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INSTALLATION RESTORATION REMEDIAL INVESTIGATION FEASIBILITY STUDY DECISION PAPER NAS FORT WORTH TX

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US AIR FORCE
INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
BASE SERVICE STATION
CARSWELL AFB, TEXAS

DECISION PAPER

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1.0 INTRODUCTION

This decision paper presents the results of an evaluation of remedial alternatives for the Base Service Station (BSS) at Carswell AFB, Texas. The evaluation was conducted as part of the IRP RI/FS Stage 2 investigation at Carswell AFB. The decision paper describes the history of the Base Service Station and the geological setting at the site, and identifies and evaluates alternative control measures to achieve remediation of contamination at the site. The no-action alternative is included in the evaluation, as required by the "Air Force Installation Restoration Program Management Guidance." The alternatives have been evaluated to recommend a cost-effective plan for mitigating potential threats to the environment from contaminated ground water and soil. Alternative control measures have been evaluated on the basis of site conditions described in the IRP RI/FS investigation reports prepared by CH_2M-Hill (Records Search) and Radian Corporation (RI/FS Stage 1 and Stage 2).

2.0 BACKGROUND

The Carswell AFB Base Service Station is located on the northwest corner of the intersection of Jennings Drive and Rogner Drive, on the eastern edge of the base. It was built to replace the gasoline station formerly located near the main gate, and has been in operation less than twenty years. Four 10,000-gallon underground storage tanks constructed of fiberglass reinforced plastic are used to store gasoline at the station, and may be the source of contamination at the site.

The upper zone deposits at the Base Service Station are generally less than twelve feet thick. These deposits generally consist of three to nine feet of silts and clays that overlie a thin seam of sands with minor gravels. This is underlain by the limestone of the Goodland Formation. Ground water at the site is usually encountered between five and eleven feet beneath the ground surface. Ground water generally flows to the east toward the West Fork of the Trinity River, and any potential contaminants are expected to migrate in this direction.

Soil and ground-water samples were collected and analyzed as part of the IRP RI/FS investigations. Sampling locations (soil borings and monitor wells) are shown on Figure 2-1. Tables 2-1 through 2-5 present the analytical results of the IRP RI/FS Stage 2 investigation. Lead, chromium, arsenic, petroleum hydrocarbons, 1,2-dichloroethane, benzene, toluene, and xylenes are the principal contaminants of concern at this site. Their presence in soil and ground water at the site was identified during the Phase 2 Installation Restoration Program (IRP) study.

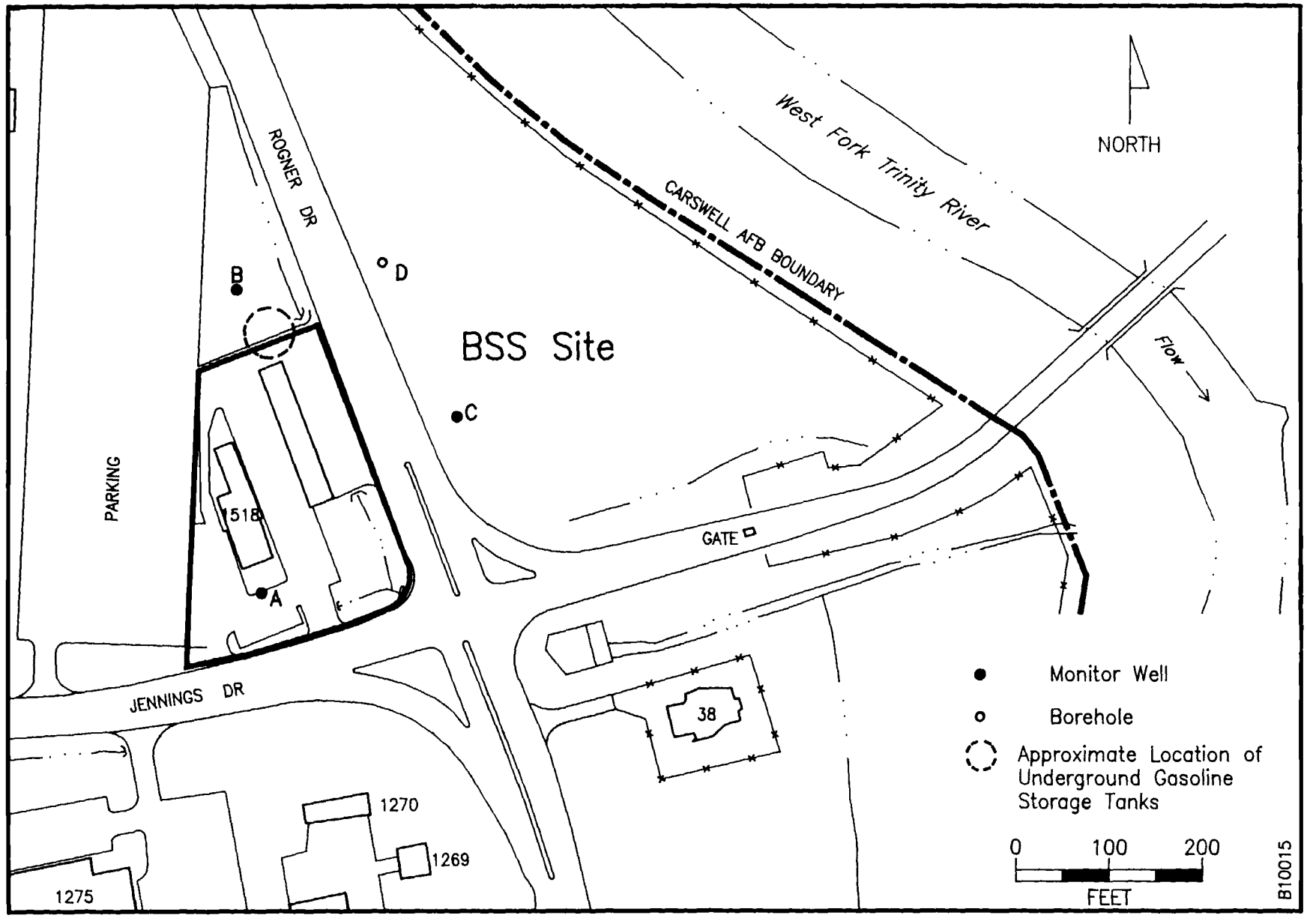

Figure 2-1. Locations of Soil Borings and Monitor Wells, Site BSS, Carswell AFB, Texas

TABLE 2-1. RESULTS OF INORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS

	Primary Results		
		Monitor Well	
		Sample ID	
		Date Sampled	
		Beg. Depth - End Depth	
	BSSA	BSSA	BSSB
	BSSA-2	BSSA-2	BSSB-3
PARAMETER	15-Feb-88	15-Feb-88	15-Feb-88
	(4 - 7)	(4 - 7)	(5 - 8)
Metals MG/KG			
Lead, graphite AA	3.3	3.8	4.2

