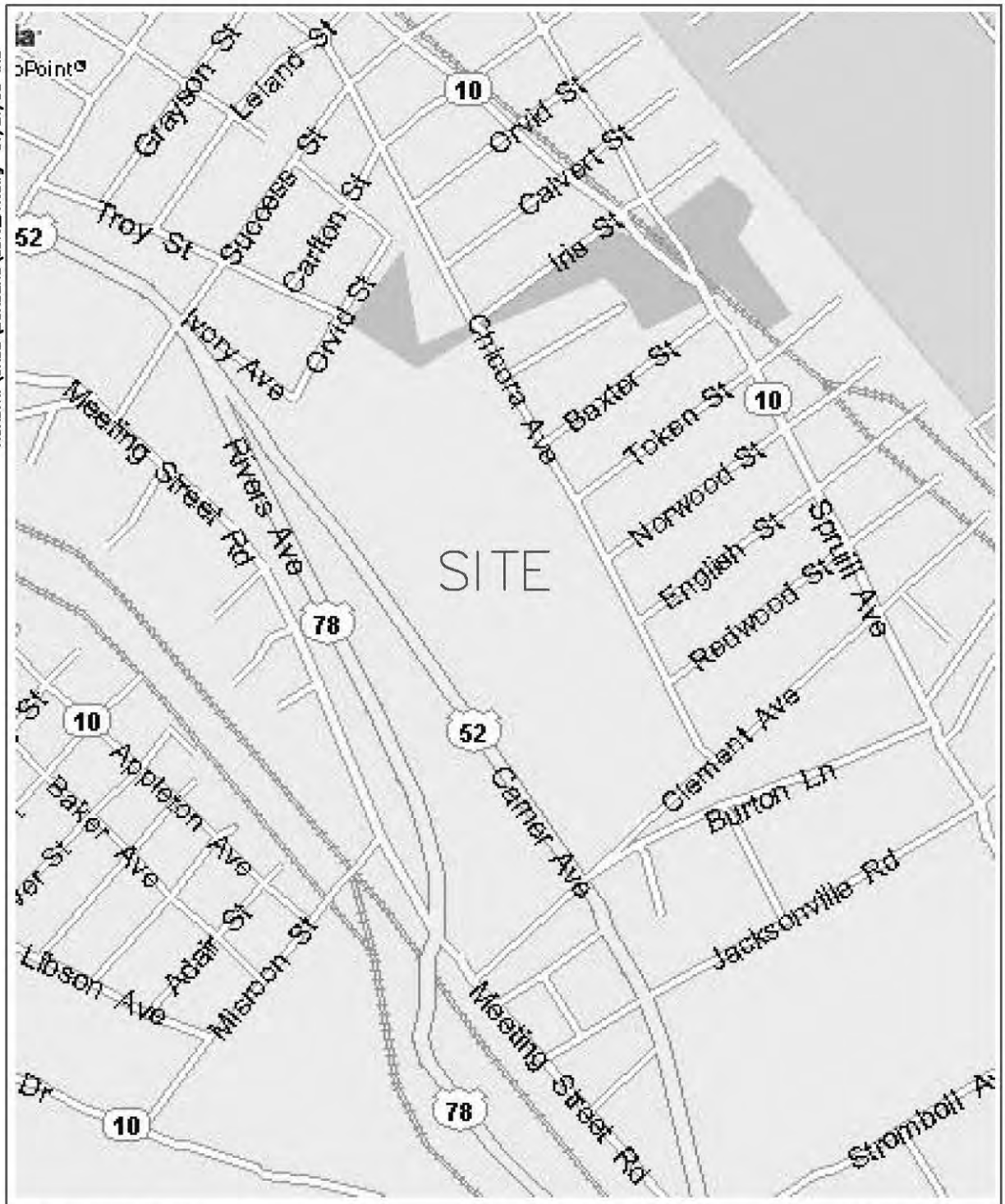
Chemical of Concern	Tank O Source Area Concentration (mg/L)	SSTLs Protective of Surface Water (Retention Pond)		SSTLs Protective of Construction Workers	Minimum On-Site SSTLs[a]
		$SSTL_{SOURCE}$ (mg/L)	$SSTL_{COMP}$ (mg/L)	$SSTL_{SOURCE}$ (mg/L)	(mg/L)
Benzene	0.003	3.58	3.37	0.15	0.15
Toluene	0.010	715.9	674.14	5.38	5.38
Ethylbenzene	0.020	501.13	471.9	6.05	6.05
Xylenes	0.045	7171.16	6750.18	102.33	102.33
Naphthalene	0.046	9.12	8.38	1.63	1.63

