1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HIB103RE

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA022S

Matrix: (soil/water) SOIL Lab Sample ID: 9804494-15

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 1H1023

Level: (low/med) LOW Date Received: 04/22/98

% Moisture: not dec. 20 Date Analyzed: 05/04/98

GC Column: J&W DB-624(FID) ID: 0.53 (mm) Dilution Factor: 2.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
	----------Gasoline Range Organics	1250	U	UJ GP2

USL

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HIB103

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA022S

Matrix: (soil/water) SOIL Lab Sample ID: 9804494-15

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 4R405

Level: (low/med) LOW Date Received: 04/22/98

% Moisture: 20 decanted: (Y/N) N Date Extracted: 04/24/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/30/98

Injection Volume: 1.0(uL) Dilution Factor: 4.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	naphthalene	1650	U
91-58-7	2-chloronaphthalene	1650	U
208-96-8	acenaphthylene	1650	U
83-32-9	acenaphthene	1650	U
86-73-7	fluorene	1650	U
85-01-8	phenanthrene	1650	U
120-12-7	anthracene	1650	U
206-44-0	fluoranthene	1650	U
129-00-0	pyrene	1650	U
56-55-3	benzo(a)anthracene	1650	U
218-01-9	chrysene	1650	U
205-99-2	benzo(b)fluoranthene	1650	U
207-08-9	benzo(k)fluoranthene	1650	U
50-32-8	benzo(a)pyrene	1650	U
193-39-5	indeno(1,2,3-cd)pyrene	1650	U
53-70-3	dibenz(a,h)anthracene	1650	U
191-24-2	benzo(g,h,i)perylene	1650	U

U

FORM I SV-1 OLM03.0

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Lorene Rollins
Project Description: Hunter Army Airfield Site

cc: SAIC00398

Report Date: May 01, 1998

Sample ID	: HI8400
Lab ID	: 9804404-18
Matrix	: Soil
Date Collected	: 04/15/98
Date Received	: 04/16/98
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
TOTAL ORGANIC CARBON (TOC)		5270	= F01,F08	24.1	100	mg/kg	1.0	RMJ	04/24/98	1135	120610	1

M = Method	Method-Description
M 1	SW846 9060 modified

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

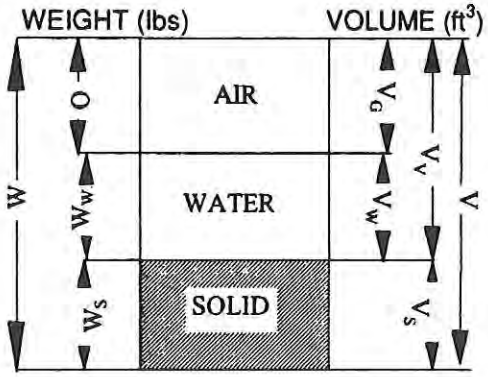
This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (803) 769-7391.

Reviewed By

9804404-18

PROJECT: Hunter Air Force Base
LOCATION OF PROJECT: CAP Part A
DESCRIPTION OF SOIL: Dark Brown Clayey Sand
TESTED BY: BV-CA

JOB NO.: 98064
SAMPLE NO.: HI8400
DEPTH OF SAMPLE: 2-4 ft.
DATE OF TESTING: 4/27/98



W = 1.44444
$W_W = W - W_S$ = 0.16418
$W_S = Y_d * V$ = 1.2803

V = 0.01425
$V_W = W_W/Y_W$ = 0.0026
$V_S = W_S/G_S*Y_W$ = 0.0078
$V_G = V - (V_S + V_W)$ = 0.00383
$V_V = V_G + V_W$ = 0.0065

MEASUREMENTS OF TUBE/CAN

HEIGHT=	22.3	cm
DIAMETER=	4.8	cm

CALCULATED VOLUME OF TUBE/CAN

V= 403.53 cm^3
0.01425 ft^3

WT. OF TUBE/CAN + WET SOIL=	844.50	g
WEIGHT OF TUBE/CAN=	189.3	g
WEIGHT OF WET SOIL=	655.20	g
W =	1.44444	lb

MOISTURE CONTENT

M_{CWS} =	33.70	g	M_C =	15.40	g
M_{CDS} =	31.62	g	M_S =	16.22	g
M_W =	2.08	g	w =	12.8	%

Wet Density, $Y_m = W / V$

Dry Density, $Y_d = W_s / V$ or $Y_d = Y_m / (1+ w)$

double check	$Y_d = Y_m / (1+ w)$
$Y_d = W_s / V$	Y_m= 101.35 lbs/ft^3
Y_d= 89.83 lbs/ft^3	Y_d= 89.83 lbs/ft^3

Void Ratio, $e = V_V/V_S$
e = 0.8279

Porosity, $n = V_V / V$
n = 0.45

Specific Gravity = 2.63

Degree of Saturation, $S = V_W/V_V$
S = 0.4074

CATLIN Engineers and Scientists
Geotechnical Laboratories

PERMEABILITY TEST ANALYSIS (ASTM D5084)

Project : Hunter AFB

Location of Project : Cap Part A

Description of Soil : Dark Brown Clayey Sand

Job # : 98064
Date of Testing: 5/18-20/98
Tested by: BV-CA
Boring # :
Sample # : HI8400
Sample Depth : 2-4ft.

Sample Type (**Undisturbed** or Remolded)
Standard Proctor:
Maximim Dry Density: _____ *pcf*
Optimum Moisture Content: _____ %

% Sample Compaction: _____ %
Sample Dry Density: _____ *pcf*
Sample Moisture Content: _____ %
Sample Wet Density: _____ *pcf*

Sample Permeation:

De-Aired Water
% Saturation: 98 %
Cell Pressure: 40 *psi*
Lower Pressure: 36 *psi*
Upper Pressure: 35 *psi*
Gradient: 11.93

Sample Dimensions		
	Before	After
Length (cm)	5.90	5.40
Diameter (cm)	4.70	4.35
Water Content (%)	5.74	22
Weight (g)	189.9	198.4

Constant Head Calculation:

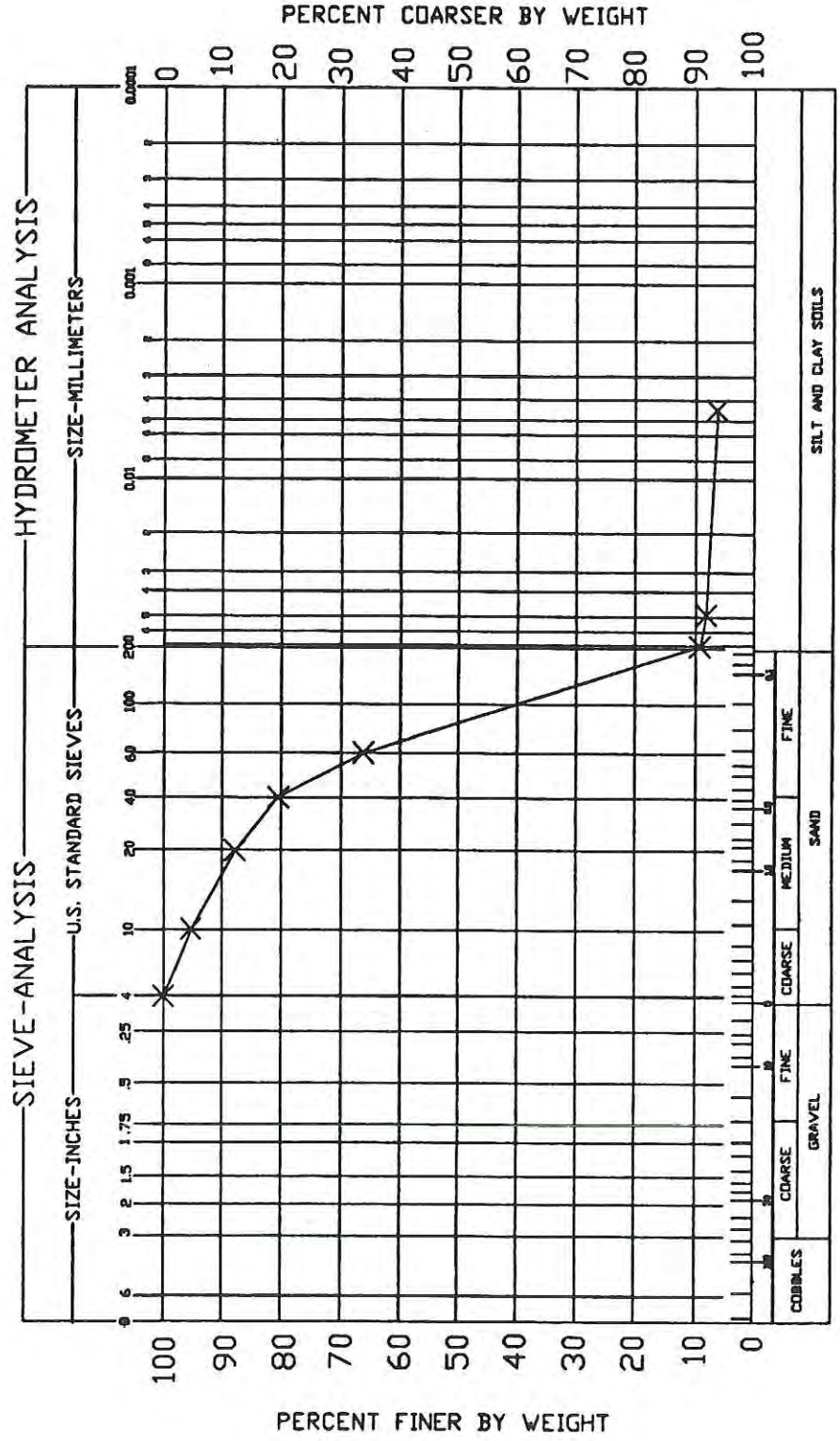
$$K = [V(t_1,t_2)\ LR_T]/[P_BAt]\ (cm/sec)$$

$V(t_1,t_2)$ = Volume of flow from t_1 to t_2 (cm^2)
L = Length of Sample = 5.90 cm
A = Area of Sample = 17.35 cm^2
$t = t_2 - t_1$ (sec)
P_B = Bias Pressure = 1 psi x 70.37 cm/psi $_{(cm - H2O)}$ = 70.37 cm
R_T = Temperature correction = 0.931

t_2 (sec)	t_1 (sec)	$(t_2 - t_1)$ (sec)	V (cm^3)	$[LR_T]/[P_BA]$ (cm^2)	K (cm/sec)
70	60	10	0.3	4.50E-03	1.35E-04
80	70	10	0.3	4.50E-03	1.35E-04
90	80	10	0.3	4.50E-03	1.35E-04
100	90	10	0.3	4.50E-03	1.35E-04

K_{avg} = 1.35E-04 cm/sec

CATLIN Engineers and Scientists
Geotechnical Laboratories



SAMPLE NO.	ELEV. OR DEPTH	CLASSIFICATION	NAT. WC	LL	PL	PI	REMARKS
H18400	2-4 FT.	SP-SC	12.8	-	-	-	DARK BROWN POORLY GRADED CLAYEY SAND 9% PASSING #200 SEIVE

PROJECT NAME: HUNTER AFB
PROJECT LOCATION: CAP PART A
RCRA PROJECT #: 98064
BORING NO.
DATE: 06\18\98

GRADATION CURVES

CAELIN
GEOTECHNICAL LABORATORY
MOUNT PLEASANT, SOUTH CAROLINA

GRAIN SIZE ANALYSIS-SIEVE (ASTM D422)

Project Hunter AFB Job No. #58064

Location of Project Cp Pit A Sample No. HI 8400

Description of Soil _____ Depth of Sample 2-4' Boring No. ____

Tested By BV. Date of Testing 8/30/58

Sample preparation procedures outlined in ASTM D421 and D2217.

Nominal diameter of largest particle	Approximate minimum Wt. of sample, g
No. 10 sieve	200
No. 4 sieve	500
3/4 in.	1500

Weight of sample used, M_{st} = 459.10 g

P-58

M_{can}	M_{dish}	M_c ____	M_w	M_s	w %	M_{wn}	M_s
	557.80	118.80	459.10				

Sieve analysis and grain shape

Sieve no.	Diam. (mm)	Wt. retained	% retained	Σ % retained	% passing
3"					
2"					
1 1/2 "					
3/4"					
3/8"					
#4		1.16	0.26	0.26	99.74
#10		18.87	4.31	4.57	95.43
#20		35.58	8.12	12.69	87.31
#40		29.82	6.81	19.50	80.50
#60		64.57	14.74	34.24	65.76
#140		275.70	62.95	97.19	2.81
#200		4.8	~~95.10~~ 1.12	98.31	1.69
pan		7.4	~~82.60~~ 1.69	100	0
		438.00			

% retained = (Wt. retained/W_s) · 100

% passing = 100 - Σ % retained.

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APPENDIX VI

ALTERNATE THRESHOLD LEVEL (ATL) CALCULATIONS

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1.0 ALTERNATE THRESHOLD LEVEL CALCULATIONS

During Underground Storage Tank (UST) system closure activities conducted at the USTs 27 & 28, Building 8059 site by Anderson Columbia, Inc. (ACE) in September 1996, one grab soil sample was collected from the bottom of the UST 27 excavation pit at a depth of 14 feet below ground surface (BGS). Soil sample 8102-TK27-S1 contained concentrations of ethylbenzene (12.6 mg/kg) and toluene (13.3 mg/kg) that exceeded the Georgia Environmental Protection Division (GA EPD) applicable soil threshold levels (i.e., Table A, column 2) of 10.0 mg/kg and 6.0 mg/kg, respectively. Following the Georgia Department of Natural Resources (GA DNR) UST Corrective Action Plan (CAP)-Part A and B guidance documents (GA DNR 1995 and 1998), the calculation of Alternate Threshold Levels (ATLs) for these constituents is warranted. The ATL calculation methodology and results are presented in the following sections.

1.1 ATL CALCULATION METHODOLOGY

Because elevated soil contamination at the site was detected at a depth (14 feet BGS) beneath the water table (4.26 to 5.39 feet BGS), leaching of the contamination through the unsaturated zone to groundwater by percolation was not performed. Instead, equilibrium contaminant partitioning between sorbed and aqueous phases [Cw = Cs/(Koc * fcs)] was utilized to determine the maximum concentration of the contaminants in the groundwater at the source. Lateral contaminant migration to the closest receptor was then performed using the Analytical Transient 1-, 2-, 3-Dimensional Model, AT123D. Based on the predicted modeling results, the dilution attenuation factor (DAF) from the source to the receptor is calculated for each contaminant. The ATLs for ethylbenzene and toluene can then be calculated using the following equation:

$$ATL = Koc * fcs * Cstd * DAF,$$

where Koc is the contaminant organic carbon partitioning coefficient (ml/g) obtained from Table 1 of the GA DNR guidance document; fcs is the calculated site specific fractional organic carbon content (%) of contaminated soil; Cstd is the applicable water quality standard (MCL) concentration (µg/L), and DAF is the dilution attenuation factor calculated from the AT123D Model.

The model was calibrated by matching the equilibrium concentrations at the source and assuming steady state conditions. Site specific soil parameters, determined from undisturbed soil samples collected at the site (Table VI-A), combined with default parameters obtained from the GA DNR guidance document provided the input parameters used in the model. To be conservative, the model was run with the lowest biodegradation rates for ethylbenzene and toluene (Howard et al. 1991). Tables VI-B and VI-C provide the input parameters used in the models for ethylbenzene and toluene, respectively.

1.2 ATL CALCULATION RESULTS

Based on the results of the model for each compound (Figures VI-A and VI-B), DAF values of 37.9 and 49.6 were calculated for ethylbenzene and toluene, respectively, using a distance of 12.5 feet as the distance between the source and the nearest receptor (storm drain). ATL values of 36.1 mg/kg for ethylbenzene and 29.7 mg/kg for toluene were then determined using the equation discussed previously.

Because the maximum soil concentrations for ethylbenzene (12.6 mg/kg) and toluene (13.3 mg/kg) are below their respective calculated ATLs, treatment of the soil at the USTs 27 & 28, Building 8059, Facility ID: 9-025083 site is not warranted.

USTs 27 & 28, Building 8059
Hunter Army Airfield
Chatham County, Facility ID: 9-025083

TABLE VI-A. GEOTECHNICAL PARAMETERS

Building ID	Tank ID	Facility ID	Sample ID	Sample Depth	Classification	Moisture Content (%)	Total Organic Carbon (%)	Specific Gravity	Porosity, n	Permeability (cm/s)	Gravel (wt %)	Sand (wt %)	Mud (wt %)
8059	28	9-025083	HI8400	2.0 to 4.0	SP-SC	12.8	0.527	2.63	0.45	1.4E-4	4.6	88.4	7.0

NOTE: SP-SC = Poorly graded, clayey sand.
USTs = Underground storage tanks.

