N61165.AR.005793
CNC CHARLESTON
5090.3a

CONTAMINATION ASSESSMENT REPORT DATED 10 SEPTEMBER 1998 FOR ZONE G AREAS 9 AND 10 WITH SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL REVIEW LETTER CNC CHARLESTON SC
11/16/1998
ENSAFE INC

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

COMMISSIONER:
Douglas E. Bryant

BOARD:
John H. Burriss
Chairman

William M. Hull, Jr., MD
Vice Chairman

Roger Leaks, Jr.
Secretary

Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

file

16 November 1998

Department of the Navy
Southern Division NFEC
P.O. Box 190010
North Charleston, SC 29419-9010
Attention: Mr. Gabriel Magwood

Re: Environmental Assessment Report dated 10 September 1998
Zone G/Area 9,10 (Site Identification # 01184)
Fuel Distribution System
Charleston Naval Complex/Charleston Naval Base
Charleston, SC
Charleston County

Dear Mr. Magwood:

The author has completed technical review of the referenced document. As submitted, the report provides a narrative describing environmental assessment activities and analytical results of soil and groundwater sampling conducted to determine if releases have occurred as a result of operation of the referenced piping system. The results presented indicate reportable concentrations of VOC (volatile organic compounds) and PAH (polynuclear aromatic hydrocarbon) compounds were detected in groundwater and soil grab samples obtained at the referenced site. The concentration reported for total naphthalene for soil samples exceed levels proposed in the SCAP (Soil Corrective Action Plan, amended July 1997).

With consideration to the above comments, the results presented by the assessment report appear to indicate that additional endeavors for remedial actions and/or contaminant characterizations are warranted at the referenced site. In this regard, the author concurs with conclusions and recommendations as presented and the proposed remedial action is approved for implementation. An appropriate and reasonable monitoring program sufficient to demonstrate the efficacy of the remedial action should be developed and submitted to my attention by 2 January 1999.

Should you have any questions please contact me at (803) 734-5328.

Sincerely,

Paul L. Bristol, Hydrogeologist
Groundwater Quality Section
Bureau of Water

cc: Trident District EQC

J.A. JONES
ENVIRONMENTAL SERVICES

Charleston Naval Complex
1849 Avenue F
N. Charleston, SC 29405

Phone: (843) 740-2780
Fax: (843) 740-2785

FAX

To: Michael Bishop

From: Brian Cantor

Fax #: 803 889 3795

Date: 5/27/03

Phone #

Total Pages: 15

Re:

Urgent For Review Please Comment Please Reply

Comments:

Areas 9-10 / X-Fer Sites AOC 631/629

ZONE G
FUEL DISTRIBUTION SYSTEM
CONTAMINATION ASSESSMENT REPORT
NAVBASE CHARLESTON
NORTH CHARLESTON, SOUTH CAROLINA

Volume I of III
Sections 1 to 7

CTO-029
Contract Number: N62467-89-D-0318

Prepared for:

Department of the Navy
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina

Prepared by:

EnSafe Inc.
5724 Summer Trees Drive
Memphis, Tennessee 38134
(901) 372-7962

September 10, 1998
Revision: 0

Release of this document requires prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina.

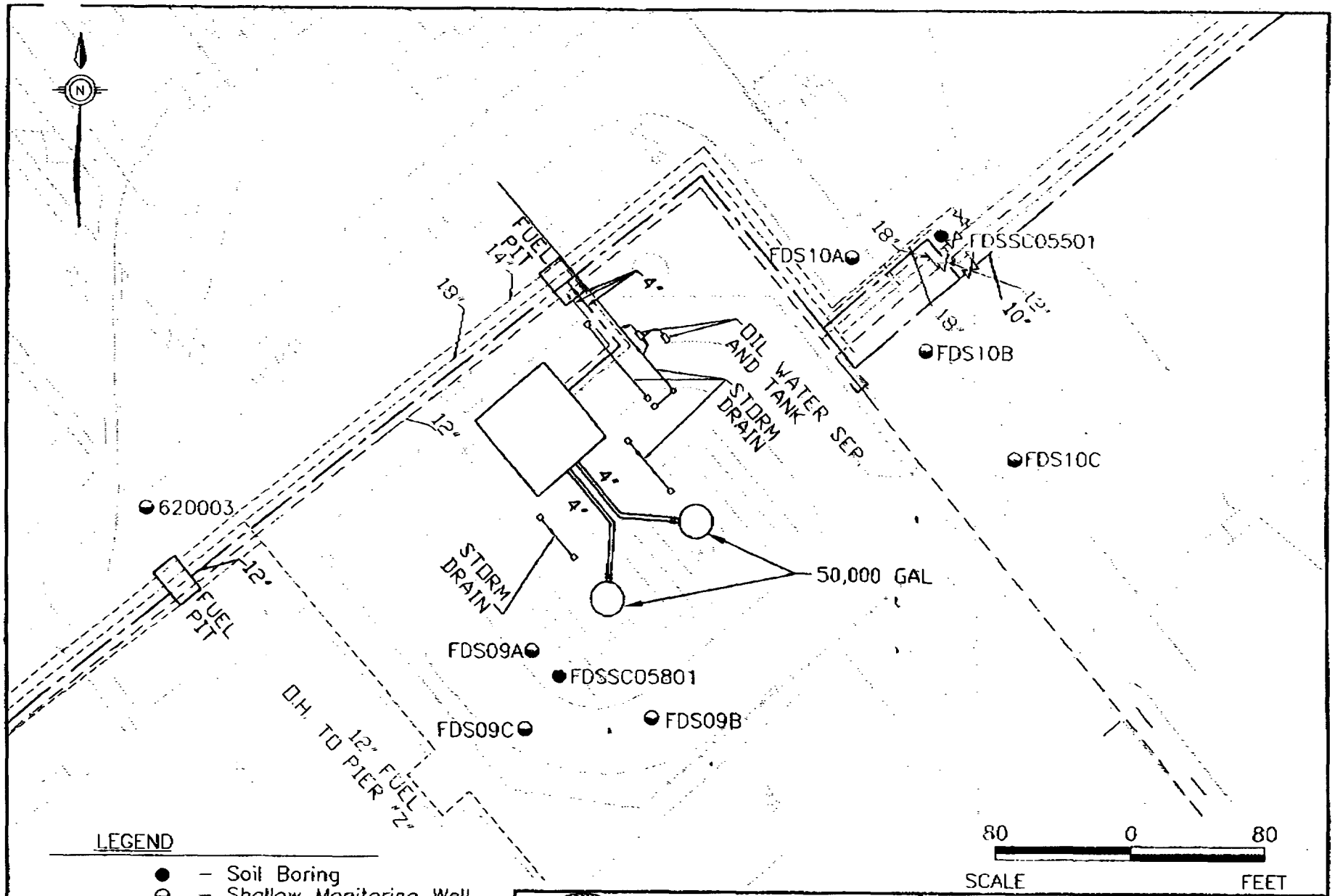
4.6 Areas 9 and 10

Areas 9 and 10 are associated with soil sample FDSSC05801 (collected from the 5 to 9 feet bgs depth interval) and FDSSC05501 (4 to 10 feet bgs), respectively. These areas of potential impact are immediately southwest of Fueling Pier Kilo (AOC 631). The Cooper River lies approximately 200 feet to the east. To investigate potential petroleum groundwater contamination, six shallow monitoring wells were installed within the two areas. The three wells for Area 9 were installed around boring FDSSC05801, which was advanced southwest of the two 50,000-gallon petroleum storage tanks associated with Pier Kilo. Three Area 10 wells were associated with sample FDSSC05501, these wells are situated along the eastern edge of River Road South, where this road passes Fueling Pier Kilo. Because of the proximity of shallow well 620003 (AOC 620 investigated during the Zone F RFI), analytical data from this well was included and reviewed relative to this investigation. Figure 4.6-1 presents the soil boring and monitoring well locations for Areas 9 and 10.

4.6.1 Site Geology and Hydrogeology

Based on well borings advanced at this site, the general stratigraphy at Areas 9 and 10 is dark brown to black clayey, sandy soil to approximately 5 feet bgs, overlying alternating intervals of tan to olive, gray to black silt, sand and organic clay to a depth of approximately 20 feet bgs. No petroleum odors or stains were noted in soil samples from monitoring well borings. Appendix B contains boring logs and monitoring well construction diagrams for these wells.

