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## Technical Memorandum

**To:** Bill Hill, NAVFAC EFD SOUTH  
Jennifer Tufts, USEPA Region 4  
Tim Woolheater, USEPA Region 4  
Roger Donovan, TDEC  
Rob Williamson, NSA Mid-South  
Jim Heide, NSA Mid-South  
Jack Carmichael, USGS

**From:** Corey Coleman, EnSafe Inc.

**Date:** March 23, 2005

**Re:** Recommendation for No Further Action  
SWMU 41 — Salvage Yard 2  
NSA Mid-South

## INTRODUCTION

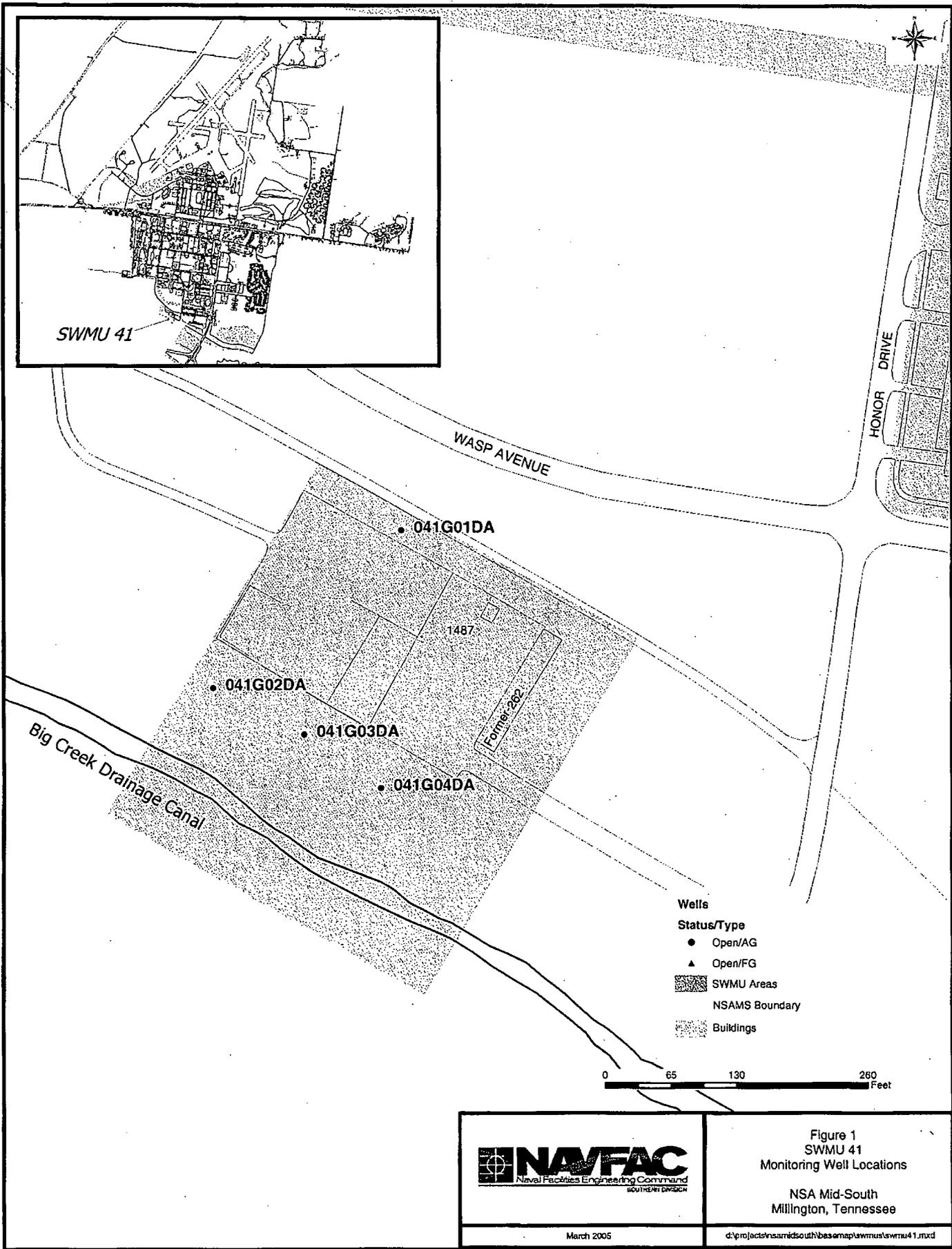
This technical memorandum provides a basis for a no-further-action recommendation at Naval Support Activity (NSA) Mid-South Solid Waste Management Unit (SWMU) 41 based on the results of the Confirmatory Sampling Investigation (CSI), RCRA Facility Investigation (RFI), and recent post-RFI groundwater sampling.

