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EPA Region 5 Records Ctr.
304911

October 27th, 2004

Mr. Nabil S. Fayoumi
U. S. EPA - Region 5
77 West Jackson Boulevard (SR-6J)
Chicago, Illinois 60604-3590

Re: Sauget Sites Area I - Sample from Well EE-11

Dear Nabil:

Attached, please find the results of the laboratory analysis of the LNAPL material recovered from Well EE-11 in Sauget Area 1. Please call if you have any questions.

Sincerely,

Steven D. Smith
Project Coordinator

cc: Sandra Bron - Illinois EPA
Chris English - CH2M Hill
Bob Goodson - CH2M Hill
Linda Tape
Rich Ricci
Richard Williams
Glen Kurowski
Joe Grana
Steve Schmidt
Craig Zimmerman
Bill Stone

GROUNDWATER SERVICES, INC.

CHEMICAL ANALYSIS AND PHYSICAL PROPERTIES TESTING OF OIL SAMPLE FROM WELL EE-11

Sauget Area 1, Sauget and Cahokia, Illinois

On May 19, 2004, personnel from Groundwater Services, Inc. (GSI) collected a sample of oil from well EE-11, which is located at Site G. The oil was reported to have dark brown color and the consistency of motor oil. Results of field measurements indicated a specific gravity of 0.94 and viscosity of 26.9 centistokes at a temperature of 78 degrees F. The specific gravity measurement and visual observations confirmed that the oil is an LNAPL and not a DNAPL.

Two 40-mL vials of the oil sample from EE-11 were submitted to Severn Trent Laboratories in Savannah, Georgia, for laboratory analysis of VOCs, SVOCs, pesticides, herbicides, PCBs, dioxin, and metals. Analytical results are presented on Table 1 and summarized below. Less than one percent of the sample composition by weight was identified by these analytical methods.

Chemical Constituents in Oil Sample from EE-11	Reported Concentration (mg/kg)	Weight Fraction (%)
VOCs (total)	829	0.083
SVOCs (total)	3300	0.33
Pesticides (total)	153	0.015
Herbicides (total)	31	0.003
PCBs (total)	2600	0.26
Dioxins/Furans (total)	32 *	0.003
Metals (total)	1580	0.16
Total Weight Fraction for Identified Constituents:		**0.85%**

* = Neither 2,3,7,8-TCDD nor 1,2,3,7,8-PeCDD was detected in the oil sample.

A liter bottle containing groundwater and oil was submitted for laboratory analysis of fluid properties at PTS Laboratories in Santa Fe Springs, California. The sample was tested using ASTM D445 and ASTM D1481, which include measurement of: i) dynamic viscosity and fluid density at three temperatures; ii) surface tension for each fluid; and iii) interfacial tension for oil/water, oil/air, and water/air. An additional volume of sample was submitted to SPL, Inc. for ASTM Method D86 Distillation. Copies of laboratory reports are provided in Attachment 1.

A liter of oil and water was retained under refrigeration by GSI. A vial of oil taken from the liter bottle was submitted to Triton Analytics Corp. on August 9, 2004 for High Temperature Simulated Distillation (HTSD). The HTSD test is a GC technique that separates individual hydrocarbon components in the order of their boiling points, giving a percent mass yield as a function of boiling point. The HTSD test can be used to determine the carbon number distribution up to C120.

GROUNDWATER SERVICES, INC.

Prior to conducting the HTSD test. Triton Analytics centrifuged the contents of the vial for ten minutes to isolate the oil layer. Triton Analytics reported that the boiling characteristics of the oil layer from the sample showed a significant amount of hydrocarbon compounds in the diesel range. A minor second boiling region of material was observed in the C23 carbon number range, which is more characteristic of a vacuum gas oil or heavier oil.