mg/L - milligrams per liter
GW - Groundwater

(a) The minimum on-site SSTLs are chosen as those SSTLs protective of both surface water (the retention pond) and the on-site construction worker.

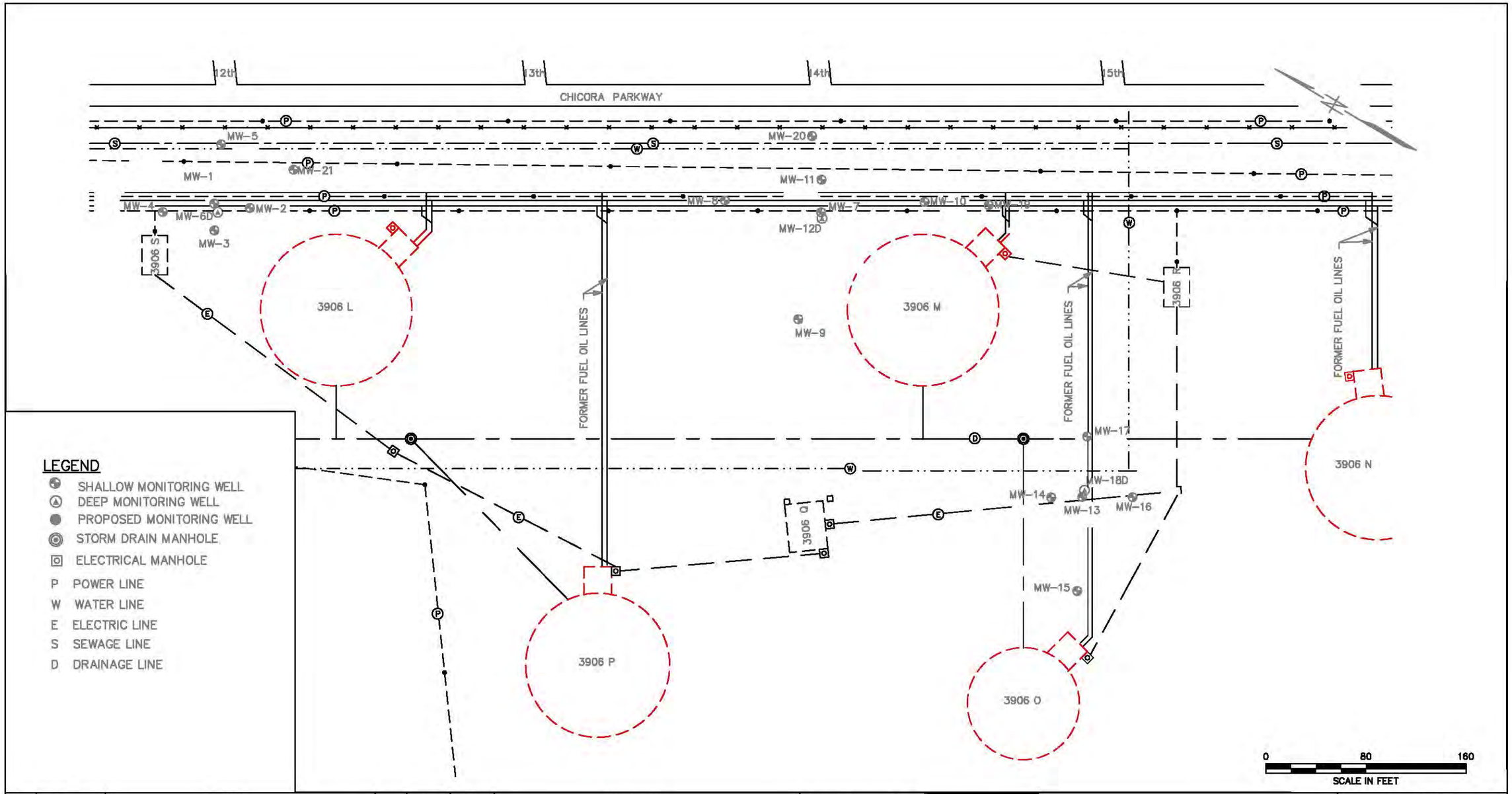
FIGURES

ACAD: K:\CADD\BORDERS\SDIV_AV.dwg 01/21/98 INL



DRAWN BY ——— DATE ———		FACILITY LOCATION MAP CHICORA TANK FARM – SITE 42 CHARLESTON NAVAL SHIPYARD CHARLESTON, SOUTH CAROLINA	CONTRACT NO. ———
