

**EPA Superfund  
Record of Decision:**

**DOVER AIR FORCE BASE  
EPA ID: DE8570024010  
OU 03  
DOVER, DE  
03/28/1995**

Text:

THE DECLARATION FOR THE RECORD OF DECISION  
REMEDIAL ALTERNATIVE SELECTION

Site Name and Location

Oil/Water Separator at Building 918 (Site OT 40) Dover Air Force Base (D  
County, Delaware.

Statement of Basis Purpose

This Record of Decision presents the selected remedial action for the Oil/Water Separator at Building 918 Operable Unit (Site OT 40) which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Contingency Plan (NCP), 40 C.F.R Part 300. This decision is based on the Administrative Record for the site.

The State of Delaware, in a letter dated May 5, 1994 to DAFB and the Environmental Protection Agency (EPA), concurs with the selected remedy. The information regarding the remedial action decision is contained in the information repository for the site located at the Dover Public Library, Dover, Delaware.

Summary of Site Risks

There are hazardous substances present in the shallow groundwater at levels which would cause risk. Additionally, arsenic and lead exist in soils at levels well above background levels. The site poses a minimal risk to public health, welfare, and the environment.

Remedial Alternatives

Three alternatives were evaluated and include: 1) No Action; 2) Removal and Backfilling; 3) Removal, Soil Excavation, and Off-Site Disposal.

The No Action alternative requires no actions be taken at the site. This alternative is used as a baseline for comparison and CERCLA requires it be evaluated. It is the selected alternative at this site because the other alternatives offer no substantial advantages.

Alternative 2 involves removal and decontamination of the O/W separator and piping for off-site disposal. The O/W separator is a gravity fed system composed of steel. The soil surrounding the separator would remain under this alternative. The separator would be backfilled with clean soil, covered with an engineered soil cap and a concrete pad.

Alternative 3 would be as outlined under Alternative 2, excepting that the O/W separator would be characterized. All contaminated soil would be removed for off-site disposal. The site would then be backfilled with clean soil and reseeded.

## Description of the Selected Remedy

The selected remedy is for no further response action to be taken. The the base long-term monitoring program to ensure that contaminant levels rema would cause a threat to human health or the environment.

## Declaration Statement

It has been determined that no significant risk or threat to human health exists from exposure to current conditions at this site. Therefore, no acti provide adequate protection to human health and the environment.

## Conclusion

The No Action alternative provides protection of human health and the en cost effective.

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EDWIN E. TENOSO  
Lieutenant General, USAF  
Air Mobility Command  
Chairperson, Environmental  
Protection Committee

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THOMAS C. VOLTAGGIO  
Hazardous Waste Management  
Division Director  
Environmental Protection  
Region III

## Record of Decision

Oil/Water Separator at Building 918 (Site OT 40) Dover Air Force  
Base, Kent County, Delaware

## Decision Summary

### Introduction

Dover Air Force Base (DAFB), in consultation with the U.S. Environmental Protection Agency (EPA) and the State of Delaware, Department of Natural Resources and Environmental Control (DNREC), has evaluated all available data for the Oil/Water (O/W) Separator at Building 918. This Record of Decision (ROD) has been prepared by DAFB, the lead agency for response actions at the site, to present the selected alternative for this operable unit.

The ROD utilizes information developed during a site

investigation (SI) conducted in May 1991, field screening data gathered during the spring of 1993, and from comments on the Proposed Plan received during the Public Comment period.

The Proposed Plan for this site was issued on March 27, 1994. It was available for public review, along with the rest of the information repository for the Administrative Record, at the Dover Public Library.

#### Site Name, Location & Description

The O/W Separator at Building 918 is located in the northeastern portion of DAFB. DAFB is located in Kent County, Delaware, 3.5 miles southeast of the City of Dover (Fig 1). Bounded to the southwest by the St. Jones River, DAFB comprises approximately 4000 acres, including annexes, easements, and leased property (Fig 2). The surrounding area is primarily cropland and wetlands with limited residential areas.

#### Site History and Enforcement Actions

DAFB began operation in December 1941 as a U.S. Army Air Corps coastal patrol base. In August 1943, the mission of the base changed to an operational training base for combat aircraft and development of air-launched rockets.

The base was deactivated in September 1946. From 1946 to 1950, the base was used periodically by the Air National Guard. In July 1950, the base was reactivated and designated DAFB. In March 1952, the base came under the command of the Military Air Transport Service (MATs) and the mission changed from air and

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land defense to cargo operations. Currently, DAFB is under the Air Mobility Command (AMC) and is home to the C-5 Galaxy Aircraft, providing global strategic airlift capability.

The surface topography of DAFB is relatively flat, with elevations ranging from 10-30 feet above mean sea level. Surface water runoff is handled by an extensive storm drainage network of open ditches and pipe culverts. The storm drainage network

discharges to the St. Jones River, the Pipe Elm Branch and the Morgan Branch.

The soils underlying DAFB consist mainly of silty sands. Depth to ground water varies across the base from 8 to 15 feet below ground surface (BGS). Shallow ground water is contained within the Columbia Aquifer. The Columbia Aquifer consists of medium-to-coarse sand with gravelly sand, gravel, silt, and clay lenses common throughout. The saturated thickness of the Columbia Aquifer ranges from 15 to 20 feet in the western portion of the base to 70 feet in the eastern portion. Since the Columbia is the shallowest aquifer, it is the most prone to degradation. The Columbia Aquifer is not used as a source of drinking water in the area surrounding DAFB.

Wastes generated by DAFB are directly related to activities supporting the various aircraft that have been stationed at the base over the years. Hangars for maintenance of aircraft and support vehicles line the main aircraft parking area, many of these hangars have floor drains connected to the base industrial waste collection drain or directly to the sanitary sewer. O/W separators are installed between the floor drains and the sewer mains to intercept any petroleum products which may be washed into the floor drains. This O/W separator is the only identified potential source of contamination in this operable unit.

The O/W Separator at Building 918 was installed in 1959 to service Hangars 918 and 922 and is still in use. The hangars currently house heavy equipment for maintenance shops. Historically, these buildings were aircraft maintenance facilities.

The O/W Separator is located below ground on the northwest side of Building 918 (Fig 3). It is constructed of reinforced concrete and measures 7 feet wide by 9 foot long by 7 feet deep. The O/W Separator works by gravity separation. A 400-gallon holding tank is used to accumulate waste oil, while the separated water is discharged to the sanitary sewer. Separated oils are collected monthly by Base personnel for storage and subsequent disposal by a civilian contractor. There has been no previous federal or state enforcement or permitting activity regarding this O/W Separator.