TABLE VI-B. AT123D FATE AND TRANSPORT MODEL INPUT PARAMETERS AND OUTPUT VALUES FOR ETHYLBENZENE AT THE USTs 27&28, BUILDING 8059 SITE

MODEL INPUT PARAMETERS

NO. OF POINTS IN X-DIRECTION 9
NO. OF POINTS IN Y-DIRECTION 5
NO. OF POINTS IN Z-DIRECTION 1
NO. OF ROOTS: NO. OF SERIES TERMS 400
NO. OF BEGINNING TIME STEP 13
NO. OF ENDING TIME STEP 220
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 12
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 0
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... 0.1524E+02
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... 0.0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... -0.3400E+01
END POINT OF X-SOURCE LOCATION (METERS) ..... 0.0000E+00
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... -0.7000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... 0.7000E+00
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... 0.0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... 0.0000E+00

POROSITY ..... 0.2000E+00
HYDRAULIC CONDUCTIVITY (METER/HOUR) 0.5000E-02
HYDRAULIC GRADIENT 0.1500E-01
LONGITUDINAL DISPERSIVITY (METER) ..... 0.5000E+01
LATERAL DISPERSIVITY (METER) ..... 0.1000E+01
VERTICAL DISPERSIVITY (METER) ..... 0.5000E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG) 0.1038E-02
HEAT EXCHANGE COEFFICIENT (KCAL/HR-M**2-DEGREE C).. 0.0000E+00

MOLECULAR DIFFUSION MULTIPLY BY POROSITY (M**2/HR) 0.2800E-05
DECAY CONSTANT (PER HOUR) 0.1270E-03
BULK DENSITY OF THE SOIL (KG/M**3) ..... 0.1450E+04
ACCURACY TOLERANCE FOR REACHING STEADY STATE 0.1000E-02
DENSITY OF WATER (KG/M**3) ..... 0.1000E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (HR) .. 0.7300E+03
DISCHARGE TIME (HR) ..... 0.8760E+06
WASTE RELEASE RATE (KCAL/HR), (KG/HR), OR (CI/HR) . 0.1660E-04

RETARDATION FACTOR ..... 0.8528E+01
RETARDED DARCY VELOCITY (M/HR) 0.4397E-04
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/HR) .. 0.2215E-03
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/HR) . 0.4561E-04
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/HR). 0.2363E-04

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.0000E+00 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.8760E+04 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
15.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00
5.	0.210E-06	0.142E-06	0.774E-07	0.336E-07	0.115E-07	0.311E-08	0.111E-12	0.000E+00	0.000E+00
0.	0.110E+02	0.328E+01	0.889E+00	0.231E+00	0.535E-01	0.106E-01	0.149E-06	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1752E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.894E-04	0.731E-04	0.526E-04	0.333E-04	0.186E-04	0.914E-05	0.414E-07	0.000E+00	0.000E+00
0.	0.119E+02	0.397E+01	0.134E+01	0.481E+00	0.173E+00	0.602E-01	0.108E-03	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.2628E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.474E-03	0.416E-03	0.332E-03	0.241E-03	0.159E-03	0.966E-04	0.223E-05	0.000E+00	0.000E+00
0.	0.120E-02	0.411E+01	0.144E+01	0.557E+00	0.223E+00	0.901E-01	0.686E-03	0.000E+00	0.000E+00

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3504E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y \ X	0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
10.	0.719E-09	0.688E-09	0.618E-09	0.522E-09	0.414E-09	0.309E-09	0.277E-10	0.197E-14	0.000E+00
5.	0.873E-03	0.792E-03	0.662E-03	0.511E-03	0.366E-03	0.244E-03	0.123E-04	0.362E-09	0.000E+00
0.	0.121E+02	0.413E+01	0.147E+01	0.577E+00	0.238E+00	0.101E+00	0.137E-02	0.191E-07	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4380E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y \ X	0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
10.	0.111E-07	0.108E-07	0.999E-08	0.876E-08	0.729E-08	0.575E-08	0.799E-09	0.328E-12	0.000E+00
5.	0.110E-02	0.102E-02	0.870E-03	0.693E-03	0.516E-03	0.361E-03	0.274E-04	0.524E-08	0.000E+00
0.	0.121E+02	0.414E+01	0.147E+01	0.583E+00	0.243E+00	0.104E+00	0.180E-02	0.144E-06	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.5256E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y \ X	0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E-00	0.000E+00
10.	0.371E-07	0.367E-07	0.347E-07	0.313E-07	0.270E-07	0.222E-07	0.423E-08	0.605E-11	0.000E+00
5.	0.121E-02	0.112E-02	0.967E-03	0.781E-03	0.593E-03	0.425E-03	0.402E-04	0.237E-07	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.584E+00	0.244E+00	0.106E+00	0.201E-02	0.425E-06	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.6132E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y \ X	0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E-00	0.000E-00	0.000E+00	0.000E+00	0.000E-00	0.000E-00	0.000E-00	0.000E-00	0.000E-00
15.	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
10.	0.714E-07	0.714E-07	0.685E-07	0.630E-07	0.556E-07	0.470E-07	0.112E-07	0.383E-10	0.000E+00
5.	0.125E-02	0.116E-02	0.101E-02	0.818E-03	0.626E-03	0.454E-03	0.480E-04	0.573E-07	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.209E-02	0.771E-06	0.000E+00

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.7008E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.102E-06	0.103E-06	0.996E-07	0.928E-07	0.831E-07	0.717E-07	0.198E-07	0.126E-09	0.000E+00
5.	0.126E-02	0.118E-02	0.102E-02	0.832E-03	0.639E-03	0.466E-03	0.520E-04	0.959E-07	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.212E-02	0.107E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.7884E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.470E-12	0.487E-12	0.490E-12	0.479E-12	0.456E-12	0.422E-12	0.187E-12	0.445E-14	0.000E+00
10.	0.124E-06	0.125E-06	0.122E-06	0.114E-06	0.103E-06	0.902E-07	0.275E-07	0.274E-09	0.000E+00
5.	0.127E-02	0.118E-02	0.103E-02	0.837E-03	0.644E-03	0.470E-03	0.538E-04	0.129E-06	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.213E-02	0.127E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.8760E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.380E-11	0.395E-11	0.399E-11	0.394E-11	0.378E-11	0.353E-11	0.169E-11	0.538E-13	0.000E+00
10.	0.136E-06	0.138E-06	0.135E-06	0.127E-06	0.116E-06	0.102E-06	0.330E-07	0.447E-09	0.000E+00
5.	0.127E-02	0.118E-02	0.103E-02	0.839E-03	0.645E-03	0.471E-03	0.545E-04	0.151E-06	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.214E-02	0.138E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.9636E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.789E-11	0.823E-11	0.836E-11	0.829E-11	0.801E-11	0.755E-11	0.386E-11	0.159E-12	0.000E+00
10.	0.142E-06	0.145E-06	0.142E-06	0.134E-06	0.122E-06	0.108E-06	0.364E-07	0.606E-09	0.000E+00
5.	0.127E-02	0.118E-02	0.103E-02	0.839E-03	0.646E-03	0.472E-03	0.548E-04	0.164E-06	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.214E-02	0.143E-05	0.000E+00

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1051E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E-00	0.000E-00
15.	0.115E-10	0.120E-10	0.123E-10	0.122E-10	0.119E-10	0.113E-10	0.605E-11	0.308E-12	0.000E+00
10.	0.145E-06	0.148E-06	0.145E-06	0.137E-06	0.126E-06	0.111E-06	0.382E-07	0.727E-09	0.000E+00
5.	0.127E-02	0.118E-02	0.103E-02	0.839E-03	0.646E-03	0.472E-03	0.549E-04	0.170E-06	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.214E-02	0.146E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1139E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.142E-10	0.149E-10	0.152E-10	0.152E-10	0.148E-10	0.141E-10	0.789E-11	0.473E-12	0.000E+00
10.	0.147E-06	0.149E-06	0.146E-06	0.139E-06	0.127E-06	0.113E-06	0.391E-07	0.806E-09	0.000E+00
5.	0.127E-02	0.118E-02	0.103E-02	0.839E-03	0.646E-03	0.472E-03	0.549E-04	0.174E-06	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.214E-02	0.147E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1226E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.160E-10	0.167E-10	0.171E-10	0.171E-10	0.168E-10	0.161E-10	0.921E-11	0.625E-12	0.000E+00
10.	0.147E-06	0.150E-06	0.147E-06	0.139E-06	0.128E-06	0.113E-06	0.395E-07	0.853E-09	0.000E+00
5.	0.127E-02	0.118E-02	0.103E-02	0.840E-03	0.646E-03	0.472E-03	0.549E-04	0.175E-06	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.214E-02	0.148E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1314E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E-00	0.000E-00	0.000E-00	0.000E-00
15.	0.170E-10	0.178E-10	0.183E-10	0.183E-10	0.180E-10	0.172E-10	0.101E-10	0.745E-12	0.000E-00
10.	0.147E-06	0.150E-06	0.147E-06	0.139E-06	0.128E-06	0.113E-06	0.397E-07	0.878E-09	0.000E+00
5.	0.127E-02	0.118E-02	0.103E-02	0.840E-03	0.646E-03	0.472E-03	0.549E-04	0.176E-06	0.000E-00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E-00	0.214E-02	0.148E-05	0.000E-00

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1402E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.125E-16	0.133E-16	0.139E-16	0.144E-16	0.146E-16	0.146E-16	0.115E-16	0.215E-17	0.000E+00
15.	0.176E-10	0.184E-10	0.189E-10	0.190E-10	0.186E-10	0.179E-10	0.105E-10	0.830E-12	0.000E+00
10.	0.148E-06	0.150E-06	0.147E-06	0.140E-06	0.128E-06	0.113E-06	0.397E-07	0.890E-09	0.000E+00
5.	0.127E-02	0.118E-02	0.103E-02	0.840E-03	0.646E-03	0.472E-03	0.549E-04	0.176E-06	0.000E+00
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.214E-02	0.148E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1489E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.325E-15	0.346E-15	0.364E-15	0.376E-15	0.382E-15	0.383E-15	0.307E-15	0.622E-16	0.214E-22
15.	0.178E-10	0.187E-10	0.192E-10	0.193E-10	0.189E-10	0.182E-10	0.108E-10	0.884E-12	0.140E-19
10.	0.148E-06	0.150E-06	0.147E-06	0.140E-06	0.128E-06	0.113E-06	0.398E-07	0.896E-09	0.138E-17
5.	0.127E-02	0.118E-02	0.103E-02	0.840E-03	0.646E-03	0.472E-03	0.549E-04	0.176E-06	0.217E-16
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.214E-02	0.148E-05	0.542E-16

STEADY STATE SOLUTION HAS NOT BEEN REACHED BEFORE FINAL SIMULATING TIME

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1577E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1038E+01 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.587E-15	0.626E-15	0.658E-15	0.681E-15	0.695E-15	0.698E-15	0.570E-15	0.124E-15	0.134E-21
15.	0.180E-10	0.189E-10	0.194E-10	0.194E-10	0.191E-10	0.184E-10	0.110E-10	0.915E-12	0.692E-19
10.	0.148E-06	0.150E-06	0.147E-06	0.140E-06	0.128E-06	0.114E-06	0.398E-07	0.899E-09	0.591E-17
5.	0.127E-02	0.118E-02	0.103E-02	0.840E-03	0.646E-03	0.472E-03	0.549E-04	0.176E-06	0.855E-16
0.	0.121E+02	0.414E+01	0.148E+01	0.585E+00	0.244E+00	0.106E+00	0.214E-02	0.148E-05	0.209E-15

TABLE VI-C. AT123D FATE AND TRANSPORT MODEL INPUT PARAMETERS AND OUTPUT VALUES FOR TOLUENE AT THE USTs 27&28, BUILDING 8059 SITE

MODEL INPUT PARAMETERS

NO. OF POINTS IN X-DIRECTION 9
NO. OF POINTS IN Y-DIRECTION 5
NO. OF POINTS IN Z-DIRECTION 1
NO. OF ROOTS: NO. OF SERIES TERMS 400
NO. OF BEGINNING TIME STEP 13
NO. OF ENDING TIME STEP 220
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 12
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 0
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... 0.1524E+02
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... 0.0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... -0.3400E+01
END POINT OF X-SOURCE LOCATION (METERS) ..... 0.0000E+00
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... -0.7000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... 0.7000E+00
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... 0.0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... 0.0000E+00

POROSITY ..... 0.2000E+00
HYDRAULIC CONDUCTIVITY (METER/HOUR) 0.5000E-02
HYDRAULIC GRADIENT 0.1500E-01
LONGITUDINAL DISPERSIVITY (METER) ..... 0.5000E+01
LATERAL DISPERSIVITY (METER) ..... 0.1000E+01
VERTICAL DISPERSIVITY (METER) ..... 0.5000E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG) 0.7847E-03
HEAT EXCHANGE COEFFICIENT (KCAL/HR-M**2-DEGREE C).. 0.0000E+00

MOLECULAR DIFFUSION MULTIPLY BY POROSITY (M**2/HR) 0.3280E-05
DECAY CONSTANT (PER HOUR) 0.1380E-03
BULK DENSITY OF THE SOIL (KG/M**3) ..... 0.1450E+04
ACCURACY TOLERANCE FOR REACHING STEADY STATE 0.1000E-02
DENSITY OF WATER (KG/M**3) ..... 0.1000E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (HR) .. 0.7300E+03
DISCHARGE TIME (HR) ..... 0.8760E+06
WASTE RELEASE RATE (KCAL/HR), (KG/HR), OR (CI/HR) . 0.2277E-04

RETARDATION FACTOR ..... 0.6689E+01
RETARDED DARCY VELOCITY (M/HR) 0.5606E-04
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/HR) .. 0.2828E-03
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/HR) . 0.5851E-04
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/HR). 0.3048E-04

TABLE VI-C (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.0000E+00 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E-00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E-00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.8760E+04 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.558E-05	0.408E-05	0.248E-05	0.126E-05	0.528E-06	0.184E-06	0.533E-10	0.000E+00	0.000E+00
0.	0.157E+02	0.536E+01	0.164E+01	0.509E+00	0.146E+00	0.376E-01	0.474E-05	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1752E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.553E-03	0.475E-03	0.366E-03	0.254E-03	0.159E-03	0.898E-04	0.120E-05	0.000E+00	0.000E+00
0.	0.167E+02	0.621E+01	0.225E+01	0.888E+00	0.357E+00	0.142E+00	0.732E-03	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.2628E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00
10.	0.820E-09	0.781E-09	0.697E-09	0.584E-09	0.458E-09	0.337E-09	0.274E-10	0.131E-14	0.000E+00
5.	0.182E-02	0.165E-02	0.138E-02	0.106E-02	0.761E-03	0.506E-03	0.239E-04	0.472E-09	0.000E+00
0.	0.169E+02	0.635E+01	0.237E-01	0.980E+00	0.424E+00	0.187E-00	0.278E-02	0.277E-07	0.000E+00

TABLE VI-C (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3504E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.412E-07	0.403E-07	0.374E-07	0.329E-07	0.275E-07	0.219E-07	0.318E-08	0.155E-11	0.000E+00
5.	0.269E-02	0.250E-02	0.216E-02	0.174E-02	0.132E-02	0.939E-03	0.790E-04	0.192E-07	0.000E+00
0.	0.169E+02	0.638E+01	0.239E+01	0.100E+01	0.441E+00	0.200E+00	0.438E-02	0.484E-06	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4380E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.179E-06	0.178E-06	0.170E-06	0.154E-06	0.135E-06	0.112E-06	0.240E-07	0.516E-10	0.000E+00
5.	0.307E-02	0.287E-02	0.252E-02	0.207E-02	0.160E-02	0.118E-02	0.131E-03	0.123E-06	0.000E+00
0.	0.169E+02	0.638E+01	0.239E+01	0.101E+01	0.445E+00	0.204E+00	0.512E-02	0.186E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.5256E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.372E-06	0.375E-06	0.363E-06	0.338E-06	0.302E-06	0.260E-06	0.709E-07	0.401E-09	0.000E+00
5.	0.320E-02	0.301E-02	0.265E-02	0.219E-02	0.172E-02	0.128E-02	0.162E-03	0.334E-06	0.000E+00
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.540E-02	0.368E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.6132E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.394E-11	0.407E-11	0.409E-11	0.400E-11	0.380E-11	0.351E-11	0.154E-11	0.348E-13	0.000E+00
10.	0.537E-06	0.544E-06	0.532E-06	0.502E-06	0.457E-06	0.401E-06	0.128E-06	0.138E-08	0.000E+00
5.	0.324E-02	0.305E-02	0.269E-02	0.224E-02	0.176E-02	0.132E-02	0.177E-03	0.569E-06	0.000E+00
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.549E-02	0.516E-05	0.000E+00

TABLE VI-C (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.7008E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.348E-10	0.362E-10	0.367E-10	0.362E-10	0.347E-10	0.325E-10	0.158E-10	0.529E-12	0.000E-00
10.	0.640E-06	0.652E-06	0.641E-06	0.609E-06	0.560E-06	0.498E-06	0.174E-06	0.288E-08	0.000E+00
5.	0.326E-02	0.307E-02	0.271E-02	0.225E-02	0.177E-02	0.133E-02	0.183E-03	0.750E-06	0.000E+00
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.552E-02	0.606E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.7884E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.795E-10	0.829E-10	0.844E-10	0.839E-10	0.814E-10	0.770E-10	0.406E-10	0.190E-11	0.000E-00
10.	0.693E-06	0.707E-06	0.698E-06	0.666E-06	0.615E-06	0.550E-06	0.203E-06	0.445E-08	0.000E+00
5.	0.326E-02	0.307E-02	0.271E-02	0.225E-02	0.178E-02	0.133E-02	0.185E-03	0.860E-06	0.000E+00
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.553E-02	0.651E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.8760E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.121E-09	0.127E-09	0.129E-09	0.129E-09	0.126E-09	0.120E-09	0.677E-10	0.411E-11	0.000E+00
10.	0.717E-06	0.732E-06	0.723E-06	0.692E-06	0.641E-06	0.575E-06	0.219E-06	0.568E-08	0.000E+00
5.	0.326E-02	0.307E-02	0.271E-02	0.226E-02	0.178E-02	0.133E-02	0.185E-03	0.915E-06	0.000E+00
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.553E-02	0.671E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.9636E+05 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E-00
15.	0.152E-09	0.159E-09	0.163E-09	0.164E-09	0.161E-09	0.154E-09	0.905E-10	0.669E-11	0.000E-00
10.	0.727E-06	0.742E-06	0.734E-06	0.703E-06	0.652E-06	0.586E-06	0.226E-06	0.648E-08	0.000E+00
5.	0.326E-02	0.307E-02	0.271E-02	0.226E-02	0.178E-02	0.133E-02	0.186E-03	0.941E-06	0.000E+00
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.553E-02	0.679E-05	0.000E+00

TABLE VI-C (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1051E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.171E-09	0.179E-09	0.184E-09	0.185E-09	0.182E-09	0.176E-09	0.106E-09	0.902E-11	0.000E+00
10.	0.730E-06	0.746E-06	0.738E-06	0.707E-06	0.656E-06	0.590E-06	0.229E-06	0.693E-08	0.000E+00
5.	0.326E-02	0.307E-02	0.271E-02	0.226E-02	0.178E-02	0.133E-02	0.186E-03	0.951E-06	0.000E+00
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.553E-02	0.682E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1139E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.472E-14	0.503E-14	0.527E-14	0.545E-14	0.554E-14	0.554E-14	0.440E-14	0.858E-15	0.000E+00
15.	0.181E-09	0.190E-09	0.196E-09	0.197E-09	0.195E-09	0.188E-09	0.116E-09	0.108E-10	0.000E+00
10.	0.732E-06	0.748E-06	0.740E-06	0.708E-06	0.657E-06	0.592E-06	0.230E-06	0.715E-08	0.000E+00
5.	0.326E-02	0.307E-02	0.271E-02	0.226E-02	0.178E-02	0.133E-02	0.186E-03	0.955E-06	0.000E+00
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.553E-02	0.683E-05	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1226E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.140E-13	0.150E-13	0.157E-13	0.163E-13	0.166E-13	0.167E-13	0.136E-13	0.294E-14	0.288E-20
15.	0.186E-09	0.196E-09	0.202E-09	0.203E-09	0.201E-09	0.194E-09	0.121E-09	0.119E-10	0.145E-17
10.	0.732E-06	0.748E-06	0.740E-06	0.709E-06	0.658E-06	0.592E-06	0.230E-06	0.725E-08	0.122E-15
5.	0.326E-02	0.307E-02	0.271E-02	0.226E-02	0.178E-02	0.133E-02	0.186E-03	0.957E-06	0.174E-14
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.553E-02	0.684E-05	0.423E-14