Key Findings: The oil sample collected from well EE-11 was determined to be an LNAPL and not a DNAPL. Chemical constituents identified by various analytical methods comprised less than one percent of the sample by weight. The boiling characteristics of the oil sample showed a significant amount of hydrocarbon compounds in the diesel range. A minor second boiling region of material was observed in the C23 carbon number range, which is more characteristic of a vacuum gas oil or heavier oil.

GROUNDWATER SERVICES, INC.

TABLE 1
CHEMICAL COMPOSITION OF OIL SAMPLE FROM WELL EE-11

Sauget Area 1
Sauget and Cahokia, Illinois

COMPOUND	CAS No.	Result	Units
Volatile Organic Compounds (VOCs) By EPA Method 8260			
Acetone	67-64-1	<250	mg/kg
Benzene	71-43-2	**44**	"
Bromodichloromethane	75-27-4	<25	"
Bromoform	75-25-2	<25	"
Bromomethane	74-83-9	<25	"
Carbon disulfide	75-15-0	<25	"
Carbon tetrachloride	56-23-5	<25	"
Chlorobenzene	108-90-7	**710**	"
Chloroethane	75-00-3	<25	"
Chloroform	67-66-3	<25	"
Chloromethane	74-87-3	<25	"
Dibromochloromethane	124-48-1	<25	"
Dichloroethane, 1,1-	75-34-3	<25	"
Dichloroethane, 1,2-	107-06-2	<25	"
Dichloroethene, 1,1-	75-35-4	<25	"
Dichloroethene, cis-1,2-	156-59-2	**7.9J**	"
Dichloroethene, trans-1,2-	156-60-5	<25	"
Dichloropropane, 1,2-	78-87-5	<25	"
Dichloropropene, cis-1,3-	10061-01-5	<25	"
Dichloropropene, trans-1,3-	10061-02-6	<25	"
Ethylbenzene	100-41-4	**27**	"
Hexanone, 2-	591-78-6	<120	"
Methyl ethyl ketone (2-Butanone)	78-93-3	<120	"
Methyl-2-pentanone, 4-	108-10-1	<120	"
Methylene chloride	75-09-2	<25	"
Styrene	100-42-5	<25	"
Tetrachloroethane, 1,1,2,2-	79-34-5	<25	"
Tetrachloroethene	127-18-4	**13J**	"
Toluene	108-88-3	**5.8J**	"
Trichloroethane, 1,1,1-	71-55-6	<25	"
Trichloroethane, 1,1,2-	79-00-5	<25	"
Trichloroethene	79-01-6	<25	"
Vinyl chloride	75-01-4	<25	"
Xylenes (total)	1330-20-7	**21J**	"
Total VOCs		**828.7**	mg/kg