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED–AREA	G:\BORDERS\southdiv\Sarlnds.tif		APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV. 1

FORM CADD NO. SDIV_AV.DWG – REV 0 – 1/20/98



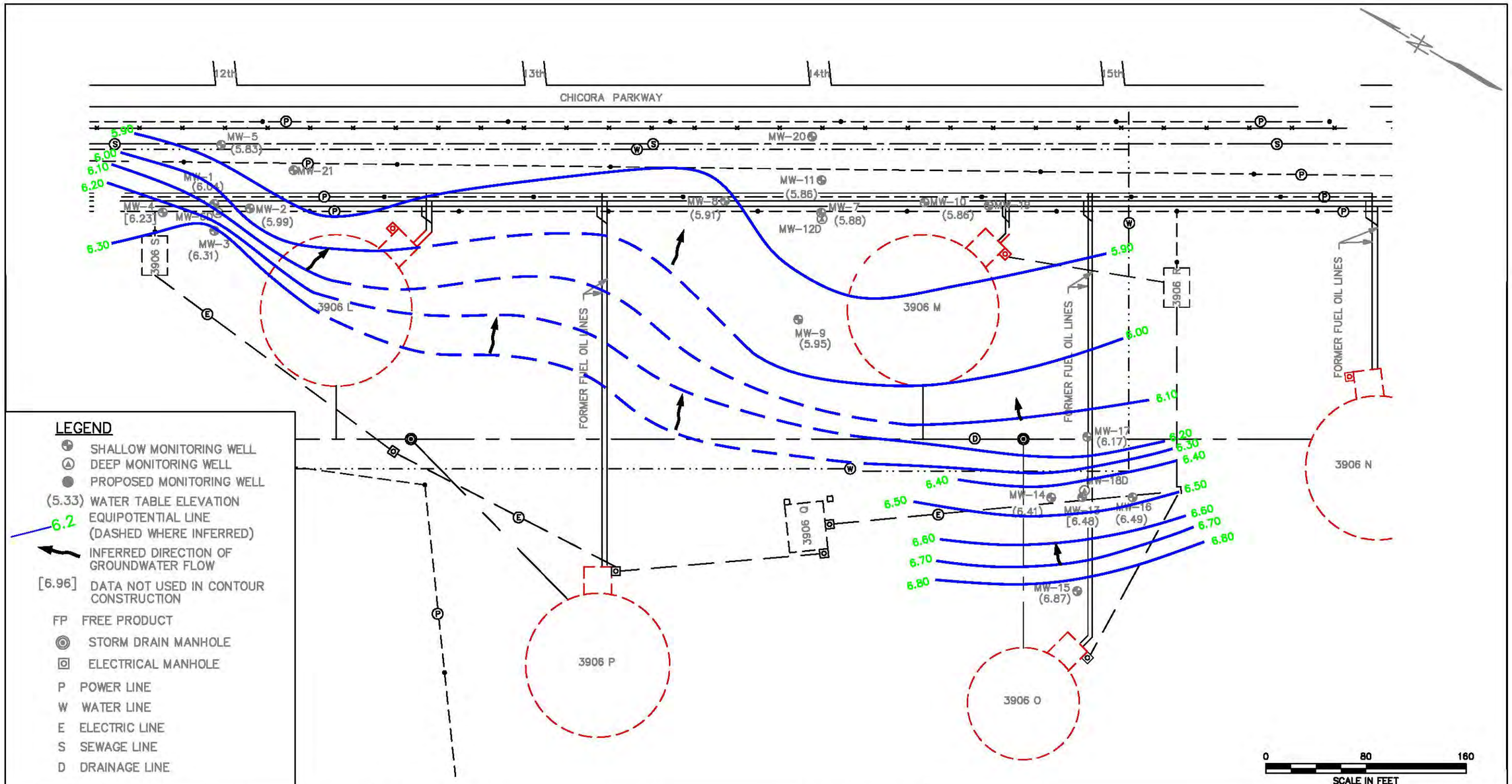
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE
CHECKED BY DATE
COST/SCHED-AREA
SCALE
AS NOTED