Shallow groundwater at Areas 9 and 10 occurs from 1.25 to 3.0 feet bgs. Figures 4.6-2 and 4.6-3 depict the shallow groundwater potentiometric surface and inferred flow direction for the site during low- and high-tide respectively. The overall flow direction was consistent between tides. The gradient was less during high-tide. Changes in groundwater elevation between tides were less than 0.35 feet.



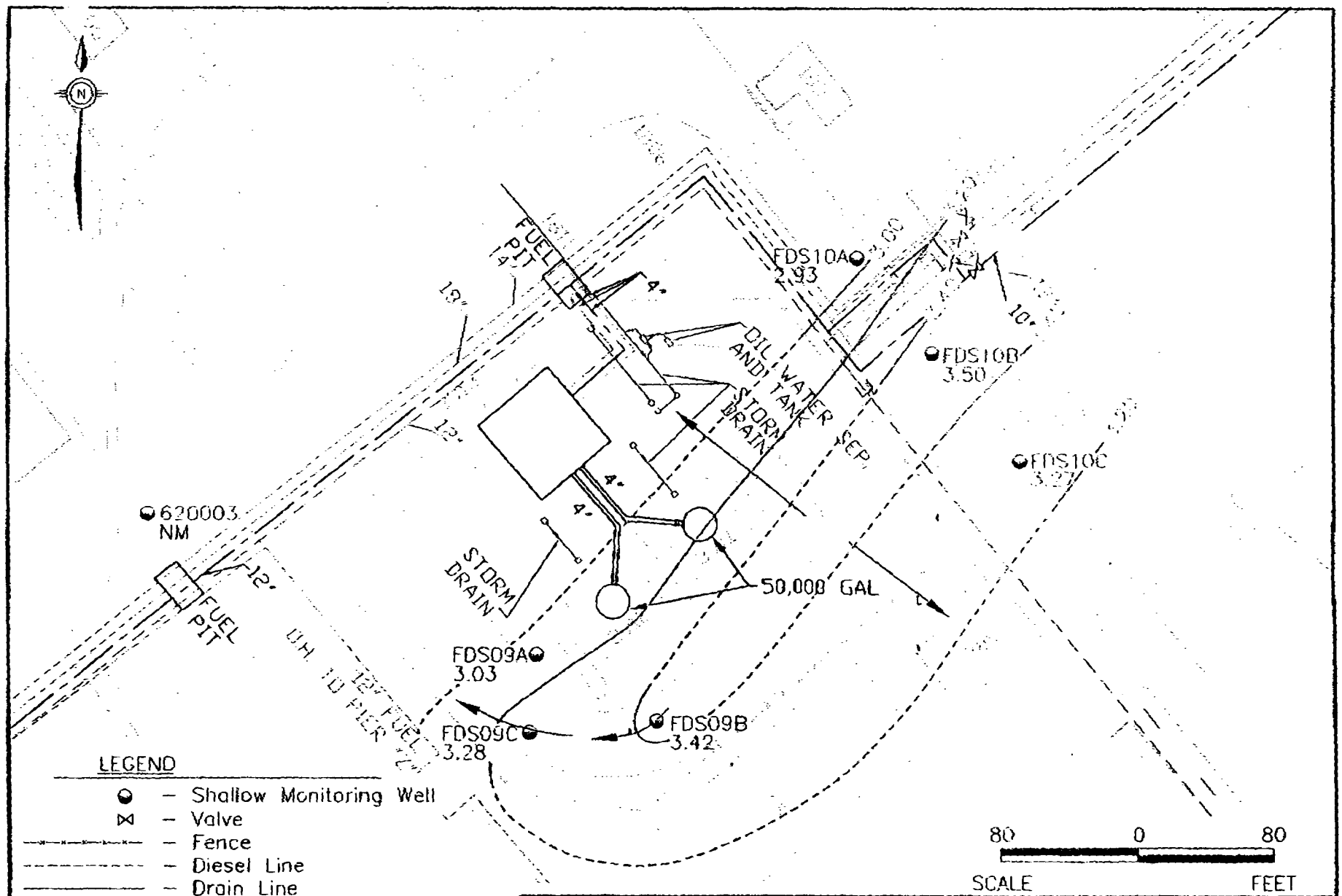
LEGEND

- ● – Soil Boring
- ◒ – Shallow Monitoring Well
- ⋈ – Valve
- –·–·–·– – Fence
- - - - - - - – Diesel Line
- —— - —— – Fuel Line
- — — — — – Sludge Line

FUEL DISTRIBUTION SYSTEM
CONTAMINATION
ASSESSMENT REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 4.6-1
AREAS 9 AND 10
SOIL AND GROUNDWATER
SAMPLE LOCATIONS

DWG DATE: 05/28/98 | DWG NAME: 2907N006



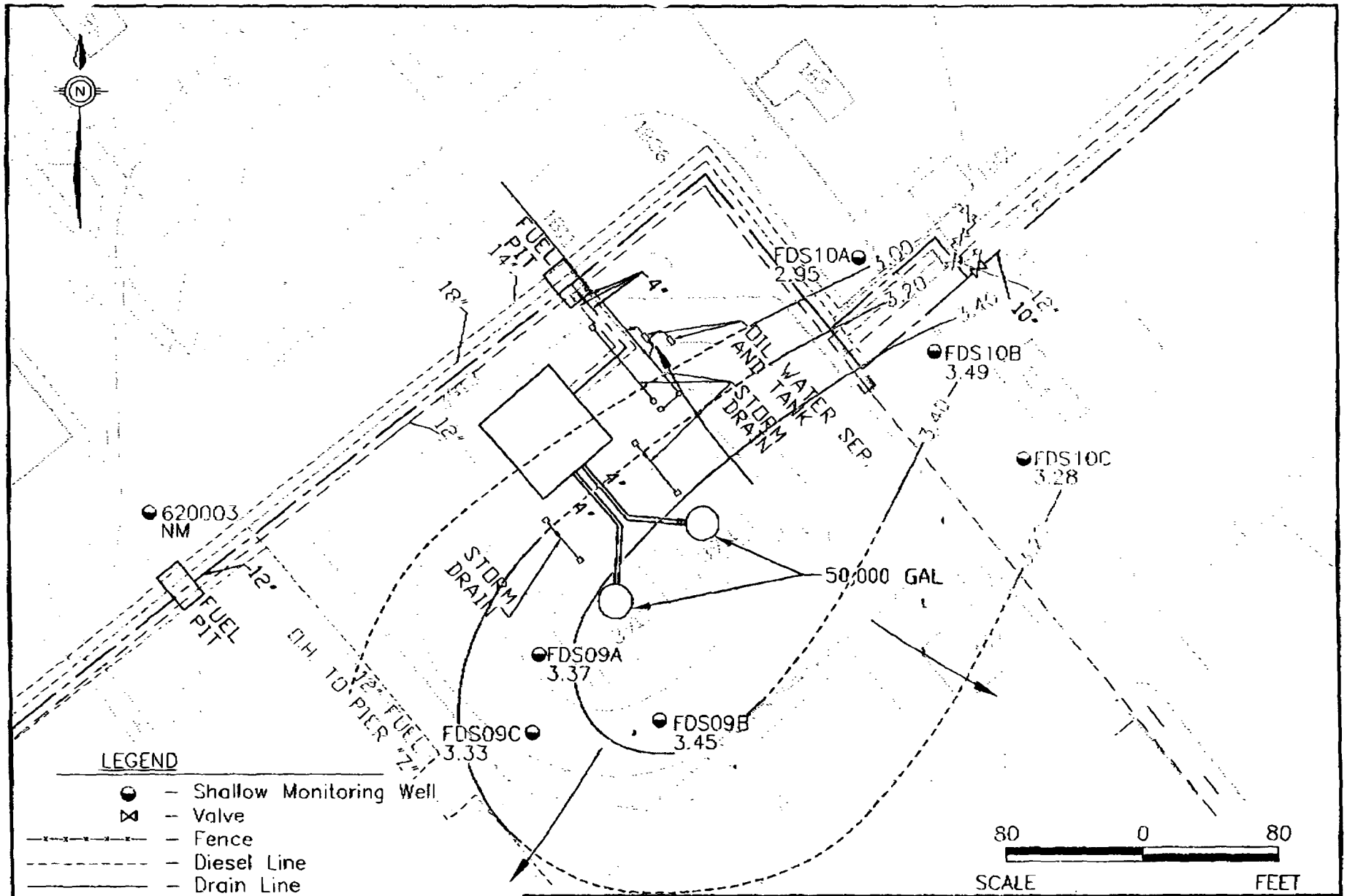
LEGEND

- ● – Shallow Monitoring Well
- ⋈ – Valve
- – Fence
- – Diesel Line
- – Drain Line
- – Fuel Line
- – Sludge Line
- – Contour Interval = 0.2 Feet
- – Arrow Indicates Flow Direction
- NM – Water Level Not Measured During This Event