When DAFB was listed on the National Priorities List (NPL) in 1989, the O/W separator at Building 918 was identified as having the potential to release hazardous substances to the environment.

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## Highlights of Community Participation

In accordance with Sections 113 and 117 of CERCLA, DAFB held a public comment period from March 27, 1994 through April 25, 1994 for the proposed remedial action described in the Site Investigation report (SI) and Proposed Plan. These documents were made available to the public in the Administrative Record maintained at DAFB and the Dover Public Library. Public notice was provided via publication in Dover's Delaware News newspaper. During the public comment period, no comments nor a request for a public meeting were received. Therefore, no public meeting was held.

## Scope and Role of the Operable Unit

The final remedial action for this operable unit described below addresses the soil at the O/W separator at Building 918. Remedial actions for neighboring operable units at DAFB will be evaluated and presented as data becomes available from the basewide remedial investigation and feasibility study. The selected remedy is consistent with the strategy for remediating DAFB, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and, to the maximum extent practicable, the National Contingency Plan (NCP).

## Summary of Site Characteristics

During the 1991 SI, four soil borings were drilled adjacent to the O/W separator, one on each side (Fig 4). Samples were collected from 0 to 2 feet and 8 to 10 feet BGS in each boring and analyzed for volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), and lead. The VOC, 1, 1, 1-tri-chloroethane (TCA), was detected at an estimated concentration of 1 ug/kg (micro grams per kilogram, or parts per billion) in a single shallow soil sample collected from SI boring B111. Acetone and methylene chloride were also detected in the soil analysis. The maximum soil concentrations for acetone and methylene chloride were 13 ug/kg and 27 ug/kg, respectively. Benzoic acid was detected in a single shallow soil sample collected from SI boring B109, at a concentration of 88 ug/kg. No other SVOCs were detected. Lead concentrations in the soil ranged from 0.59 to 17.8 mg/Kg (milligrams per kilogram, or parts per million), with the higher concentrations generally found in the shallow surface samples.

Organic constituents detected in soil samples collected during the SI that may be attributable to site conditions were restricted to two shallow samples (i.e., at 0 to 2 feet). These isolated constituents are benzoic acid and 1, 1, 1-TCA. Acetone

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and methylene chloride were also present in the sample analysis. These analytes were also found in the associated blanks. Acetone and methylene chloride are common laboratory contaminants. Given this and the fact the two compounds were found in the associated blanks, acetone and methylene chloride were not considered as contaminants of concern. Benzoic acid was not detected in the duplicate sample taken at this location. Although Benzoic acid occurs naturally, it was not detected in any other area of the base, and is widely used as a food preservative and a chemical industry intermediate. It degrades rapidly in soil and water and has a low toxicity (tap water - 150,000 ppm, aquatic - 5,400 ppm). For these reasons, benzoic acid poses no threat to public health, welfare, and the environment. The compound 1, 1, 1-TCA was not detected in the duplicate sample taken at this location, reinforcing the estimated nature of this detection. The hazardous substances, 1, 1, 1-TCA and benzoic acid, detected in the shallow soil are most likely attributable to minor spills during the removal of liquids from the O/W separator, which holds the waste oil after it is separated from the waste stream. Their distribution is not consistent with a leaking O/W separator; however, it does show that the oil contains hazardous substances (1, 1, 1-TCA and benzoic acid) not normally occurring in virgin product. No metals were detected at concentrations exceeding the natural concentrations reported in Delaware soil.

The SI at this site concluded that the O/W separator has not released constituents into nearby soil. However, to confirm the absence of contamination in all media at this site, a ground water probe sample and an additional soil sample were collected during the 1993 field screening effort. A soil gas survey of Area 4 was conducted in the area surrounding the O/W separator. No soil gas detections for VOCs were reported near Building 918, which indicates no VOC contamination in the soil or ground water near this site.

One soil sample (BGP3019) was collected from the boring created by the ground water probe at a depth of 10 to 12 feet and analyzed for target analyte list (TAL) metals (Fig 4). Twelve inorganic constituents were detected in the sample. Table 1 compares detected concentrations of these inorganic to their reported natural concentration ranges in Delaware soil (Shacklette and Boerngen, 1981). Where no data are available for Delaware soil, the 95 percent upper confidence limit reported for metals in soil of the eastern United States is used (Shacklette and Boerngen, 1984). Arsenic and antimony exceeded their Risk Based Screening Concentrations (RBSCs), but these levels are within regional naturally occurring ranges. None of the

inorganic analytes detected in the soil sample exceeded these levels, and the detections are believed to represent natural levels for this area. Lead was detected at a concentration of 3.5 mg/kg in sample BGP3019, which is of the same order of magnitude as detected during the previous investigation and is below the natural range (10 to 20 mg/kg) reported for Delaware soil.

Table 1

OT40(918)  
CHEMICAL DATA FOR SOIL

TAL METALS (mg/kg)

Site ID:	OT40	OT40				
Location ID:	918	918				
Sample ID:	BDL3019	BDL3019D				
SDO:	699069	699069			95 * Confidence	
Sample Data:	03/23/93	03/23/93		USOS Range(a)	Upper Bound	
Depth (feet):	10.0-12.0	10.2-12.0		Delaware	Eastern U.	
	L	V		L	V	
ALUMINUM	3960	00 *	J	4280.00 *	J	15.000-30.000 272
ANTIMONY	6.50	UN	UJ	6.50	UN	UJ <1 2.9
ARSENIC	2.50	S		1.40	B	<0.1-2.7 31
BARIUM	10.00	B		11.80	B	300-500 1.600
BERYLLIUM	0.68	U		0 68	U	BDL 3.5
CADMIUM	1.10	U		1 10	U	-- --
CALCIUM	107.00	B		188 00	B	1.500-1.700 32.000
CHROMIUM	4.60	*		6 30 *		10-50 223
COBALT	2 70	U		2.70	U	5 39
COPPER	5 60	U		5 60	U	3-7 102
IRON	2270 00 *		3150 00 *			5.000-10.000 115.000
LEAD	3.50		J	2.90	J	10-20 53
MAGNESIUM	149.00	B		219 00	B	500-1.000 26.000
MANGANESE	14.70	*		20 30 *		70-100 3.800
MERCURY	0.11	U		0.11	U	0.03-0.05 0.05
NICKEL	8 60	U		8 60	U	<5-7 77
POTASSIUM	892.00	U		892 00	U	-- 27.000(c)
SELENIUM	0.68	UN	UJ	0 68	UWN	UJ -- 1.8
SILVER	2.30	U		2.30	U	-- --
SODIUM	96.30	B		137 00	B	2.000-5.000
THALLIUM	0 68	U		0 68	U	2.8-7 19.2
VANADIUM	5.50	B		6 80	B	10-30 271
ZINC	3.90	B		5.30		17-29 178

- a) Shacklette and Boerngen. 1981.
- b) Geometric mean of data times standard deviation squared (Shacklette and Boerngen. 1981)
- c) Arithmetic mean of data plus two standard deviations (Shacklette and Boerngen. 1981)



BDL = Below detection level

-- \* Value not available.