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TABLE 1
CHEMICAL COMPOSITION OF OIL SAMPLE FROM WELL EE-11

Sauget Area 1
Sauget and Cahokia, Illinois

COMPOUND	CAS No.	Result	Units
Semivolatile Organic Compounds (SVOCs) By EPA Method 8270			
Acenaphthene	83-32-9	<860	mg/kg
Acenaphthylene	208-96-8	<860	"
Anthracene	120-12-7	<860	"
Benzo(a)anthracene	56-55-3	<860	"
Benzo(a)pyrene	50-32-8	**120J**	"
Benzo(b)fluoranthene	205-99-2	<860	"
Benzo(ghi)perylene	191-24-2	**180J**	"
Benzo(k)fluoranthene	207-08-9	<860	"
Bis(2-chloroethoxy) methane	111-91-1	<860	"
Bis(2-chlorethyl)ether	111-44-4	<860	"
Bis(2-ethylhexyl) phthalate	117-81-7	<860	"
Bromophenyl phenyl ether, 4-	101-55-3	<860	"
Butylbenzyl phthalate	85-68-7	<860	"
Carbazole	86-74-8	<860	"
Chloro-3-methylphenol, 4-	59-50-7	<860	"
Chloroaniline, 4-	106-47-8	**410J**	"
Chloronaphthalene, 2-	91-58-7	<860	"
Chlorophenol, 2-	95-57-8	<860	"
Chlorophenyl phenyl ether, 4-	7005-72-3	<860	"
Chrysene	218-01-9	**440J**	"
Dibenz(a,h)anthracene	53-70-3	**97J**	"
Dibenzofuran	132-64-9	<860	"
Dichlorobenzene, 1,2-	95-50-1	**130J**	"
Dichlorobenzene, 1,3-	541-73-1	<860	"
Dichlorobenzene, 1,4-	106-46-7	**150J**	"
Dichlorobenzidine, 3,3'-	91-94-1	<1700	"
Dichlorophenol, 2,4-	120-83-2	<860	"
Diethylphthalate	84-66-2	<860	"
Dimethylphenol, 2,4-	105-67-9	<860	"
Dimethyl phthalate	131-11-3	<860	"
Di-n-butyl phthalate	84-74-2	<860	"
Dinitro-o-Cresol, 4,6-	534-52-1	<4400	"
Dinitrophenol, 2,4-	51-28-5	<4400	"
Dinitrotoluene, 2,4-	121-14-2	<860	"
Dinitrotoluene, 2,6-	606-20-2	<860	"
Di-n-octyl phthalate	117-84-0	**850J**	"
Dinoseb	88-85-7	<860	"
Fluoranthene	206-44-0	<860	"
Fluorene	86-73-7	<860	"
Hexachlorobenzene	118-74-1	<860	"
Hexachlorobutadiene	87-68-3	<860	"
Hexachlorocyclopentadiene	77-47-4	<860	"
Hexachloroethane	67-72-1	<860	"
Indeno(1,2,3-cd)pyrene	193-39-5	**110J**	"
Isophorone	78-59-1	<860	"

GROUNDWATER SERVICES, INC.

TABLE 1
CHEMICAL COMPOSITION OF OIL SAMPLE FROM WELL EE-11

Sauget Area 1
Sauget and Cahokia, Illinois

COMPOUND	CAS No.	Result	Units
Semivolatile Organic Compounds (SVOCs) By EPA Method 8270 Continued			
Methylnaphthalene, 2-	91-57-6	<860	mg/kg
Cresol, o-	95-48-7	<860	"
Cresol, p-	106-44-5	<860	"
Naphthalene	91-20-3	<860	"
Nitroaniline, 2-	88-74-4	<4400	"
Nitroaniline, 3-	99-09-2	<4400	"
Nitroaniline, 4-	100-01-6	<4400	"
Nitrobenzene	98-95-3	<860	"
Nitrophenol, 2-	88-75-5	<860	"
Nitrophenol, 4-	100-02-7	<4400	"
N-nitrosodi-n-propylamine	621-64-7	<860	"
Nitrosodiphenylamine, N-	86-30-6	<860	"
Pentachlorophenol	87-86-5	<4400	"
Phenanthrene	85-01-8	<860	"
Phenol	108-95-2	<860	"
Pyrene	129-00-0	**360J**	"
Trichlorobenzene, 1,2,4-	120-82-1	**450J**	"
Trichlorophenol, 2,4,5-	95-95-4	<860	"
Trichlorophenol, 2,4,6-	88-06-2	<860	"
Total SVOCs		**3297**	mg/kg
Metals By EPA Method 6010			
Aluminum	7429-90-5	**39**	mg/kg
Antimony	7440-36-0	<1.90	"
Arsenic	7440-38-2	<.93	"
Barium	7440-39-3	**310**	"
Beryllium	7440-41-7	<.37	"
Cadmium	7440-43-9	**0.20B**	"
Calcium	7440-70-2	**300**	"
Chromium	7440-47-3	**270**	"
Cobalt	7440-48-4	**1.1**	"
Copper	7440-50-8	**0.60B**	"
Iron	7439-89-6	**140**	"
Lead	7439-92-1	**380**	"
Magnesium	7439-95-4	**8.7B**	"
Mercury	7439-97-6	**0.026B**	"
Nickel	7440-02-0	**43**	"
Potassium	7440-09-7	**29B**	"
Selenium	7782-49-2	<.93	"
Silver	7440-22-4	<.93	"
Sodium	7440-23-5	**36B**	"
Thallium	7440-28-0	<.93	"
Vanadium	7440-62-2	**6.6**	"
Zinc	7440-66-6	**15**	"
Total Metals		**1579**	mg/kg

GROUNDWATER SERVICES, INC.