## SITE DESCRIPTION

SWMU 41 is an approximately 1.2-acre area located at the corner of Wasp Avenue and Honor Drive, near the southwest corner of NSA Mid-South's Southside (Figure 1). This area mainly consists of grassy flats and a fenced asphalt-covered storage area currently used by the U.S. Army Corps of Engineers. Along the southern edge of SWMU 41 is Big Creek Drainage Canal, into which the SWMU's storm water flows. SWMU 41 and the surrounding area are characterized by relatively low-relief topography. A flood-control levee north of SWMU 41 serves to contain the possibility of flooding in Big Creek Drainage Canal. SWMU 41's operation dates as far back as 1944. This area was designated for nonhazardous storage but may have at one time received hazardous material. This SWMU is also reported to have been used by the Defense Reutilization and Management Office to store scrap metal, abandoned equipment (planes, helicopters, etc.), tires, furniture, and batteries.

## BACKGROUND

During a CSI in 1998, eight groundwater samples were collected using a direct push technology (DPT) rig. Four of these groundwater samples were collected from the sand and gravels in the deep alluvium, while four groundwater samples were collected from the clays and silts of the upper alluvium. Sample depths from the deep alluvium were at the DPT refusal depth of 50 feet below land surface (bls), and sample depths from the upper alluvium were collected from 27 feet bls. All groundwater samples were analyzed for volatile organic compounds (VOCs).



SWMU 41

WASP AVENUE

HONOR DRIVE

041G01DA

1487

041G02DA

041G03DA

Former 262

041G04DA

Big Creek Drainage Canal

- Wells**
- Open/AG
  - ▲ Open/FG
  - ▨ SWMU Areas
  - - - NSAMS Boundary
  - ▩ Buildings

0 65 130 260 Feet

NAVFAC  
Naval Facilities Engineering Command  
SOUTHERN DISTRICT

Figure 1  
SWMU 41  
Monitoring Well Locations

NSA Mid-South  
Millington, Tennessee

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March 2005

Figure 1 Monitoring Well Locations

One upper alluvium sample contained 1,2-dichloroethane (1,2-DCA) at a concentration of 59 micrograms per liter ( $\mu\text{g/L}$ ), which exceeds its United States Environmental Protection Agency (USEPA) Region 3 tap water risk-based concentration ( $0.12 \mu\text{g/L}$ ) and maximum contaminant level ( $5 \mu\text{g/L}$ ), the regulatory standards used for comparison at the time of the CSI. The USEPA Region 9 tap water Preliminary Remediation Goal (PRG) concentration, the standard currently being used instead of the USEPA Region 3 risk-based concentration, for 1,2-DCA is  $0.12 \mu\text{g/L}$ . The excess cancer risk threshold of  $1\text{E-}4$ , as established by the USEPA, was also exceeded, as calculated in a preliminary risk evaluation (PRE). The PRE calculations show that groundwater in a residential land-use scenario has an excess risk of  $4.9\text{E-}4$ . For industrial land use, it has an excess cancer risk of  $1.2\text{E-}4$ . Because of the presence of 1,2-DCA in the upper alluvium, the CSI report recommended full RFI characterization.

In April 1999, four monitoring wells (041G01DA through 041G04DA) were installed as part of the RFI to evaluate whether the 1,2-DCA in the upper alluvium had migrated vertically into the more permeable sands and gravels in the deep alluvium/top of the Cockfield Formation. Well screens ranged between 35 and 40 feet in length, screening the entire interval from the top of the deep alluvium through sand occurring in the upper portion of the Cockfield Formation. Groundwater samples were collected in June 1999, from three to four intervals in each well using diffusion sampling techniques to vertically profile VOC concentrations in the screened interval. No VOCs were detected above regulatory standards in groundwater samples from the wells. Complete profiles of these results can be found in the *Assemblies G and H RFI Report*<sup>1</sup>.