ND: Not detected at specified detection limit
( ): Detection limit

TABLE 2-1. RESULTS OF INORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

	Primary Results	
	Monitor Well	
	Sample ID	
	Date Sampled	
	Beg. Depth - End Depth	
	BSSC	BSSD
	BSSC-4	BSSD-3
PARAMETER	14-Feb-88	14-Feb-88
Metals MG/KG	(9 - 10)	(4 - 6)
Lead, graphite AA	3.1	11.0

ND: Not detected at specified detection limit
( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS

Primary Results

	Monitor Well					
	Sample ID					
	Date Sampled					
	Beg. Depth - End Depth					
	BSSA		BSSA		BSSB	
	BSSA-2		BSSA-2		BSSB-3	
	15-Feb-88		15-Feb-88		15-Feb-88	
PARAMETER	4 - 7		4 - 7		5 - 8	
Petroleum Hydrocarbons MG/KG						
Petroleum Hydrocarbons	15.0		520.0		1800.0	
Volatile Organic Compounds MG/KG						
1,1,1-trichloroethane	ND	(0.0044)	ND	(0.0043)	ND	(2.9)
1,1,2,2-tetrachloroethane	ND	(0.0080)	ND	(0.0079)	ND	(5.2)
1,1,2-trichloroethane	ND	(0.0058)	ND	(0.0057)	ND	(3.8)
1,2-dichloroethane	ND	(0.0032)	ND	(0.0032)	ND	(2.1)
1,2-dichloropropane	ND	(0.0070)	ND	(0.0068)	ND	(4.5)
2-butanone	ND	(0.029)	ND	(0.029)	6.8BJ	(19.0)
2-chloroethylvinyl ether	ND	(0.0058)	ND	(0.0057)	ND	(3.8)
2-hexanone	ND	(0.042)	ND	(0.041)	ND	(27.0)
4-methyl-2-pentanone	ND	(0.053)	ND	(0.052)	ND	(35.0)
Benzene	ND	(0.0051)	ND	(0.0050)	7.8	(3.3)
Ethylbenzene	ND	(0.0084)	ND	(0.0082)	41.0	(5.4)
Toluene	ND	(0.0070)	0.0075	(0.0068)	110.0	(4.5)
Trichloroethene	ND	(0.0022)	ND	(0.0022)	ND	(1.4)
acetone	0.027B	(0.0087)	0.0056BJ	(0.0086)	5.8B	(5.6)
bromodichloromethane	ND	(0.0026)	ND	(0.0025)	ND	(1.7)
bromoform	ND	(0.0055)	ND	(0.0054)	ND	(3.5)
bromomethane	ND	(0.0058)	ND	(0.0057)	ND	(3.8)
carbon disulfide	ND	(0.0020)	ND	(0.0019)	ND	(1.3)
carbon tetrachloride	ND	(0.0032)	ND	(0.0032)	ND	(2.1)
chlorobenzene	ND	(0.0070)	ND	(0.0068)	ND	(4.5)
chloroethane	ND	(0.0058)	ND	(0.0057)	ND	(3.8)
chloroform	ND	(0.0019)	ND	(0.0018)	ND	(1.2)

B: Detected in Reagent Blank; background subtraction not performed

BJ: Analyte detected in blank. Estimated value below detection limit.

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

	Monitor Well					
	Sample ID					
	Date Sampled					
	Beg. Depth - End Depth					
	BSSA		BSSA		BSSB	
	BSSA-2		BSSA-2		BSSB-3	
	15-Feb-88		15-Feb-88		15-Feb-88	
PARAMETER	4 - 7		4 - 7		5 - 8	
chloromethane	ND	(0.0058)	ND	(0.0057)	ND	(3.8)
cis-1,3-Dichloropropene	ND	(0.0058)	ND	(0.0057)	ND	(3.8)
dibromochloromethane	ND	(0.0036)	ND	(0.0035)	ND	(2.3)
methylene chloride	ND	(0.0032)	ND	(0.0032)	ND	(2.1)
styrene	ND	(0.0035)	ND	(0.0034)	ND	(2.3)
tetrachloroethene	ND	(0.0048)	ND	(0.0047)	ND	(3.1)
total xylenes	ND	(0.0053)	ND	(0.0052)	280.0	(3.5)
trans-1,2-Dichloroethene	ND	(0.0019)	ND	(0.0018)	ND	(1.2)
trans-1,3-Dichloropropene	ND	(0.0058)	ND	(0.0057)	ND	(3.8)
trichlorofluoromethane	ND	(0.0058)	ND	(0.0057)	ND	(3.8)
vinyl acetate	ND	(0.0080)	ND	(0.0079)	ND	(5.2)
vinyl chloride	ND	(0.0058)	ND	(0.0057)	ND	(3.8)

B: Detected in Reagent Blank; background subtraction not performed

BJ: Analyte detected in blank. Estimated value below detection limit.

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

PARAMETER	Monitor Well Sample ID Date Sampled Beg. Depth - End Depth BSSC BSSC-4 14-Feb-88 9 - 10		BSSD BSSD-3 14-Feb-88 4 - 6	
Petroleum Hydrocarbons MG/KG				
Petroleum Hydrocarbons	ND	(5.0)	ND	(5.0)
Volatile Organic Compounds MG/KG				
1,1,1-trichloroethane	ND	(0.0045)	ND	(0.0042)
1,1,2,2-tetrachloroethane	ND	(0.0082)	ND	(0.0077)
1,1,2-trichloroethane	ND	(0.0060)	ND	(0.0056)
1,2-dichloroethane	ND	(0.0033)	ND	(0.0031)
1,2-dichloropropane	ND	(0.0071)	ND	(0.0067)
2-butanone	ND	(0.030)	ND	(0.028)
2-chloroethylvinyl ether	ND	(0.0060)	ND	(0.0056)
2-hexanone	ND	(0.043)	ND	(0.040)
4-methyl-2-pentanone	ND	(0.055)	ND	(0.051)
Benzene	ND	(0.0052)	ND	(0.0049)
Ethylbenzene	ND	(0.0086)	ND	(0.0080)
Toluene	ND	(0.0071)	0.0069	(0.0067)
Trichloroethene	ND	(0.0023)	ND	(0.0021)
acetone	0.0060BJ	(0.0089)	0.0056BJ	(0.0083)
bromodichloromethane	ND	(0.0026)	ND	(0.0024)
bromoform	ND	(0.0056)	ND	(0.0052)
bromomethane	ND	(0.0060)	ND	(0.0056)
carbon disulfide	ND	(0.0020)	ND	(0.0019)
carbon tetrachloride	ND	(0.0033)	ND	(0.0031)
chlorobenzene	ND	(0.0071)	ND	(0.0067)
chloroethane	ND	(0.0060)	ND	(0.0056)
chloroform	ND	(0.0019)	ND	(0.0018)
chloromethane	ND	(0.0060)	ND	(0.0056)

BJ: Analyte detected in blank. Estimated value below detection limit.