The ground water probe sampling location was positioned adjacent to SI boring B111, because it contained the most constituents (Fig 4). Ground water samples GP3019 and GP3019D were collected at a depth of 23.5 feet and were analyzed for target compound list (TCL) VOCs, TCL SVOCs, TCL pesticides/polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) filtered and unfiltered metals. For accelerated chemical results, a sample was also analyzed for selected VOCs at an on-site laboratory.

The ground water sample submitted for on-site analysis contained chloroform at a concentration of 2 ug/L (micrograms per liter, or parts per billion) and 8.1 ug/L (Table 2). Chloroform was also detected in the off-site analysis at concentrations of 2 ug/L and 3 ug/L. Chloroform detections in the off-site analyses were removed during the validation process on the basis of blank contamination (Table 3). Chloroform in the on-site sample was well below the maximum contaminant level (MCL) for total trihalomethanes of 100 ug/L. Chloroform is also a common laboratory contaminant and, as such, is not considered to be a contaminant of concern at this site.

Bis (2-Ethylhexyl) phthalate was detected in ground water at estimated concentrations of 2 ug/L and 3 ug/L. This compound was also detected in the associated blanks. Bis (2-Ethylhexyl) phthalate is commonly used in the manufacture of rubber products such as laboratory gloves. Since the compound was detected in the associated blanks at low estimated concentrations, its validity is questionable. Detected concentrations are well below the MCL of 6 ug/L and do not pose a threat.

The pesticides heptachlor and lindane were detected at low, estimated concentrations of 0.0015 ug/L and 0.0012 ug/L, respectively. However, no pesticides were detected in the duplicate sample. These concentrations are well below their respective MCLs of 0.4 ug/L and 0.2 ug/L. Additionally, the presence of these pesticides is questionable, because they were not confirmed in the duplicate sample. The only known use of pesticides at this location is an occasional application to control insects.

Both total and dissolved inorganic constituents were analyzed for at the site. As expected for most analytes, the total concentration of most inorganic analytes exceeded the dissolved concentration. Chromium and lead exceeded MCLs in the total metals (unfiltered) sample. However, no constituents exceeded MCLs in the dissolved metals (filtered) sample. Comparing results of the total metals to the dissolved metals clearly indicates that the elevated concentrations of almost all the metals in the unfiltered (total) sample are the result of the high sample turbidity. Only sodium was detected at a higher

concentration in the filtered sample than in the unfiltered sample. Filtered samples are more representative of actual ground water conditions; therefore, the concentrations in the

Table 2

OT40(918)  
 CHEMICAL DATA FOR GROUNDWATER  
 ONSITE ANALYSIS

SELECTED VOCs (ug/L)

Site I.D.	OT40	OT40		
Location I.D.	918	918		
Sample I.D.		GP3019	GP3019D	
Sample Date		03/23/93	03/23/93	MCL
Depth (feet)	23.5	23.5	FINAL	
Vinyl Chloride	NT		NT	2
Freon 113	<0.5	<0.5		
1,1-DCE	<1.0	<1 0	7	
Methylene Chloride	<2.0	<2 0	5	
1-1,2-DCE	<5.0	<5 0	70	
Chloroform	2		8 1	100
1,1,1-TCA	<0.5	<0.5	200	
TCE	<0.5	<0.5	5	
PCE	<0.5	<0.5	5	
Benzene	<2.0	<2 0	5	
Toluene	<2.0	<2.0	1000	
Ethylbenzene	<2.0	<2.0	700	
Total Xylenes	<2.0	<2.0	10000	

Source: Drinking Water Standards - EPA (May 1993) Drinking Water Regulation and Health Advisories, Office of Drinking Water, Washington, D.C.

Table 3

OT40(918)  
 CHEMICAL DATA FOR GROUNDWATER

TCL VOCs (ug/L)

Site ID:	OT40	OT		
Location ID:	918		918	
Sample ID:		GP3019	GP3019D	
SDO:	57		130	
Sample Date:		03/23/93	03/23/93	MCL
Depth (feet):	0.0		0.0	FINAL

	L	V		L	V	
1,1,1-TRICHLOROETHANE		10 U		10 U		200
1,1,2,2-TETRACHLOROETHANE			10 U		10 U	
1,1,2-TRICHLOROETHANE		10 U		10 U		5
1,1-DICHLOROETHANE		10 U		10 U		
1,1-DICHLOROETHENE		10 U		10 U		7
1,2-DICHLOROETHANE		10 U		10 U		5
1,2-DICHLOROETHENE		10 U		10 U		70
1,2-DICHLOROPROPANE		10 U		10 U		5
2-HEXANONE	10 U			10 U		
4-METHYL-2-PENTANONE	10 U			10 U		
ACETONE	10 U			10 U		
BENZENE	10 U			10 U		5
BROMODICHLOROMETHANE	10 U			10 U		100
BROMOFORM	10 U	UJ		10 U		100
BROMOMETHANE	10 U	UJ		10 U		
CARBON DISULFIDE		10 U	UJ		10 U	
CARBON TETRACHLORIDE	10 U			10 U		5
CHLOROBENZENE	10 U			10 U		100
CHLOROETHANE	10 U			10 U		
CHLOROFORM	2 J	U		3 J	U	100
CHLOROMETHANE	10 U			10 U		
CIS-1,3-DICHLOROPROPENE		10 U			10 U	
DIBROMOCHLOROMETHANE	10 U			10 U		100
ETHYLBENZENE	10 U			10 U		700
METHYL ETHYL KETONE		10 U			10 U	
METHYLENE CHLORIDE		8 BJ	U		10 U	5
STYRENE	10 U			10 U		100
TETRACHLOROETHENE		10 U			10 U	5
TOLUENE	10 U			10 U		1000
TRANS-1,3-DICHLOROPROPENE		10 U			10 U	
TRICHLOROETHENE	10 U			10 U		5
VINYL CHLORIDE	10 U			10 U		2
XYLENE (TOTAL)	10 U			10 U		10000