The RFI's human health risk assessment (HHRA) did not identify any chemicals of concern (COC) in soil. However, 1,2-DCA was identified as a COC in groundwater based on its non-carcinogenic risk to a potential future child resident. The HHRA concluded there are no known residential receptors, and it is unlikely that future land use will be residential.

In the *Assemblies G and H RFI Report*, no further action was recommended for soil based on the analytical results for soil and groundwater samples, the HHRA, the Environmental Risk Assessment, and the fate-and-transport models. Additionally, the RFI Report recommended annual monitoring of VOCs in the four deep alluvium monitoring wells at SWMU 41, which included periodic evaluations to determine if continued monitoring or corrective measures are warranted. The RFI Report was approved by the USEPA in October 2002 and the Tennessee Department of Environment and Conservation (TDEC) in January 2003.

#### **POST-RFI SAMPLING**

On November 18, 2004, EnSafe personnel collected groundwater samples from the four SWMU 41 wells (041G01DA through 041G04DA) using low-flow sampling techniques. These samples were submitted to Mitkem Corporation of Warwick, Rhode Island, for VOC analysis. Sample results were below the laboratory detection limits for each parameter analyzed. The groundwater results for the site's monitoring wells are documented in Attachment A.

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<sup>1</sup>EnSafe. (2001, November). *NSA Mid-South Assemblies G and H RFI Report-Revision 1*. EnSafe: Memphis, TN.

**CONCLUSIONS AND RECOMMENDATIONS**

Evaluation of CSI, RFI, and post-RFI groundwater data for SWMU 41 indicate that there has been only one groundwater sample collected with 1,2- DCA concentrations above regulatory standards. This sample was collected from the alluvium using a Geoprobe during the CSI. No groundwater samples collected from onsite alluvium monitoring wells have had a detection for this COC. Both low-flow and diffusion sampling techniques have been used.

1,2-DCA was identified as a COC in groundwater based on its non-carcinogenic risk to a potential future child resident. However, the HHRA concluded there are no known residential receptors, and it is unlikely that future land use will be residential.

Municipal water from the Memphis aquifer and the deeper Fort Pillow aquifer is readily available at NSA Mid-South and the surrounding area. Consequently, alluvial groundwater at SWMU 41 is not used as potable or general use water.

Based on these factors EnSafe recommends no further action for SWMU 41. If USEPA and TDEC representatives concur with this recommendation, the four onsite monitoring wells will be abandoned.

**Attachment A**  
**Analytical Data**

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NSA MID-SOUTH  
SWMU41 Groundwater Results