FUEL DISTRIBUTION SYSTEM
CONTAMINATION
ASSESSMENT REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 4.6-2
AREAS 9 AND 10
SHALLOW GROUNDWATER
LOW-TIDE POTENTIOMETRIC MAP

DWG DATE: 06/29/98 | DWG NAME: 2907N038



FUEL DISTRIBUTION SYSTEM
CONTAMINATION
ASSESSMENT REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 4.6-3
AREAS 9 AND 10
SHALLOW GROUNDWATER
HIGH-TIDE POTENTIOMETRIC MAP

DWG DATE: 06/29/98 | DWG NAME: 2907N039

Maximum average calculated groundwater velocity (utilizing the steepest gradient) was 0.008 feet/day based on an average porosity (0.359) and hydraulic conductivity (0.37 feet/day) determined during the Zone G RFI (EnSafe, February 1998).

4.6.2 Nature of Contamination in Subsurface Soil

Analytes detected in subsurface soil at Area 9 and 10 are summarized in Table 4.6.1. Appendix C contains a complete analytical data report for all FDS samples.

TPH-GRO in Subsurface Soil

The Phase I samples at Area 9 and 10 showed TPH-GRO concentrations of 63.7 μg/kg at FDSSC05501 and 10 μg/kg at FDSSC05801. FDSSC05501 was advanced to Phase II based on elevated TPH. FDSSC05801 was advanced to Phase II based on visual observations. Nearby samples FDSSC03801, FDSSC03901, FDSSC04001, FDSSC04101, FDSSC05701, FDSSC05901, FDSSC06001, and FDSSC06201 identified no significant TPH contamination.

Volatile Organic Compounds in Subsurface Soil

Toluene was the only VOC detected in subsurface soil at Area 9 and 10, at a concentration far below its RBSL and SSL.

Semivolatile Organic Compounds in Subsurface Soil

Twelve SVOCs were detected in subsurface soil at Area 9 and 10. The RBSL for total naphthalenes (210 μg/kg) was slightly exceeded at FDCSC05801. The total naphthalene concentration at this location (250 μg/kg) represents only 2-methylnaphthalene. All other SVOC concentrations were far below their RBSLs and SSLs. Figure 4.6-4 presents the distribution of naphthalenes in soil at Area 9 and 10.

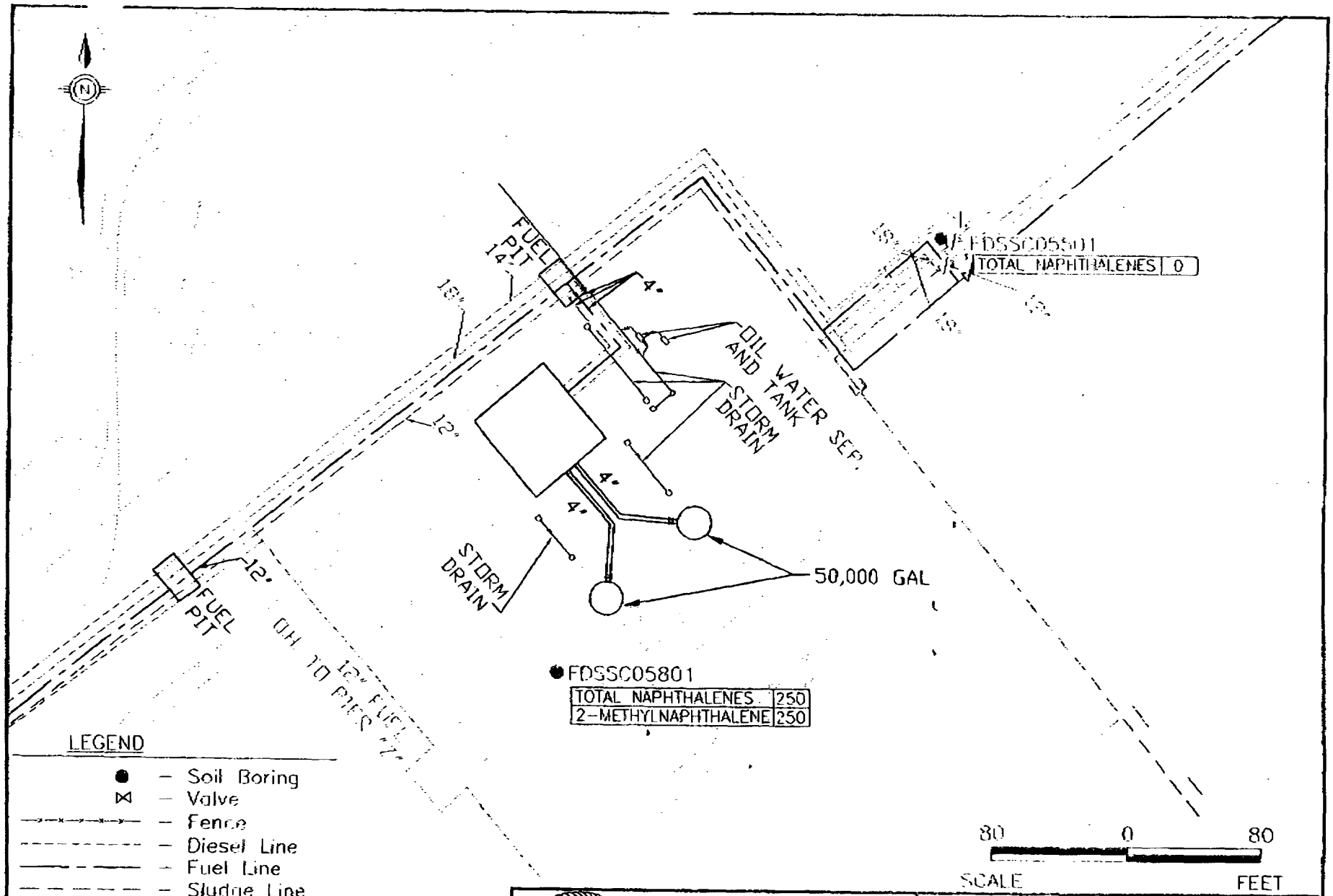
Table 4.6.1
Analytes Detected in Subsurface Soil
Areas 9 & 10
Fuel Distribution System

Parameters	Location	Subsurface Conc.	RBSL/SSL	Subsurface Background
TPH - GRO (μg/kg)				
Gasoline	FDSSC05501	63.7	NL/NL	NA
	FDSSC05801	10		
Volatile Organic Compounds (μg/kg)				
Toluene	FDSSC05501	2	1622/12000	NA
Semivolatile Organic Compounds (μg/kg)				
Total Naphthalenes	FDSSC05801	250	210/84000	NA
2-Methylnaphthalene	FDSSC05801	250	NL/126000	NA
Benzo(a)anthracene	FDSSC05501	74	73084/2000	NA
Benzo(b)fluoranthene	FDSSC05501	53	29097/5000	NA
Benzo(a)pyrene	FDSSC05501	68	NL/8000	NA
Benzo(g,h,i)perylene	FDSSC05501	65	NL/4.66E+08	NA
Benzoic acid	FDSSC05501	61	NL/400000	NA
Chrysene	FDSSC05501	150	12998/160000	NA
	FDSSC05801	140		
Dibenzofuran	FDSSC05801	64	NL/50000	NA
Fluoranthene	FDSSC05801	88	NL/4300000	NA
Fluorene	FDSSC05801	70	NL/560000	NA
Phenanthrene	FDSSC05801	160	NL/1380000	NA
Pyrene	FDSSC05501	45	NL/4200000	NA
	FDSSC05801	160		
Pesticides (μg/kg)				
4,4'-DDE	FDSSC05801	4.2	NL/54000	NA
alpha-Chlordane	FDSSC05801	3.4	NL/10000	NA
gamma-Chlordane	FDSSC05801	5.4	NL/10000	NA
Inorganics (mg/kg)				
Aluminum (Al)	FDSSC05501	3830	NL/1000000	23600
	FDSSC05801	6110		
Arsenic (As)	FDSSC05501	1.3	NL/29	15.5[a]
	FDSSC05801	5.4		
Barium (Ba)	FDSSC05501	5.9	NL/1600	64.5
	FDSSC05801	10.1		
Beryllium (Be)	FDSSC05501	.09	NL/63	1.63
	FDSSC05801	.45		
Cadmium (Cd)	FDSSC05501	.09	NL/8	0.48
Calcium (Ca)	FDSSC05501	22100	NL/NL	NL
	FDSSC05801	15500		
Chromium (Cr)	FDSSC05501	7.3	NL/1000000	43.4[a]
	FDSSC05801	12.8		
Cobalt (Co)	FDSSC05501	.71	NL/2000	8.14
	FDSSC05801	1.8		
Copper (Cu)	FDSSC05501	1.8	NL/920	32.6