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1314E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.209E-13	0.223E-13	0.235E-13	0.243E-13	0.249E-13	0.250E-13	0.208E-13	0.487E-14	0.129E-19
15.	0.189E-09	0.198E-09	0.204E-09	0.206E-09	0.204E-09	0.197E-09	0.123E-09	0.126E-10	0.477E-17
10.	0.732E-06	0.748E-06	0.740E-06	0.709E-06	0.658E-06	0.592E-06	0.231E-06	0.729E-08	0.334E-15
5.	0.326E-02	0.307E-02	0.271E-02	0.226E-02	0.178E-02	0.133E-02	0.186E-03	0.957E-06	0.431E-14
0.	0.169E+02	0.638E+01	0.240E+01	0.101E+01	0.446E+00	0.205E+00	0.553E-02	0.684E-05	0.101E-13

TABLE VI-C (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1402E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.251E-13	0.268E-13	0.283E-13	0.293E-13	0.300E-13	0.303E-13	0.256E-13	0.634E-14	0.324E-19
15.	0.190E-09	0.200E-09	0.206E-09	0.20?E-09	0.205E-09	0.198E-09	0.125E-09	0.129E-10	0.929E-17
10.	0.732E-06	0.749E-06	0.740E-06	0.709E-06	0.658E-06	0.592E-06	0.231E-06	0.731E-08	0.555E-15
5.	0.326E-02	0.307E-02	0.271E-02	0.226E-02	0.178E-02	0.133E-02	0.186E-03	0.957E-06	0.661E-14
0.	0.169E+02	0.638E+01	0.240E+01	0.101E-01	0.446E+00	0.205E+00	0.553E-02	0.684E-05	0.151E-13

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1489E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.275E-13	0.294E-13	0.310E-13	0.322E-13	0.330E-13	0.333E-13	0.284E-13	0.733E-14	0.631E-19
15.	0.190E-09	0.200E-09	0.206E-09	0.208E-09	0.205E-09	0.199E-09	0.125E-09	0.131E-10	0.144E-16
10.	0.732E-06	0.749E-06	0.740E-06	0.709E-06	0.658E-06	0.592E-06	0.231E-06	0.732E-08	0.756E-15
5.	0.326E-02	0.307E-02	0.271E-02	0.226E-02	0.178E-02	0.133E-02	0.186E-03	0.957E-06	0.842E-14
0.	0.169E+02	0.638E+01	0.240E+01	0.101E-01	0.446E+00	0.205E+00	0.553E-02	0.684E-05	0.189E-13

STEADY STATE SOLUTION HAS NOT BEEN REACHED BEFORE FINAL SIMULATING TIME

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.1577E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.7847E+00 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	3.	4.	5.	10.	20.	50.
20.	0.287E-13	0.307E-13	0.324E-13	0.337E-13	0.345E-13	0.349E-13	0.299E-13	0.793E-14	0.103E-18
15.	0.190E-09	0.200E-09	0.206E-09	0.208E-09	0.205E-09	0.199E-09	0.125E-09	0.132E-10	0.194E-16
10.	0.732E-06	0.749E-06	0.740E-06	0.709E-06	0.658E-06	0.592E-06	0.231E-06	0.732E-08	0.915E-15
5.	0.326E-02	0.307E-02	0.271E-02	0.226E-02	0.178E-02	0.133E-02	0.186E-03	0.958E-06	0.968E-14
0.	0.169E+02	0.638E+01	0.240E+01	0.101E-01	0.446E+00	0.205E+00	0.553E-02	0.684E-05	0.214E-13

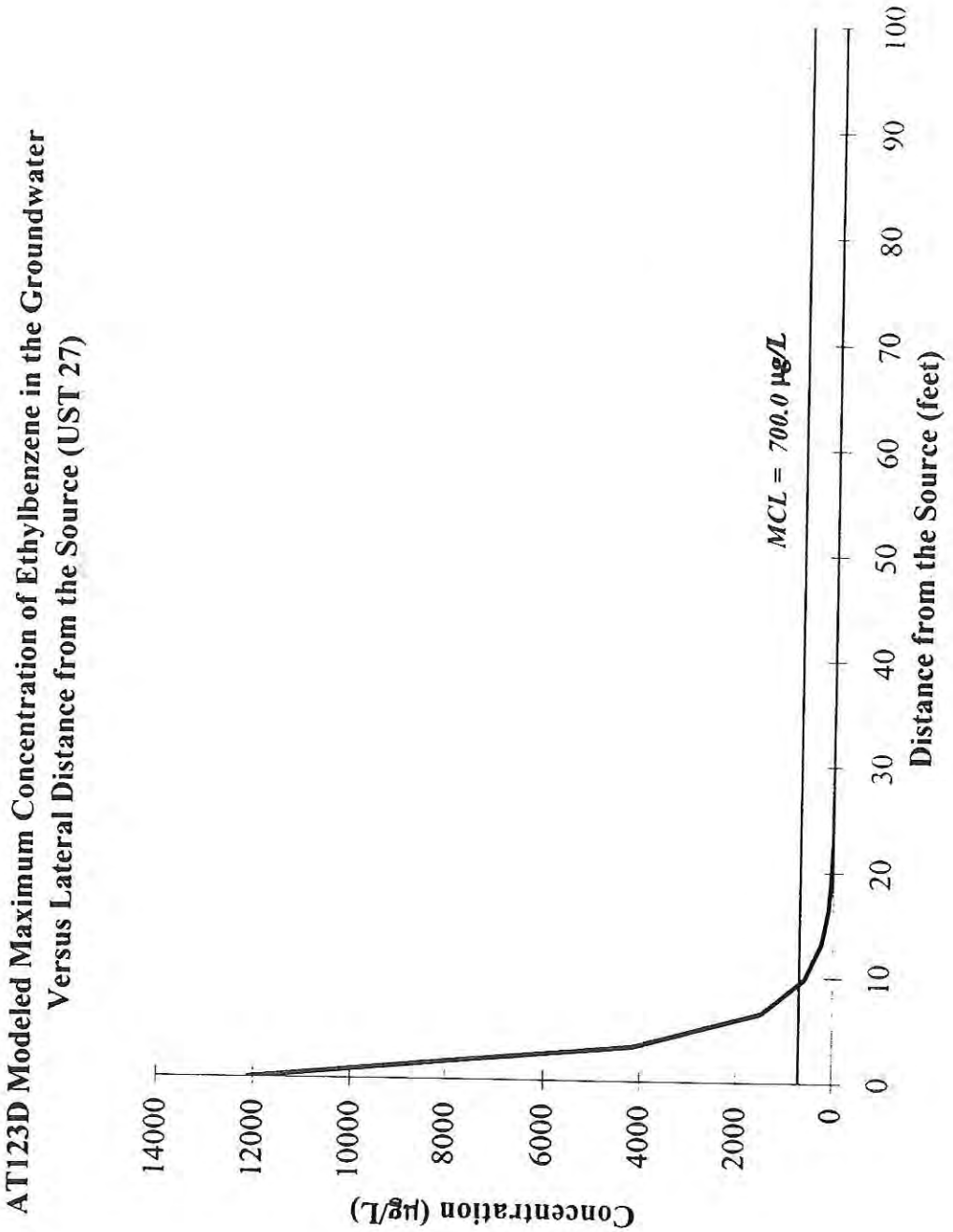

Figure VI-A. AT123D Modeled Maximum Concentration of Ethylbenzene in the Groundwater Versus Lateral Distance from the Source (UST 27)

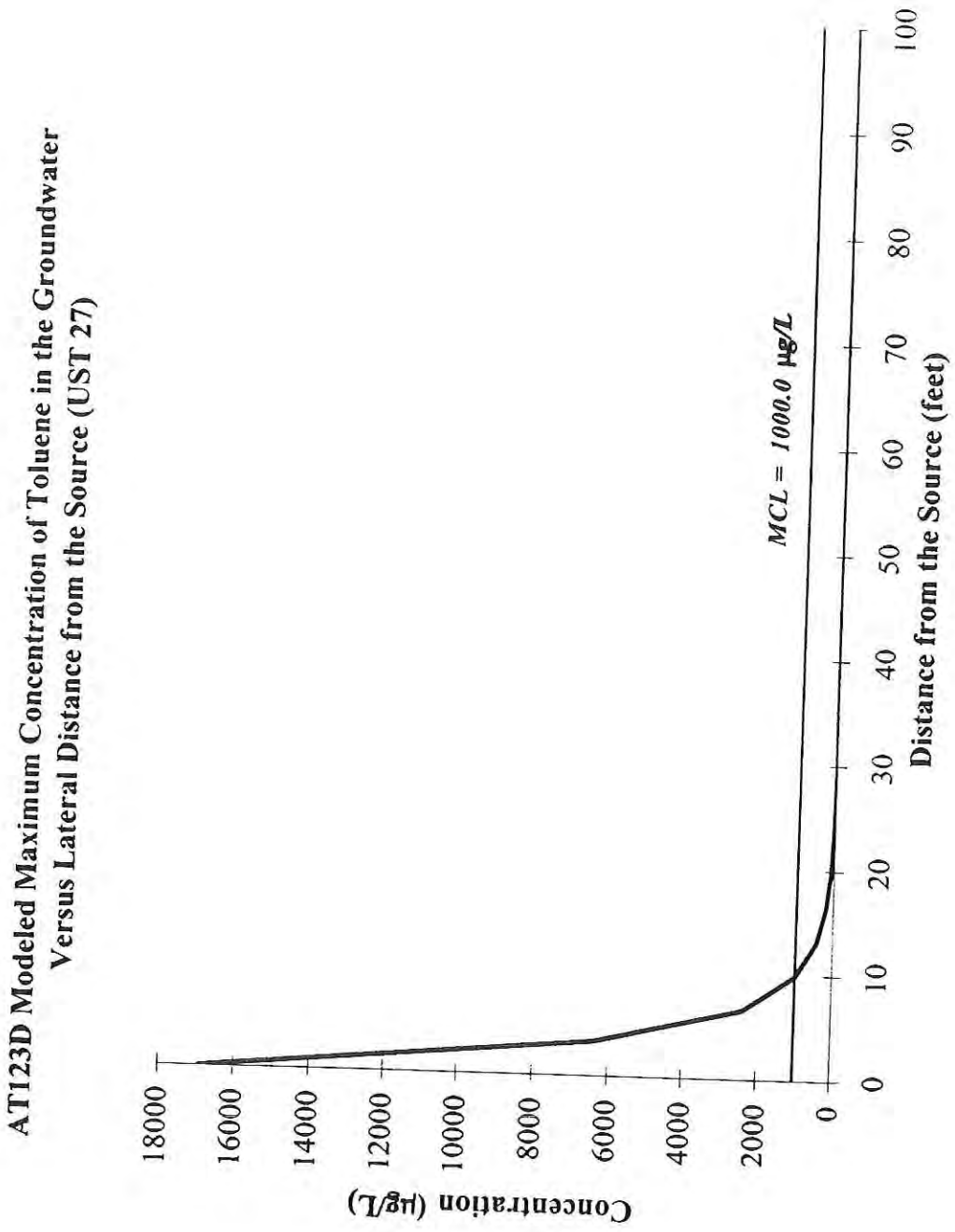

Figure VI-B. AT123D Modeled Maximum Concentration of Toluene in the Groundwater Versus Lateral Distance from the Source (UST 27)

2.0 FATE AND TRANSPORT MODEL

Further evaluation of the groundwater at the underground storage tanks (USTs) 27 and 28, Building 8059, Facility ID: 9-025083 site is necessary because concentrations of benzo(a)pyrene were above the maximum contaminant level (MCL) of 0.2 µg L (Appendix II, Table 3b). To assist in evaluating site conditions, simulation of fate and transport of benzo(a)pyrene in the water table aquifer was conducted to evaluate the contribution of the site to the contamination of the nearest groundwater receptor. The following sections present the model selection, application, and results.

2.1 MODEL SELECTION

For the fate and transport analysis of this site, analytical model AT123D was selected. The model was chosen in accordance with Appendix I of the Georgia Department of Natural Resources (GA DNR) UST Corrective Action Plan (CAP)-Part B guidance document (GA DNR 1995). The following criteria were used in selecting the model:

- capability of treating adsorption, organic decay, and longitudinal and transverse dispersion;
- capability of calculating concentrations at extended times and distances;
- availability of codes;
- degree of code documentation; and
- degree of code verification.

The Analytical Transient 1-, 2-, 3-Dimensional Model, AT123D, meets all of the above criteria and was selected for performing fate and transport analysis for this site. AT123D is a well-known and commonly used analytical groundwater pollutant fate and transport model. This model computes the spatial-temporal concentration distribution of chemicals in the aquifer system and predicts the transient spread of a chemical plume through a groundwater aquifer. The fate and transport processes accounted for in AT123D are advection, dispersion, adsorption retardation, and decay. This model can be used as a tool for estimating the dissolved concentration of a chemical in one, two, or three dimensions in the groundwater resulting from a mass release (either continuous or instant or depleting source) over a source area (i.e., point, line, area, or volume source).

2.2 MODEL APPLICATION

A two-dimensional calibrated transport model was developed using AT123D to predict benzo(a)pyrene concentrations at receptor locations in the future. The model was calibrated by varying the loading rate of benzo(a)pyrene into the aquifer in order to match the current concentration of benzo(a)pyrene in the groundwater. A steady state loading rate was assumed for the period of simulation (e.g., 100 years). It was observed that a continuous constant loading of 0.385 mg/hour produced a benzo(a)pyrene peak concentration of 6.7 µg/L in the groundwater, which matched the observed maximum concentration detected in groundwater collected from boring I-2 at the site in April 1998 (Appendix II, Table 3b). The model was applied to perform long-term simulation of benzo(a)pyrene to predict the peak concentration at the nearest potential receptor, which was determined to be a storm drain located approximately 12.5 feet downgradient of the site.

The source was assumed to be constant and the release continuous. The aquifer was calculated to be 50 feet thick and corresponded to the water table down to the first confining clay member of the Hawthorne Group. The average water table level determined by field measurements at the site was 4.7 feet below ground surface (Appendix II, Table 4). Based on the size of the tanks and their locations, the source area (UST 27) was estimated to have an area of 192 square feet (12 feet × 16 feet).

Undisturbed soil samples were collected to determine geotechnical parameters of the soil at the site (Appendix VI, Table VI-A). These soil parameters, combined with literature values presented in both the GA DNR UST CAP-Part A and B guidance documents, provided the input parameter values used in the model (Table VI-D). Soil parameter values used were as follows: moisture content, 12.8 percent; soil type, silty sand; porosity, 0.45; specific gravity, 2.63; permeability, 1.4E-04 cm/second; total organic content, 5270 mg/kg; and saturated hydraulic conductivity of 1.39E-04 cm/second. The average slope of the surface was determined to be 0.005, and ground cover was maintained grass. To be conservative, the model was run with the lowest biodegradation rate available in literature (Howard et al. 1991).

2.3 MODEL RESULTS

The results of the fate and transport model are provided in Table VI-D and illustrated in Figure VI-C. Using the generally accepted biodegradation literature value for benzo(a)pyrene (3.27×10^{-4}/day or a half-life of 5.8 years), the model predicts that the concentration of benzo(a)pyrene in the groundwater beneath the source will be completely degraded before migrating offsite.

Therefore, as predicted by the simulation, the benzo(a)pyrene found in the groundwater at the USTs 27 and 28, Building 8059, Facility ID: 9-025083 site poses no threat to the closest receptor. Based on the results of the fate and transport model, further investigation activities are not recommended for this site.

TABLE VI-D. AT123D FATE AND TRANSPORT MODEL INPUT PARAMETERS AND OUTPUT VALUES FOR BENZO(A)PYRENE AT THE USTs 27&28, BUILDING 8059 SITE

MODEL INPUT PARAMETERS

NO. OF POINTS IN X-DIRECTION 10
NO. OF POINTS IN Y-DIRECTION 5
NO. OF POINTS IN Z-DIRECTION 1
NO. OF ROOTS: NO. OF SERIES TERMS 400
NO. OF BEGINNING TIME STEP 380
NO. OF ENDING TIME STEP 600
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 12
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 0
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... 0.1524E+02
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... 0.0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... -0.4900E+01
END POINT OF X-SOURCE LOCATION (METERS) ..... 0.0000E+01
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... -0.2000E+01
END POINT OF Y-SOURCE LOCATION (METERS) ..... 0.2000E+01
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... 0.0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... 0.0000E+00

POROSITY ..... 0.2000E+00
HYDRAULIC CONDUCTIVITY (METER/HOUR) 0.5000E-02
HYDRAULIC GRADIENT 0.1500E-01
LONGITUDINAL DISPERSIVITY (METER) ..... 0.6000E+01
LATERAL DISPERSIVITY (METER) ..... 0.2000E+01
VERTICAL DISPERSIVITY (METER) ..... 0.6000E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG) ..... 0.1487E+01
HEAT EXCHANGE COEFFICIENT (KCAL/HR-M**2-DEGREE C) ..... 0.0000E+00

MOLECULAR DIFFUSION MULTIPLY BY POROSITY (M**2/HR) ... 0.3240E-05
DECAY CONSTANT (PER HOUR) 0.1360E-04
BULK DENSITY OF THE SOIL (KG/M**3) ..... 0.1450E+04
ACCURACY TOLERANCE FOR REACHING STEADY STATE 0.1000E-02
DENSITY OF WATER (KG/M**3) ..... 0.1000E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (HR) ..... 0.7300E+03
DISCHARGE TIME (HR) ..... 0.8760E+06
WASTE RELEASE RATE (KCAL/HR), (KG/HR), OR (CI/HR) 0.3850E-06

RETARDATION FACTOR ..... 0.1078E+05
RETARDED DARCY VELOCITY (M/HR) 0.3478E-07
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/HR) 0.2102E-06
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/HR) 0.7106E-07
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/HR) 0.2237E-07

TABLE VI-D (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.0000E+00 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.2767E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.664E-02	0.233E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.2854E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.664E-02	0.257E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.2942E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.665E-02	0.282E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE VI-D (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3030E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.665E-02	0.307E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3117E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.666E-02	0.332E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3205E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.666E-02	0.356E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3292E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.666E-02	0.379E-06	0.151E-12	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE VI-D (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3380E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.667E-02	0.403E-06	0.348E-12	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3468E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.667E-02	0.425E-06	0.658E-12	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3555E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.667E-02	0.447E-06	0.108E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3643E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.667E-02	0.468E-06	0.162E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE VI-D (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3730E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E-00	0.000E-00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
15.	0.000E-00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
10.	0.000E-00	0.000E-00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
5.	0.000E-00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
0.	0.668E-02	0.488E-06	0.230E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3818E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E-00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
15.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
5.	0.000E-00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
0.	0.668E-02	0.507E-06	0.312E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3906E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
0.	0.668E-02	0.525E-06	0.413E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3993E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
10.	0.000E-00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E-00	0.000E+00
0.	0.668E-02	0.542E-06	0.530E-11	0.000E-00	0.000E+00	0.000E+00	0.000E-00	0.000E+00	0.000E-00	0.000E+00

TABLE VI-D (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4081E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.559E-06	0.666E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4168E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.574E-06	0.823E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4256E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.588E-06	0.100E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

STEADY STATE SOLUTION HAS NOT BEEN REACHED BEFORE FINAL SIMULATING TIME

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4344E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.602E-06	0.120E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