June 1999

MS026 VOA		SAMPLE ID ----->	041-G-01DA-46	041-H-01DA-46	041-G-01DA-56	041-G-01DA-65	041-G-01DA-72
		ORIGINAL ID ----->	041G01DA46	041H01DA46	041G01DA56	041G01DA65	041G01DA72
		LAB SAMPLE ID ---->	9906571-16	9906571-17	9906571-18	9906571-19	9906571-20
		SAMPLE DATE ----->	06/22/99	06/22/99	06/22/99	06/22/99	06/22/99
		DATE EXTRACTED -->	06/24/99	06/24/99	06/24/99	06/24/99	06/24/99
		DATE ANALYZED ---->	06/24/99	06/24/99	06/24/99	06/24/99	06/24/99
		MATRIX ----->	Water	Water	Water	Water	Water
		UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L
CAS #	Parameter		A	A	A	A	A
71-55-6	1,1,1-Trichloroethane	3.	U	3.	U	3.	U
79-34-5	1,1,2,2-Tetrachloroethane	3.	U	3.	U	3.	U
79-00-5	1,1,2-Trichloroethane	3.	U	3.	U	3.	U
75-34-3	1,1-Dichloroethane	3.	U	3.	U	3.	U
75-35-4	1,1-Dichloroethene	3.	U	3.	U	3.	U
107-06-2	1,2-Dichloroethane	3.	U	3.	U	3.	U
540-59-0	1,2-Dichloroethene (total)	3.	U	3.	U	3.	U
78-87-5	1,2-Dichloropropane	3.	U	3.	U	3.	U
78-93-3	2-Butanone (MEK)	5.	U	1.	J	5.	U
591-78-6	2-Hexanone	5.	U	5.	U	5.	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.	U	5.	U	5.	U
67-64-1	Acetone	2.	J	7.	J	2.	J
71-43-2	Benzene	3.	U	3.	U	3.	U
75-27-4	Bromodichloromethane	3.	U	3.	U	3.	U
75-25-2	Bromoform	3.	U	3.	U	3.	U
74-83-9	Bromomethane	3.	U	3.	U	3.	U
75-15-0	Carbon disulfide	3.	U	3.	U	3.	U
56-23-5	Carbon tetrachloride	3.	U	3.	U	3.	U
108-90-7	Chlorobenzene	3.	U	3.	U	3.	U
75-00-3	Chloroethane	3.	U	3.	U	3.	U
67-66-3	Chloroform	3.	U	3.	U	3.	U
74-87-3	Chloromethane	3.	U	3.	U	3.	U
124-48-1	Dibromochloromethane	3.	U	3.	U	3.	U
100-41-4	Ethylbenzene	3.	U	3.	U	3.	U
75-09-2	Methylene chloride	3.	U	3.	U	3.	U
100-42-5	Styrene	3.	U	3.	U	3.	U
127-18-4	Tetrachloroethene	3.	U	3.	U	3.	U
108-88-3	Toluene	3.	U	3.	U	3.	U
79-01-6	Trichloroethene	3.	U	3.	U	3.	U
75-01-4	Vinyl chloride	3.	U	3.	U	3.	U
1330-20-7	Xylene (Total)	3.	U	3.	U	3.	U
10061-01-5	cis-1,3-Dichloropropene	3.	U	3.	U	3.	U
10061-02-6	trans-1,3-Dichloropropene	3.	U	3.	U	3.	U

\*\*\* Validation Complete \*\*\*

NSA MID-SOUTH  
SWMU41 Groundwater Results  
June 1999

MS027 VGA	SAMPLE ID ----->	041-G-02DA-46	041-G-02DA-53	041-G-02DA-68	041-G-03DA-48	041-G-03DA-57	041-G-03DA-69
	ORIGINAL ID ----->	041G02DA46	041G02DA53	041G02DA68	041G03DA48	041G03DA57	041G03DA69
	LAB SAMPLE ID ----->	9906572-01	9906572-02	9906572-03	9906572-04	9906572-05	9906572-06
	SAMPLE DATE ----->	06/22/99	06/22/99	06/22/99	06/22/99	06/22/99	06/22/99
	DATE EXTRACTED ----->	06/24/99	06/24/99	06/24/99	06/24/99	06/24/99	06/24/99
	DATE ANALYZED ----->	06/24/99	06/24/99	06/24/99	06/24/99	06/24/99	06/24/99
	MATRIX ----->	Water	Water	Water	Water	Water	Water
	UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
CAS #	Parameter	A	A	A	A	A	A
71-55-6	1,1,1-Trichloroethane	3. U					
79-34-5	1,1,2,2-Tetrachloroethane	3. U					
79-00-5	1,1,2-Trichloroethane	3. U					
75-34-3	1,1-Dichloroethane	3. U					
75-35-4	1,1-Dichloroethene	3. U					
107-06-2	1,2-Dichloroethane	3. U					
540-59-0	1,2-Dichloroethene (total)	3. U					
78-87-5	1,2-Dichloropropane	3. U					
78-93-3	2-Butanone (MEK)	5. UR					
591-78-6	2-Hexanone	5. U					
108-10-1	4-Methyl-2-Pentanone (MIBK)	5. U					
67-64-1	Acetone	5. UR	9. J	5. UR	5. UR	5. UR	5. UR
71-43-2	Benzene	3. U					
75-27-4	Bromodichloromethane	3. U					
75-25-2	Bromoform	3. U					
74-83-9	Bromomethane	3. U					
75-15-0	Carbon disulfide	3. U					
56-23-5	Carbon tetrachloride	3. U					
108-90-7	Chlorobenzene	3. U					
75-00-3	Chloroethane	3. U					
67-66-3	Chloroform	3. U					
74-87-3	Chloromethane	3. U					
124-48-1	Dibromochloromethane	3. U					
100-41-4	Ethylbenzene	3. U					
75-09-2	Methylene chloride	3. U					
100-42-5	Styrene	3. U					
127-18-4	Tetrachloroethene	3. U					
108-88-3	Toluene	3. U					
79-01-6	Trichloroethene	3. U					
75-01-4	Vinyl chloride	3. U					
1330-20-7	Xylene (Total)	3. U					
10061-01-5	cis-1,3-Dichloropropene	3. U					
10061-02-6	trans-1,3-Dichloropropene	3. U					