Table 3 (cont'd)

TCL SVOCs (ug/L)

Site ID:	OT40		OT40		
Location ID:	918		918		
Sample ID:	GP3019		GP3019D		
SDO:	57	130			
Sample Date:	03/23/93		03/23/93		MCL
Depth (feet):	0.0		0.0		FINAL
	L	V	L	V	
1,2,4-TRICHLOROBENZENE		10 U	10 U		70
1,2-DICHLOROBENZENE		10 U	10 U		600
1,3-DICHLOROBENZENE		10 U	10 U		600
1,4-DICHLOROBENZENE		10 U	10 U		75

2,4,5-TRICHLOROPHENOL	25 U	25 U	70
2,4,6-TRICHLOROPHENOL	10 U	10 U	
2,4-DICHLOROPHENOL	10 U	10 U	
2,4-DIMETHYLPHENOL	10 U	10 U	
2,4-DINITROPHENOL	25 U	25 U	
2,4-DINITROTOLUENE	10 U	10 U	
2,6-DINITROTOLUENE	10 U	10 U	
2-CHLORONAPHTHALENE	10 U	10 U	
2-CHLOROPHENOL	10 U	10 U	
2-METHYLNAPHTHALENE	10 U	10 U	
2-METHYLPHENOL	10 U	10 U	
2-NITROANILINE	25 U	25 U	
2-NITROPHENOL	10 U	10 U	
3,3-DICHLOROBENZIDINE	10 U	10 U	R
3-NITROANILINE	25 U	25 U	
4,6-DINITRO-O-CRESOL	25 U	25 U	
4-BROMOPHENYL PHYENYL ETHER		10 U	10 U UJ
4-CHLORO-3-METHYLPHENOL	10 U	10 U	
4-CHLOROANILINE	10 U	10 U	
4-CHLOROPHENYLETHER	10 U	10 U	
4-METHYLPHENOL	10 U	10 U	
4-NITROANILINE	25 U	25 U	UJ
4-NITROPHENOL	25 U	25 U	
ACENAPHTRENE	10 U	10 U	
ACENAPHTHYLENE	10 U	10 U	
ANTHRACENE	10 U	10 U	
BENZO(A)ANTHRACENE	10 U	10 U	0.1
BENZO(A)PYRENE	10 U	10 U	0.2
BENZO(B)FLUORANTHENE	10 U	10 U	0.2
BENZO(G,H,I)PERYLENE	10 U	10 U	
BENZO(K)FLUORANTHENE	10 U	10 U	0.2
BIS(2-CHLORO-1-METHYLETHYL) ETHER		10 U	10 U
BIS(2-CHLOROETHOXY) METHANE		10 U	10 U
BIS(2-CHLOROETHYL) ETHER	10 U	10 U	UJ
BIS(2-ETHYLHEXYL) PHTHALATE		2 BJ U	3 BJ U
BUTYL BENZYL PHTHALATE	10 U	UJ	10 U 100
CARBOZOLE	10 U	10 U	
CHRYSENE	10 U	10 U	
DI-N-BUTYL PHTHALATE	10 U	10 U	
DI-N-OCTYL PHTHALATE	10 U	10 U	
DIBENZOFURAN	10 U	10 U	
DIBENZ(A,H)ANTHRACENE	10 U	10 U	0.3
DIETHYL PHTHALATE	10 U	10 U	
DIMETHYL PHTHALATE	10 U	10 U	
FLUORANTHENE	10 U	10 U	

Table 3 (cont'd)

TCL SVOCs (ug/L)

Site ID: OT40 OT40  
Location ID: 918 918

Sample ID:		GP3019		GP3019D	
SDO:	57			130	
Sample Date:		03/23/93		03/23/93	MCL
Depth (feet):		0.0		0.0	FINAL

	L	V	L	V	
FLUORENE		10 U		10 U	
HEXACHLOROBENZENE		10 U		10 U	UJ 1
HEXACHLOROBUTADIENE		10 U		10 U	
HEXACHLOROCYCLOPENTADIENE		10 U		10 U	50
HEXACHLOROETHANE		10 U		10 U	
INDENO(1,2,3-CD)PYRENE		10 U		10 U	0.4
ISOPHORONE		10 U		10 U	
N-NITROSODIRHENYLAMINE		10 U		10 U	
N-NITROSODIPROPYLAMINE		10 U		10 U	
NAPHTHALENE		10 U		10 U	
NITROBENZENE		10 U		10 U	
PENTACHLOROPHENOL		25 U		25 U	1
PHENANTHRENE		10 U		10 U	UJ
PHENOL		10 U		10 U	
PYRENE		10 U			

Table 3 (cont'd)

TCL PESTICIDES/PCBs (ug/L)

Site ID:		OT40		OT40	
Location ID:		918		918	
Sample ID:		GP3019		GP3019D	
SDO:	57			130	
Sample Date:		03/23/93		03/23/93	MCL
Depth (feet):		0.0		0.0	FINAL

	L	V	L	V	
4,4-DDD		0.1000 U		UJ 0.1000 U	UJ
4,4-DDE		0.1000 U		UJ 0.1000 U	UJ
4,4-DDT		0.1000 U		UJ 0.1000 U	UJ
ALDRIN		0.0500 U		UJ 0.0500 U	UJ
ALPHA-BHC		0.0500 U		UJ 0.0500 U	UJ
BETA-BHC		0.0500 U		UJ 0.0500 U	UJ
CHLORDANE-ALPHA		0.0500 U		UJ 0.0500 U	UJ 2
CHLORDANE-GAMMA		0.0500 U		UJ 0.0500 U	UJ 2
DELTA-BHC		0.0500 U		UJ 0.0500 U	UJ
DIELDRIN		0.1000 U		UJ 0.1000 U	UJ
ENDOSULFAN I		0.0500 U		UJ 0.0500 U	UJ
ENDOSULFAN SULFATE		0.1000 U		UJ 0.1000 U	UJ
ENDRIN		0.1000 U		UJ 0.1000 U	UJ 2
ENDRIN ALDEHYDE		0.1000 U		UJ 0.1000 U	UJ
ENDRIN KETONE		0.1000 U		UJ 0.1000 U	UJ
HEPTACHLOR		0.0015 JP		J 0.0500 U	UJ 0.4
HEPTACHLOR EPOXIDE		0.0500 U		UJ 0.0500 U	UJ 0.2
LINDANE		0.0012 JP		J 0.5000 U	UJ 0.2
METHOXYCHLOR		0.5000 U		UJ 0.5000 U	UJ 40