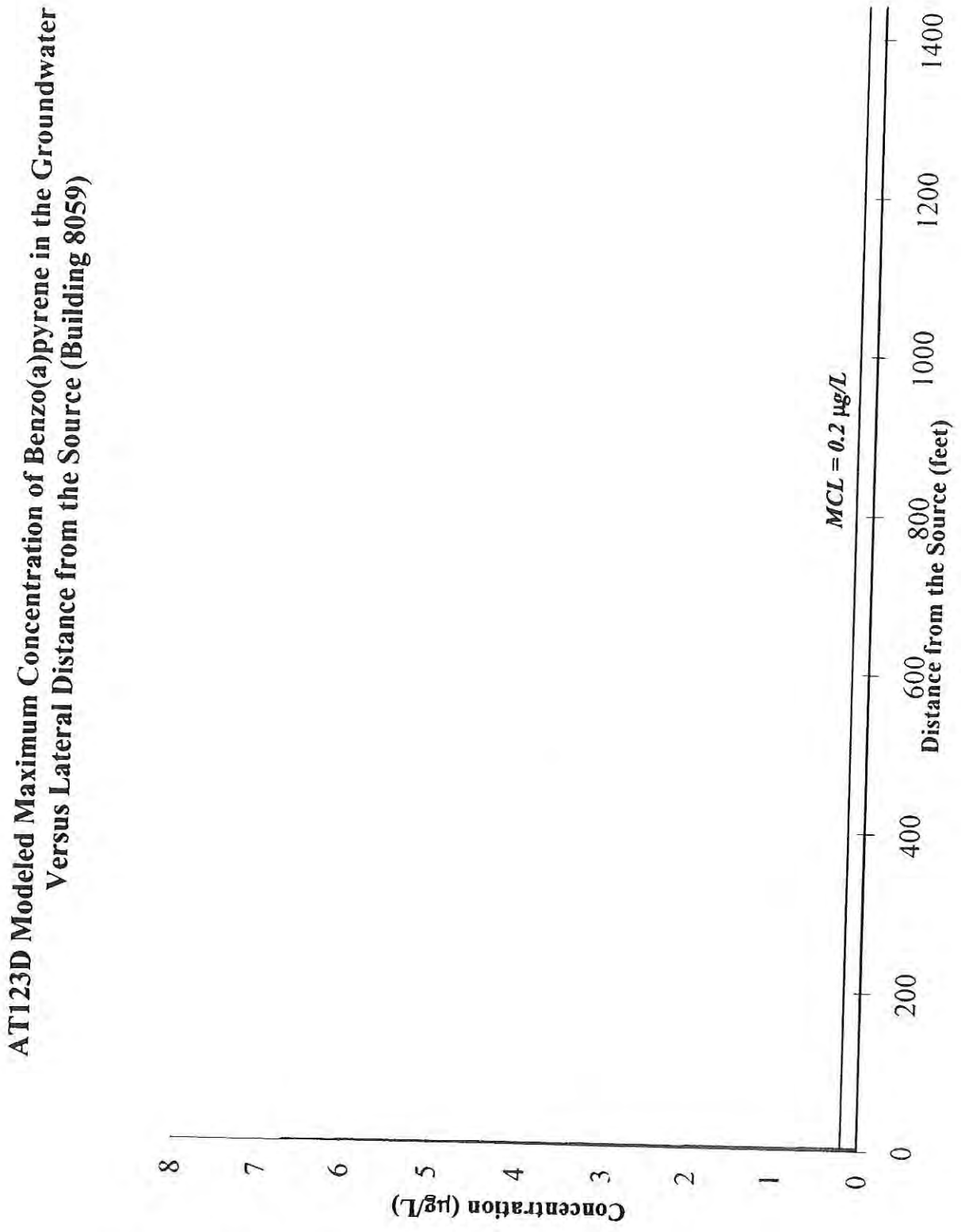

Figure VI-C. Modeled Concentration of Benzo(a)pyrene in the Groundwater at the USTs 27 & 28, Building 8059, Facility ID: 9-025083 Site

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APPENDIX VI

ALTERNATE THRESHOLD LEVEL (ATL) CALCULATIONS

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Calculations of alternate threshold levels are not indicated for the Underground Storage Tanks 27 and 28, Facility ID: 9-025083 site because soil concentrations did not exceed the Georgia Environmental Protection Division (GA EPD) applicable soil threshold levels (i.e., Table A, column 2).

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1.0 FATE AND TRANSPORT MODEL

Further evaluation of the groundwater at the underground storage tanks (USTs) 27 and 28, Building 8059, Facility ID: 9-025083 site is necessary because concentrations of benzo(a)pyrene were above the maximum contaminant level (MCL) of 0.2 µg/L (Appendix II, Table 3b). To assist in evaluating site conditions, simulation of fate and transport of benzo(a)pyrene in the water table aquifer was conducted to evaluate the contribution of the site to the contamination of the nearest groundwater receptor. The following sections present the model selection, application, and results.

1.1 MODEL SELECTION

For the fate and transport analysis of this site, analytical model AT123D was selected. The model was chosen in accordance with Appendix I of the Georgia Department of Natural Resources (GA DNR) UST Corrective Action Plan (CAP)-Part B guidance document (GA DNR 1995). The following criteria were used in selecting the model:

- capability of treating adsorption, organic decay, and longitudinal and transverse dispersion;
- capability of calculating concentrations at extended times and distances;
- availability of codes;
- degree of code documentation; and
- degree of code verification.

The Analytical Transient 1-, 2-, 3-Dimensional Model, AT123D, meets all of the above criteria and was selected for performing fate and transport analysis for this site. AT123D is a well-known and commonly used analytical groundwater pollutant fate and transport model. This model computes the spatial-temporal concentration distribution of chemicals in the aquifer system and predicts the transient spread of a chemical plume through a groundwater aquifer. The fate and transport processes accounted for in AT123D are advection, dispersion, adsorption/retardation, and decay. This model can be used as a tool for estimating the dissolved concentration of a chemical in one, two, or three dimensions in the groundwater resulting from a mass release (either continuous or instant or depleting source) over a source area (i.e., point, line, area, or volume source).

1.2 MODEL APPLICATION

A two-dimensional calibrated transport model was developed using AT123D to predict benzo(a)pyrene concentrations at receptor locations in the future. The model was calibrated by varying the loading rate of benzo(a)pyrene into the aquifer in order to match the current concentration of benzo(a)pyrene in the groundwater. A steady state loading rate was assumed for the period of simulation (e.g., 100 years). It was observed that a continuous constant loading of 0.385 mg/hour produced a benzo(a)pyrene peak concentration of 6.7 µg/L in the groundwater, which matched the observed maximum concentration detected in groundwater collected from boring I-2 at the site in April 1998 (Appendix II, Table 3b). The model was applied to perform long-term simulation of benzo(a)pyrene to predict the peak concentration at the nearest potential receptor, which was determined to be a drainage ditch located approximately 700 feet downgradient of the site.

The source was assumed to be constant and the release continuous. The aquifer was calculated to be 50 feet thick and corresponded to the water table down to the first confining clay member of the Hawthorne Group. The average water table level determined by field measurements at the site was 4.7 feet below ground surface (Appendix II, Table 4). Based on the size of the tanks and their locations, the source area (UST 27) was estimated to have an area of 192 square feet (12 feet × 16 feet).

Undisturbed soil samples were collected to determine geotechnical parameters of the soil at the site (Appendix VI, Table VI-A). These soil parameters, combined with literature values presented in both the GA DNR UST CAP-Part A and B guidance documents, provided the input parameter values used in the model. Soil parameter values used were as follows: moisture content, 12.8 percent; soil type, silty sand; porosity, 0.45; specific gravity, 2.63; permeability, 1.4E-04 cm/second; total organic content, 5270 mg/kg; and saturated hydraulic conductivity of 1.39E-04 cm/second. The average slope of the surface was determined to be 0.005, and ground cover was maintained grass. To be conservative, the model was run with the lowest biodegradation rate available in literature (Howard et al. 1991).

1.3 MODEL RESULTS

The results of the fate and transport model are illustrated in Figure VI-A. Using the generally accepted biodegradation literature value for benzo(a)pyrene (3.27×10^{-4}/day or a half-life of 5.8 years), the model predicts that the concentration of benzo(a)pyrene in the groundwater beneath the source will be completely degraded before migrating offsite.

Therefore, as predicted by the simulation, the benzo(a)pyrene found in the groundwater at the USTs 27 and 28, Building 8059, Facility ID: 9-025083 site poses no threat to the closest receptor. Based on the results of the fate and transport model, further investigation activities are not recommended for this site.

TABLES

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USTs 27 & 28, Building 8059
Hunter Army Airfield
Chatham County, Facility ID: 9-025083

TABLE VI-A. GEOTECHNICAL PARAMETERS

Building ID	Tank ID	Facility ID	Sample ID	Sample Depth	Classification	Moisture Content (%)	Total Organic Carbon (%)	Specific Gravity	Porosity, n	Permeability (cm/s)	Gravel (wt %)	Sand (wt %)	Mud (wt %)
8059	28	9-025083	HI8400	2.0 to 4.0	SP-SC	12.8	0.527	2.63	0.45	1.4E-4	4.6	88.4	7.0

NOTE: SP-SC = Poorly graded, clayey sand.
USTs = Underground storage tanks.

TABLE VI-B. AT123D FATE AND TRANSPORT MODEL INPUT PARAMETERS AND OUTPUT VALUES FOR BENZO(A)PYRENE AT THE USTs 27&28, BUILDING 8059 SITE

MODEL INPUT PARAMETERS

NO. OF POINTS IN X-DIRECTION 10
NO. OF POINTS IN Y-DIRECTION 5
NO. OF POINTS IN Z-DIRECTION 1
NO. OF ROOTS: NO. OF SERIES TERMS 400
NO. OF BEGINNING TIME STEP 380
NO. OF ENDING TIME STEP 600
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 12
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 0
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... 0.1524E+02
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... 0.0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... -0.4900E+01
END POINT OF X-SOURCE LOCATION (METERS) ..... 0.0000E+01
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... -0.2000E+01
END POINT OF Y-SOURCE LOCATION (METERS) ..... 0.2000E+01
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... 0.0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... 0.0000E+00

POROSITY ..... 0.2000E+00
HYDRAULIC CONDUCTIVITY (METER/HOUR) 0.5000E-02
HYDRAULIC GRADIENT 0.1500E-01
LONGITUDINAL DISPERSIVITY (METER) ..... 0.6000E+01
LATERAL DISPERSIVITY (METER) ..... 0.2000E+01
VERTICAL DISPERSIVITY (METER) ..... 0.6000E+00
DISTRIBUTION COEFFICIENT, KD (M**3/KG) ..... 0.1487E+01
HEAT EXCHANGE COEFFICIENT (KCAL/HR-M**2-DEGREE C) ..... 0.0000E+00

MOLECULAR DIFFUSION MULTIPLY BY POROSITY (M**2/HR) ... 0.3240E-05
DECAY CONSTANT (PER HOUR) 0.1360E-04
BULK DENSITY OF THE SOIL (KG/M**3) ..... 0.1450E+04
ACCURACY TOLERANCE FOR REACHING STEADY STATE 0.1000E-02
DENSITY OF WATER (KG/M**3) ..... 0.1000E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (HR) ..... 0.7300E+03
DISCHARGE TIME (HR) ..... 0.8760E+06
WASTE RELEASE RATE (KCAL/HR), (KG/HR), OR (CI/HR) 0.3850E-06

RETARDATION FACTOR ..... 0.1078E+05
RETARDED DARCY VELOCITY (M/HR) 0.3478E-07
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/HR) 0.2102E-06
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/HR) 0.7106E-07
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/HR) 0.2237E-07

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.0000E+00 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.2767E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.664E-02	0.233E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.2854E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.664E-02	0.257E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.2942E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.665E-02	0.282E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3030E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.665E-02	0.307E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3117E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.666E-02	0.332E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3205E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.666E-02	0.356E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3292E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.666E-02	0.379E-06	0.151E-12	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3380E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.667E-02	0.403E-06	0.348E-12	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3468E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.667E-02	0.425E-06	0.658E-12	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3555E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.667E-02	0.447E-06	0.108E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3643E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.667E-02	0.468E-06	0.162E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3730E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.488E-06	0.230E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3818E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.507E-06	0.312E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3906E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.525E-06	0.413E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.3993E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.542E-06	0.530E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

TABLE VI-B (continued)

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4081E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.559E-06	0.666E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4168E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.574E-06	0.823E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4256E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.588E-06	0.100E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

STEADY STATE SOLUTION HAS NOT BEEN REACHED BEFORE FINAL SIMULATING TIME

DISTRIBUTION OF DISSOLVED CHEMICALS IN PPM AT 0.4344E+06 HRS
(ADSORBED CHEMICAL CONC. = 0.1487E+04 * DISSOLVED CHEMICAL CONC.)

Z = 0.00

Y	X 0.	1.	2.	5.	10.	20.	40.	50.	100.	213.
20.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
15.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
10.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
5.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.	0.668E-02	0.602E-06	0.120E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

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FIGURES

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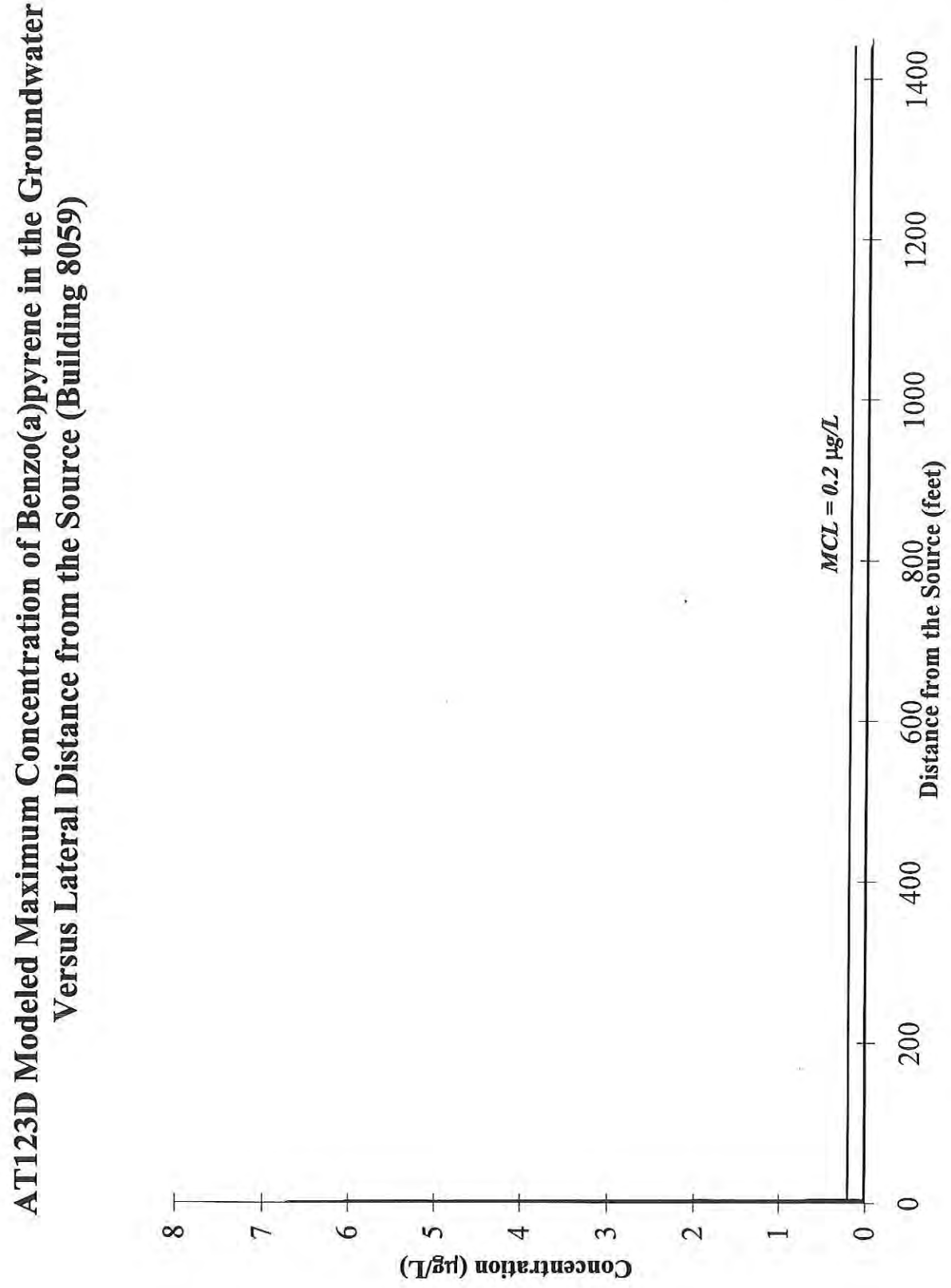

Figure VI-A. Modeled Concentration of Benzo(a)pyrene in the Groundwater at the USTs 27 & 28, Building 8059, Facility ID: 9-025083 Site

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APPENDIX VII

MONITORING WELL DETAILS

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Monitoring wells were not installed as part of the Corrective Action Plan-Part A investigation. Temporary piezometers were installed at the Underground Storage Tanks 27 and 28, Building 8059, Facility ID: 9-025083 site. Refer to Appendix IV for temporary piezometer installation details.

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APPENDIX VIII

GROUNDWATER LABORATORY RESULTS

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USTs 27 & 28, Building 8059
Hunter Army Airfield
Chatham County, Facility ID: 9-025083

TABLE VIII-A. SUMMARY OF GROUNDWATER ANALYTICAL RESULTS[2]

Location		I-1	I-2	HI-2	I-3	I-4	I-5	I-6	I-6	I-6	I-6	I-6
Sample ID		HI1200	HI2200	HI2230	HI3200	HI4200	HI5200	HI6301	HI6302	HI6303	HI6304	HI6305
Date Collected	Applicable	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/16/98
Depth (ft BGS)	Standards[1]	4.0 to 11.0	6.0 to 10.0	Rinsate[3]	5.0 to 9.0	5.0 to 9.0	5.0 to 9.0	11.0 to 15.0	21.0 to 25.0	31.0 to 35.0	41.0 to 45.0	51.0 to 55.0
VOCs	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Benzene	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Toluene	1,000	2 U	2 U	5.9 J	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Ethylbenzene	700	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Xylenes	10,000	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
PAHs	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
2-Chloronaphthalene	NRC	10 U	10.1 U	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Acenaphthene	NRC	10 U	1 J	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Acenaphthylene	NRC	10 U	3.2 J	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Anthracene	NRC	10 U	0.83 J	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Benzo(a)anthracene	NRC	10 U	5.0 J	9.9 U	0.56 J	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Benzo(a)pyrene	0.2	10 U	**6.7 J[4]**	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Benzo(b)fluoranthene	NRC	10 U	9.1 J	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Benzo(g,h,i)perylene	NRC	10 U	3.4 J	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Benzo(k)fluoranthene	NRC	10 U	10.1 U	9.9 U	0.65 J	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Chrysene	NRC	10 U	8.6 J	9.9 U	0.8 J	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Dibenzo(a,h)anthracene	NRC	10 U	1 J	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Fluoranthene	NRC	10 U	6.9 J	9.9 U	0.83 J	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Fluorene	NRC	10 U	1.4 J	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Indeno(1,2,3-cd)pyrene	NRC	10 U	2.7 J	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Naphthalene	NRC	10 U	10.1 U	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Phenanthrene	NRC	10 U	2 J	9.9 U	10.5 UJ	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A
Pyrene	NRC	10 U	10.3 =	9.9 U	1.7 J	10 U	10.2 U	10.4 U	10 U	10 U	10.5 U	N/A

NOTE: [1]U.S. Environmental Protection Agency Safe Drinking Water Act maximum contaminant level.
[2]**All field work and analytical sampling were performed prior to the release of the new Georgia Department of Natural Resources (GA DNR) Corrective Action Plan (CAP)-Part A Guidance (i.e., May 1998); therefore, the new analytical methods specified were not used.**
[3]Quality control rinsate sample collected after sample HI1200 and before HI2200.
[4]Analytical parameter exceeding applicable standard.
N/A - Not applicable; a sufficient volume of groundwater was not available during collection, and the analysis for this compound could not be performed.
BGS - Below ground surface. PAHs - Polynuclear aromatic hydrocarbons.
NRC - No regulatory criteria. VOCs - Volatile organic compounds.