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

	Monitor Well			
	Sample ID			
	Date Sampled			
	Beg. Depth - End Depth			
	BSSC		BSSD	
	BSSC-4		BSSD-3	
	14-Feb-88		14-Feb-88	
PARAMETER	9 - 10		4 - 6	
cis-1,3-Dichloropropene	ND	(0.0060)	ND	(0.0056)
dibromochloromethane	ND	(0.0037)	ND	(0.0034)
methylene chloride	ND	(0.0033)	ND	(0.0031)
styrene	ND	(0.0036)	ND	(0.0033)
tetrachloroethene	ND	(0.0049)	ND	(0.0046)
total xylenes	ND	(0.0055)	ND	(0.0051)
trans-1,2-Dichloroethene	ND	(0.0019)	ND	(0.0018)
trans-1,3-Dichloropropene	ND	(0.0060)	ND	(0.0056)
trichlorofluoromethane	ND	(0.0060)	ND	(0.0056)
vinyl acetate	ND	(0.0082)	ND	(0.0077)
vinyl chloride	ND	(0.0060)	ND	(0.0056)

B.J: Analyte detected in blank. Estimated value below detection limit.

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

	Monitor Well	
	Sample ID	
	Date Sampled	
	Beg. Depth - End Depth	
	BSS	
	BSS-DC	
	24-Feb-88	
PARAMETER	0 - 0	
Volatile Organic Compounds MG/KG		
1,1,1-trichloroethane	ND	(0.54)
1,1,2,2-tetrachloroethane	ND	(0.98)
1,1,2-trichloroethane	ND	(0.71)
1,2-dichloroethane	ND	(0.40)
1,2-dichloropropane	ND	(0.85)
2-butanone	5.6B	(3.6)
2-chloroethylvinyl ether	ND	(0.71)
2-hexanone	ND	(5.1)
4-methyl-2-pentanone	ND	(6.5)
Benzene	ND	(0.62)
Ethylbenzene	ND	(1.0)
Toluene	ND	(0.85)
Trichloroethene	ND	(0.27)
acetone	3.8B	(1.1)
bromodichloromethane	ND	(0.31)
bromoform	ND	(0.67)
bromomethane	ND	(0.71)
carbon disulfide	ND	(0.24)
carbon tetrachloride	ND	(0.40)
chlorobenzene	ND	(0.85)
chloroethane	ND	(0.71)
chloroform	ND	(0.23)
chloromethane	ND	(0.71)
cis-1,3-Dichloropropene	ND	(0.71)
dibromochloromethane	ND	(0.44)
methylene chloride	ND	(0.40)

B: Detected in Reagent Blank; background subtraction not performed

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

	Monitor Well	
	Sample ID	
	Date Sampled	
	Beg. Depth - End Depth	
	BSS	
	BSS-DC	
	24-Feb-88	
PARAMETER	0 - 0	
styrene	ND	(0.43)
tetrachloroethene	ND	(0.58)
total xylenes	3.7	(0.65)
trans-1,2-Dichloroethene	ND	(0.23)
trans-1,3-Dichloropropene	ND	(0.71)
trichlorofluoromethane	ND	(0.71)
vinyl acetate	ND	(0.98)
vinyl chloride	ND	(0.71)
Semivolatile Organic Compounds MG/KG		
1,2,4-trichlorobenzene	ND	(0.16)
1,2-dichlorobenzene	ND	(0.16)
1,3-dichlorobenzene	ND	(0.16)
1,4-dichlorobenzene	ND	(0.36)
2,4,5-trichlorophenol	ND	(0.82)
2,4,6-trichlorophenol	ND	(0.22)
2,4-dichlorophenol	ND	(0.22)
2,4-dimethylphenol	ND	(0.22)
2,4-dinitrophenol	ND	(3.4)
2,4-dinitrotoluene	ND	(0.47)
2,6-dinitrotoluene	ND	(0.16)
2-chloronaphthalene	ND	(0.16)
2-chlorophenol	ND	(0.27)
2-methylnaphthalene	2.5	(0.82)
2-methylphenol	ND	(0.82)
2-nitroaniline	ND	(4.1)
2-nitrophenol	ND	(0.29)

B: Detected in Reagent Blank; background subtraction not performed

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

	Monitor Well	
	Sample ID	
	Date Sampled	
	Beg. Depth - End Depth	
	BSS	
	BSS-DC	
	24-Feb-88	
PARAMETER	0 - 0	
3,3'-dichlorobenzidine	ND	(1.3)
3-nitroaniline	ND	(4.1)
4,6-dinitro-2-methylphenol	ND	(2.0)
4-bromophenyl-phenylether	ND	(0.16)
4-chloro-3-methylphenol	ND	(0.25)
4-chloroaniline	ND	(0.82)
4-chlorophenyl-phenylether	ND	(0.34)
4-methylphenol	ND	(0.82)
4-nitroaniline	ND	(4.1)
4-nitrophenol	ND	(0.20)
acenaphthene	ND	(0.16)
acenaphthylene	ND	(0.29)
aniline	ND	(0.82)
anthracene	ND	(0.16)
benzidine	ND	(3.6)
benzo(a)anthracene	ND	(0.64)
benzo(a)pyrene	ND	(0.20)
benzo(b)fluoranthene	ND	(0.39)
benzo(k)fluoranthene	ND	(0.20)
benzoic acid	ND	(4.1)
benzyl alcohol	ND	(4.1)
bis(2-chloroethoxy)methane	ND	(0.43)
bis(2-chloroethyl) ether	ND	(0.47)
bis(2-chloroisopropyl)ether	ND	(0.47)
bis(2-ethylhexyl)phthalate	0.55B	(0.20)
butylbenzylphthalate	ND	(0.20)
chrysene	ND	(0.20)