Table 4.6.1
Analytes Detected in Subsurface Soil
Areas 9 & 10
Fuel Distribution System

Parameters	Location	Subsurface Conc.	RBSL/SSL	Subsurface Background
Iron (Fe)	FDSSC05501	2560	NL/NL	NL
	FDSSC05801	6960		
Lead (Pb)	FDSSC05501	3.2	NL/4000	66.3
	FDSSC05801	11.2		
Magnesium (Mg)	FDSSC05501	534	NL/NL	NL
	FDSSC05801	1670		
Manganese (Mn)	FDSSC05501	18.2	NL/1100	291
	FDSSC05801	87.8		
Nickel (Ni)	FDSSC05501	2.4	NL/130	18.3
Potassium (K)	FDSSC05801	767	NL/NL	NL
Sodium (Na)	FDSSC05501	478	NL/NL	NL
	FDSSC05801	2370		
Vanadium (V)	FDSSC05501	5.2	NL/6000	72.5
	FDSSC05801	15.2		
Zinc (Zn)	FDSSC05501	5.5	NL/12000	145

Notes:
a = Background value for non-clay samples
ND = Not detected
NL = Not listed
NA = Not applicable
µg/kg = Micrograms per kilogram
mg/kg = Milligrams per kilogram
RBSLs from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) and soil-to-groundwater SSLs (DAF=20) from the *Soil Screening Guidance: Technical Background Document* (USEPA, 1996b) were used as reference concentrations.
Bolded concentrations exceed RBSL or the SSL (if no RBSL is available).
All background values for Zone G are based on twice the mean of grid sample concentrations.



LEGEND

- ● – Soil Boring
- ⋈ – Valve
- –×–×–×– – Fence
- - - - - - – Diesel Line
- —— – – —— – Fuel Line
- — — — — — – Sludge Line

All Concentrations in ug/kg
Soil RBSL for Total Naphthalenes=210 ug/kg
(SCDHEC January 5, 1998)

FUEL DISTRIBUTION SYSTEM
CONTAMINATION
ASSESSMENT REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 4.6-4
AREAS 9 AND 10
NAPHTHALENES IN SOIL

DWG DATE: 06/02/98 | DWG NAME: 2907N023

Pesticides in Subsurface Soil

Three pesticides were detected in subsurface soil at Area 9 and 10. No RBSLs are available for pesticides in soil. Concentrations of 4,4'-DDE, alpha-chlordane, and gamma-chlordane were detected at FDSSC05801 below SSLs.

Inorganics in Subsurface Soil

Eighteen metals were detected in subsurface soil at Area 9 and 10. No soil RBSLs are available. All detected metals concentrations were below SSLs and Zone G background concentrations.

4.6.3 Nature of Contamination in Shallow Groundwater

Analytes detected in groundwater at Areas 9 and 10 are summarized in Table 4.6.2. No free product was observed in these wells. Appendix C contains a complete analytical data report for all FDS samples. For Area 9 and 10, the FDS well data are based on two sampling events, January and June of 1997. Data for monitoring well 620003 are taken from sampling in May and September of 1997.

Volatile Organic Compounds in Shallow Groundwater

Acetone and xylene were the only VOCs detected in Area 9 and 10 groundwater. These parameters were detected in the most recent FDS09C samples at concentrations far below RBSLs and tap water RBCs.

Semivolatile Organic Compounds in Shallow Groundwater

Acenaphthene, benzoic acid, and 4-chloro-3-methylphenol were detected in Area 9 and 10 groundwater, from well 620003 adjacent to Areas 9 and 10, at concentrations far below RBSLs and tap water RBCs. Total PAHs was also far below the RBSL.

Table 4.6.2
Analytes Detected in Shallow Groundwater
Areas 9 & 10
Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Volatile Organic Compounds (µg/L)					
Acetone	FDS09C	ND	6	NL/370	NA
Xylene (Total)	FDS09C	ND	1	10000/1200	NA
Semivolatile Organic Compounds (µg/L)					
Total PAHs	620003	0	2	25/NL	NA
Acenaphthene	620003	ND	2	10/220	NA
Benzoic acid	620003	ND	4.0	NL/15000	NA
4-Chloro-3-methylphenol	620003	ND	1.0	NL/NL	NA
Dioxins (pg/L)					
Dioxin (2,3,7,8-TCDD TEQs[1])	FDS09B	0.004	NT	NL/0.45	NA
Inorganics (µg/L)					
Aluminum (Al)	620003	ND	182	NL/3700	692
	FDS09A	273	39.9		
	FDS09B	197.5	110.1		
	FDS09C	136	ND		
	FDS10A	230	ND		
	FDS10B	379	10.7		
	FDS10C	93.1	77		
Antimony (Sb)	FDS09B	4.1	ND	NL/1.5	4.85
	FDS10A	2.6	ND		
	FDS10B	2.8	ND		
	FDS10C	2.4	ND		
Arsenic (As)	620003	ND	11.1	50/0.045	17.8
	FDS09A	4	3.3		
	FDS09B	4.2	6.1		
	FDS09C	4.4	3.5		
	FDS10A	6.5	5.2		
Barium (Ba)	620003	32.9	67.2	2000/260	31
	FDS09A	45.4	37.6		
	FDS09B	202.5	237		
	FDS09C	37.8	33.7		
	FDS10A	411	247		
	FDS10B	182	200		
	FDS10C	42.6	33		
Beryllium (Be)	FDS09A	.38	ND	NL/0.016	ND
Cadmium (Cd)	620003	0.3	ND	5/1.8	0.53
	FDS10C	ND	0.32		
Calcium (Ca)	620003	129000	134000	NL/NL	NL
	FDS09A	144000	138000		
	FDS09B	23700	236500		
	FDS09C	143000	131000		
	FDS10A	133000	133000		
	FDS10B	191000	203000		
	FDS10C	170000	155000		
Chromium (Cr)	620003	ND	1.4	100/18	3.88
	FDS10A	ND	2.2		
	FDS10C	ND	2.5		

Table 4.6.2
Analytes Detected in Shallow Groundwater
Areas 9 & 10
Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Cobalt (Co)	FDS09A	2.9	ND	NL/220	1.45
	FDS09B	1.1	ND		
	FDS09C	1.9	ND		
	FDS10A	1.8	ND		
	FDS10B	.96	ND		
	FDS10C	1	ND		
Copper (Cu)	620003	2.5	ND	NL/13000	8.33
Cyanide (CN)	FDS09A	10.9	NT	NL/73	3.8
	FDS09C	16.7	NT		
	FDS10B	3.8	NT		
	FDS10C	8.1	NT		
Iron (Fe)	620003	6880	11700	NL/NL	NL
	FDS09A	1300	15200		
	FDS09B	23600	14700		
	FDS09C	10400	12400		
	FDS10A	7590	8390		
	FDS10B	5560	4650		
	FDS10C	13300	10600		
Lead (Pb)	FDS10A	2	ND	15/15	4.6
Magnesium (Mg)	620003	23100	18800	NL/NL	NL
	FDS09A	574000	462000		
	FDS09B	70450	53550		
	FDS09C	583000	485000		
	FDS10A	245000	199000		
	FDS10B	382000	280000		
	FDS10C	343000	297000		
Manganese (Mn)	620003	749	604	NL/84	2906
	FDS09A	694	992		
	FDS09B	1475	1245		
	FDS09C	561	576		
	FDS10A	156	137		
	FDS10B	275	263		
	FDS10C	790	707		
Nickel (Ni)	FDS09C	1	ND	NL/73	4.08
	FDS10A	3.7	2.4		
	FDS10B	1.2	ND		
	FDS10C	.92	ND		
Potassium (K)	620003	16800	19200	NL/NL	NL
	FDS09A	195000	164000		
	FDS09B	47300	38850		
	FDS09C	190000	168000		
	FDS10A	85800	74900		
	FDS10B	131000	107000		
	FDS10C	137000	120000		
Silver (Ag)	FDS09B	ND	1.9	5/18	1.65
	FDS10A	1.3	ND		
	FDS10B	ND	1.1		