Laboratory Qualifiers
U - Indicates the compound was not detected at the concentration reported.
J - Indicates the value for the compound is an estimated value.
UJ - Indicates the compound was not detected at the reported concentration and the concentration was estimated.
= - Indicates the compound was detected at the concentration reported.

TABLE VIII-A. SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (continued)[2]

Location		I-7	I-7	HI-3	I-7	I-7	I-7	I-9	I-9	I-A	I-B
Sample ID		HI7301	HI7310[3]	HI7330	HI7302	HI7303	HI7304	HI9200	HI9210[5]	HIA200	HIB200
Date Collected	Applicable	04/18/98	04/18/98	04/18/98	04/18/98	04/18/98	04/18/98	04/21/98	04/21/98	04/21/98	04/21/98
Depth (ft BGS)	Standards[1]	11.0 to 15.0	11.0 to 15.0	Rinsate[4]	21.0 to 25.0	31.0 to 35. 0	41.0 to 45.0	7.0 to 11.0	7.0 to 11.0	6.0 to 10.0	7.0 to 11.0
VOCs	µg/kg	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Benzene	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Toluene	1,000	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Ethylbenzene	700	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Xylenes	10,000	6 U	6 U	6 U	6 U	6 U	6 U	3.6 J	6 U	6 U	6 U
PAHs	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
2-Chloronaphthalene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Acenaphthene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Acenaphthylene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Anthracene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Benzo(a)anthracene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Benzo(a)pyrene	0.2	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Benzo(b)fluoranthene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Benzo(g,h,i)perylene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Benzo(k)fluoranthene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Chrysene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Dibenzo(a,h)anthracene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Fluoranthene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Fluorene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Indeno(1,2,3-cd)pyrene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Naphthalene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Phenanthrene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U
Pyrene	NRC	10.5 U	10.4 U	10.4 U	10.4 U	10.4 U	10.6 U	10.2 U	10.7 U	10.2 U	10.1 U

NOTE: [1]U.S. Environmental Protection Agency maximum contaminant level.
[2]All field work and analytical sampling were performed prior to the release of the new Georgia Department of Natural Resources (GA DNR) Corrective Action Plan (CAP)-Part A Guidance (i.e., May 1998); therefore, the new analytical methods specified were not used.
[3]Duplicate sample for sample collected from location I-7 at a depth of 11.0 to 15.0 feet BGS.
[4]Quality control rinsate sample collected after sample HI7301 and before HI7302.
[5]Duplicate sample for sample collected from location I-9 at a depth of 7.0 to 11.0 feet BGS.
BGS - Below ground surface. PAHs - Polynuclear aromatic hydrocarbons.
NRC - No regulatory criteria. VOCs - Volatile organic compounds.

Laboratory Qualifiers
U - Indicates the compound was not detected at the concentration reported.
J - Indicates the value for the compound is an estimated value.
UJ - Indicates the compound was not detected at the reported concentration and the concentration was estimated.
= - Indicates the compound was detected at the concentration reported.

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CHAIN OF CUSTODY RECORD

COC NO.: 416,0A

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature): Mitchell H. Hall (Printed Name): Mitchell H. Hall

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HI63Ø1	4/15/98	1455	water		X				2	NA	11.Ø-15.Øft
HI63Ø3	4/15/98	154Ø	water		X				2	NA	31.Ø - 35.Øft
HI42ØØ	4/15/98	1315	water		X				2	NA	NA
HI52ØØ	4/15/98	142Ø	water		X				2	NA	NA
HI63Ø2	4/15/98	1515	water		X				2	NA	21.Ø - 25.Øft
HI63Ø1	4/15/98	1455	water	X					2	NA	11.Ø - 15.Øft
HI42ØØ	4/15/98	1315	water	X					2	NA	NA
HI52ØØ	4/15/98	142Ø	water	X					2	NA	NA
HI63Ø2	4/15/98	1515	water	X					2	NA	21.Ø - 25.Øft
HI32ØØ	4/15/98	114Ø	water	X					2	NA	NA
HI22ØØ	4/15/98	1Ø5Ø	water	X					2	NA	6.Ø - 16.Øft
HITBØ11	4/15/98	Ø9ØØ	water	X					2	NA	ASTM TYPE II water LOT # J3Ø3
HI12ØØ	4/15/98	Ø93Ø	water	X					2	NA	7.Ø - 11.Øft

REQUESTED PARAMETERS

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 26	Cooler Temperature: 4°C
Mitchell H. Hall	4/16/98 1315			Cooler ID: #169	FEDEX NUMBER: NA
COMPANY NAME: SAIC		COMPANY NAME:			
RECEIVED BY:	Date/Time 4/16/98 1315	RELINQUISHED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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Hunter Army Airfield UST CAP-A Report
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CHAIN OF CUSTODY RECORD

COC NO.: 4/618C

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature) Mitchell H. Hall (Printed Name) Mitchell H. Hall

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod Charleston, SC 29417

PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HI223Ø	4/15/98	1Ø3Ø	water		X				2	NA	equip. rinsate
HI32ØØ	4/15/98	114Ø	water		X				2	NA	5.Ø - 9.Ø ft
HI.12ØØ	4/15/98	Ø93Ø	water		X				2	NA	7.Ø - 11Ø ft
HI22ØØ	4/15/98	1Ø5Ø	water		X				2	NA	6.Ø - 1Ø.Ø ft
HJ12ØØ	4/16/98	1Ø35	water		X				2	NA	6.Ø - 1Ø.Ø ft

REQUESTED PARAMETERS

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 1Ø	Cooler Temperature: 4°C
COMPANY NAME: SAIC	4/16/98 1315	COMPANY NAME:		Cooler ID: 371	FEDEX NUMBER: NA
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time		
COMPANY NAME:	4/16/98 1315	COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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CHAIN OF CUSTODY RECORD

COC NO.: 41698B

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature): Mitchell H. Hall (Printed Name): Mitchell H. Hall

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HI223ϕ	4/15/98	1ϕ3ϕ	water	X					2	NA	Equip. Rinsate
7I63ϕ4	4/15/98	16ϕ5	water	X					2	NA	41.ϕ - 45.ϕ ft
HI63ϕ3	4/15/98	154ϕ	water	X					2	NA	31.ϕ - 35.ϕ ft
HI63ϕ5	4/16/98	ϕ845	water	X					2	NA	51.ϕ - 55.ϕ ft
HJ12ϕϕ	4/16/98	1ϕ35	water	X					2	NA	6.ϕ - 1ϕ.ϕ ft
HJ22ϕϕ	4/16/98	11ϕϕ	water	X					2	NA	6.5 - 1ϕ.5 ft
HJ32ϕϕ	4/16/98	1135	water	X					2	NA	7.ϕ - 11.ϕ ft

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MH 4/16/98

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 14	Cooler Temperature: 4°C
COMPANY NAME: SAIC	4/16/98 1315	COMPANY NAME:		Cooler ID: #169	FEDEX NUMBER: NA
RECEIVED BY:	Date/Time 4/16/98 1315	RELINQUISHED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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CHAIN OF CUSTODY RECORD

COC NO.: 4168F

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature): Mitchell Hall (Printed Name): Mitchell Hall

REQUESTED PARAMETERS

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HJ22ØØ	4/16/98	11ØØ	water		X				2	NA	6.5 - 16.5 ft
HI63Ø4	4/15/98	16Ø5	water		X				2	NA	41.Ø - 45.Ø ft
HJ32ØØ	4/16/98	1135	water		X				2	NA	7.Ø - 11.Ø ft

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 6	Cooler Temperature: 4°C
COMPANY NAME: SAIC	4/16/98 1315	COMPANY NAME:		Cooler ID: 63	FEDEX NUMBER: NA
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time		
COMPANY NAME: GEL	4/16-98 1315	COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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Hunter Army Airfield UST CAP-A Report
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CHAIN OF CUSTODY RECORD

COC NO.: 418,6D

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature): [signature] (Printed Name): Mitchell Hall

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HI73Φ1	4/18/98	Φ74Φ	water	X			X		2	NA	11.Φ - 15.Φ ft
HI73Φ2	4/18/98	Φ82Φ	water	X			X		2	NA	21.Φ - 25.Φ ft
HI731Φ	4/18/98	Φ74Φ	water	X			X		2	NA	11.Φ - 15.Φ ft
HI733Φ	4/18/98	Φ725	water	X			X		2	NA	Equip Rinsate
HD52ΦΦ	4/17/98	164Φ	water	X			X		2	NA	8.Φ - 12.Φ ft
HD32ΦΦ	4/17/98	1346	water	X			X		2	NA	2.Φ - 6.Φ ft
HI73Φ3	4/18/98	Φ845	water	X			X		2	NA	31.Φ - 35.Φ ft
HTBΦ14	4/18/98	Φ9ΦΦ	water	X			X		2	NA	TRIP BLANK
HD42ΦΦ	4/17/98	16Φ5	water	X			X		2	NA	9.Φ - 13.Φ ft
HI73Φ4	4/18/98	Φ925	water	X			X		2	NA	41.Φ - 45.Φ ft
HO53Φ1	4/18/98	1Φ5Φ	water	X			X		2	NA	16.Φ - 20.Φ ft
HO53Φ2	4/18/98	11ΦΦ	water	X			X		2	NA	26.Φ - 30.Φ ft
HO53Φ3	4/18/98	1125	water	X			X		2	NA	36.Φ - 40.Φ ft

RELINQUISHED BY: [signature]	Date/Time: 4/18/98 1330	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 26	Cooler Temperature: 4°C
COMPANY NAME: SAIC		COMPANY NAME:		Cooler ID: 5Φ4	FEDEX NUMBER: NA
RECEIVED BY: [signature]	Date/Time: 4/18/98 1330	RELINQUISHED BY:	Date/Time	HD 52ΦΦ, HD 32ΦΦ, HD 42ΦΦ } Quick turnaround	
COMPANY NAME: GEL		COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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CHAIN OF CUSTODY RECORD

COC NO.: 418.8A

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature): Mitchell Hall (Printed Name): Mitchell Hall

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HD32ΦΦ	4/17/98	134Φ	water		X				2	NA	7.Φ - 6.Φ ft
HD42ΦΦ	4/17/98	16Φ5	water		X				2	NA	9.Φ - 13.Φ ft
HD52ΦΦ	4/17/98	164Φ	water		X				2	NA	8.Φ - 12.Φ ft
HI73ΦΦ	4/18/98	Φ725	water		X				2	NA	Equipment Rinsate
HI731Φ	4/18/98	Φ74Φ	water		X				2	NA	Field Duplicate
HI73Φ1	4/18/98	Φ74Φ	water		X				2	NA	11.Φ - 15.Φ ft

4H 4/18/98

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 12	Cooler Temperature: 4°C
Mitchell Hall	4/18/98 1330			Cooler ID: 465	FEDEX NUMBER: NA
COMPANY NAME: SAIC		COMPANY NAME:			
RECEIVED BY: Steven Kelley	Date/Time 4/18/98 1330	RELINQUISHED BY:	Date/Time		
COMPANY NAME: GEL		COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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Hunter Army Airfield UST CAP-A Report
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CHAIN OF CUSTODY RECORD

COC NO.: 4/8,6C

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature): Mitchell Hall (Printed Name): Mitchell Hall

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod Charleston, SC 29417

PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HI73Ø2	4/18/98	Ø82Ø	water		X				2	NA	21.Ø-25.Ø ft
HI73Ø3	4/18/98	Ø845	water		X				2	NA	31.Ø-35.Ø ft
HI73Ø4	4/18/98	Ø925	water		X				2	NA	41.Ø-45.Ø ft
HO53Ø1	4/18/98	1Ø5Ø	water		X				2	NA	16.Ø-2Ø.Ø ft
HO53Ø2	4/18/98	11ØØ	water		X				2	NA	26.Ø-3Ø.Ø ft

REQUESTED PARAMETERS

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
COMPANY NAME: SAIC	4/18/98 1330	COMPANY NAME:	
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time
COMPANY NAME: GEL	4/18/98 1330	COMPANY NAME:	
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
COMPANY NAME:		COMPANY NAME:	

TOTAL NUMBER OF CONTAINERS: 1Ø

Cooler ID: #226

Cooler Temperature: 4°C

FEDEX NUMBER: NA

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CHAIN OF CUSTODY RECORD

COC NO.: 47.18 B

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature): Mitchell Hall (Printed Name): Mitchell Hall

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HJ72ΦΦ	4/20/98	1525	water	X					2	NA	6.Φ - 10.Φ ft
HJ721Φ	4/20/98	1525	water	X					2	NA	6.Φ - 10.Φ ft
HI92ΦΦ	4/21/98	ΦΦ55	water	X					2	NA	7.Φ - 11.Φ ft
HI921Φ	4/21/98	ΦΦ55	water	X					2	NA	7.Φ - 11.Φ ft
~~HI9~~HIA2ΦΦ	4/21/98	1Φ15	water	X					2	NA	6.Φ - 10.Φ ft
HIB2ΦΦ	4/21/98	1135	water	X					2	NA	7.Φ - 11.Φ ft
HG72ΦΦ	4/22/98	Φ95Φ	water	X					2	NA	5.Φ - 9.Φ ft
LIL92ΦΦ	4/22/98	113Φ	water	X					2	NA	6.Φ - 10.Φ ft
HTBΦ17	4/22/98	ΦΦΦΦ	water	X					2	NA	ASTM TYPE I WATER LOT # 3103

4/22/98

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 18	Cooler Temperature: 4°C
Mitchell Hall	4/22/98 1350			Cooler ID: 538	FEDEX NUMBER: NA
COMPANY NAME: SAIC		COMPANY NAME:			
RECEIVED BY:	Date/Time 4/22/98	RELINQUISHED BY:	Date/Time		
COMPANY NAME: GEL	1330	COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

VIII-19

Hunter Army Airfield UST CAP-A Report
USTs 27 & 28, Building 8059, Facility ID: 9-025083

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SAIC An Employee-Owned Company
Science Applic :rnational Corporation
800 Oak Ridge Turnpike, Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: 42, 84

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature) Mitchell Hall **(Printed Name)** Mitchell Hall

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HJ72Ø	4/2Ø/98	1525	water		X				2	NA	~~Dup~~ 6.Ø-1Ø.Ø
HIB2ØØ	4/21/98	1135	water		X				2	NA	7.Ø-11.Ø ft
HL92ØØ	4/22/98	113Ø	water		X				2	NA	6.Ø-1Ø.Ø ft
HG72ØØ	4/22/98	Ø95Ø	water		X				2	NA	5.Ø-9.Ø ft
HIA2ØØ	4/21/98	1Ø15	water		X				2	NA	6.Ø-1Ø.Ø ft

Mitchell 4/22/98

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 1Ø	Cooler Temperature: 4 °C
Mitchell Hall	4/22/98 1339			Cooler ID: 537	FEDEX NUMBER: NA
COMPANY NAME: SAIC		COMPANY NAME:			
RECEIVED BY:	Date/Time 4/22/98	RELINQUISHED BY:	Date/Time		
COMPANY NAME:	1330	COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

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SAIC An Employee-Owned Company
Science Applic rnational Corporation
800 Oak Ridge Tur.., Oak Ridge, TN 37831 (423) 481-4600

CHAIN OF C STODY RECORD

COC NO.: 42 78E

PROJECT NAME: CAP - Hunter AFB - Part A

PROJECT NUMBER: 0019

PROJECT MANAGER: Allison Bailey

Sampler (Signature): Mitchell Hall (Printed Name): Mitchell Hall

LABORATORY NAME: General Engineering Laboratory

LABORATORY ADDRESS: 2040 Savage Raod, Charleston, SC 29417

PHONE NO: (803) 556-8171

Sample ID	Date Collected	Time Collected	Matrix	BTEX	PAH	DRP	GRO	TOC	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
HI9210	4/21/98	0855	water		X				2	NA	7.0-11.0 ft
HI9200	4/21/98	0855	water		X				2	NA	7.0-11.0 ft
HI7200	4/20/98	1525	water		X				2	NA	6.0-10.0 ft

RELINQUISHED BY: M. Hall | Date/Time: 4/22/98 1330 | RECEIVED BY: | Date/Time | TOTAL NUMBER OF CONTAINERS: 6 | Cooler Temperature: 4°C

COMPANY NAME: SAIC | COMPANY NAME: | Cooler ID: 477 | FEDEX NUMBER: NA

RECEIVED BY: [signature] | Date/Time: 4/22/98 1330 | RELINQUISHED BY: | Date/Time

COMPANY NAME: GEL | COMPANY NAME:

RELINQUISHED BY: | Date/Time | RECEIVED BY: | Date/Time

COMPANY NAME: | COMPANY NAME:

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI1200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-08

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G307

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/29/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

U ↓

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI1200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-03

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 7R115

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/20/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/27/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.0	U
91-58-7	2-chloronaphthalene	10.0	U
208-96-8	acenaphthylene	10.0	U
83-32-9	acenaphthene	10.0	U
86-73-7	fluorene	10.0	U
85-01-8	phenanthrene	10.0	U
120-12-7	anthracene	10.0	U
206-44-0	fluoranthene	10.0	U
129-00-0	pyrene	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
50-32-8	benzo(a)pyrene	10.0	U
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U
53-70-3	dibenz(a,h)anthracene	10.0	U
191-24-2	benzo(g,h,i)perylene	10.0	U

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FORM I SV-1 OLM03.0

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI2200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-06

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G2018

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/29/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