B: Detected in Reagent Blank; background subtraction not performed

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

	Monitor Well		
	Sample ID		
	Date Sampled		
	Beg. Depth - End Depth		
		BSS	
		BSS-DC	
		24-Feb-88	
PARAMETER		0 - 0	
di-n-butylphthalate		ND	(0.20)
di-n-octyl phthalate		ND	(0.20)
dibenzo(a,h)anthracene		ND	(0.20)
dibenzofuran		ND	(0.82)
diethylphthalate		ND	(0.16)
dimethyl phthalate		ND	(0.13)
fluoranthene		ND	(0.18)
fluorene		ND	(0.16)
hexachlorobenzene		ND	(0.16)
hexachlorobutadiene		ND	(0.074)
hexachlorocyclopentadiene		ND	(0.49)
hexachloroethane		ND	(0.13)
indeno(1,2,3-cd)pyrene		ND	(0.30)
isophorone		ND	(0.18)
n-nitroso-di-n-propylamine		ND	(0.98)
n-nitrosodimethylamine		ND	(0.82)
n-nitrosodiphenylamine		ND	(0.16)
naphthalene		1.1	(0.13)
nitrobenzene		ND	(0.16)
pentachlorophenol		ND	(0.29)
phenanthrene		ND	(0.44)
phenol		ND	(0.12)
pyrene		ND	(0.16)
Organochlorine Pesticides and PCBs UG/L			
4,4'-DDD		ND	(0.080)
4,4'-DDE		ND	(0.080)

B: Detected in Reagent Blank; background subtraction not performed

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

	Monitor Well		
	Sample ID	BSS	
	Date Sampled	BSS-DC	
	Beg. Depth - End Depth	24-Feb-88	
PARAMETER		0 - 0	
4,4'-DDT		ND	(0.16)
PCB-1016		ND	(0.80)
PCB-1221		ND	(1.6)
PCB-1232		ND	(1.6)
PCB-1242		ND	(0.80)
PCB-1248		ND	(0.80)
PCB-1254		ND	(1.6)
PCB-1260		ND	(1.6)
aldrin		ND	(0.080)
alpha-BHC		ND	(0.080)
beta-BHC		ND	(0.080)
chlordane		ND	(0.40)
delta-BHC		ND	(0.080)
dieldrin		ND	(0.080)
endosulfan I		ND	(0.080)
endosulfan II		ND	(0.24)
endosulfan sulphate		ND	(0.40)
endrin		ND	(0.080)
endrin aldehyde		ND	(0.16)
endrin ketone		ND	(0.40)
gamma-BHC (lindane)		ND	(0.080)
heptachlor		ND	(0.080)
heptachlor epoxide		ND	(0.080)
methoxychlor		ND	(0.40)
toxaphene		ND	(4.0)

Chlorinated Phenoxy Herbicides UG/L

B: Detected in Reagent Blank; background subtraction not performed

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-2. RESULTS OF ORGANIC ANALYSES FOR SOIL SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

	Monitor Well		
	Sample ID		
	Date Sampled		
	Beg. Depth - End Depth		
	BSS		
	BSS-DC		
	24-Feb-88		
PARAMETER	0 - 0		
2,4,5-T	ND	(0.19)	
2,4,5-TP (Silvex)	ND	(0.19)	
2,4-D	ND	(0.95)	

B: Detected in Reagent Blank; background subtraction not performed

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-3. RESULTS OF INORGANIC ANALYSES FOR WATER SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS

Primary Results

PARAMETER	EPA Standards, Criteria	Monitor Well / Sample ID / Date Sampled: BSSA 03-34 04-Mar-88		BSSA 04-77 15-Apr-88		BSSB 03-35 04-Mar-88		BSSB 04-74 15-Apr-88	
Total Dissolved Solids MG/L									
Total Dissolved Solids		660.0	(1.0)	580.0	(1.0)	830.0	(1.0)	760.0	(1.0)
Metals MG/L									
Arsenic, graphite AA	0.050(M)	ND	(0.0040)	0.012		0.010		0.040	
Mercury	0.0020(M)	ND	(0.00012)	ND	(0.00012)	ND	(0.00012)	ND	(0.00012)
Lead, graphite AA	0.050(M)	0.058		0.037		0.14		0.035	
Selenium, graphite AA	0.010(M)	ND	(0.0050)	ND	(0.0030)	ND	(0.0050)	ND	(0.0030)
Metal Screen (ICP) MG/L									
Ag Silver		ND	(0.0090)	ND	(0.0090)	ND	(0.0090)	0.011	(0.0090)
Al Aluminum		60.0	(0.20)	47.0	(0.20)	85.0	(0.20)	23.0	(0.20)
As Arsenic	0.050(M)	ND	(0.30)	ND	(0.30)	ND	(0.30)	ND	(0.30)
B Boron		ND	(0.60)	ND	(0.60)	ND	(0.60)	ND	(0.60)
Ba Barium	1.0(M)	0.88	(0.0090)	0.54	(0.0090)	0.64	(0.0090)	0.21	(0.0090)
Be Beryllium		ND	(0.0010)	0.0010	(0.0010)	0.0020	(0.0010)	0.0010	(0.0010)
Ca Calcium		1400.0	(0.12)	790.0	(0.12)	970.0	(0.12)	250.0	(0.060)
Cd Cadmium	0.010(M)	0.0040	(0.0030)	ND	(0.0030)	0.0050	(0.0030)	ND	(0.0030)
Co Cobalt		0.074	(0.010)	0.040	(0.010)	0.070	(0.010)	ND	(0.010)
Cr Chromium	0.050(M)	0.18	(0.0090)	0.14	(0.0090)	0.22	(0.0090)	0.059	(0.0090)
Cu Copper	1.0(G)	0.060	(0.010)	0.060	(0.010)	0.12	(0.010)	0.030	(0.010)
Fe Iron	0.30(G)	210.0	(0.030)	130.0	(0.030)	190.0	(0.030)	40.0	(0.030)
K Potassium		9.6	(0.30)	13.0	(0.30)	12.0	(0.30)	3.6	(0.30)
Mg Magnesium		22.0	(0.10)	17.0	(0.10)	32.0	(0.10)	18.0	(0.10)
Mn Manganese	0.050(G)	5.8	(0.0030)	4.1	(0.0030)	2.1	(0.0030)	0.64	(0.0030)
Mo Molybdenum		ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Na Sodium		52.0	(0.080)	57.0	(0.080)	85.0	(0.080)	82.0	(0.080)
Ni Nickel		0.22	(0.020)	0.12	(0.020)	0.24	(0.020)	0.060	(0.020)

EPA Standards and Criteria are designated: M-Maximum Contaminant Level (MCL), G-Maximum Contaminant Level Goal (MCLG) or other secondary or proposed standard (Refer to Tables 4.1-1 and 4.1-2).