PCB 1016	1.0000 U UJ	1.0000 U UJ	0.5
PCB 1221	2.0000 U UJ	2.0000 U UJ	0.5
PCB 1232	1.0000 U UJ	1.0000 U UJ	0.5
PCB 1242	1.0000 U UJ	1.0000 U UJ	0.5
PCB 1248	1.0000 U UJ	1.0000 U UJ	0.5
PCB 1254	1.0000 U UJ	1.0000 U UJ	0.5
PCB 1260	1.0000 U UJ	1.0000 U UJ	0.5
TOXAPHENE	5.0000 U UJ	5.0000 U UJ	3

Table 3 (cont'd)

TOTAL TAL METALS (ug/L)

Site ID:	OT40	OT40	
Location ID:	918	918	
Sample ID:	GP3019	GP3019D	
SDO:	990140	990140	
Sample Data:	03/23/93	03/23/93	MCL
Depth (feet):	0.0	0.0	FINAL
	L V	L V	
ALUMINUM	303000 00	135000 00	
ANTIMONY	30.00 UN UJ	30 00 UN UJ	6
ARSENIC	5.40 BWN J	8.90 UN J	50
BARIUM	767.00	434.00	2000
BERYLLIUM	3.70 B	1.80 B	4
CADMIUM	5.00 U	5.00 U	5
CALCIUM	7630 00	6610.00	
CHROMIUM	249.00	102.00	100
COBALT	23.80 B	11.70 B	
COPPER	96.60	50.20	1300 (1)
IRON	35200 00	14100 00	
LEAD	67.00 N J	31.60 N J	15 (f)
MAGNESIUM	7840.00	5590 00	
MANGANESE	275.00	158.00	
MERCURY	0.20 U	0.20 U	2
NICKEL	99.90	38.90 B	100
POTASSIUM	6260.00	3430 00	B
SELENIUM	30.00 UN R	30 00 UN R	50
SILVER	5.00 U	5 00 U	
SODIUM	4740.00 B	4580 00 B	
THALLIUM	3.00 UW UJ	3.00 UW UJ	2
VANADIUM	307.00	148.00	
ZINC	169.00	64.00	

Notes: (1) - values listed are section levels at the lsp

Table 3 (cont'd)

DISSOLVED TAL METALS (ug/L)

Site ID:	OT40	OT40		
Location ID:	918	918		
Sample ID:	GP3019	GP3019D		
SDO:	99087D	99087D		
Sample Data:	03/23/93	03/23/93	MCL	Natural Range
Depth (feet):	0.0	0.0	FINAL	Dissolved

	L	V		L	V			
ALUMINUM		85.20	B		84.30	B		<10-
ANTIMONY	30.00	U		30.00	U		6	<1
ARSENIC	3.00	U	UJ	3.00	U	UJ	50	<1-1
BARIUM	58.10	B		73.60	B		2000	30-
BERYLLIUM	1.00	U		1.00	U		4	<0.
CADMIUM	5.00	U		5.00	U		5	<1-4
CALCIUM		5680	00		5710	00		1.300-37.000 (b)
CHROMIUM	6	00	U	6	00	U	100	<5-6
COBALT	9	00	U	9	00	U		<3-100
COPPER	4.00	U		4.00	U		1300 (f)	<10-90
IRON	514.00			554	00		3-2.900 (b)	
LEAD	2.00	UWN	UJ	2.00	UWN	UJ	15 (1)	10-30 (a)
MAGNESIUM	3950.00	B		3980.00	B			310-23.000
MANGANESE	79.70			81.80			<1-570 (a)	
MERCURY	0.20	U		0.20	U		2	<0.
NICKEL	13.00	U		13.00	U		100	<10-
POTASSIUM	1440.00	U		1440.00	U			400-36
SELENIUM	3.00	U	UJ	3.00	U	UJ	50	<1-6
SILVER	5.00	U	UJ	5	00	U	UJ	<1-3
SODIUM	4870.00	B		4780	00	B		2.700-36.000
THALLIUM	3.00	UWN	UJ	4.00	UWN	UJ	2	N/A
VANADIUM	4.00	U		4.00	U			<6-11
ZINC	5.00	U		5.00	B		3-320	(a)

Sources:

Drinking Water Standards - EPA (May 1993) Drinking Water Regulations and Health Advisories, Office of Drinking Water, Washington DC

a) Denver, J.M., 1986.

b) James, R.F. et.al., 1988.

Notes: (1) - value listed are section levels at the lsp

N/A - Not Available

SUMMARY OF LABORATORY AND VALIDATION FLAGS

Laboratory Flags:

ORGANICS

B - Analyte found in associated blank as well as in the sample.

C - Confirmed by GC/MS.

D - Compound identified in the analysis of a secondary dilution fac

E - Value exceeds the calibration range of GC/MS.

J - Value is estimated.

P - Greater than 25% difference in analyte concentration betw

primary & confirmation analysis. Lower concentration reported.  
U - Analyte was analyzed for but not detected.

#### INORGANICS

A - The reported results are single point standard addition to comp  
B - Reported value is greater than the instrument detection limit  
but less than the contract-required detection limit.  
E - Serial dilution not within control limits.  
N - Matrix related interference in the sample preparation procedure  
Q - Analytical spike recovery associated with sample is less  
S - Reported value was determined by the method of standard addition  
U - Analyte was analyzed for but not detected.  
W - Slight matrix related interference is present.  
\* - Sample matrix is non-homogeneous.

#### Validation Flags:

U - Analyte was analyzed for but was not detected above the reported  
sample quantitation limit.  
J - Analyte was positively identified; the associated numerical value  
is the approximate concentration.  
R - Results are rejected due to serious deficiencies in the ability  
analyze the sample and meet quality control criteria.  
The presence or absence of the analyte cannot be verified.  
UJ - Analyte was not detected above the reported sample quantitation  
limit. However, the reported quantitation limit is approximate  
or may not represent the actual limit of quantitation necessarily  
accurately and precisely measure the analyte in the sample.