SITE LAYOUT
CHICORA TANK FARM – SITE 42
CHARLESTON NAVAL SHIPYARD
CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 4015
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2
REV. 0

FORM CADD NO. SDIV_BH.DWG – REV 0 – 1/20/98



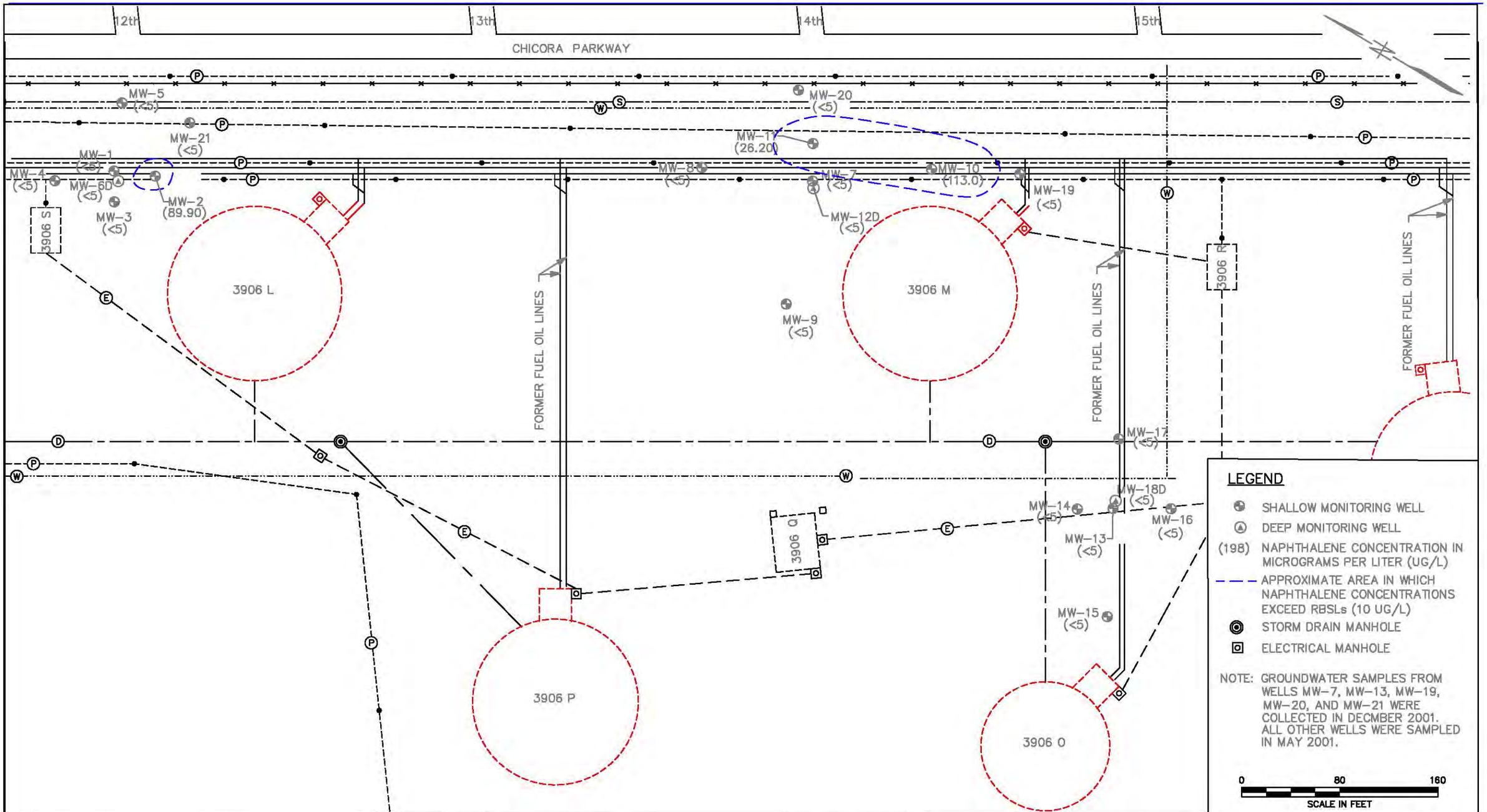
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER POTENTIOMETRIC MAP
AUGUST 30, 2001
CHICORA TANK FARM – SITE 42
CHARLESTON NAVAL SHIPYARD
CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 4015
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 3
REV. 0

FORM CADD NO. SDIV_BH.DWG – REV 0 – 1/20/98



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER NAPHTHALENE MAP
MAY/DECEMBER 2001
CHICORA TANK FARM – SITE 42
CHARLESTON NAVAL SHIPYARD
CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 4015
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4
REV. 0

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12th
13th
14th
15th
CHICORA PARKWAY
MW-5