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FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI2200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-04

Sample wt/vol: 990.0 (g/mL) ML Lab File ID: 7R311

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/20/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/29/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.1	U
91-58-7	2-chloronaphthalene	10.1	U
208-96-8	acenaphthylene	3.2	J
83-32-9	acenaphthene	1.0	J
86-73-7	fluorene	1.4	J
85-01-8	phenanthrene	2.0	J
120-12-7	anthracene	0.83	J
206-44-0	fluoranthene	6.9	J
129-00-0	pyrene	10.3	
56-55-3	benzo(a)anthracene	5.0	J
218-01-9	chrysene	8.6	J
205-99-2	benzo(b)fluoranthene	9.1	J
207-08-9	benzo(k)fluoranthene	10.1	U
50-32-8	benzo(a)pyrene	6.7	J
193-39-5	indeno(1,2,3-cd)pyrene	2.7	J
53-70-3	dibenz(a,h)anthracene	1.0	J
191-24-2	benzo(g,h,i)perylene	3.4	J

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI2230

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-09

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G308

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/29/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U	U
108-88-3	Toluene	5.9	P	J
100-41-4	Ethylbenzene	2.0	U	U
1330-20-7	Xylenes (total)	6.0	U	U

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FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI2230

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W
Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-01
Sample wt/vol: 1010 (g/mL) ML Lab File ID: 2R506
Level: (low/med) LOW Date Received: 04/16/98
% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/20/98
Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/01/98
Injection Volume: 1.0(uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	9.9	U
91-58-7	2-chloronaphthalene	9.9	U
209-96-8	acenaphthylene	9.9	U
83-32-9	acenaphthene	9.9	U
86-73-7	fluorene	9.9	U
85-01-8	phenanthrene	9.9	U
120-12-7	anthracene	9.9	U
206-44-0	fluoranthene	9.9	U
129-00-0	pyrene	9.9	U
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
50-32-8	benzo(a)pyrene	9.9	U
193-39-5	indeno(1,2,3-cd)pyrene	9.9	U
53-70-3	dibenz(a,h)anthracene	9.9	U
191-24-2	benzo(g,h,i)perylene	9.9	U

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DATA VALIDATION COPY

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI3200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-05

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G2017

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/29/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

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FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI3200 V

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-02

Sample wt/vol: 950.0 (g/mL) ML Lab File ID: 2R409

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 04/20/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/30/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
91-20-3	naphthalene	10.5	U	UJ G02
91-58-7	2-chloronaphthalene	10.5	U	
209-96-8	acenaphthylene	10.5	U	
83-32-9	acenaphthene	10.5	U	
86-73-7	fluorene	10.5	U	
85-01-8	phenanthrene	10.5	U	
120-12-7	anthracene	10.5	U	
206-44-0	fluoranthene	0.83	J	J G
129-00-0	pyrene	1.7	J	
56-55-3	benzo(a)anthracene	0.56	J	
218-01-9	chrysene	0.80	J	,C05
205-99-2	benzo(b)fluoranthene	10.5	U	UJ G02
207-08-9	benzo(k)fluoranthene	0.65	J	J G02
50-32-8	benzo(a)pyrene	10.5	U	UJ G02
193-39-5	indeno(1,2,3-cd)pyrene	10.5	U	
53-70-3	dibenz(a,h)anthracene	10.5	U	
191-24-2	benzo(g,h,i)perylene	10.5	U	

Use

DATA VERIFICATION

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI4200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-02

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G2014

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/28/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

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FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI4200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W
Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-11
Sample wt/vol: 1005 (g/mL) ML Lab File ID: 7R123
Level: (low/med) LOW Date Received: 04/16/98
% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/20/98
Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/27/98
Injection Volume: 1.0(uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10	U
91-58-7	2-chloronaphthalene	10	U
208-96-8	acenaphthylene	10	U
83-32-9	acenaphthene	10	U
86-73-7	fluorene	10	U
85-01-8	phenanthrene	10	U
120-12-7	anthracene	10	U
206-44-0	fluoranthene	10	U
129-00-0	pyrene	10	U
56-55-3	benzo(a)anthracene	10	U
218-01-9	chrysene	10	U
205-99-2	benzo(b)fluoranthene	10	U
207-08-9	benzo(k)fluoranthene	10	U
50-32-8	benzo(a)pyrene	10	U
193-39-5	indeno(1,2,3-cd)pyrene	10	U
53-70-3	dibenz(a,h)anthracene	10	U
191-24-2	benzo(g,h,i)perylene	10	U

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI5200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-03

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G2015

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/29/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI5200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-12

Sample wt/vol: 980.0 (g/mL) ML Lab File ID: 7R124

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/20/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/28/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.2	U
91-58-7	2-chloronaphthalene	10.2	U
208-96-8	acenaphthylene	10.2	U
83-32-9	acenaphthene	10.2	U
86-73-7	fluorene	10.2	U
85-01-8	phenanthrene	10.2	U
120-12-7	anthracene	10.2	U
206-44-0	fluoranthene	10.2	U
129-00-0	pyrene	10.2	U
56-55-3	benzo(a)anthracene	10.2	U
218-01-9	chrysene	10.2	U
205-99-2	benzo(b)fluoranthene	10.2	U
207-08-9	benzo(k)fluoranthene	10.2	U
50-32-8	benzo(a)pyrene	10.2	U
193-39-5	indeno(1,2,3-cd)pyrene	10.2	U
53-70-3	dibenz(a,h)anthracene	10.2	U
191-24-2	benzo(g,h,i)perylene	10.2	U

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DATA VALIDATION COPY

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI6301

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-01

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G2013

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/28/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI6301

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-09

Sample wt/vol: 960.0 (g/mL) ML Lab File ID: 7R121

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 04/20/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/27/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.4	U
91-58-7	2-chloronaphthalene	10.4	U
208-96-8	acenaphthylene	10.4	U
83-32-9	acenaphthene	10.4	U
86-73-7	fluorene	10.4	U
85-01-8	phenanthrene	10.4	U
120-12-7	anthracene	10.4	U
206-44-0	fluoranthene	10.4	U
129-00-0	pyrene	10.4	U
56-55-3	benzo(a)anthracene	10.4	U
218-01-9	chrysene	10.4	U
205-99-2	benzo(b)fluoranthene	10.4	U
207-08-9	benzo(k)fluoranthene	10.4	U
50-32-8	benzo(a)pyrene	10.4	U
193-39-5	indeno(1,2,3-cd)pyrene	10.4	U
53-70-3	dibenz(a,h)anthracene	10.4	U
191-24-2	benzo(g,h,i)perylene	10.4	U

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FORM I SV-1 OLM03.0

DATA VALIDATION COPY

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI6302

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-04

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G2016

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/29/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI6302

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-13

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 7R404

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/20/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/30/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.0	U
91-58-7	2-chloronaphthalene	10.0	U
208-96-8	acenaphthylene	10.0	U
83-32-9	acenaphthene	10.0	U
86-73-7	fluorene	10.0	U
85-01-8	phenanthrene	10.0	U
120-12-7	anthracene	10.0	U
206-44-0	fluoranthene	10.0	U
129-00-0	pyrene	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
50-32-8	benzo(a)pyrene	10.0	U
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U
53-70-3	dibenz(a,h)anthracene	10.0	U
191-24-2	benzo(g,h,i)perylene	10.0	U

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FORM I SV-1 OLM03.0

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI6303

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W
Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-11
Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G3010
Level: (low/med) LOW Date Received: 04/16/98
% Moisture: not dec. _____ Date Analyzed: 04/29/98
GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI6303 ✓

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W
Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-10
Sample wt/vol: 1000 (g/mL) ML Lab File ID: 7R122
Level: (low/med) LOW Date Received: 04/16/98
% Moisture: _____ decanted: (Y/N)___ Date Extracted: 04/20/98
Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/27/98
Injection Volume: 1.0(uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.0	U
91-58-7	2-chloronaphthalene	10.0	U
208-96-8	acenaphthylene	10.0	U
83-32-9	acenaphthene	10.0	U
86-73-7	fluorene	10.0	U
85-01-8	phenanthrene	10.0	U
120-12-7	anthracene	10.0	U
206-44-0	fluoranthene	10.0	U
129-00-0	pyrene	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
50-32-8	benzo(a)pyrene	10.0	U
193-39-5	indeno(1,2,3-cd)pyrene	10.0	U
53-70-3	dibenz(a,h)anthracene	10.0	U
191-24-2	benzo(g,h,i)perylene	10.0	U

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI6304

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-10

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G309

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/29/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U	U
108-88-3	Toluene	2.0	U	
100-41-4	Ethylbenzene	2.0	U	
1330-20-7	Xylenes (total)	6.0	U	

FORM I VOA

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI6304 ✓

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA014W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804406-07

Sample wt/vol: 950.0 (g/mL) ML Lab File ID: 7R119

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 04/20/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/27/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.5	U
91-58-7	2-chloronaphthalene	10.5	U
208-96-8	acenaphthylene	10.5	U
83-32-9	acenaphthene	10.5	U
86-73-7	fluorene	10.5	U
85-01-8	phenanthrene	10.5	U
120-12-7	anthracene	10.5	U
206-44-0	fluoranthene	10.5	U
129-00-0	pyrene	10.5	U
56-55-3	benzo(a)anthracene	10.5	U
218-01-9	chrysene	10.5	U
205-99-2	benzo(b)fluoranthene	10.5	U
207-08-9	benzo(k)fluoranthene	10.5	U
50-32-8	benzo(a)pyrene	10.5	U
193-39-5	indeno(1,2,3-cd)pyrene	10.5	U
53-70-3	dibenz(a,h)anthracene	10.5	U
191-24-2	benzo(g,h,i)perylene	10.5	U

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6/16/98

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI6305

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA016W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804427-12

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G3011

Level: (low/med) LOW Date Received: 04/16/98

% Moisture: not dec. _____ Date Analyzed: 04/29/98

GC Column: J&W DB-624(PID) ID: 0.53 (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
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI7301

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA020W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804486-01

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G4013

Level: (low/med) LOW Date Received: 04/18/98

% Moisture: not dec. _____ Date Analyzed: 04/30/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
71-43-2	Benzene	2.0	U	U
108-88-3	Toluene	2.0	U	
100-41-4	Ethylbenzene	2.0	U	
1330-20-7	Xylenes (total)	6.0	U	

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI7301

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA019W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804484-11

Sample wt/vol: 955.0 (g/mL) ML Lab File ID: 1R418

Level: (low/med) LOW Date Received: 04/18/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/21/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/01/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.5	U
91-58-7	2-chloronaphthalene	10.5	U
208-96-8	acenaphthylene	10.5	U
83-32-9	acenaphthene	10.5	U
86-73-7	fluorene	10.5	U
85-01-8	phenanthrene	10.5	U
120-12-7	anthracene	10.5	U
206-44-0	fluoranthene	10.5	U
129-00-0	pyrene	10.5	U
56-55-3	benzo(a)anthracene	10.5	U
218-01-9	chrysene	10.5	U
205-99-2	benzo(b)fluoranthene	10.5	U
207-08-9	benzo(k)fluoranthene	10.5	U
50-32-8	benzo(a)pyrene	10.5	U
193-39-5	indeno(1,2,3-cd)pyrene	10.5	U
53-70-3	dibenz(a,h)anthracene	10.5	U
191-24-2	benzo(g,h,i)perylene	10.5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI7310

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA020W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804486-03

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G5012

Level: (low/med) LOW Date Received: 04/18/98

% Moisture: not dec. _____ Date Analyzed: 05/01/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

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FORM I VOA

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI7310

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA019W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804484-10

Sample wt/vol: 960.0 (g/mL) ML Lab File ID: 1R417

Level: (low/med) LOW Date Received: 04/18/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/21/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/01/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.4	U
91-58-7	2-chloronaphthalene	10.4	U
208-96-8	acenaphthylene	10.4	U
83-32-9	acenaphthene	10.4	U
86-73-7	fluorene	10.4	U
85-01-8	phenanthrene	10.4	U
120-12-7	anthracene	10.4	U
206-44-0	fluoranthene	10.4	U
129-00-0	pyrene	10.4	U
56-55-3	benzo(a)anthracene	10.4	U
218-01-9	chrysene	10.4	U
205-99-2	benzo(b)fluoranthene	10.4	U
207-08-9	benzo(k)fluoranthene	10.4	U
50-32-8	benzo(a)pyrene	10.4	U
193-39-5	indeno(1,2,3-cd)pyrene	10.4	U
53-70-3	dibenz(a,h)anthracene	10.4	U
191-24-2	benzo(g,h,i)perylene	10.4	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI7330

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA020W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804486-04

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G4014

Level: (low/med) LOW DATA VALIDATION COPY Date Received: 04/18/98

% Moisture: not dec. _____ Date Analyzed: 04/30/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q
71-43-2	Benzene	2.0	U	U
108-88-3	Toluene	7.4		U FB4, FB7
100-41-4	Ethylbenzene	2.0	U	U
1330-20-7	Xylenes (total)	7.6		U
				U FB4, FB7

FORM I VOA

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI7330

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA019W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804484-09

Sample wt/vol: 980.0 (g/mL) ML Lab File ID: 1R416

Level: (low/med) LOW DATA VALIDATION COPY Date Received: 04/18/98

% Moisture: _____ decanted: (Y/N) Date Extracted: 04/21/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/30/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.2	U
91-58-7	2-chloronaphthalene	10.2	U
208-96-8	acenaphthylene	10.2	U
83-32-9	acenaphthene	10.2	U
86-73-7	fluorene	10.2	U
85-01-8	phenanthrene	10.2	U
120-12-7	anthracene	10.2	U
206-44-0	fluoranthene	10.2	U
129-00-0	pyrene	10.2	U
56-55-3	benzo(a)anthracene	10.2	U
218-01-9	chrysene	10.2	U
205-99-2	benzo(b)fluoranthene	10.2	U
207-08-9	benzo(k)fluoranthene	10.2	U
50-32-8	benzo(a)pyrene	10.2	U
193-39-5	indeno(1,2,3-cd)pyrene	10.2	U
53-70-3	dibenz(a,h)anthracene	10.2	U
191-24-2	benzo(g,h,i)perylene	10.2	U

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FORM I SV-1 OLM03.0

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI7302

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA020W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804486-02

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G409

Level: (low/med) LOW Date Received: 04/18/98

% Moisture: not dec. _____ Date Analyzed: 04/30/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0 ~~2.1~~	J

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U FOR FOH, FOG

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6/16/98

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FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI7302

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA019W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804484-01

Sample wt/vol: 960.0 (g/mL) ML Lab File ID: 1R409

Level: (low/med) LOW Date Received: 04/18/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/21/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/30/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.4	U
91-58-7	2-chloronaphthalene	10.4	U
208-96-8	acenaphthylene	10.4	U
83-32-9	acenaphthene	10.4	U
86-73-7	fluorene	10.4	U
85-01-8	phenanthrene	10.4	U
120-12-7	anthracene	10.4	U
206-44-0	fluoranthene	10.4	U
129-00-0	pyrene	10.4	U
56-55-3	benzo(a)anthracene	10.4	U
218-01-9	chrysene	10.4	U
205-99-2	benzo(b)fluoranthene	10.4	U
207-08-9	benzo(k)fluoranthene	10.4	U
50-32-8	benzo(a)pyrene	10.4	U
193-39-5	indeno(1,2,3-cd)pyrene	10.4	U
53-70-3	dibenz(a,h)anthracene	10.4	U
191-24-2	benzo(g,h,i)perylene	10.4	U

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FORM I SV-1 OLM03.0

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI7303

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA020W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804486-07

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G5010

Level: (low/med) LOW Date Received: 04/18/98

% Moisture: not dec. _____ Date Analyzed: 05/01/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0 ~~2.8~~	J

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U F44, F46

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DATA VALIDATION
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI7303

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA019W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804484-02

Sample wt/vol: 960.0 (g/mL) ML Lab File ID: 1R410

Level: (low/med) LOW Date Received: 04/18/98

% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/21/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/30/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.4	U
91-58-7	2-chloronaphthalene	10.4	U
208-96-8	acenaphthylene	10.4	U
83-32-9	acenaphthene	10.4	U
86-73-7	fluorene	10.4	U
85-01-8	phenanthrene	10.4	U
120-12-7	anthracene	10.4	U
206-44-0	fluoranthene	10.4	U
129-00-0	pyrene	10.4	U
56-55-3	benzo(a)anthracene	10.4	U
218-01-9	chrysene	10.4	U
205-99-2	benzo(b)fluoranthene	10.4	U
207-08-9	benzo(k)fluoranthene	10.4	U
50-32-8	benzo(a)pyrene	10.4	U
193-39-5	indeno(1,2,3-cd)pyrene	10.4	U
53-70-3	dibenz(a,h)anthracene	10.4	U
191-24-2	benzo(g,h,i)perylene	10.4	U

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MMP 6/16/98

FORM I SV-1 OLM03.0

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI7304

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA020W
Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804486-10
Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2G4021
Level: (low/med) LOW Date Received: 04/18/98
% Moisture: not dec. _____ Date Analyzed: 04/30/98
GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0
Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI7304

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA019W
Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804484-03
Sample wt/vol: 940.0 (g/mL) ML Lab File ID: 1R411
Level: (low/med) LOW Date Received: 04/18/98
% Moisture: _____ decanted: (Y/N)___ Date Extracted:04/21/98
Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/30/98
Injection Volume: 1.0(uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.6	U
91-58-7	2-chloronaphthalene	10.6	U
208-96-8	acenaphthylene	10.6	U
83-32-9	acenaphthene	10.6	U
86-73-7	fluorene	10.6	U
85-01-8	phenanthrene	10.6	U
120-12-7	anthracene	10.6	U
206-44-0	fluoranthene	10.6	U
129-00-0	pyrene	10.6	U
56-55-3	benzo(a)anthracene	10.6	U
218-01-9	chrysene	10.6	U
205-99-2	benzo(b)fluoranthene	10.6	U
207-08-9	benzo(k)fluoranthene	10.6	U
50-32-8	benzo(a)pyrene	10.6	U
193-39-5	indeno(1,2,3-cd)pyrene	10.6	U
53-70-3	dibenz(a,h)anthracene	10.6	U
191-24-2	benzo(g,h,i)perylene	10.6	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI9200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA023W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804617-11

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2H1017

Level: (low/med) LOW Date Received: 04/22/98

% Moisture: not dec. _____ Date Analyzed: 05/04/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	3.6	J

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI9200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA023W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804617-02

Sample wt/vol: 980.0 (g/mL) ML Lab File ID: 4R416

Level: (low/med) LOW Date Received: 04/22/98

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 04/24/98

Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 04/30/98

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.2	U
91-58-7	2-chloronaphthalene	10.2	U
208-96-8	acenaphthylene	10.2	U
83-32-9	acenaphthene	10.2	U
86-73-7	fluorene	10.2	U
85-01-8	phenanthrene	10.2	U
120-12-7	anthracene	10.2	U
206-44-0	fluoranthene	10.2	U
129-00-0	pyrene	10.2	U
56-55-3	benzo(a)anthracene	10.2	U
218-01-9	chrysene	10.2	U
205-99-2	benzo(b)fluoranthene	10.2	U
207-08-9	benzo(k)fluoranthene	10.2	U
50-32-8	benzo(a)pyrene	10.2	U
193-39-5	indeno(1,2,3-cd)pyrene	10.2	U
53-70-3	dibenz(a,h)anthracene	10.2	U
191-24-2	benzo(g,h,i)perylene	10.2	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HI9210