Note: NT - Not tested.

dissolved fraction of ground water are compared to background  
values reported for Delaware ground water and to MCLs (Table 2).  
No inorganic constituents in the filtered sample exceeded the  
reported natural concentration ranges in Delaware ground water or  
the MCLs. In the process of filtering, groundwater samples are  
run through a paper membrane to remove suspended soil particles.  
This process imitates the natural filtering process that occurs  
as ground water flows through underground sand beds.

Based upon these analytical results, ground water quality does  
not appear to be adversely impacted due to site conditions.

Sample collection at this site during 1993 was based on a  
screening approach. For this reason, detection limits for some  
analytes were set above their respective MCLs. Following this  
procedure allows for more samples to be taken while still being  
able to detect releases of hazardous chemicals. If a release  
is occurring from the O/W separator, contaminant levels would  
be well above MCLs and the presence of a wide range of petroleum  
hydrocarbon compounds, some of which are fairly stable in the  
environment, would be present. For example, benzene concentration



in a ground water probe sample near a leaking pipeline was found to be 38,000,000 ug/L. This is well above the detection limit of 10 ug/L and MCL of 5 ug/L.

#### Summary of Site Risks

The purpose of the Risk Assessment is to determine whether exposure to site-related contaminants could adversely affect human health and the environment in the event that the contamination is not remediated. The analysis of the "No Action" scenario is referred to as the Baseline Risk Assessment. The focus of the Baseline Risk Assessment is on the possible human health and environmental effects that could occur under current or potential future use conditions.

Exposure pathways considered by DAFB in the Baseline Risk Assessment include ground water and soil. Potential risks to human health were identified by calculating the risk level or hazard index (HI) for such chemicals. The HI identifies the potential for the most sensitive individuals to be adversely affected by noncarcinogenic chemicals. If the HI exceeds one (1.0), there may be concern for potential noncarcinogenic effects. As a rule, the greater the value of the hazard index above 1.0, the greater the level of concern.

Potential carcinogenic risks are identified by a risk level from a potential exposure to a chemical for a set number of years. For example, a risk level of  $1 \times 10E-6$  indicates that one additional cancer case per one million may occur. EPA considers carcinogenic risk level equal to or less than  $1 \times 10E-4$ , one additional cancer case per ten thousand, as minimally acceptable.

Carcinogenic risk and HI calculations are presented in Appendix one.

An industrial exposure scenario is used to calculate risks associated with someone coming in contact with soils at the site. The industrial exposure scenario assumed a worker will be exposed to a hazardous chemical for 250 days per year for 25 years. This type of scenario is applicable at the site for many reasons. The O/W separator at Building 918 is in the industrial portion of the base adjacent to the flight line. Access is limited to authorized personnel. Additionally, DAFB is an active military air base, and as such, maintains a security fence around the perimeter of the base. This keeps the general public from entering the base and onto the site.

Although the shallow ground water is not used for any purpose including drinking at or near this site, a residential drinking water exposure scenario is used to calculate risk. This scenario

is used because it is the most conservative approach and is most protective of human health.

In the case of the O/W separator at Building 918, only trace amounts of two pesticides (heptachlor and lindane) were detected in the ground water. Each was found at a low, estimated concentration that did not exceed the risk based screening concentration (RBSC). Of the 17 metals present in the unfiltered ground water sample, eight were also found in the filtered sample. None of the dissolved metals exceeded their RBSCs (Appendix 1). Criteria are not available for four metals that are essential human nutrients; calcium, iron, magnesium, and sodium. Therefore, ground water at the site does not pose a risk to human health.

Organic compounds present in the soil at the site were limited to isolated occurrences of low, estimated concentrations of 1, 1, 1-TCA, acetone, methylene chloride, and benzoic acid in shallow soil samples. Only arsenic and antimony exceeded their RBSC's but these levels are within regional naturally occurring ranges. Of the 12 metals detected in soil, all of the non-essential human nutrients were within the background range. As with ground water at the site, criteria are not available for calcium, iron, magnesium, and sodium which are essential human nutrients.

Soil exposure at the O/W separator at Building 918 is associated with a risk on the order of  $10E-6$  and a hazard index (HI) of 0.007. The total risk for soil of  $1 \times 10E-6$  is two orders of magnitude below the EPA action level of  $1 \times 10E-4$ . The HI for soil of 0.007 is three orders of magnitude below the HI of 1.0 (Appendix 2).

A preliminary ecological assessment (EA) was performed for this and other areas at the base, and further EA studies will be performed site-wide and will be addressed in the base-wide

investigation under a different operable unit. The likelihood of exposure to the soil by terrestrial wildlife at this operable unit is slight because contaminant levels are found only in trace amounts and are located well below grade.

#### Description of Alternatives

This section summarizes the three alternatives reviewed for analysis and fulfillment of applicable or relevant and appropriate requirements. The selected alternatives for the O/W separator at Building 918 include:

Alternative 1: No Action

Alternative 2: Removal and Capping

Alternative 3: Removal, Soil Excavation, Off-Site Disposal

Alternative 1: Pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300, DAFB must evaluate the no action alternative for the O/W separator at Building 918 to establish a baseline for comparison to other alternatives. Under the no action alternative, no further remedial action would be taken at the site. No other alternatives offer substantial advantages over the no action alternative; therefore, the no action option is the preferred alternative. Cost for this alternative is \$0.

Alternative 2: Under this alternative, the O/W separator and piping to the building would be removed, decontaminated, and disposed of at an off-base facility. Soil surrounding the separator would be left in place. The excavation would be backfilled with clean soil and capped.

Decontamination of the O/W separator and piping will require removal of any residual liquid, sludge, and/or solid material from within these units. Removal of the underground piping with the appropriate excavation equipment prior to cleanup will facilitate decontamination activities. Pumps, manual labor, and other appropriate mechanical equipment will be used to clean the piping and separator. Steam-cleaning will then be used to decontaminate the piping and separator. The material removed from these units and the solutions resulting from decontamination procedures will be collected in tanker trucks, vacuum trucks, 55-gallon drums, or other suitable containers prior to shipment and off-base disposal. Analysis of the waste materials will be performed to determine the appropriate disposal and/or treatment requirements for the collected material. The O/W separator will then be removed with the appropriate excavation equipment. All of the decontaminated piping and structures will then be transported and disposed of off base at a sanitary landfill or salvage yard. Following backfilling of the excavation, a composite cap consisting of a geomembrane, a drainage layer, and a soil cover would be placed over the fill. The surface of the

cap should slope (1 to 3 percent) to prevent ponding of water, and the cap should extend over the edges of the fill.