\*\*\* Validation Complete \*\*\*

NSA MID-SOUTH  
SWMU41 Groundwater Results  
June 1999

MS027 VQA	SAMPLE ID ----->	041-G-04DA-47	041-G-04DA-57	041-H-04DA-57	041-G-04DA-61	041-G-04DA-69
	ORIGINAL ID ----->	041G04DA47	041G04DA57	041H04DA57	041G04DA61	041G04DA69
	LAB SAMPLE ID ----->	9906572-07	9906572-09	9906572-08	9906572-10	9906572-11
	SAMPLE DATE ----->	06/22/99	06/22/99	06/22/99	06/22/99	06/22/99
	DATE EXTRACTED ----->	06/24/99	06/24/99	06/24/99	06/24/99	06/24/99
	DATE ANALYZED ----->	06/24/99	06/24/99	06/24/99	06/24/99	06/24/99
	MATRIX ----->	Water	Water	Water	Water	Water
	UNITS ----->	UG/L	UG/L	UG/L	UG/L	UG/L
CAS #	Parameter	A	A	A	A	A
71-55-6	1,1,1-Trichloroethane	3. U				
79-34-5	1,1,2,2-Tetrachloroethane	3. U				
79-00-5	1,1,2-Trichloroethane	3. U				
75-34-3	1,1-Dichloroethane	3. U				
75-35-4	1,1-Dichloroethene	3. U				
107-06-2	1,2-Dichloroethane	3. U				
540-59-0	1,2-Dichloroethene (total)	3. U				
78-87-5	1,2-Dichloropropane	3. U				
78-93-3	2-Butanone (MEK)	5. UR				
591-78-6	2-Hexanone	5. U				
108-10-1	4-Methyl-2-Pentanone (MIBK)	5. U				
67-64-1	Acetone	5. UR				
71-43-2	Benzene	3. U				
75-27-4	Bromodichloromethane	3. U				
75-25-2	Bromoform	3. U				
74-83-9	Bromomethane	3. U				
75-15-0	Carbon disulfide	3. U				
56-23-5	Carbon tetrachloride	3. U				
108-90-7	Chlorobenzene	3. U				
75-00-3	Chloroethane	3. U				
67-66-3	Chloroform	3. U				
74-87-3	Chloromethane	3. U				
124-48-1	Dibromochloromethane	3. U				
100-41-4	Ethylbenzene	3. U				
75-09-2	Methylene chloride	3. U				
100-42-5	Styrene	3. U				
127-18-4	Tetrachloroethene	3. U				
108-88-3	Toluene	3. U				
79-01-6	Trichloroethene	3. U				
75-01-4	Vinyl chloride	3. U				
1330-20-7	Xylene (Total)	3. U				
10061-01-5	cis-1,3-Dichloropropene	3. U				
10061-02-6	trans-1,3-Dichloropropene	3. U				