Table 4.6.2
Analytes Detected in Shallow Groundwater
Areas 9 & 10
Fuel Distribution System

Parameters	Location	First Sampling Event	Second Sampling Event	RBSL/Tap Water RBC (µg/L)	Shallow Background
Sodium (Na)	620003	75900	71400	NL/NL	NL
	FDS09A	5320000	4380000		
	FDS09B	472000	394000		
	FDS09C	5260000	4710000		
	FDS10A	2370000	2150000		
	FDS10B	3550000	2940000		
	FDS10C	3050000	2920000		
Thallium (Tl)	620003	5.2	ND	NL/0.29	ND
	FDS09A	ND	5.6		
	FDS09B	ND	6.7		
	FDS09C	ND	5.8		
	FDS10A	ND	7.1		
Vanadium (V)	FDS09A	4.7	3.6	NL/26	15.4
	FDS09B	2.0	1.7		
	FDS09C	3.4	1.7		
	FDS10A	2.6	ND		
	FDS10B	3.6	1.8		
	FDS10C	3.3	2.7		
Zinc (Zn)	FDS10A	**2790**	**2340**	NL/1100	15.6

Notes:
1 = Calculated from methods described in USEPA Interim *Supplemental Guidance to RAGS: Human Health Risk Assessment*, Bulletin 2 (USEPA, 1995).
NL = Not listed
NA = Not applicable
ND = Not detected
NT = Not taken
TCDD = Tetrachlorodibenzo-p-dioxin
TEQ = TCDD equivalency quotient
µg/L = Micrograms per liter
pg/L = Picograms per liter
RBSLs from the *South Carolina Risk-Based Corrective Action for Petroleum Releases* (SCDHEC, January 5, 1998) and tap water RBCs (THQ=0.1) from *Risk Based Concentration Table* (USEPA, October 22, 1997) were used as reference concentrations.
Bolded concentrations exceed RBSL or the tap water RBC (if no RBSL is available).
All background values for Zone G are based on twice the mean of grid sample concentrations. Background values for groundwater are based on two sampling rounds in two wells at each depth.

Dioxins in Groundwater

Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin equivalency quotient [TCDD TEQ]) was detected in the first groundwater sampling event at well FDS09B, far below its tap water RBC. No RBSL is available for this compound. Dioxin was not analyzed for during the second sampling event.

Inorganics in Shallow Groundwater

Twenty-one metals plus cyanide were detected in groundwater samples associated with Area 9 and 10. No RBSLs for groundwater metals were exceeded at Area 9 and 10. Concentrations of manganese, thallium, and zinc exceeded their tap water RBCs in the second sampling event. Although concentrations of manganese exceeded the tap water RBC, they were below the Zone G background value. No background or RBSL was established for thallium. Concentrations of zinc detected during both events exceeded the tap water RBC and Zone G background. No RBSL was established for zinc, the source of which is not known.

01184

CH2M-Jones,LLC

March 24, 2003

RECEIVED
MAR 25 2003
Water Monitoring, Assessment & Protection Division

Michael Bishop
SCDHEC
2600 Bull Street
Columbia, SC 29201

Re: RCRA Site Area of Concern 631 transfer

Michael,

The intent of this letter is to document and identify that the southern portion of AOC 631 has been previously addressed under the UST program as Fuel Distribution System: Areas 9-10.

Area of Concern (AOC) 631 the site of former fueling operations, supported the transfer of petroleum products to and from barges and vessels along Pier Kilo (K). In a letter dated 13 June 2001 (Hunt to Litton), it is recommended that the northern portion of AOC 631 on the pier head that is over the water be addressed by the Zone J scope of work. The letter also recommends that the remainder of Pier K (southern portion) be covered under the UST program. This southern portion of AOC 631 is part of the fuel distribution system identified as Areas 9-10. Areas 9-10 have been investigated under the UST program and have been issued a NFA (see attached letter dated 14 November 2001/ Bishop to Magwood).

The *Fuel Distribution System Contamination Assessment Report* (FDSAR) dated September 10, 1998 prepared by Ensafe provides background descriptions of AOCs 629 and 631. Attached to this letter are figures from the report that provides visual reference to the AOCs and FDS Areas. Figure 1-1 shows the locations of AOC 629, AOC 631, and FDS Area 9-10, and Figures 4.6-1 and 5-108 shows the footprint of the fuel unloading facility.

On behalf of the U.S. Navy Southern Division Naval Facilities Engineering Command, CH2M-Jones requests a NFA for recently transferred site AOC 631-S based on the NFA received for Areas 9-10 on November 14, 2001.