Before installing the cap system, the site would be graded and large objects (e.g., boulders, concrete slab fragments), if present, would be removed; then a layer of nonwoven geotextile fabric would be placed over the site. This fabric layer would protect the overlying 60-mil HDPE geomembrane, which would serve as an impermeable barrier over the soils, from puncturing. A drainage layer would be placed on top of the geomembrane. This layer would be installed over the entire exposed cap and would

drain any water that infiltrates through the soil cover.  
A 2-foot thick layer of clean soil would be placed on top of the drainage layer and seeded. Vegetation would prevent erosion of the soil layer, which would be graded to prevent run-on and promote run-off.

The site would be monitored yearly to ensure contaminants left in place are not migrating off-site.

This alternate would take approximately 4 months to implement and cost \$200,000.

Alternative 3: Under Alternative 3, the O/W separator and piping to the building would be removed, decontaminated, and disposed of at an off-base facility. Soil surrounding the separator and piping would also be excavated and disposed of off-site. The resulting excavation would be backfilled with clean soil and reseeded.

Decontamination of the O/W separator and piping would take place as outlined under Alternative 2.

Following removal of the O/W separator and piping, soil remaining within the excavation would be screened using a photo-ionization detector (PID) and visually inspected. Any soil with high PID readings or that is visually contaminated will be removed and stored in 55-gallon drums or other appropriate containers. The soil will be sampled and characterized for disposal. Samples will also be taken from the open excavation to ensure that all contaminated soil has been removed. The excavation would be backfilled with clean soil and reseeded.

This alternative would take approximately 3 months to implement and cost \$258,000.

#### Comparative Analysis of Alternatives

This section provides an analysis of the performance of the proposed alternatives in comparison to one another. The proposed alternatives are evaluated using the nine criteria as set forth in 40 CFR Section 300.430 (e)(a)(iii) and (f). The nine criteria are as follows:

- Overall protection of human health and the environment
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume
- Short-term effectiveness
- Cost

Implementability  
State acceptance and  
Community acceptance.

Overall Protection Alternatives 2 and 3 will provide an acceptable level of protection of human health and the environment by eliminating the principal threats through contaminant source reduction and treatment.

Alternative 1 will also provide an acceptable level of protection of human health and the environment since none of the detected constituents exceeded their health based action levels.

Compliance with ARARs In RODs where the No Action alternative is selected because action is not necessary to protect either the public's health and welfare, or the environment, the evaluation of ARARs is not applicable.

Long-Term Effectiveness and Permanence. This criteria addresses the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Alternatives 1, 2, and 3 will meet the criteria for long-term effectiveness and permanence.

Reduction in Toxicity, Mobility, or Volume Through Treatment  
Alternative 1 does not reduce the toxicity, mobility, or volume of potential contaminants at this site.

Alternative 2 will reduce the mobility of potential contaminants at the site by placing a cap over the soil. The cap will stop water infiltration and eliminate the chance of contaminants being leached into the ground water.

Alternative 3 will reduce the toxicity, mobility, and volume of potential contaminants through the removal of the O/W separator and any contaminated soil at this site.

Short Term Effectiveness Alternative 1 becomes effective immediately upon signing of the ROD for this site. No site work

will take place, thereby eliminating any exposure of workers to potential contaminants.

Implementability Alternative 2 will take approximately 4 months to implement. Alternative 3 will take approximately 3 months to

implement. Both alternatives will require soil disturbance for a short period. The use of personal protective equipment and air monitoring will be required to ensure worker safety. Alternative 1, No Action Alternative, can be implemented immediately.

Cost The cost for each alternative is as follows:

Alternative 1: \$ 0  
Alternative 2: \$ 200,000  
Alternative 3: \$ 258,000

State Acceptance The State of Delaware supports the Alternative preferred in the March 1994 Proposed Plan of no further action.

Community Acceptance Since no comments were received during the Public Comment period, the community would appear to support the Proposed Plan's Preferred Alternative for this action.

#### Selected Remedy

Based upon the above facts, DAFB and EPA decided that no further remedial response action under CERCLA be taken at this operable unit. DAFB and EPA have determined through evaluation of data in the Field Screening Report and the SI that site contaminants do not pose any risks or threat to human health or the environment that would warrant a remedial action.

Contaminants in the shallow ground water at the site occur in concentrations below MCLs and below their RBSCs. Additionally, the shallow ground water is not currently used for drinking. However, should this groundwater be used for drinking purposes in the future, the risk, as discussed in the Summary of Site Risks section, will be minimal. The only soil contaminant that exceeded its RBSC, arsenic, was detected within its natural range at a depth of 10-12 feet BGS. The low chance of exposure to soil from this depth supports the conclusion that the soil at the site is not a threat to human health or the environment.

#### Statutory/Authority Findings

The selected remedial action satisfies the remedy selection process requirements of CERCLA and the NCP. The selected remedy provides protection of human health and the environment, and is cost effective.

#### GLOSSARY

Administrative Record: An official compilation of documents, data, reports, and other information that is considered important to the status of and decisions made relative to a site. A public version of the record is placed in the information repository to allow public access to the material.

Carcinogens: Substances which can or may cause cancer.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1988 by the Superfund Amendments and Reauthorization Act (SARA).

Maximum Contaminant Level (MCL): The maximum permissible level of a contaminant in water delivered to any user of a public water system. MCLs are enforceable standards.

Information Repository: A location where copies of documents and data related to the site are placed to allow the public access to the material. The IR also contains an index for the Administrative Record.

National Priorities List: EPA's list of the nation's top priority hazardous waste sites.

Operable Unit: A separate activity or portion of work undertaken as part of a site cleanup.

Record of Decision: A legal document that describes the final remedial action selected for a Site, why the remedial action was chosen, how much it will cost and how the public responded.

Risk Assessment: A means of estimating the amount of harm which a site could cause to human health and the environment. The objectives of a risk assessment are (1) to help determine the need for action by estimating the harm if the site is not cleaned up, (2) to help determine the levels of chemicals that can remain on the site and still protect human health and the environment, and (3) to provide a basis for comparing different cleanup methods.

1, 1, 1-TCA: 1, 1,1-Trichloroethane.

Target Analyte List: A subset of the Target Compound List which includes only inorganic constituents.

Target Compound List (TCL): Developed by EPA for Superfund site sample analytes. The TCL is a list of analytes (34 VOCs, 65 VOCs, 19 pesticides, 7 PCBs, 23 metals and total cyanide).