\*\*\* Validation Complete \*\*\*

NSA MID-SOUTH  
SWMU41 Groundwater Results  
November 2004

0411195 VOA		SAMPLE ID -----> ORIGINAL ID -----> LAB SAMPLE ID ----> SAMPLE DATE -----> DATE EXTRACTED --> DATE ANALYZED ----> MATRIX -----> UNITS ----->	041-G-01DA-02 041G01DA02 0411195-02 11/18/04 12/01/04 12/01/04 Water UG/L	A	041-G-02DA-02 041G02DA02 0411195-03 11/18/04 12/01/04 12/01/04 Water UG/L	A	041-H-02DA-02 041H02DA02 0411195-06 11/18/04 12/01/04 12/01/04 Water UG/L	A	041-G-03DA-02 041G03DA02 0411195-04 11/18/04 12/01/04 12/01/04 Water UG/L	A	041-G-04DA-02 041G04DA02 0411195-05 11/18/04 12/01/04 12/01/04 Water UG/L	A
CAS #	Parameter											
71-55-6	1,1,1-Trichloroethane	1.	U	1.	U	1.	U	1.	U	1.	U	
79-34-5	1,1,2,2-Tetrachloroethane	1.	U	1.	U	1.	U	1.	U	1.	U	
79-00-5	1,1,2-Trichloroethane	1.	U	1.	U	1.	U	1.	U	1.	U	
75-34-3	1,1-Dichloroethane	1.	U	1.	U	1.	U	1.	U	1.	U	
75-35-4	1,1-Dichloroethene	1.	U	1.	U	1.	U	1.	U	1.	U	
107-06-2	1,2-Dichloroethane	1.	U	1.	U	1.	U	1.	U	1.	U	
78-87-5	1,2-Dichloropropane	1.	U	1.	U	1.	U	1.	U	1.	U	
78-93-3	2-Butanone (MEK)	10.	U	10.	U	10.	U	10.	U	10.	U	
591-78-6	2-Hexanone	5.	U	5.	U	5.	U	5.	U	5.	U	
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.	U	5.	U	5.	U	5.	U	5.	U	
67-64-1	Acetone	10.	U	10.	U	10.	U	10.	U	10.	U	
71-43-2	Benzene	1.	U	1.	U	1.	U	1.	U	1.	U	
75-27-4	Bromodichloromethane	1.	U	1.	U	1.	U	1.	U	1.	U	
75-25-2	Bromoform	1.	U	1.	U	1.	U	1.	U	1.	U	
74-83-9	Bromomethane	2.	UJ	2.	UJ	2.	UJ	2.	UJ	2.	UJ	
75-15-0	Carbon disulfide	1.	U	1.	U	1.	U	1.	U	1.	U	
56-23-5	Carbon tetrachloride	1.	U	1.	U	1.	U	1.	U	1.	U	
108-90-7	Chlorobenzene	1.	U	1.	U	1.	U	1.	U	1.	U	
75-00-3	Chloroethane	2.	U	2.	U	2.	U	2.	U	2.	U	
67-66-3	Chloroform	1.	U	1.	U	1.	U	1.	U	1.	U	
74-87-3	Chloromethane	2.	U	2.	U	2.	U	2.	U	2.	U	
124-48-1	Dibromochloromethane	1.	U	1.	U	1.	U	1.	U	1.	U	
100-41-4	Ethylbenzene	1.	U	1.	U	1.	U	1.	U	1.	U	
1634-04-4	Methyl tert-butyl ether	1.	U	1.	U	1.	U	1.	U	1.	U	
75-09-2	Methylene chloride	2.	U	2.	U	2.	U	2.	U	2.	U	
91-20-3	Naphthalene	1.	U	1.	U	1.	U	1.	U	1.	U	
100-42-5	Styrene	1.	U	1.	U	1.	U	1.	U	1.	U	
127-18-4	Tetrachloroethene	1.	U	1.	U	1.	U	1.	U	1.	U	
108-88-3	Toluene	1.	U	1.	U	1.	U	1.	U	1.	U	
79-01-6	Trichloroethene	1.	U	1.	U	1.	U	1.	U	1.	U	
75-01-4	Vinyl chloride	2.	UJ	2.	U	2.	U	2.	U	2.	U	
1330-20-7	Xylene (Total)	1.	U	1.	U	1.	U	1.	U	1.	U	
156-59-2	cis-1,2-Dichloroethene	1.	U	1.	U	1.	U	1.	U	1.	U	
10061-01-5	cis-1,3-Dichloropropene	1.	U	1.	U	1.	U	1.	U	1.	U	
156-60-5	trans-1,2-Dichloroethene	1.	U	1.	U	1.	U	1.	U	1.	U	
10061-02-6	trans-1,3-Dichloropropene	1.	U	1.	U	1.	U	1.	U	1.	U	