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-3. RESULTS OF INORGANIC ANALYSES FOR WATER SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

PARAMETER		EPA Standards, Criteria	Monitor Well Sample ID / Date Sampled: BSSA 03-34 04-Mar-88		BSSA 04-77 15-Apr-88		BSSB 03-35 04-Mar-88		BSSB 04-74 15-Apr-88	
Pb	Lead	0.050(M)	0.12	(0.050)	0.080	(0.050)	0.22	(0.050)	ND	(0.050)
Sb	Antimony		0.39	(0.060)	0.12	(0.060)	0.24	(0.060)	0.080	(0.060)
Se	Selenium	0.010(M)	ND	(0.30)	ND	(0.30)	0.31	(0.30)	ND	(0.30)
Si	Silicon		100.0	(0.30)	93.0	(0.30)	120.0	(0.30)	57.0	(0.30)
Tl	Thallium		ND	(0.090)	ND	(0.090)	ND	(0.090)	ND	(0.090)
V	Vanadium		0.46	(0.020)	0.30	(0.020)	0.51	(0.020)	0.12	(0.020)
Zn	Zinc	5.0(G)	0.34	(0.0060)	0.22	(0.0060)	0.39	(0.0060)	0.069	(0.0060)

EPA Standards and Criteria are designated: M-Maximum Contaminant Level (MCL), G-Maximum Contaminant Level Goal (MCLG) or other secondary or proposed standard (Refer to Tables 4.1-1 and 4.1-2).

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-3. RESULTS OF INORGANIC ANALYSES FOR WATER SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

PARAMETER	EPA Standards, Criteria	Monitor Well Sample ID Date Sampled BSSB 04-75 15-Apr-88		BSSC 03-36 04-Mar-88		BSSC 04-76 15-Apr-88	
Total Dissolved Solids MG/L							
Total Dissolved Solids		760.0	(1.0)	570.0	(1.0)	510.0	(1.0)
Metals MG/L							
Arsenic, graphite AA	0.050(M)	0.018		0.45		0.34	
Mercury	0.0020(M)	ND	(0.00012)	ND	(0.00012)	ND	(0.00012)
Lead, graphite AA	0.050(M)	0.016		0.024		0.020	
Selenium, graphite AA	0.010(M)	ND	(0.0030)	ND	(0.0050)	ND	(0.0030)
Metal Screen (ICP) MG/L							
Ag Silver		ND	(0.0090)	ND	(0.0090)	ND	(0.0090)
Al Aluminum		12.0	(0.20)	21.0	(0.20)	20.0	(0.20)
As Arsenic	0.050(M)	ND	(0.30)	ND	(0.30)	ND	(0.30)
B Boron		ND	(0.60)	ND	(0.60)	ND	(0.60)
Ba Barium	1.0(M)	0.16	(0.0090)	0.93	(0.0090)	0.61	(0.0090)
Be Beryllium		ND	(0.0010)	ND	(0.0010)	ND	(0.0010)
Ca Calcium		210.0	(0.060)	510.0	(0.060)	430.0	(0.060)
Cd Cadmium	0.010(M)	ND	(0.0030)	ND	(0.0030)	ND	(0.0030)
Co Cobalt		ND	(0.010)	0.030	(0.010)	ND	(0.010)
Cr Chromium	0.050(M)	0.033	(0.0090)	0.066	(0.0090)	0.068	(0.0090)
Cu Copper	1.0(G)	0.010	(0.010)	ND	(0.010)	0.030	(0.010)
Fe Iron	0.30(G)	20.0	(0.030)	190.0	(0.030)	93.0	(0.030)
K Potassium		1.7	(0.30)	3.6	(0.30)	3.7	(0.30)
Mg Magnesium		16.0	(0.10)	14.0	(0.10)	13.0	(0.10)
Mn Manganese	0.050(G)	0.53	(0.0030)	5.5	(0.0030)	3.4	(0.0030)
Mo Molybdenum		ND	(0.050)	ND	(0.050)	ND	(0.050)
Na Sodium		88.0	(0.080)	44.0	(0.080)	49.0	(0.080)
Ni Nickel		0.040	(0.020)	0.069	(0.020)	0.050	(0.020)

EPA Standards and Criteria are designated: M-Maximum Contaminant Level (MCL), G-Maximum Contaminant Level Goal (MCLG) or other secondary or proposed standard (Refer to Tables 4.1-1 and 4.1-2).

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-3. RESULTS OF INORGANIC ANALYSES FOR WATER SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

PARAMETER		EPA Standards, Criteria	Monitor Well Sample ID Date Sampled BSSB 04-75 15-Apr-88		BSSC 03-36 04-Mar-88		BSSC 04-76 15-Apr-88	
Pb	Lead	0.050(M)	ND	(0.050)	0.12	(0.050)	ND	(0.050)
Sb	Antimony		ND	(0.060)	0.16	(0.060)	0.10	(0.060)
Se	Selenium	0.010(M)	ND	(0.30)	ND	(0.30)	ND	(0.30)
Si	Silicon		35.0	(0.30)	58.0	(0.30)	54.0	(0.30)
Tl	Thallium		ND	(0.090)	ND	(0.090)	ND	(0.090)
V	Vanadium		0.050	(0.020)	0.11	(0.020)	0.11	(0.020)
Zn	Zinc	5.0(G)	0.031	(0.0060)	0.046	(0.0060)	0.026	(0.0060)

EPA Standards and Criteria are designated: M-Maximum Contaminant Level (MCL), G-Maximum Contaminant Level Goal (MCLG) or other secondary or proposed standard (Refer to Tables 4.1-1 and 4.1-2).

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-4. RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS

Primary Results

PARAMETER	EPA Standards, Criteria		Monitor Well / Sample ID / Date Sampled: BSSA 03-34 04-Mar-88		BSSA 04-77 15-Apr-88		BSSB 03-35 04-Mar-88		BSSB 04-74 15-Apr-88	
Petroleum Hydrocarbons UG/L										
Petroleum Hydrocarbons			400.0		ND	(200.0)	30000.0		3200.0	
Purgeable Halocarbons UG/L										
1,1,1-Trichloroethane	200.0(M)	200.0(G)	ND	(0.090)	ND	(0.090)	ND	(0.090)	ND	(0.090)
1,1,2,2-Tetrachloroethane			ND	(0.12)	ND	(0.12)	ND	(0.12)	ND	(0.12)
1,1,2-Trichloroethane			ND	(0.070)	ND	(0.070)	ND	(0.070)	ND	(0.070)
1,1-Dichloroethane			ND	(0.090)	ND	(0.090)	ND	(0.090)	ND	(0.090)
1,1-Dichloroethene	7.0(M)	7.0(G)	ND	(0.10)	ND	(0.10)	ND	(0.10)	ND	(0.10)
1,2-Dichlorobenzene	620.0(G)		ND	(0.50)	ND	(0.50)	ND	(0.50)	ND	(0.50)
1,2-Dichloroethane	5.0(M)	0.0(G)	ND	(0.030)	ND	(0.030)	8.1	(0.030)	4.7	(0.030)
1,2-Dichloropropane			ND	(0.10)	ND	(0.10)	ND	(0.10)	ND	(0.10)
1,3-Dichlorobenzene	400.0(G)		ND	(0.30)	ND	(0.30)	ND	(0.30)	ND	(0.30)
1,4-Dichlorobenzene	750.0(M)	750.0(G)	ND	(0.40)	ND	(0.40)	ND	(0.40)	ND	(0.40)
2-Chloroethylvinyl ether			ND	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Bromodichloromethane			ND	(0.10)	ND	(0.10)	ND	(0.10)	ND	(0.10)
Bromoform			ND	(0.30)	ND	(0.30)	ND	(0.30)	ND	(0.30)
Bromomethane			ND	(1.2)	ND	(1.2)	ND	(1.2)	ND	(1.2)
Carbon tetrachloride	5.0(M)	0.0(G)	ND	(0.10)	ND	(0.10)	ND	(0.10)	ND	(0.10)
Chlorobenzene	60.0(G)		ND	(0.30)	ND	(0.30)	ND	(0.30)	ND	(0.30)
Chloroethane			ND	(0.50)	ND	(0.50)	ND	(0.50)	ND	(0.50)
Chloroform			ND	(0.050)	ND	(0.050)	ND	(0.050)	ND	(0.050)
Chloromethane			ND	(0.30)	ND	(0.30)	ND	(0.30)	ND	(0.30)
Dibromochloromethane			ND	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)