TABLE 1
CHEMICAL COMPOSITION OF OIL SAMPLE FROM WELL EE-11

Sauget Area 1
Sauget and Cahokia, Illinois

COMPOUND	CAS No.	Result	Units
Pesticides By EPA Method 8081			
Aldrin	309-00-2	<0.25	mg/kg
alpha-BHC	319-84-6	<0.25	"
beta-BHC	319-85-7	<0.25	"
Gamma-BHC (Lindane)	58-89-9	<0.25	"
delta-BHC	319-86-8	<0.25	"
alpha Chlordane	5103-71-9	<0.25	"
Gamma Chlordane	5103-74-2	<0.25	"
4,4'-DDD	72-54-8	61P	"
4,4'-DDE	72-55-9	4P	"
4,4'-DDT	50-29-3	88P	"
Dieldrin	60-57-1	<0.50	"
Endosulfan I	959-98-8	<0.25	"
Endosulfan II	33213-65-9	<0.50	"
Endosulfan sulfate	1031-07-8	<0.50	"
Endrin	72-20-8	<0.50	"
Endrin aldehyde	7421-93-4	<0.50	"
Endrin ketone	53494-70-5	<0.50	"
Heptachlor	76-44-8	<0.25	"
Heptachlor epoxide	1024-57-3	<0.25	"
Methoxychlor	72-43-5	<2.5	"
Toxaphene	8001-35-2	<25	"
Total Pesticides		153	mg/kg
Chlorinated Herbicides By EPA Method 8151			
2,4-D	94-75-7	<0.083	mg/kg
Dalapon	75-99-0	<20	"
2,4-DB	94-82-6	<0.083	"
Dicamba	1918-00-9	<.2	"
Dichloroprop	120-36-5	<1	"
MCPA	94-74-6	<20	"
MCPP	7085-19-0/ 93-65-2	<20	"
Pentachlorophenol	87-86-5	31	"
2,4,5-T	93-76-5	<0.083	"
2,4,5-TP (Silvex)	93-72-1	<0.083	"
Total Chlorinated Herbicides		31	mg/kg
Polychlorinated Biphenyls (PCBs) By EPA Method 8082			
Aroclor 1016	12674-11-2	<5	mg/kg
Aroclor 1221	11104-28-2	<10	"
Aroclor 1232	11141-16-5	<5	"
Aroclor 1242	53469-21-9	87	"
Aroclor 1248	12672-29-6	<5	"
Aroclor 1254	11097-69-1	870P	"
Aroclor 1260	11096-82-5	1600P	"
Total PCBs		2557	mg/kg

GROUNDWATER SERVICES, INC.