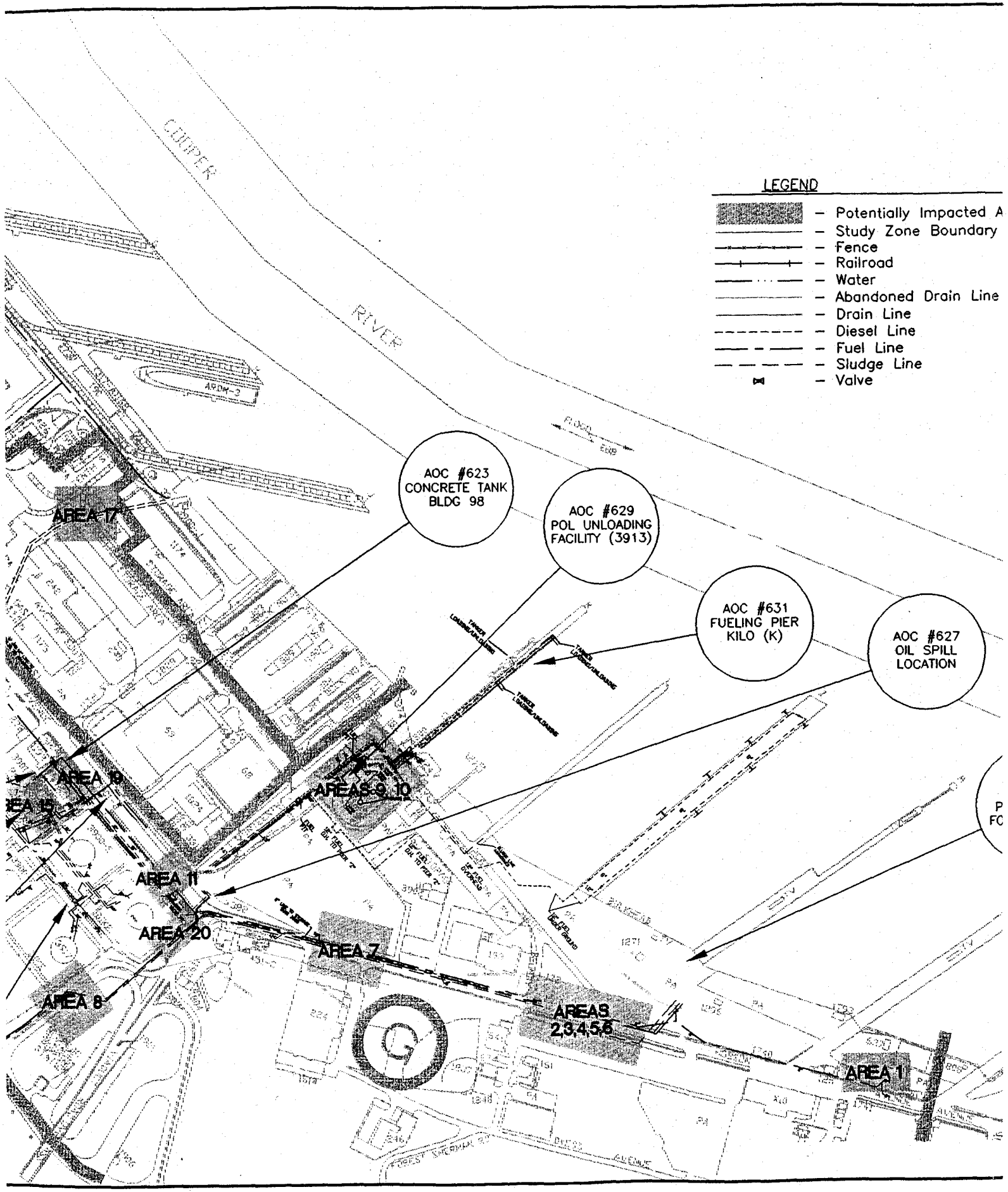
Sincerely,

CH2M-Jones, LLC

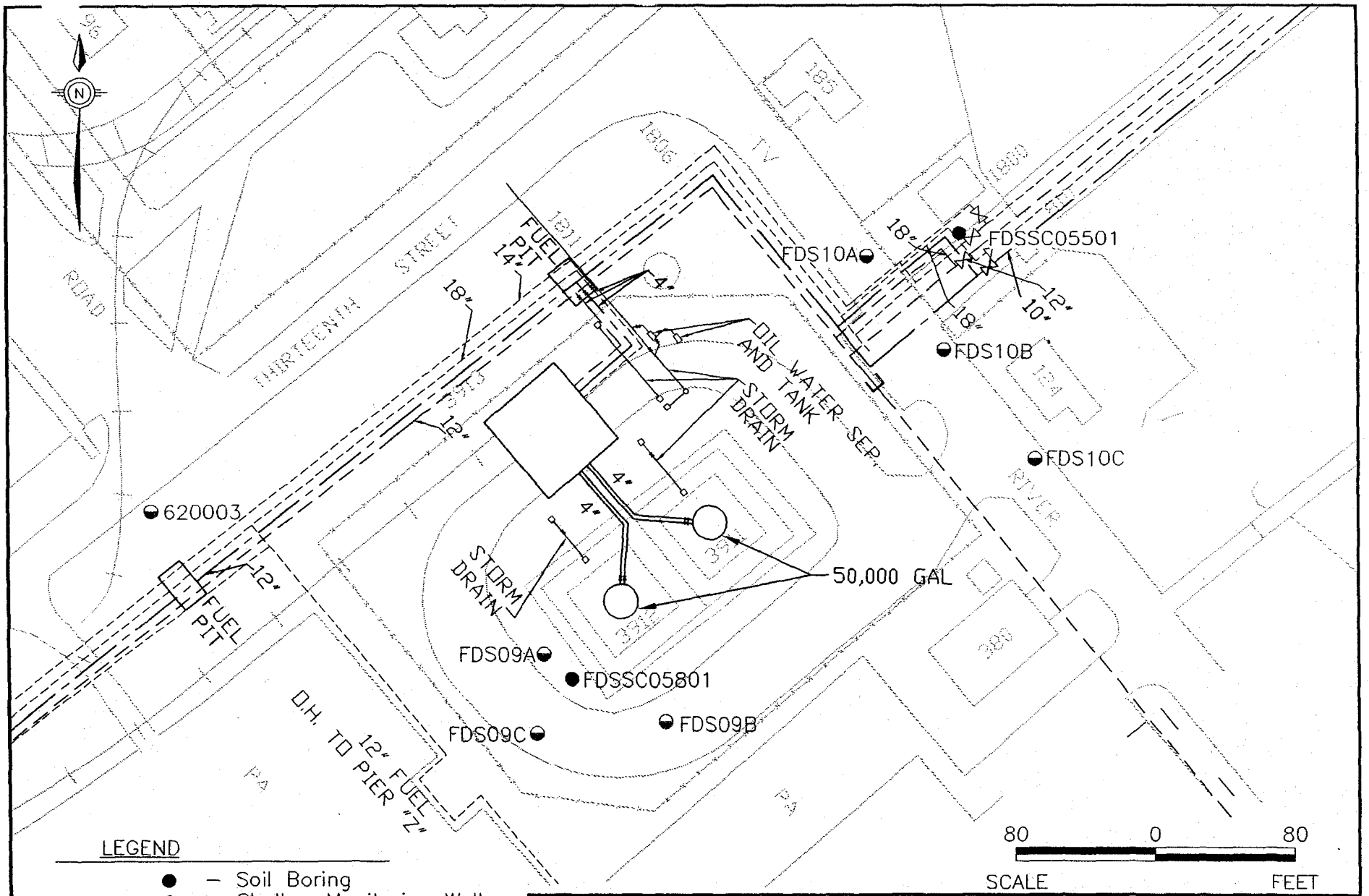
Brian Crawford
CH2M-Jones, LLC
(843) 740-2780

enclosures

Cc: Rob Harrell SOUTHDIV
Gary Foster CH2M-Jones, LLC-ATL.



PORTION
FIG 1-1



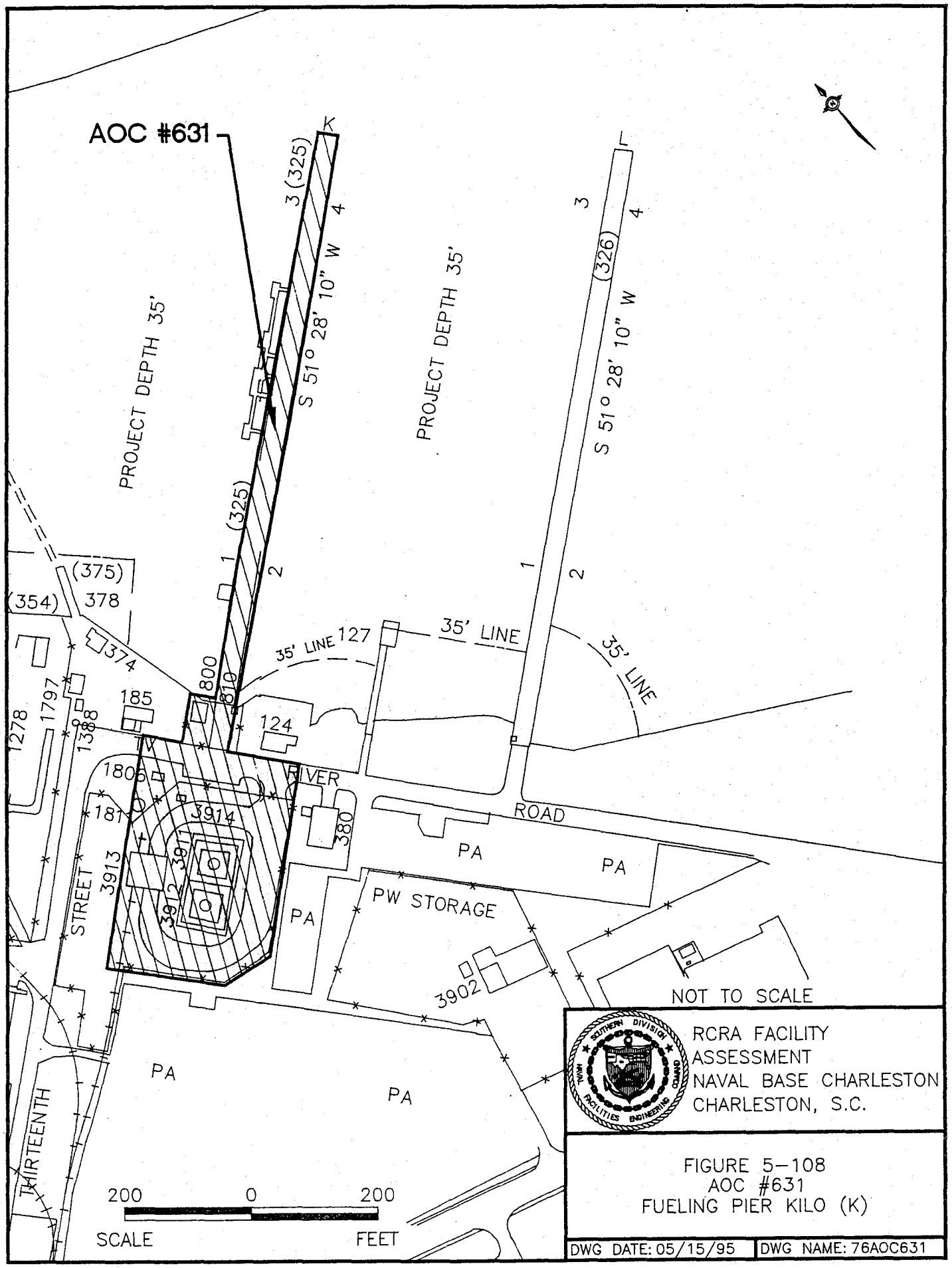
LEGEND

- ● — Soil Boring
- ◒ — Shallow Monitoring Well
- ⋈ — Valve
- —×—×—×—×— — Fence
- - - - - - - - - — Diesel Line
- ——— - ——— — Fuel Line
- — — — — — — Sludge Line