EPA Standards and Criteria are designated: M-Maximum Contaminant Level (MCL), G-Maximum Contaminant Level Goal (MCLG) or other secondary or proposed standard (Refer to Tables 4.1-1 and 4.1-2).

&: cis-1,3-Dichloropropene cannot be quantitated due to coelution.

@: Indicates that the analytical spike recovery for this analysis was not within acceptance limits indicating an interferent present.

@+: Spike recovery and % difference (MS and MS dup.) are both outside control limits.

Q: Daily EPA QC recovery outside 95% confidence limit.

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-4. RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

			Monitor Well Sample ID Date Sampled							
			BSSA		BSSA		BSSB		BSSB	
	EPA Standards,		03-34		04-77		03-35		04-74	
PARAMETER	Criteria		04-Mar-88		15-Apr-88		04-Mar-88		15-Apr-88	
Methylene chloride			ND	(0.30)	ND	(0.30)	ND	(0.30)	ND	(0.30)
Tetrachloroethene	8.0(G)		ND	(0.030)	ND	(0.030)	0.50	(0.030)	0.60	(0.030)
Trichloroethene	5.0(M)	0.0(G)	0.90	(0.20)	0.50	(0.20)	0.20	(0.20)	ND	(0.20)
Trichlorofluoromethane			ND	(0.10)	ND	(0.10)	ND	(0.10)	ND	(0.10)
Vinyl chloride	2.0(M)	0.0(G)	ND	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
cis-1,3-Dichloropropene			ND&		ND&		ND&		ND&	
trans-1,2-Dichloroethene	70.0(G)		1.1	(0.20)	ND	(0.20)	ND	(0.20)	ND	(0.20)
trans-1,3-Dichloropropene			ND	(0.30)	ND	(0.30)	ND	(0.30)	ND	(0.30)
Purgeable Aromatics UG/L										
1,2-Dichlorobenzene	620.0(G)		ND	(0.40)	ND	(0.40)	ND	(100.0)	ND	(100.0)
1,3-Dichlorobenzene	400.0(G)		ND	(0.40)	ND	(0.40)	ND	(100.0)	ND	(100.0)
1,4-Dichlorobenzene	750.0(M)	750.0(G)	ND	(0.30)	ND	(0.30)	ND	(80.0)	ND	(80.0)
Benzene	5.0(M)	0.0(G)	ND	(0.20)	0.20	(0.20)	4400.0	(50.0)	2200.0@	(50.0)
Chlorobenzene	60.0(G)		ND	(0.30)	ND	(0.30)	ND	(80.0)	ND	(80.0)
Ethylbenzene	680.0(G)		ND	(0.30)	ND	(0.30)	1900.0	(80.0)	730.0	(80.0)
Toluene	2000.0(G)		6.5	(0.20)	0.80	(0.20)	12000.0	(50.0)	5900.0	(50.0)
m-Xylene			ND	(0.20)	0.40	(0.20)	5500.0	(50.0)	2300.0@	(50.0)
o-Xylene			ND	(0.10)	0.20Q	(0.10)	3500.0	(30.0)	1500.0	(30.0)
p-Xylene			ND	(0.20)	0.30	(0.20)	2500.0	(50.0)	1100.0@+	(50.0)

EPA Standards and Criteria are designated: M-Maximum Contaminant Level (MCL), G-Maximum Contaminant Level Goal (MCLG) or other secondary or proposed standard (Refer to Tables 4.1-1 and 4.1-2).

&: cis-1,3-Dichloropropene cannot be quantitated due to coelution.

@: Indicates that the analytical spike recovery for this analysis was not within acceptance limits indicating an interferent present.

@+: Spike recovery and % difference (MS and MS dup.) are both outside control limits.

Q: Daily EPA QC recovery outside 95% confidence limit.

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-4. RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, SITE BASS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

PARAMETER	EPA Standards, Criteria		Monitor Well Sample ID Date Sampled BSSB 04-75 15-Apr-88		BSSC 03-36 04-Mar-88		BSSC 04-76 15-Apr-88	
Petroleum Hydrocarbons UG/L								
Petroleum Hydrocarbons			1400.0		500.0		ND	(200.0)
Purgeable Halocarbons UG/L								
1,1,1-Trichloroethane	200.0(M)	200.0(G)	ND	(0.090)	ND	(0.090)	ND	(0.090)
1,1,2,2-Tetrachloroethane			ND	(0.12)	ND	(0.12)	ND	(0.12)
1,1,2-Trichloroethane			ND	(0.070)	ND	(0.070)	ND	(0.070)
1,1-Dichloroethane			ND	(0.090)	ND	(0.090)	ND	(0.090)
1,1-Dichloroethene	7.0(M)	7.0(G)	ND	(0.10)	ND	(0.10)	ND	(0.10)
1,2-Dichlorobenzene	620.0(G)		ND	(0.50)	ND	(0.50)	ND	(0.50)
1,2-Dichloroethane	5.0(M)	0.0(G)	2.3	(0.030)	ND	(0.030)	ND	(0.030)
1,2-Dichloropropane			ND	(0.10)	ND	(0.10)	ND	(0.10)
1,3-Dichlorobenzene	400.0(G)		ND	(0.30)	ND	(0.30)	ND	(0.30)
1,4-Dichlorobenzene	750.0(M)	750.0(G)	ND	(0.40)	ND	(0.40)	ND	(0.40)
2-Chloroethylvinyl ether			ND	(0.20)	ND	(0.20)	ND	(0.20)
Bromodichloromethane			ND	(0.10)	ND	(0.10)	ND	(0.10)
Bromoform			ND	(0.30)	ND	(0.30)	ND	(0.30)
Bromomethane			ND	(1.2)	ND	(1.2)	ND	(1.2)
Carbon tetrachloride	5.0(M)	0.0(G)	ND	(0.10)	ND	(0.10)	ND	(0.10)
Chlorobenzene	60.0(G)		ND	(0.30)	ND	(0.30)	ND	(0.30)
Chloroethane			ND	(0.50)	ND	(0.50)	ND	(0.50)
Chloroform			ND	(0.050)	ND	(0.050)	ND	(0.050)
Chloromethane			ND	(0.30)	ND	(0.30)	ND	(0.30)
Dibromochloromethane			ND	(0.20)	ND	(0.20)	ND	(0.20)
Methylene chloride			ND	(0.30)	ND	(0.30)	ND	(0.30)
Tetrachloroethene	8.0(G)		0.80	(0.030)	ND	(0.030)	ND	(0.030)

EPA Standards and Criteria are designated: M-Maximum Contaminant Level (MCL), G-Maximum Contaminant Level Goal (MCLG) or other secondary or proposed standard (Refer to Tables 4.1-1 and 4.1-2).