MW-20
MW-21
MW-11
MW-1
(FP)
10'X10'
MW-4
MW-6
MW-2
MW-3
MW-8
MW-7
(FP)
MW-10
MW-19
10'X10'
MW-12D
3906 S
3906 L
3906 M
3906 R
MW-9
FORMER FUEL OIL LINES
FORMER FUEL OIL LINES
FORMER FUEL OIL LINES
MW-17
MW-18D
MW-14
MW-16
MW-13
(FP)
10'X10'
3906 Q
MW-15
3906 P
3906 O

LEGEND

- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- (FP) FREE PRODUCT MEASURED
- STORM DRAIN MANHOLE
- ELECTRICAL MANHOLE
- EXCAVATION BOUNDARIES

NOTE: GROUNDWATER SAMPLES FROM WELLS MW-7, MW-13, MW-19, MW-20, AND MW-21 WERE COLLECTED IN DECMBER 2001. ALL OTHER WELLS WERE SAMPLED IN MAY 2001.

0 80 160
SCALE IN FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE
CHECKED BY DATE
COST/SCHED-AREA
SCALE
AS NOTED

PROPOSED EXCAVATION BOUNDARIES MAP
CHICORA TANK FARM – SITE 42
CHARLESTON NAVAL SHIPYARD
CHARLESTON, SOUTH CAROLINA

CONTRACT NO. 4015
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 5
REV. 0

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