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA023W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804617-12

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2H1018

Level: (low/med) LOW Date Received: 04/22/98

% Moisture: not dec. _____ Date Analyzed: 05/04/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HI9210

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA023W
Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804617-01
Sample wt/vol: 935.0 (g/mL) ML Lab File ID: 4R415
Level: (low/med) LOW Date Received: 04/22/98
% Moisture: _____ decanted: (Y/N) _____ Date Extracted: 04/24/98
Concentrated Extract Volume: 1.00(mL) Date Analyzed: 04/30/98
Injection Volume: 1.0(uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH: 7.0

DATA VALIDATION COPY

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
91-20-3	naphthalene	10.7	U	U
91-58-7	2-chloronaphthalene	10.7	U	
208-96-8	acenaphthylene	10.7	U	
83-32-9	acenaphthene	10.7	U	
86-73-7	fluorene	10.7	U	
85-01-8	phenanthrene	10.7	U	
120-12-7	anthracene	10.7	U	
206-44-0	fluoranthene	10.7	U	
129-00-0	pyrene	10.7	U	
56-55-3	benzo(a)anthracene	10.7	U	
218-01-9	chrysene	10.7	U	
205-99-2	benzo(b)fluoranthene	10.7	U	
207-08-9	benzo(k)fluoranthene	10.7	U	
50-32-8	benzo(a)pyrene	10.7	U	
193-39-5	indeno(1,2,3-cd)pyrene	10.7	U	
53-70-3	dibenz(a,h)anthracene	10.7	U	
191-24-2	benzo(g,h,i)perylene	10.7	U	

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HIA200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA023W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804617-13

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2H1019

Level: (low/med) LOW Date Received: 04/22/98

% Moisture: not dec. _____ Date Analyzed: 05/04/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HIA200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA
Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA023W
Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804617-08
Sample wt/vol: 980.0 (g/mL) ML Lab File ID: 4R422
Level: (low/med) LOW Date Received: 04/22/98
% Moisture: _____ decanted: (Y/N) N Date Extracted: 04/24/98
Concentrated Extract Volume: 1.00 (mL) Date Analyzed: 05/01/98
Injection Volume: 1.0 (uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) N pH: 7.0

DATA VALIDATION COPY

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.2	U
91-58-7	2-chloronaphthalene	10.2	U
208-96-8	acenaphthylene	10.2	U
83-32-9	acenaphthene	10.2	U
86-73-7	fluorene	10.2	U
85-01-8	phenanthrene	10.2	U
120-12-7	anthracene	10.2	U
206-44-0	fluoranthene	10.2	U
129-00-0	pyrene	10.2	U
56-55-3	benzo(a)anthracene	10.2	U
218-01-9	chrysene	10.2	U
205-99-2	benzo(b)fluoranthene	10.2	U
207-08-9	benzo(k)fluoranthene	10.2	U
50-32-8	benzo(a)pyrene	10.2	U
193-39-5	indeno(1,2,3-cd)pyrene	10.2	U
53-70-3	dibenz(a,h)anthracene	10.2	U
191-24-2	benzo(g,h,i)perylene	10.2	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HIB200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA023W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804617-14

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 2H1020

Level: (low/med) LOW Date Received: 04/22/98

% Moisture: not dec. _____ Date Analyzed: 05/04/98

GC Column: J&W DB-624(PID) ID: 0.53 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	2.0	U
108-88-3	Toluene	2.0	U
100-41-4	Ethylbenzene	2.0	U
1330-20-7	Xylenes (total)	6.0	U

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HIB200

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HA023W

Matrix: (soil/water) GROUNDH2O Lab Sample ID: 9804617-05

Sample wt/vol: 990.0 (g/mL) ML Lab File ID: 4R419

Level: (low/med) LOW Date Received: 04/22/98

% Moisture: _____ decanted: (Y/N) ___ Date Extracted: 04/24/98

Concentrated Extract Volume: 1.00(mL) Date Analyzed: 05/01/98

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

DATA VALIDATION COPY

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
91-20-3	naphthalene	10.1	U
91-58-7	2-chloronaphthalene	10.1	U
208-96-8	acenaphthylene	10.1	U
83-32-9	acenaphthene	10.1	U
86-73-7	fluorene	10.1	U
85-01-8	phenanthrene	10.1	U
120-12-7	anthracene	10.1	U
206-44-0	fluoranthene	10.1	U
129-00-0	pyrene	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
50-32-8	benzo(a)pyrene	10.1	U
193-39-5	indeno(1,2,3-cd)pyrene	10.1	U
53-70-3	dibenz(a,h)anthracene	10.1	U
191-24-2	benzo(g,h,i)perylene	10.1	U

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APPENDIX IX

CONTAMINATED SOIL DISPOSAL MANIFESTS

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All soil removed during the underground storage tank (UST) removal effort for this site was returned to the UST excavation by Anderson Columbia Environmental, inc. Therefore, soil disposal manifests do not exist for the USTs 27 and 28, Facility ID: 9-025083 site.

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APPENDIX X

SITE RANKING FORM

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SITE RANKING FORM

Facility Name: Tanks 27 & 28, Building 8059 **Ranked by:** C. Allison Bailey

County: Chatham **Facility ID #:** 9-025083 **Date Ranked:** 10/23/98

SOIL CONTAMINATION

A. Total PAHs –
Maximum Concentration found on the site
(Assume <0.660 mg/kg if only gasoline was stored on site)

☐	≤0.660 mg/kg	= 0
☐	>0.66 - 1 mg/kg	= 10
☒	>1 - 10 mg/kg	= 25
☐	>10 mg/kg	= 50

B. Total Benzene -
Maximum Concentration found on the site

☒	≤0.005 mg/kg	= 0
☐	>0.005 - .05 mg/kg	= 1
☐	>0.05 - 1 mg/kg	= 10
☐	>1 - 10 mg/kg	= 25
☐	>10 - 50 mg/kg	= 40
☐	>50 mg/kg	= 50

C. Depth to Groundwater
(bls = below land surface)

☐	>50' bls	= 1
☐	>25' - 50' bls	= 2
☐	>10' - 25' bls	= 5
☒	≤10' bls	= 10

Fill in the blanks: **(A. 25) + (B. 0) = (25) x (C. 10) = (D. 250)**

GROUNDWATER CONTAMINATION

E. Free Product (Nonaqueous-phase liquid hydrocarbons; See Guidelines For definition of "sheen").

☒	No free product	= 0
☐	Sheen - 1/8"	= 250
☐	>1/8" - 6"	= 500
☐	>6" - 1ft.	= 1,000
☐	For every additional inch, add another 100 points = 1,000 + _____	

F. Dissolved Benzene -
Maximum Concentration at the site
(One well must be located at the source of the release.)

☒	≤5 µg/L	= 0
☐	>5 - 100 µg/L	= 5
☐	>100 - 1,000 µg/L	= 50
☐	>1,000 - 10,000 µg/L	= 100
☐	>10,000 µg/L	= 250

Fill in the blanks: **(E. 0) + (F. 0) = (G. 0)**

POTENTIAL RECEPTORS (MUST BE FIELD-VERIFIED)

Distance from nearest contaminant plume boundary to the nearest downgradient and hydraulically connected Point of Withdrawal for water supply. **If the point of withdrawal is not hydraulically connected, evidence as outlined in the CAP-A guidance document MUST be presented to substantiate this claim.**

H. Public Water Supply

☐	Impacted	= 2000
☐	≤500'	= 500
☐	>500' - ¼ mi	= 25
☐	¼ mi - 1 mi	= 10
☐	>1 mi - 2 mi	= 2
☒*	> 2 mi	= 0

For lower susceptibility areas only:

☐	>1 mi	= 0

Note: If site is in lower susceptibility area, do not use the shaded areas.

* Note: Please see Section 1.0, Other Geologic and Hydrogeologic Data, page X-5, for justification of this evaluation.

I. Non-Public Water Supply

☐	Impacted	= 1000
☐	≤100'	= 500
☐	>100' - 500'	= 25
☐	>500' - ¼ mi	= 5
☐	>¼ - ½ mi	= 2
☒	>½ mi	= 0

For lower susceptibility areas only:

☐	>¼ mi	= 0

J. Distance from nearest Contaminant Plume boundary to downgradient Surface Waters **OR UTILITY TRENCHES & VAULTS** (a utility trench may be omitted from ranking if its invert elevation is more than 5 feet above the water table)

☐	Impacted	= 500
☒	≤500'	= 50
☐	>500' - 1,000'	= 5
☐	>1,000'	= 1

K. Distance from any Free Product to basements and crawl spaces

☐	Impacted	= 500
☐	<500'	= 50
☐	>500' - 1,000'	= 5
☒	>1,000' or no free product.	= 0

Fill in the blanks: (H. 0) + (I. 0) + (J. 50) + (K. 0) = L. 50

(G. 0) x (L. 50) = M. 0

(M. 0) + (D. 250) = N. 250

P. **SUSCEPTIBILITY AREA MULTIPLIER**

☐ If site is located in a Low Ground-Water Pollution Susceptibility Area = 0.5

☒ All other sites = 1

Q. **EXPLOSION HAZARD**

Have any explosive petroleum vapors, possibly originating from this release, been detected in any subsurface structure (e.g., utility trenches, basements, vaults, crawl spaces, etc.)?

☐ Yes = 200,000

☒ No = 0

Fill in the blanks: (N. 250) x (P. 1) = (250) + (Q. 0)

= 250

ENVIRONMENTAL SENSITIVITY SCORE

1.0 OTHER GEOLOGIC AND HYDROGEOLOGIC DATA

The following information is presented to provide supplemental information to Appendix X (Site Ranking Form) of the Corrective Action Plan (CAP)-Part A form and provides detailed information relating to the geologic and hydrogeologic conditions at Hunter Army Airfield (HAAF) to support determinations of groundwater flow pathway(s) or direction(s) and contaminant transport.

1.1 REGIONAL GEOLOGY

Southeast Georgia is located within the Coastal Plain Physiographic Province of the Southeast United States (Clark and Zisa 1976). In this region, the thickness of southeastward dipping, subsurface strata ranges from 0 feet at the fall line, located approximately 350 miles inland from the Atlantic coast, to approximately 4,200 feet below land surface (BLS) at the coast. Herrick (1961) provides detailed lithologic descriptions of the stratigraphic units encountered during the installation of water and petroleum exploration wells in Chatham County. The well log of GGS Well 125, located on White Bluff Road, 700 feet west and 0.3 miles north of Buckhalter Road, Savannah, provides one of the more complete lithologic descriptions of upper Eocene, Miocene, and Pliocene to Recent sedimentary strata in Chatham County.

The upper Eocene (Ocala Limestone) section of GGS Well 125 is approximately 225 feet thick and dominated by light-gray to white, fossiliferous limestone. The Miocene section is approximately 250 feet thick and consists of limestone with a 160-feet-thick cap of dark green phosphatic clay. This clay is regionally extensive and is known to occupy the Coosawatchie Formation of the Hawthorn Group (Furlow 1969; Arora 1984; Huddlestun 1988). The interval from approximately 80 feet to the surface is Pliocene to Recent in age and composed primarily of sand interbedded with clay and silt. This section is occupied by the Satilla and Cypresshead Formations (Huddlestun 1988).

1.2 LOCAL GEOLOGY

HAAF is located within the Barrier Island Sequence District of the Coastal Plain Physiographic Province of the Southeast United States (Clark and Zisa 1976). The Barrier Island Sequence District in Chatham and Bryan Counties is characterized by the existence of several marine terraces (step-like topographic surfaces that decrease in elevation toward the coast). These marine terraces, and their associated deposits, are the results of sea level fluctuations that occurred during the Pleistocene Epoch. The surficial (Quaternary) deposits in Chatham and Bryan Counties, in decreasing elevation and age, are part of the Okefenokee, Wicomico, Penholoway, Pamlico, and Silver Bluff terrace complexes (Wilkes et al. 1974; GA DNR 1976; Huddlestun 1988).

HAAF, as well as most of Chatham County, is underlain by the Pleistocene Pamlico Terrace. The Pleistocene Satilla Formation (formerly known as the Pamlico Formation) consists of deposits of the Pamlico Terrace complex and other terrace complexes in the region (Huddlestun 1988). The Satilla Formation is a lithologically heterogeneous unit that consists of variably bedded to non-bedded sand and variably bedded silty to sandy clay. During the Pleistocene, these sand and clay deposits were formed in offshore and inner continental shelf, barrier island, and marsh/lagoonal-type environments (Huddlestun 1988). According to the Geologic Map of Georgia (GA DNR 1976), clay beds of marsh origin, which were deposited on the northwest side of the former Pamlico Barrier Island complex, exist in the western quarter of HAAF. Very fine- to

coarse-grained sand deposits of barrier island origin are more common throughout the remaining areas of HAAF.

Based on the coring and sampling of unconsolidated strata at HAAF during the CAP-Part A investigations, it is concluded that all former underground storage tanks (USTs) were buried within the Satilla Formation, which is overlain by various soil types. Soil groups at HAAF include the Chipley, Leon, Ellabelle, Kershaw, Pelham, Albany, Wahee, and Ogeechee (Wilkes et al. 1974).

1.3 REGIONAL AND LOCAL HYDROGEOLOGY

The hydrogeology in the vicinity of HAAF is mostly influenced by two aquifer systems. These are referred to as the Principal (Floridan) Aquifer and the Surficial Aquifer (Miller 1990). The Principal Aquifer is the lowermost hydrologic unit and is regionally extensive from South Carolina through Georgia, Alabama, and most of Florida. Known elsewhere as the Floridan, this aquifer, approximately 800 feet in total thickness, is composed primarily of Tertiary-age limestone including the Bug Island Formation, the Ocala Group, and the Suwannee Limestone. Groundwater from the Floridan is used primarily for drinking water (Arora 1984). According to Miller (1990), one of the largest cones of depression produced in the Upper Floridan Aquifer exists directly beneath Savannah, Georgia. Net water-level decline in the Floridan system, between the predevelopment period and 1980, exceeded 80 feet beneath Savannah. In addition, according to 1980 estimates, more than 500 million gallons of water per day were withdrawn from the Floridan for public and industrial use in southeast Georgia, more than any other region.

The confining layer for the Principal (Floridan) Aquifer is the phosphatic clay of the Hawthorn Group. There are minor occurrences of aquifer material within the Hawthorn Group; however, they have limited utilization (Miller 1990). The Surficial Aquifer overlies the Hawthorn confining unit.

The Surficial Aquifer consists of widely varying amounts of sand and clay, ranging from 55 to 150 feet in thickness, and is composed primarily of the Satilla and Cypresshead Formations in the Savannah vicinity (Arora 1984). This aquifer is primarily used for domestic lawn and agricultural irrigation. The top of the water table ranges from approximately 2 to 10 feet below ground level (Miller 1990). Groundwater in the Surficial Aquifer system is under unconfined, or water table, conditions. However, locally, thin clay beds create confined or semiconfined conditions, as is the case at HAAF where thin, surficial clay beds are present in the west quadrant (GA DNR 1976).

Groundwater encountered at all the UST investigation sites is part of the Surficial Aquifer system. Based on the fact that all public and non-public water supply wells draw water from the Principal (Floridan) Aquifer, and that the Hawthorn confining unit separates the Principal (Floridan) Aquifer from the Surficial Aquifer, it is concluded that there is no hydraulic interconnection between UST sites (and associated plumes, if applicable) and water supply withdrawal points (Figure X-A).

1.4 GEOLOGIC AND HYDROGEOLOGIC CONDITIONS AT THE USTs 27 & 28, BUILDING 8059 SITE

According to Wilkes et al. (1974), the soil common in the area occupied by Building 8059 consists of the Chipley-Urban land complex (Cuc). This complex contains 40 to 70 percent Chipley soils and 20 to 40 percent Urban Land soils. The surface layer of this complex is very

dark grayish brown to gray, with the underlying layer being olive brown to light yellowish brown mottled with gray within 40 inches of the surface. The texture is fine sand to a depth of six or more feet. A seasonal high water table is 15 to 36 inches below the surface. In places, the soil profile has been altered due to the cutting, filing, and grading activities resulting from urban development (Wilkes et al. 1974).

The presence of the Chipley-Urban, as predicted by Wilkes et al. (1974), was confirmed during direct-push activities at the USTs 27 & 28, Facility ID: 9-025083 site. Soil samples consisted predominantly of silty, fine-grained, poorly graded sand (SP) interbedded with less common organic rich, silty sand with light brown and gray hues.

Groundwater was measured at the site at depths ranging from 4.26 to 5.39 feet below ground surface. Based on the construction of a potentiometric surface map, groundwater is interpreted to flow toward the drainage ditch located approximately 700 feet northwest of the site.