&: cis-1,3-Dichloropropene cannot be quantitated due to coelution.

@: Indicates that the analytical spike recovery for this analysis was not within acceptance limits indicating an interferent present.

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-4. RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Primary Results

PARAMETER	EPA Standards, Criteria		Monitor Well Sample ID / Date Sampled: BSSB 04-75 15-Apr-88		BSSC 03-36 04-Mar-88		BSSC 04-76 15-Apr-88	
Trichloroethene	5.0(M)	0.0(G)	ND	(0.20)	ND	(0.20)	ND	(0.20)
Trichlorofluoromethane			ND	(0.10)	ND	(0.10)	ND	(0.10)
Vinyl chloride	2.0(M)	0.0(G)	ND	(0.20)	ND	(0.20)	ND	(0.20)
cis-1,3-Dichloropropene			ND&		ND&		ND&	
trans-1,2-Dichloroethene	70.0(G)		ND	(0.20)	0.20	(0.20)	ND	(0.20)
trans-1,3-Dichloropropene			ND	(0.30)	ND	(0.30)	ND	(0.30)
Purgeable Aromatics UG/L								
1,2-Dichlorobenzene	620.0(G)		ND	(100.0)	ND	(0.40)	ND	(4.0)
1,3-Dichlorobenzene	400.0(G)		ND	(100.0)	ND	(0.40)	ND	(4.0)
1,4-Dichlorobenzene	750.0(M)	750.0(G)	ND	(80.0)	ND	(0.30)	ND	(3.0)
Benzene	5.0(M)	0.0(G)	1500.0	(50.0)	37.0	(2.0)	20.0	(2.0)
Chlorobenzene	60.0(G)		ND	(80.0)	ND	(0.30)	ND	(3.0)
Ethylbenzene	680.0(G)		560.0	(80.0)	21.0	(0.30)	5.5	(3.0)
Toluene	2000.0(G)		4100.0	(50.0)	17.0	(2.0)	2.0	(2.0)
m-Xylene			1700.0	(50.0)	2.4	(0.20)	ND	(2.0)
o-Xylene			1100.0	(30.0)	3.6	(0.10)	ND@	(1.0)
p-Xylene			850.0	(50.0)	7.1	(0.20)	ND	(2.0)

EPA Standards and Criteria are designated: M-Maximum Contaminant Level (MCL), G-Maximum Contaminant Level Goal (MCLG) or other secondary or proposed standard (Refer to Tables 4.1-1 and 4.1-2).

&: cis-1,3-Dichloropropene cannot be quantitated due to coelution.

@: Indicates that the analytical spike recovery for this analysis was not within acceptance limits indicating an interferent present.

ND: Not detected at specified detection limit

( ): Detection limit

TABLE 2-5. RESULTS OF FIELD ANALYSES FOR WATER SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS

Analyte	Unit of Measure	Monitor Well Sample ID Date Sampled							
		BSSA 03-34 04-Mar-88		BSSA 04-77 15-Apr-88		BSSB 03-35 04-Mar-88		BSSB 04-74 15-Apr-88	
Alkalinity	mg/L			2055.0	(5.0)			970.0	(5.0)
Specific Conductance	uMHOS/CM	900.0	(1.0)	960.0	(10.0)	1160.0	(1.0)	1160.0	(10.0)
Temperature	C	16.0	(1.0)	19.0	(1.0)	16.0	(1.0)	18.5	(1.0)
pH	S.U.	6.7	(0.010)	6.9	(0.010)	6.6	(0.010)	6.8	(0.010)

( ): Detection Limit

TABLE 2-5. RESULTS OF FIELD ANALYSES FOR WATER SAMPLES, SITE BSS (BASE SERVICE STATION), CARSWELL AFB, TEXAS (Cont.)

Analyte	Unit of Measure	Monitor Well Sample ID Date Sampled: BSSC 03-36 04-Mar-88		BSSC 04-76 15-Apr-88	
Alkalinity	mg/L			405.0	(5.0)
Specific Conductance	uMHOS/CM	835.0	(1.0)	890.0	(10.0)
Temperature	C	13.0	(1.0)	18.0	(1.0)
pH	S.U.	6.8	(0.010)	6.9	(0.010)

( ): Detection Limit

3.0 ALTERNATIVE CONTROL MEASURES

3.1 Identification of Alternative Control Measures

A matrix of possible remedial technologies was developed for consideration of contaminant control at the Base Service Station as part of the RI/FS investigation. Further analysis and evaluation of these technologies has resulted in grouping the technologies into nine alternative control measures, listed below:

1. No action.

2. Deed restriction and annual ground-water monitoring.

3. Remove underground storage tanks, excavate contaminated soil from the immediate area and dispose of soil in a landfill, monitor ground water for hydrocarbon constituents.

4. Same as Alternative 3, except incinerate contaminated soil instead of using a landfill.

5. Same as Alternative 3, except aerate contaminated soil instead of using a landfill.

6. Same as Alternative 3, except install an interceptor trench.

7. Same as Alternative 4, except install an interceptor trench.

8. Same as Alternative 5, except install an interceptor trench.

3.2 Screening of Alternative Control Measures

The alternative control measures identified in Section 3.1 were screened to select a technically feasible and cost-effective plan for control

of contamination at the Base Service Station. The control measures were screened according to the following criteria:

1. Concentration and distribution of contaminants at the Base Service Station;

2. Technical feasibility and effectiveness of possible remedial alternatives;

3. Estimated cost of each alternative; and

4. Regulatory compliance.

3.3 Evaluation of Alternative Control Measures

Table 3-1 summarizes the results of the evaluation of the alternative control measures. The estimated costs listed in the table have been developed from a conceptual application of various control technologies to the site, and as such should be used for comparative purposes only. Assumptions used in estimating costs are that four 10,000 gallon tanks will be removed, along with excavation of surrounding contaminated soils to a depth of twelve feet (approximately 340 cu yds soil) and a 400 foot long interceptor trench, installed in two segments at the approximate locations shown on Figure 3-1, will be sufficient to recover contaminated ground water. These costs should not be used as a basis for budgetary planning or funding purposes for contractors or subcontractors. When a specific design alternative is chosen and regulatory compliance is assured, a detailed cost analysis can then be performed.