FUEL DISTRIBUTION SYSTEM CONTAMINATION ASSESSMENT REPORT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 4.6-1
AREAS 9 AND 10
SOIL AND GROUNDWATER SAMPLE LOCATIONS

DWG DATE: 05/28/98 | DWG NAME: 2907N006



RCRA FACILITY
ASSESSMENT
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 5-108
AOC #631
FUELING PIER KILO (K)

DWG DATE: 05/15/95 | DWG NAME: 76AOC631

1.3 Current Investigation

Objective

The objective of this CAR is to present the site background and history, investigative methodology, and contamination assessment results of the field investigation in order to prepare a Corrective Action Plan (CAP) for petroleum contamination related to the FDS.

Field Investigation Scope

Ten Solid Waste Management Units (SWMUs) or Areas of Concern (AOCs) associated with the FDS were identified through the RCRA Facility Assessment (RFA) process, as discussed in the *Final RCRA Facility Assessment for Naval Base Charleston* (EnSafe/Allen and Hoshall [E/A&H], June 6, 1995). Identification of potential SWMUs and AOCs was based on the best information available at that time and is subject to change should more information become available. Originally intended to be included in the *Draft Zone G RFI Report* (EnSafe, February 1998), the FDS was separated from the RFI process for evaluation under the South Carolina petroleum program. This CAR presents the results of this evaluation. Newly identified AOC 709 (Area 16) a portion of AOC 613 (Area 17) and SWMU 24, which were originally associated with the FDS, were retained in the RFI due to RCRA constituents detected during the FDS. The remaining nine SWMUs and AOCs associated with the FDS are described in Table 1.1. Figure 1-3 identifies the layout of the FDS. The *Final Zones D, F and G RFI Work Plan* (E/A&H, June 13, 1996) outlined an investigative strategy for the FDS. Included in this report is a discussion of the analytical results from the FDS field investigation. Two additional areas requiring investigation were identified subsequent to the RFI. Area 19 was identified adjacent to the south of Building 98 during closure activities of UST 148, which is part of AOC 623. Area 20, located at the northeast corner of AOC 626 was identified during cleaning and closure of the FDS pipelines.

Table 1.1
AOC Descriptions
Fuel Distribution System

Number	Description	Materials Released, Stored, or Disposed	Potential Pathways
AOC 622 Ballast Water Treatment Facility, Facility 3926	Facility 3926 is an oil-water separator that separates ballast water for discharge to the sanitary sewer. Oil was collected in Tank 3901A and disposed of as used oil.[a]	Petroleum Products, Metals	Soil Groundwater Sanitary sewer Surface water Utility ways
AOC 623 Concrete Tank, Building 98	Tank 148 is a concrete stripper tank used to hold the contents of pipelines while being emptied for maintenance or alteration.[a]	Residual Petroleum Products (Bunker C, Navy Special Fuel Oil)	Soil Groundwater Utility ways
AOC 624 Fuel Oil Booster Pumphouse, Building 98	Building 98 served as a pumphouse to boost the flow of fuel products (used and unused) through the FDS.[a]	Petroleum Products, Benzene, Toluene, Ethylbenzene and Xylene (BTEX), Metals, Volatile Organic Compounds (VOCs)	Soil Groundwater Surface water Utility ways
AOC 625 Sludge Pumphouse, Building 3901B	Building 3901B served as a pumphouse to transfer used oil to and from Tank 3901A.[a]	Petroleum Products, BTEX, VOCs, Metals	Soil Groundwater Surface water Utility ways
AOC 626 Charleston Naval Supply Center Fuel Farm	Fuel Farm contains four large fuel tanks, several smaller tanks, various pumps and piping systems, used oil, and wastewater processing systems.[b]	Petroleum Products, BTEX, VOCs, Polychlorinated Biphenyls (PCBs), Metals	Soil Groundwater Surface water Utility ways Subsurface gas
AOC 627 Oil Spill Area at Hobson Avenue and Viaduct Road	Location is scene of various fuel spills throughout the history of the FDS. Soil and utilities have been impacted.[a]	Petroleum Products, BTEX, VOCs, PCBs, Metals	Soil Groundwater Surface water Utility ways
AOC 629 Tank Truck/Car Loading/Unloading Facility	Facility supports transfer of petroleum products and used oil to and from tank cars, tank trucks and the FDS.[a]	Petroleum Products (including lube oils), BTEX, VOCs, PCBs, Metals	Soil Groundwater Surface water Utility ways Subsurface gas
AOC 631 Fueling Pier Kilo (K)	Facility supports transfer of petroleum products and used oil to and from barges and vessels along Pier Kilo.[a]	Petroleum Products, BTEX, VOCs, PCBs, Metals, Creosote	Soil Groundwater Surface water Utility ways Subsurface gas
AOC 641 Stripper Pumphouse, Former Building 39-K	Facility was used to remove fuel from the pipelines on pier, previously located near site of present Pier M. This facility was misidentified during the RFA process.[a]	Residual Petroleum Products (Bunker C, Navy Special Fuel Oil)	Soil Groundwater Surface water Utility ways

Notes:
a = Described in the *Final RCRA Facility Assessment, Volume II, June 6, 1995.*
b = Described in the *Final RCRA Facility Assessment, Volume I, June 6, 1995.*
SWMU 24 was retained in the RFI due to RCRA waste oil constituents detected.

5090/11
Code 18B1
13 June 2001

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street,
Columbia, SC 29201

Subject: STRATEGY FOR ADDRESSING SITE CLOSE OUT ISSUES RELATED TO ZONE J, L AND OTHER SITES AT THE CHARLESTON NAVAL COMPLEX

The purpose of this letter is to present the strategy the Navy intends to use for addressing site close out issues associated with the Waterbodies (Zone J) and the Sewer and Railroad systems (Zone L) at the Charleston Naval Complex. The strategy has been developed in order to delineate the division of responsibility between the two Navy contractors (Ensafe and CH2M-Jones) in a manner that meets the regulatory requirements of the RCRA Part B permit. The permit is issued to the Navy by the S.C. Department of Health and Environmental Control (DHEC) and the U.S. Environmental Protection Agency (EPA).

Zone J and L are investigative zones created for purposes of project management given the large number of Solid Waste Management Units (SWMUs) and Areas Of Concern (AOCs) at the CNC. Instead of evaluating the risk to human health and ecological receptors in the waterbodies from each site, Zone J was created to address these issues once the contaminant migration pathways from the terrestrial sites were established. Zone L was created to address the potential for hazardous materials or waste to be discharged to the waterbodies through the sanitary or storm sewer systems and to address releases in terrestrial areas that occurred at transfer or storage stations along the railroad system. The original Zone J strategy was to sample sediment and surface water at and around outfalls in order to identify where any contamination existed and then attempt to establish the pathway back to the terrestrial site at CNC. The original Zone L strategy involved sampling along the sewer systems downstream of sources that used hazardous materials (primarily industrial sources) with the intent of further investigating those areas that exceeded screening levels for the constituents of concern.