TABLE 1
CHEMICAL COMPOSITION OF OIL SAMPLE FROM WELL EE-11

Sauget Area 1
Sauget and Cahokia, Illinois

COMPOUND	CAS No.	Result	Units
Dioxins and Furans By EPA Method 8280A			
2,3,7,8-TCDD	1746-01-6	<2.9	ng/g
Total TCDD		<3.6	"
1,2,3,7,8-PeCDD	40321-76-4	<33	"
Total PeCDD		<33	"
1,2,3,4,7,8-HxCDD	39227-28-6	<10	"
1,2,3,6,7,8-HxCDD	57653-85-7	**77J**	"
1,2,3,7,8,9-HxCDD	19408-74-3	<27	"
Total HxCDD		**300**	"
1,2,3,4,6,7,8-HpCDD	35822-39-4	**2400**	"
Total HpCDD		**4500**	"
OCDD	3268-87-9	**19000E**	"
2,3,7,8-TCDF	51207-31-9	<20	"
Total TCDF		<20	"
1,2,3,7,8-PeCDF	57117-41-6	<3.4	"
2,3,4,7,8-PeCDF	57117-31-4	<7.2	"
Total PeCDF		<20	"
1,2,3,4,7,8-HxCDF	70648-26-9	<59	"
1,2,3,6,7,8-HxCDF	57117-44-9	<17	"
2,3,4,6,7,8-HxCDF	60851-34-5	<18	"
1,2,3,7,8,9-HxCDF	72918-21-9	<10	"
Total HxCDF		**400**	"
1,2,3,4,6,7,8-HpCDF	67562-39-4	**750**	"
1,2,3,4,7,8,9-HpCDF	55673-89-7	**78J**	"
Total HpCDF		**3500**	"
OCDF	39001-02-0	**3900**	"
Total Dioxins and Furans		**31600**	ng/g

Notes:

1. The oil sample was collected from EE-11 on May 19, 2004.
2. All analyses were conducted by Severn Trent Laboratories (STL), Savannah, Georgia, with the exception of dioxins and furans which were analyzed by STL, Sacramento, California. Detected analytes are presented in bold type.
3. J = Analyted detected below the reporting limit but above the method detection limit (MDL).
   < = Analyte not detected at the specified reporting limit. B = Reported value was obtained from a reading that was less than the project reporting limit but greater than or equal to the method detection limit.
   S = The reported value was determined by the method of standard additions (MSA).
   E = Estimated result. Result exceeds the calibration range.
   P = Identification of target analytes using GC methodology is based on retention time. Although two dissimilar GC columns confirmed the presence of target analyte in sample, relative percent difference is >40%. Thus, viewer discretion should be employed during data review and interpretation of results for this target compound.

GSI Job No. G-2876
Issued 10/22/04

GROUNDWATER
SERVICES, INC.

CHEMICAL ANALYSIS AND PHYSICAL PROPERTIES TESTING OF OIL SAMPLE FROM WELL EE-11

Sauget Area 1, Sauget and Cahokia, Illinois

ATTACHMENT 1 – LAB REPORTS FOR OIL SAMPLE FROM WELL EE-11

Chemical analysis results from Severn Trent Laboratories (14 pages)

Physical properties testing results from PTS Laboratories (3 pages)

ASTM D86 Distillation Test results from SPL, Inc. (2 pages)

High Temperature Simulated Distillation (HTSD) results from Triton Analytics Corp. (10 pages)

SEVERN TRENT STL

STL Savannah 5102 LaRoche Avenue - Savannah GA 31404 Telephone:(912) 354-7858 Fax:(912) 351-3673

Analytical Report

For: Mr. James Kearley
Groundwater Services, Inc.
2211 Norfolk, Suite 1000
Houston, TX 77098-4044
CC:

Order Number: S444433
SDG Number: SDN001
Client Project ID: G-2876
Project: Monsanto/Sauget Area I/SDN001
Report Date: 06/30/2004
Sampled By: Client
Sample Received Date: 05/20/2004
Requisition Number:
Purchase Order: 4508647262 Monsanto

Lidya Gulizia

Lidya Gulizia, Project Manager
lgulizia@stl-inc.com
10/25/2004

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Sample Summary

Order: S444433
Date Received: 05/20/2004

Client Groundwater Services Inc.
Project Monsanto Sauget Area I/SDN001

Client Sample ID	Lab Sample ID	Matrix	Date Sampled
EE-11 NAPL	S444433*1	OIL	05/19/2004 10:15
EE-11 NAPL	S444433*1-DL	OIL	05/19/2004 10:15

STL-2

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
44433-1	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001
44433-1-DL	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001