TABLE 3-1. NARRATIVE MATRIX
TECHNICAL EVALUATION OF ALTERNATIVES

Alternative	Cost[1] ($)	Engineering Feasibility	Regulatory Compliance
1. No action	0	----------	----------
2. Deed restriction/ ground-water monitoring	6,000[1]	Proven technology	TWC approval necessary
3. Remove tank/excavate soil/landfill/ground-water monitoring	100,406[1,2]	Proven technology	TWC approval necessary[4]
4. Remove tank/excavate/ soil/incinerate/ground-water monitoring	722,200[1,2]	Proven technology	TWC approval necessary
5. Remove tank/excavate soil/aerate/ground-water monitoring	19,400[1]	Proven technology	TWC approval necessary
6. Option 3/install interceptor trench	180,800[2,3]	Proven technology	TWC approval necessary[4]
7. Option 4/install interceptor trench	798,700[2,3]	Proven technology	TWC approval necessary
8. Option 5/install interceptor trench	94,100[3]	Proven technology	TWC approval necessary

All costs based on a conceptual application of remedial technologies, and therefore should not be used for detailed budget planning purposes.

[1]Based on four ground-water sampling events monitoring four wells.

[2]Based on disposal of 378 yd^3 of Class I material and four USTs.

[3]Assumes a 400 foot long trench x 12 feet deep.

[4]May be subject to the land ban disposal restrictions.

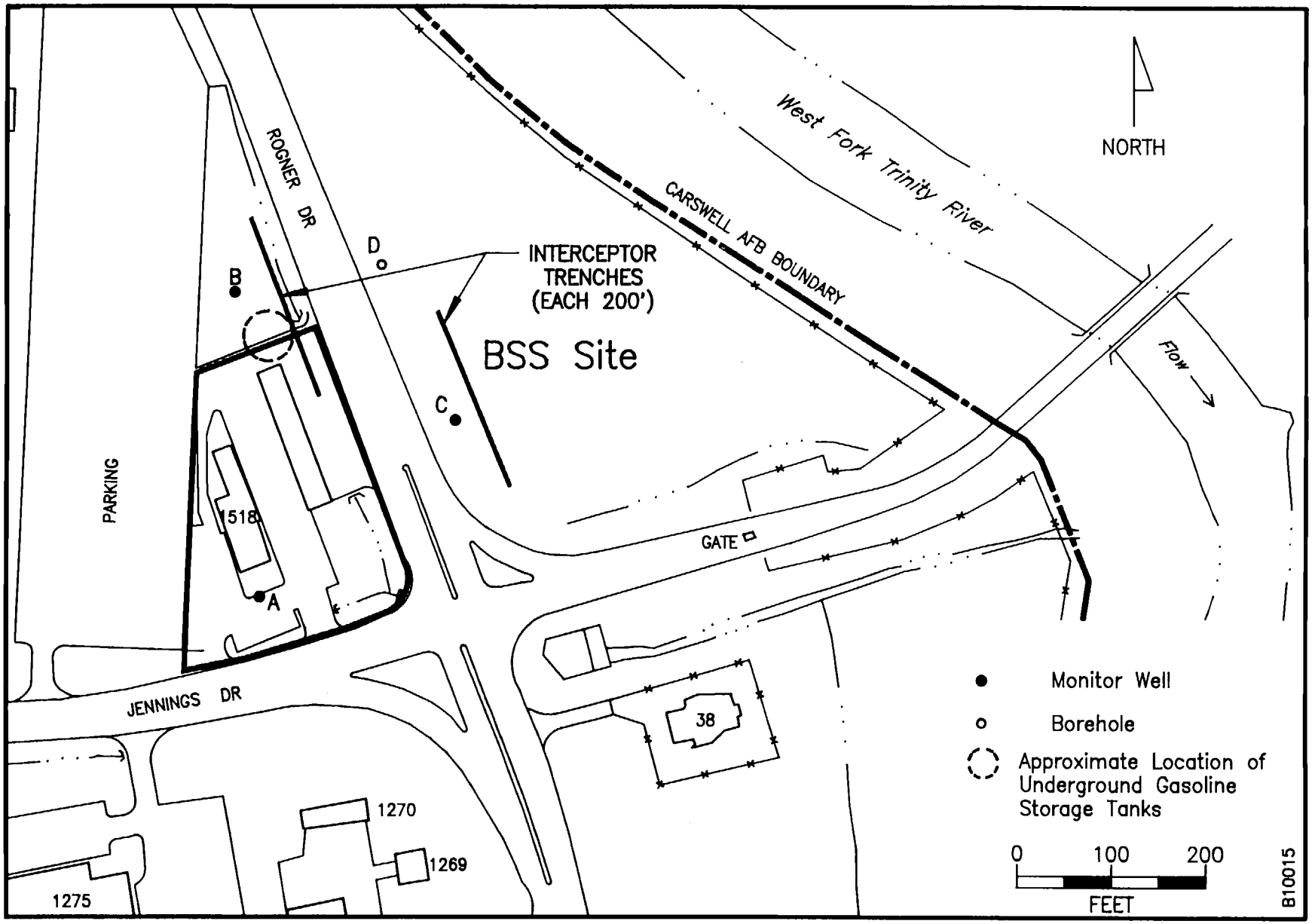

Figure 3-1. Proposed Locations of Interceptor Trenches, Site BSS, Carswell AFB, Texas

4.0 RECOMMENDATION

Except in the vicinity of the underground storage tanks these contaminants were found in relatively low concentrations, and do not appear to have migrated to any significant degree. No off-site soil contamination was observed. Evidence of ground-water contamination was found at all monitor wells, however the highest concentrations of organic compounds were identified in samples from well B, located approximately 160 feet north of the Service Station and in close proximity to the tanks.

Based on the results of the baseline risk assessment conducted during the RI/FS, the Base Service Station does not pose an immediate and direct health hazard, but remedial action is appropriate to reduce the low risks associated with the site.

The source of contamination is most likely one or more of the gasoline underground storage tanks or associated piping. However, additional activities (i.e., tank testing) are recommended to confirm the tank(s) and/or piping are the source and to identify which tanks and/or piping are leaking. At that point contaminated soils may be decontaminated by aeration (Alternative 5) since only volatile organics are of concern in the soil. The pollutants in the ground water (both organics and metals) should be monitored to ensure higher concentrations are not found which may indicate the source of pollutants is still present.

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