The change in strategy is necessary as a result of the change in contracting strategy by the Navy. The following contractual delineation is provided in order to assist the Department in understanding the division of responsibility between Navy contractors. The current contract scope with CH2M-Jones requires that they provide site close out of all terrestrial sites. Delineation and remediation of contaminated sediments below the mean high water line are specifically excluded under their contract unless the contamination is a result of contaminated groundwater from a terrestrial site discharging to a waterbody. In the

absence of groundwater recharge CH2M-Jones will address contaminated sediments above the mean high water line that present an unacceptable risk to ecological receptors, using either risk assessment or remediation methods. For purposes of the division of responsibility then, once a contaminant enters the storm sewer or passes beyond the mean high water mark into the waterbody the characterization responsibility of CH2M – Jones is complete. The previous Navy contractor (Ensafe) will be responsible for characterization of the contamination in the remainder of the sewer system, sediments beyond the mean high water mark and waterbodies.

The following strategy describes how the Navy intends to meet the regulatory requirements associated with the site closeout issues and the division of responsibility of the two contractors in completing the characterization. First with Zone J, the process of identifying potential contaminant migration pathways has been assigned to Ensafe with CH2M-Jones providing input. Ensafe is in the process of identifying drainage basins with surface water runoff that may intersect contaminated sites. Ensafe is also reviewing sediment data taken from selected collection basins that may further provide a link to source given the apparent contaminated sediment transport.

As stated previously, CH2M-Jones's characterization responsibility is limited to the terrestrial portion up to the point at which contaminants are migrating into the storm sewer, or up to the mean high water mark via surface runoff or via groundwater discharge into the waterbody. Ensafe's characterization responsibility is essentially the extension of the characterization effort from where contamination enters the storm sewer system or at the mean high water mark where contamination discharges to the surface water via overland flow. Ensafe will compile site data and use screening criteria to identify COPCs. CH2M-Jones is expected to review site data and determine the adequacy of the previous characterization efforts and determine where the potential exists for these COPCs to migrate to the storm sewer or to surface water through overland flow. Information provided by Ensafe regarding the presence of contaminated sediment in the catch basins may lead to further site characterization by CH2M-Jones to evaluate whether the source of the contaminated sediment can be determined (or possibly to further storm sewer sampling by EnSafe).

Ensafe has identified three major pathways and have selected screening criteria to determine what COPCs need to be carried forward to sediment or outfall sampling. The first pathway involves surface water runoff where the contaminated site media contain COPCs that exceed screening levels which, if in contact or suspended by sediment in surface water runoff, has the potential to enter the storm sewer system or directly discharge to a water body. This would also include the obvious direct discharge of a contaminant that is seen by discoloration of surface soil or paving leading to storm water inlets. Ensafe would compile this information into the data for that stormwater inlet, ditch or collection pond and evaluate the need for additional data and/or linkage to sediment contaminants. The second identified pathway is where contaminated groundwater from a site has migrated to the extent that it is recharging to the waterbodies. This will require an evaluation by CH2M-Jones to determine the adequacy of the site characterization for groundwater contaminants and comparison of COPCs to screening

level data in order to establish whether a concern exists. Where COPCs exceed screening levels in wells near the mean high water mark or in sediments where groundwater is discharging, these will be identified as COCs and CH2M – Jones will evaluate the need for collection of additional sediment data beyond the mean high water mark. The final pathway is whether contaminated groundwater can infiltrate into the storm sewer system and thereby be discharged to the waterbodies. This pathway is more likely to occur than storm water exfiltrating into the adjacent aquifer. The most obvious method to evaluate this pathway is by collection of effluent samples from the storm sewer outfalls. Ensafe will evaluate the need to collect this data (and will eventually collect it) and provide input to CH2M-Jones on the potential sources based on the COPCs that exceed screening criteria, sites and basin boundaries serviced by the outfall.

The influence of the railroad system on site closure will be evaluated on a site by site basis by CH2M-Jones during site closeout criteria evaluation. Additionally CH2M – Jones will evaluate the adequacy of characterization of No Further Action sites in completed RFIs which were closed under the assumption that Zone L would address the additional pathways. Any part of the sanitary sewer system that meets the definition of solid waste management units or areas of concern will be addressed in the site closeout criteria evaluation. This would include only that part of the system that is in service and continues to discharge wastes defined as hazardous waste under the S.C. Hazardous and Solid Waste Management Regulations (SC HSWMR R79.61) to the waterbodies. The majority of the CNC sanitary sewer lines have been rerouted to the Public Owned Treatment Works through the Main Discharge Point regulated by the North Charleston Sewer District (NCSD) and wastes discharged to it are therefore not a solid waste or hazardous waste by definition in Part 261 of the SC HSWMR.

CH2M – Jones will conduct the remediation where required on the terrestrial sites as far as the mean high water mark after the completion of the RFI and remedy selection. In addition, any sediment contamination found in the catch basins, sewer systems or sediments contaminated by groundwater recharge will be addressed by CH2M – Jones. The remediation of the contamination in the waterbodies and sediments beyond the mean high water mark will be done by a Remedial Action Contractor (RAC) under contract to the Navy at the time of RFI completion and remedy selection.

In addition to the sanitary and storm sewer systems (SWMU 37 and AOC 699 respectively) several other sites require discussion in order to clarify how the Navy intends to address the site investigation and corrective action requirements under the RCRA Part B permit. AOC 501, 502 and 503 are Unexploded Ordnance (UXO) sites in Zone J that will be dealt with by the Navy. AOC 504 (Railroad System) is being addressed in the site closeout criteria similar to the sewer systems. That portion of AOC 631 (northern portion) that is over the water will be addressed by the Zone J scope of work. The recommendation is made by this letter to address the remainder of Pier K (southern portion) in the UST program with the remainder of the Fuel Distribution system. Drydock discharges (AOC 556), the Waterfront releases (AOC 691) and Free Product Along the Cooper River (AOC 692) will be dealt with in the Zone J scope of work.

As a result of this letter the following changes will be required in the RCRA Part B permit;

Site	Site Description	Site Status	Investigative Zone
SWMU 37	Sanitary Sewer System	NFA	Addressed by site*
AOC 699	Storm Sewer System	NFA	Addressed by site*
AOC 504	Railroad System	NFA	Addressed by site*
AOC 556	Drydock Discharges	RFI	J
AOC 501	UXO Site (Pier S and T)	RFI	None (Navy)
AOC 502	UXO Site (East of X-54)	RFI	None (Navy)
AOC 503	UXO Site (Pier G and H)	RFI	None (Navy)
AOC 631N	Pier K (North)	RFI	J
AOC 631S	Pier K (South)	NFA	Recommend transfer to the UST program

*Zone L is eliminated as an investigative zone.

This should provide sufficient clarification on the division of responsibilities and the strategy the Navy is using to address the requirements of the RCRA Part B permit. Should you have any additional questions please contact either myself or Matthew Humphrey at the Caretaker Site Office at 843-820-5525 or 843-743-9985 respectively.

Sincerely,

M.A.Hunt, P.E.
BRAC Environmental Coordinator
BRAC Division

Copy to:
SCDHEC (4)
USEPA (Dann Spariousu)
CH2M Hill/Jones (Dean Williamson, Gary Foster
Ensafe (Todd Haverkost)

July 20, 2001

Mr. Matthew A. Hunt, P.E.
BRAC Environmental Coordinator, BRAC Division
Naval Facilities Engineering Command, Southern Division
P.O. Box 190010
North Charleston, SC 29419-9010

RE: Strategy for Addressing Site Close Out Issues
Zone J, L, and Other Sites
Charleston Naval Complex
SC0 170 022 560

Dear Mr. Hunt:

The Department of Health and Environmental Control (the Department) is in receipt of your letter dated June 13, 2001, which presents the strategy the Navy intends to use in order to address site close out issues associated with the water bodies (Zone J) and the sewer and railroad systems (Zone L) at the Charleston Naval Complex. The strategy delineates the division of responsibility between the two Navy contractors (Ensafe and CH2M-Jones) in a manner that meets the regulatory requirements of the Charleston Naval Complex RCRA Part B Permit.

Thank you for your assistance and cooperation in this matter. Should you require additional information, please contact David Scaturo at (803) 896-4185, or by email at scaturdm@columb34.dhec.state.sc.us.

Sincerely,

John T. Litton, P.E.
Director, Division of Waste Management
Bureau of Land and Waste Management

JTL:dms