Upper Confidence Limit: The upper limit of a statistical range with a specified probability that a given parameter lies below it.

REFERENCES

Dames and Moore, Inc./HAZWRAP, Site Investigation for the O/W Separator at Site 918 (MAC Code OT40), DAFB, September 1991.

Dames and Moore, Inc./HAZWRAP, Draft Field Screening Report, Volume I, DAFB, September 1993.

Shacklette, H.T., and J.G. Boerngen, 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States, U.S. Geological Survey, Professional Paper No. 1270.

Shacklette, H.T., and J.G. Boerngen, 1981. Chemical analysis of Soils, and Other Surficial Materials of the Conterminous United States, U.S. Geological Survey, Open-file Report 81-197.

APPENDIX 1

Appendix 1

Risk - Based Screen o  
OT40 (918)

VOCs in Soil-mg/kg

Site ID:	OT40		OT40		OT40	
Location ID:	B109		B110		B111	
Sample ID:	B109.0-2D		B110.0-2		B111.0-2	
Sample Date:	RBSC	Exceeds?	05/13/91		05/13/91	
Depth (feet):	for Soil		0.0-2.0	0.0-2.0	0.0-2.0	
			L	V	L	V
1,1,1-TRICHLOROETHANE	9.200.000	No				1 J
ACETONE	10.000.000	No	6	BJ J	12	B J
METHYLENE CHLORIDE	380.000	No	27	B J		

SVOCs in Soil-mg/kg

Site ID:	OT40	
Location ID:	B109	
Sample ID:	B109.0-2	
Sample Date:	RBSC	Exceeds? 05/13/91
Depth (feet):	for Soil	0.0-2.0



			L V		
BENZOIC ACID	410.000.000	No		88	J

Lead in Soil--mg/kg

Site ID:		OT40	OT40	OT40
Location ID:		B109	B109	B109
Sample ID:		B109.0-2	B109.0-2D	B109.8-10
Sample Date:	RBSC	Exceeds?	05/13/91	05/13/91
Depth (feet):	for Soil	0.0-2.0	0.0.-2.0	8.0-

			L V	L V	L V
LEAD	500	No	11.50 N J	17.80	0.68 10.

Site ID:		OT40	OT40	OT40
Location ID:		B111	B112	B112
Sample ID:		B111.8-10	B112.0-2	B112.8-10
Sample Date:		05/13/91	05/13/91	05/13/91
Depth (feet):		8.0-10.0	0.0-2.0	8.0-10.0

			L V	L V	L V
LEAD			1.10 N	3.70	0.59

Appendix 1 (

Risk - Based  
OT40 (9

TAL Metals in Soil--mg/kg

Site ID:		OT40	OT40
Location ID:		918	918
Sample ID:		BGP3019	BGP3019D
Sample Date:	RBSC	Exceeds?	03/23/93 03/23/93
Depth (feet):	for Soil		10.0-12.0 10.0-12.0

			L V	L V		
ALUMINUM	300.000	No		3960	* J	4280
ARSENIC	1.6	Yes	2.50	S	1.40	B
BARIUM	7200.00	No		10.0	B	11.8 B
CALCIUM	NA	--		107	B	188 B
CHROMIUM	510	No		4.60	*	6.30 *
IRON	NA	--		2270	*	3150 *
LEAD	500	No		3.50	J	2.90 J
MAGNESIUM	NA	--		149	B	219
MANGANESE	10.000	No		14.2	*	20.3
SODIUM	NA	--		96.3	B	137 B
VANADIUM	720	No		5.50	B	6.80
ZINC	31.000	No		3.90	B	5.30

Appendix 1 (cont'd)  
Risk - Based  
OT40 (91)

Pesticides/PCBs in Groundwater--ug/L

Site ID:		OT40		
Location ID:		918		
Sample ID:	RBSC	Exceeds?	GP3019	
Sample Date:	for Drinking	03/23/93		
Depth (feet):	Water	0.0		
		L	V	
HEPTACHLOR	0.00031	No	0.0015	JP J
LINDANE	0.066	No	0.0012	JP J

Total TAL Metals in Groundwater--ug/L

Site ID:		OT40		OT40
Location ID:		918		918
Sample ID:	RBSC	Exceeds?	GP3019	GP3019D
Sample Date:	for Drinking	03/23/93		03/23/93
Depth (feet):	Water	0.0	0.0	
		L	V	L V
ALUMINUM	11000	Yes	303000	135000
ARSENIC	1.1	Yes	5.40 BWJ	8.90 BN J
BARIUM	260	Yes	767	434
BERYLLIUM	0.02	Yes	3.70 B	1.80 B
CALCIUM	NA	--	7630	6610
CHROMIUM	18	Yes	249	102
COBALT	1	Yes	23.8 B	11.7 B
COPPER	140	Yes	96.6	50.2
IRON	NA	--	35200	14100
LEAD	15	Yes	67.0 N J	31.6 N J
MAGNESIUM	NA	--	7840	5590
MANGANESE	370	Yes	275	158
NICKEL	73	Yes	99.9	38.9 B
POTASSIUM	NA	--	6260	3430 B
SODIUM	NA	--	4740 B	4580 B
VANADIUM	26	Yes	307	148
ZINC	1100	Yes	169	64.0

Appendix 1 (  
Risk - Based S  
OT40

Dissolved TAL Metals in Groundwater--ug/L

Site ID:		OT40		OT40
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Location ID:		918		918	
Sample ID:	RBSC	Exceeds?		GP3019	GP3019D
Sample Date:	for Drinking			03/23/93	03/23/93
Depth (feet):	Water	0.0		0.0	

			L	V		L	V	
ALUMINUM	11000	No			8.52	B		84.3 B
BARIUM	260	No			58.1	B		73.6 B
CALCIUM	NA	--			5680			5710
IRON	NA	--	514		544			
MAGNESIUM	NA	--			3950	B		3980 B
MANGANESE	370	No			79.7			81.8
SODIUM	NA	--			4870	B		4780 B
ZINC	1100	No					5.8	B

APPENDIX 2

Appendix 2  
 OT40 (918) Calculated Risks and Hazards

	RBSC for EPC	1E-06	RBSC for Risk	Hazard I	Site Related Risk
OT40 (918)					
Soil (mg/kg):					
Arsenic	2	1 6E 00	3 1E 02		1E 06
			Total Risk:	1E 06	HI: 7E 03
Groundwater:					
No constituents of concern				OE 00	OE 00