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FIGURES

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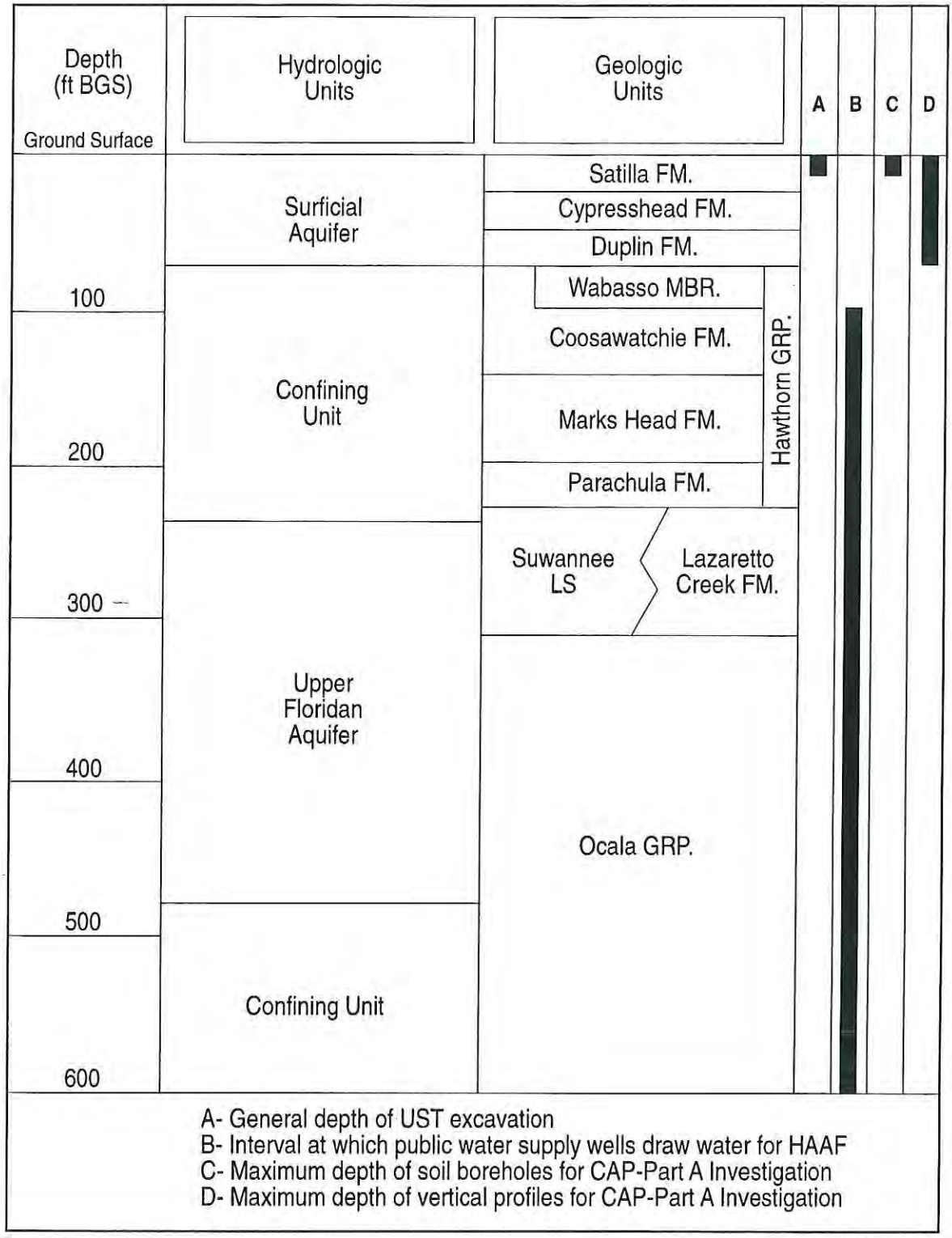

Figure X-A. Generalized Stratigraphy of Chatham County, Georgia

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APPENDIX XI

COPIES OF PUBLIC NOTIFICATION LETTERS AND CERTIFIED RECEIPTS OR NEWSPAPER NOTICE

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Affidavit of Publication
___Savannah Morning News
___Savannah Evening Press

STATE OF GEORGIA
CHATHAM COUNTY

Personnally appeared before me, Joan T. Jenkins, to me known, who being sworn, deposes and says:

That he is the Classified Adv Supv of Southeastern Newspapers Corporation, a Georgia corporation, doing business in Chatham County, Georgia, under the trade name of Savannah Morning News/Savannah Evening Press, a daily newspaper published in said county;

That he is authorized to make affidavits of publication on behalf of said published corporation;

That said newspaper is of general circulation in said county and in the area adjacent thereto;

That he has reviewed the regular editions of the Savannah Morning News/Savannah Evening Press, published on 1-24, 1999, 1-31, 1999, _____, 19___, _____, 19___, and finds that the following Advertisement, to-wit:

015 Miscellaneous Notices

PUBLIC NOTICE
Notification of Corrective Action Plan, Underground Storage Tank Releases, Fort Stewart, Georgia

The United States Army Corps of Engineers, and Fort Stewart Directorate of Public Works have prepared Corrective Action Plan (CAP) - Part A reports to assess the environmental impact of diesel, gasoline, or waste oil releases from numerous underground storage tanks (USTs) located at the above referenced property. These reports will be submitted to the Georgia Environmental Protection Division after February 1, 1999. A listing of the UST sites for which CAP - Part A reports have been prepared is presented at the end of this notification.

The Georgia rules for UST management require notification of the public most directly affected by the plans. If you would like a copy of any of the plans, please contact:

Commander, 3rd Infantry Division (Mechanized) and Fort Stewart, attn: AFZP-DEV (M. Little), 1557 Frank Cochran Dr., Bldg. 1139, Fort Stewart, Ga. 31314-4928

A copy of each requested plan will be mailed at a nominal copying and shipping fee.

To make comments on any of the plans, or to examine the Georgia Environmental Protection Division's files, contact the Corrective Action Unit, Underground Storage Tank Management Program, Environmental Protection Division, at 404-362-2687. The Underground Storage Tank Management Program will accept public comments on the CAP - Part A reports up to 30 days after submittal to the Georgia Environmental Protection Division. Following is their mailing address: Corrective Action Unit, Underground Storage Tank Management Program, 4244 International Parkway, Suite 100, Atlanta, Ga. 30354

Hunter Army Airfield CAP - Part A Underground Storage Tank Sites

Tank Number	Facility ID: Building
21 and 22	9-025053; 1327
27 and 28	9-025083; 8059
108	9-025104; 1346
109	9-025105; 1310
112	9-025108; 8464
116	9-025112; 9002

appeared in each of said editions.

Joan T. Jenkins
(Deponent)

Sworn to and subscribed before me this 2 day of Feb, 1999.

Lillie D. Lang
Notary Public, Chatham County, Georgia

LILLIE D. LANG
Notary Public, Chatham County, Ga.
My Commission Expires Apr. 8, 2001

Form 121 rev.

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APPENDIX XII

GUST TRUST FUND REIMBURSEMENT APPLICATION AND CLAIM FOR REIMBURSEMENT

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The Hunter Army Airfield is a federally owned facility and has funded the investigation for the Underground Storage Tanks 27 & 28, Building 8059 site, Facility ID: 9-025083, using Environmental Restoration Account funds. Application for Georgia Underground Storage Tank Trust Fund reimbursement is not being pursued at this time.

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ATTACHMENT A

TECHNICAL APPROACH

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TECHNICAL APPROACH

1.0 INTRODUCTION

The overall objective of this project was to provide the services required to produce Corrective Action Plans (CAPs) for the subject underground storage tank (UST) and heating oil tank (HOT) sites per the requirement of the Georgia Environmental Protection Division (EPD). The field activities included the installation of temporary piezometers, soil borings, and soil and groundwater sampling. Upon completion of the field activities, this CAP-Part A report was prepared to meet requirements of the Georgia EPD, Fort Stewart Directorate of Public Works (FS DPW), and the U.S. Army Corps of Engineers (USACE)-Savannah District.

2.0 FIELD ACTIVITIES

The following sections detail the methodologies used for direct-push sampling and piezometer installation. All boreholes were drilled and piezometers installed by R. E. Wright [Science Applications International Corporation (SAIC), Drilling Services Division], a drilling firm licensed in the state of Georgia. A geologist from SAIC, working under the direction of a registered professional engineer, was on site at all times. Drilling activities were not undertaken until all utility clearances and permits were obtained from Hunter Army Airfield (HAAF) utility personnel.

2.1 SUBSURFACE SOIL SAMPLING

2.1.1 Borehole Installation

A truck-mounted direct-push Geoprobe was used for installation of soil boreholes. All sampling devices were pushed to required depths using 4.0- and 3.0-foot push rods. During all borehole drilling, 4.0-foot soil cores were collected continuously from ground surface to the top of the water table.

2.1.2 Sample Collection

Soil samples were collected from boreholes using a 4.0-foot acetate-lined, steel macrocoring device. Upon retrieval of the sampling device, the acetate liner containing the soil core was removed from the steel macrocoring device. The soil core was removed from the protective sleeve using a truck-mounted, acetate-liner cutting device. The exposed soil core was split into two 2.0-foot sections using a stainless steel knife. A portion of each 2.0-foot section was collected for possible laboratory analysis. The remaining portion of each 2.0-foot section was used for field measurements.

Samples designated for possible laboratory analysis were collected from the cores using a stainless steel spoon. Soil was collected from along the entire length of the core in order to collect a representative sample. The portion of the sample designated for volatile organic analyses was placed into laboratory sample containers first, followed by placement of the remaining portion of the sample into the containers designated for other types of analyses. Sample containers designated for volatile organic analyses were filled so that minimal headspace was present. Headspace gas concentration measurements were made using a field organic vapor meter (OVM). Initially, soil

from each 2.0-foot interval was placed into a glass jar, leaving some air space, and covered with aluminum foil to create an air-tight seal. The sample was allowed to volatilize for a minimum of 15 minutes. The sealed jar was punctured with the OVM probe and headspace gas drawn until the meter reading was stable. The concentration of the headspace gas was recorded to the nearest 0.1 parts per million (ppm).

Immediately following collection of each sample and completion of bottle label information, each potential analytical sample container was placed into an ice-filled cooler to ensure preservation. A clean acetate-lined, steel macrocore sampling device was used to collect soil core from each interval of the project boreholes. Information regarding the soil sample selection criteria for off-site shipment to a laboratory for chemical analysis is presented in Section 3.1.3 of the project Sampling and Analysis Plan. Soil samples that were not selected for laboratory analysis were disposed of as investigation-derived waste (IDW).

2.2 GROUNDWATER SAMPLING

2.2.1 Groundwater Collection

Collection of groundwater samples from soil boreholes was accomplished through the use of a 3.5-foot-long, 1.0-inch-diameter steel slotted screen encased in a 3.5-foot-long, 1.5-inch-diameter stainless steel sleeve attached to an expendable 1.5-inch length, 1.5-inch-diameter steel drive point. The entire device was pushed 5 feet below the water table. The 3.5-foot steel sleeve was subsequently raised 4.0 feet from the bottom while discarding the steel drive point and exposing the entire length of the screen to groundwater. By raising the steel sleeve 4.0 feet, the steel slotted screen was raised 0.5 feet from the bottom of the borehole. As a result, the groundwater was collected from a 4.0-foot interval. Water was brought to the surface using a peristaltic pump attached to a clean acetate tube, which was cut to desired length prior to sampling and discarded following each sampling event. Enough water was extracted for laboratory sample containment and for water quality parameters to be measured with a Horiba U-10. Following groundwater sample collection, subsurface sampling devices were removed from the borehole, and a temporary piezometer was installed. Temporary piezometers were constructed of 1.0-inch inside diameter (ID) polyvinyl chloride (PVC) casing with a 5-foot screened interval.

2.2.2 Field Measurements

Groundwater field measurements performed during the project included measurement of static groundwater level, free product layer thickness, pH, specific conductance, and temperature. Groundwater levels were measured inside the temporary PVC piezometers. A summary of the procedures and criteria to be used for groundwater field measurements is presented in the following sections.

Static Groundwater Level

Static groundwater level measurements were made using an electronic water-level indicator. Initially, the indicator probe was lowered into each temporary piezometer casing until the alarm sounded and/or the indicator light illuminated. The probe was withdrawn several feet and slowly lowered again until the groundwater surface was contacted as indicated by the alarm and/or light. Water-level measurements were estimated to the nearest 0.01 foot based on the difference between the nearest probe cord mark to the top of the piezometer casing.

The distance between the top of the casing and the surrounding ground surface was taken into account in measuring the water level to within 0.01 foot. The static water level measurement procedure was repeated two or three times to ensure that the water level measurements were consistent (plus or minus 0.01 foot).

Free Product Thickness

Free product layer thickness measurements were collected at applicable sites using an electric interface probe. Initially, the interface probe was lowered into each temporary piezometer casing until the alarm sounded and/or the indicator light was illuminated. The probe was withdrawn and then slowly lowered again until the liquid surface was contacted as noted by the alarm and/or indicator light. The meter was lowered until the alarm indicated the water surface. The thickness of the product was determined by subtracting the measurement of the free product layer surface from the measurement of the water surface. The water/product level measurements were estimated to the nearest 0.01 foot based on the difference between the nearest probe cord mark to the top of the piezometer casing.

The free product measurement was repeated two or three times to ensure that the measurements were consistent (plus or minus 0.01 foot).

pH, Specific Conductance, and Temperature

The pH, specific conductance, and temperature measurements were recorded for groundwater during groundwater sampling. The pH, temperature, and conductivity measurements were made using a Horiba U-10 designed to measure these parameters. A portion of each groundwater sample was retrieved from the sampler and poured into the collection cup. With the combination meter set in the pH mode, the meter electrode was swirled at a slow, constant rate within the sample until the meter reading reached equilibrium. The sample pH was recorded to the nearest 0.1 pH unit.

Upon completion of the pH measurement, conductivity and temperature measurements were made on a groundwater sample collected in the same manner as described above. With the combination meter set in the conductivity mode, the meter electrode was swirled at a slow, constant rate until the meter reading reached equilibrium. Concurrently, a temperature probe was placed into the sample and allowed to reach equilibrium. The sample conductivity was recorded to the nearest 10 mS/cm and the temperature to the nearest 0.1°C. All recorded conductivity values were converted to conductance at 25°C.

2.3 TEMPORARY PIEZOMETER INSTALLATION

Following the collection of the groundwater sample, a 2-inch PVC piezometer, with a 5-foot screened section, was installed to prevent the borehole from collapsing. The piezometer remained in the borehole at least 24 hours, after which time measurements to determine the presence of a free product layer were made, if applicable, and the static water level was measured.

2.4 BOREHOLE ABANDONMENT

Once static water levels were measured, the temporary piezometers were removed, and the boreholes were abandoned. Abandonment was conducted in a manner preventing any current, or subsequent, fluid media from entering, or migrating within, the subsurface environment along the

axis or from the endpoint of the borehole. Abandonment was accomplished by filling the entire volume of the borehole with bentonite powder.

Boreholes located in concrete-covered areas were capped with grout. After a 24-hour period, the abandoned borehole was checked for grout and bentonite settlement.

2.5 SURVEYING

A topographic survey of the horizontal and vertical locations of all soil boreholes was conducted after completion of field activities. The topographic survey was conducted by a surveyor registered in the state of Georgia.

The horizontal coordinates for each soil borehole were surveyed to the closest 1.0 foot and referenced to the State Plane Coordinate System. Ground elevations were surveyed to the closest 0.01 foot. Elevations were referenced to the National Geodetic Vertical Datum of 1983.

2.6 DECONTAMINATION PROCEDURES

Decontamination of equipment used for soil and groundwater sampling was conducted at each investigation site. Non-dedicated equipment was decontaminated after each use. The direct-push sampling equipment was decontaminated by removing soil and contaminants with potable water, phosphate-free detergent, and scrub brushes. This was followed by a potable water rinse, American Society for Testing and Materials (ASTM) Type I or equivalent water rinse, methanol rinse, and ASTM Type I or equivalent water rinse. The sampling equipment was then allowed to air dry and was wrapped in plastic or aluminum foil.

In addition to the sampling equipment, field measurement instruments were also decontaminated between uses. Only those portions of each instrument that came into contact with environmental media were decontaminated. Because of the delicate nature of these instruments, the decontamination procedure only involved initial rinsing of the instrument probes with ASTM Type I or equivalent water.

2.7 INVESTIGATION-DERIVED WASTE MANAGEMENT

Soil cuttings obtained during the installation of each borehole, and water collected for the measurement of water quality parameters, were the only indigenous IDW generated during the project. Non-indigenous IDW included solid compactible trash, decontamination solutions, and sludges.

2.7.1 Waste Collection and Containment

All soil waste was contained in a 55-gallon U.S. Department of Transportation (DOT) Specification 17C drums at the point of generation. At each site, water waste was contained in 55-gallon DOT specification 17E drums. All containers were appropriately labeled with generation point information and transported to the Central Staging Area. Sanitary waste was placed in trash bags at the point of generation.

2.7.2 Waste Characterization

Soil IDW was characterized by collecting a representative soil aliquot from each drum and creating a single homogenized composite sample. The sample was analyzed for Resource Conservation and Recovery Act Toxicity Characteristic Leaching Procedure (TCLP) analytes. Soil was considered non-contaminated if the TCLP results were below the regulatory criteria, and the analytical results for the associated field samples indicated all of the following:

- benzene, toluene, ethylbenzene, and xylene (BTEX) and polynuclear aromatic hydrocarbon (PAH) concentrations below applicable Table A or B Threshold Levels as defined in Rules of Georgia Department of Natural Resources, Environmental Protection Division, rule 391-3-15-.09;
- total petroleum hydrocarbon (TPH) concentrations below 100 ppm; and
- total lead concentrations below 100 ppm.

Water IDW was characterized by collecting one sample from each drum. Each sample was analyzed for BTEX, pH, oil and grease, phenols, and TCLP metals.

2.7.3 Waste Disposal

All of the soil IDW was characterized as being non-contaminated and approved for disposal by FS DPW personnel. The soil was spread in an area designated by FS DPW personnel.

All of the water IDW was characterized as meeting the acceptance criteria of the FS Industrial Waste Treatment Plant (IWTP) and approved for disposal by FS DPW personnel at the IWTP.

2.8 DOCUMENTATION OF FIELD ACTIVITIES

All information pertinent to drilling and sampling activities, including instrument calibration data, was recorded in field logbooks. The logbooks were bound and the pages consecutively numbered. Entries in the logbooks were made in black permanent ink and included, at a minimum, a description of all activities, individuals involved in drilling and sampling activities, date and time of drilling and sampling, weather conditions, problems encountered, and field measurements. Lot numbers, manufacturers' names, and expiration dates of standard solutions used for field instrument calibration were also recorded. Sufficient information was recorded in the logbooks to permit reconstruction of direct-push and sampling activities.

3.0 SAMPLE HANDLING AND ANALYSIS

3.1 ANALYTICAL PROGRAM

Soil samples were screened for the presence of volatile vapors using a PhotoVac photoionization detector. The PhotoVac was calibrated daily using 100 ppm isobutylene. The headspace of each sample was measured approximately 15 minutes after collection.

Soil samples were analyzed for BTEX by method SW 846-8020, for PAH by method SW 846-8270, and for TPH by method SW 846-8015 (modified). TPH analysis included both gasoline-range organics and diesel-range organics. Groundwater samples were analyzed for BTEX by method SW 846-8240 and PAH by method SW 846-8270. The groundwater and soil sample containers, preservatives, and holding times are summarized in Table 1.1 of the Quality Assurance Project Plan of the SAP (SAIC 1998). All samples were shipped to General Engineering Laboratories (GEL), Charleston, South Carolina.

Duplicate samples of soil and groundwater were collected throughout the project and represented approximately 10 percent of the total sample population. Rinsate blanks, which represented approximately 5 percent of the total sample population, were collected to detect sample cross-contamination. Duplicates and rinsates were submitted to GEL.

Split samples were collected in addition to other quality control samples but were sent to the USACE quality assurance laboratory in Marietta, Georgia, as an independent quality check.

3.2 SAMPLE PACKAGING AND SHIPMENT

Each sample container was labeled and taped shut with electrical tape (except those containing samples designated for volatile organic analysis), and an initialed/dated custody seal was placed over the lid. Each sample bottle was placed into a separate plastic bag and sealed. The samples were placed upright in thermally insulated rigid-body coolers and surrounded by vermiculite to prevent breakage during shipment. In addition, samples were cooled to approximately 4°C with wet ice. These measures were taken to slow the decomposition and volatilization of contaminants during shipping and handling. The sample coolers were shipped to the analytical laboratory via courier service provided by the laboratory.

ATTACHMENT B

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