Parameter	Units	Lab Sample IDs 44433-1	44433-1-DL
Volatiles by GC/MS (8260)			
Chloromethane	mg/kg	25U	
Bromomethane (Methyl bromide)	mg/kg	25U	
Vinyl chloride	mg/kg	25U	
Chloroethane	mg/kg	25U	
Methylene chloride (Dichloromethane)	mg/kg	25U	
Acetone	mg/kg	250U	
Carbon disulfide	mg/kg	25U	
1,1-Dichloroethene	mg/kg	25U	
1,1-Dichloroethane	mg/kg	25U	
cis-1,2-Dichloroethene	mg/kg	7.9J	
trans-1,2-Dichloroethene	mg/kg	25U	
Chloroform	mg/kg	25U	
1,2-Dichloroethane	mg/kg	25U	
2-Butanone (MEK)	mg/kg	120U	
1,1,1-Trichloroethane	mg/kg	25U	
Carbon tetrachloride	mg/kg	25U	
Bromodichloromethane	mg/kg	25U	
1,1,2,2-Tetrachloroethane	mg/kg	25U	
1,2-Dichloropropane	mg/kg	25U	
trans-1,3-Dichloropropene	mg/kg	25U	
Trichloroethene	mg/kg	25U	
Dibromochloromethane	mg/kg	25U	
1,1,2-Trichloroethane	mg/kg	25U	
Benzene	mg/kg	44	
cis-1,3-Dichloropropene	mg/kg	25U	
Bromoform	mg/kg	25U	
2-Hexanone	mg/kg	120U	
4-Methyl-2-pentanone (MIBK)	mg/kg	120U	

STL-3

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
44433-1	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001
44433-1-DL	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001

Parameter	Units	Lab Sample IDs 44433-1	44433-1-DL
Volatiles by GC/MS (8260)			
Tetrachloroethene	mg/kg	13J	
Toluene	mg/kg	5 8J	
Chlorobenzene	mg/kg	710	
Ethylbenzene	mg/kg	27	
Styrene	mg/kg	25U	
Xylenes, Total	mg/kg	21J	
Surrogate - Toluene-d8 *	%	96 %	
Surrogate - 4-Bromofluorobenzene *	%	104 %	
Surrogate - Dibromofluoromethane *	%	108 %	
Dilution Factor		12 5	
Prep Date		06/01/04	
Analysis Date		06/01/04	
Batch ID		160601	
TCL Semivolatiles (8270)			
Phenol	mg/kg dw	860U	
bis(2-Chloroethyl)ether	mg/kg dw	860U	
2-Chlorophenol	mg/kg dw	860U	
1,3-Dichlorobenzene	mg/kg dw	860U	
1,4-Dichlorobenzene	mg/kg dw	150J	
1,2-Dichlorobenzene	mg/kg dw	130J	
2-Methylphenol (o-Cresol)	mg/kg dw	860U	
3-Methylphenol/4-Methylphenol (m&p-Cresol)	mg/kg dw	860U	
N-Nitroso-di-n-propylamine	mg/kg dw	860U	
Hexachloroethane	mg/kg dw	860U	

STL-4

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
44433-1	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001
44433-1-DL	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001

Parameter	Units	Lab Sample IDs 44433-1	44433-1-DL
TCL Semivolatiles (8270)			
Nitrobenzene	mg/kg dw	860U	
Isophorone	mg/kg dw	860U	
2-Nitrophenol	mg/kg dw	860U	
2,4-Dimethylphenol	mg/kg dw	860U	
bis(2-Chloroethoxy)methane	mg/kg dw	860U	
1,2,4-Trichlorobenzene	mg/kg dw	450J	
Naphthalene	mg/kg dw	860U	
4-Chloroaniline	mg/kg dw	410J	
Hexachlorobutadiene	mg/kg dw	860U	
4-Chloro-3-methylphenol	mg/kg dw	860U	
2-Methylnaphthalene	mg/kg dw	860U	
Hexachlorocyclopentadiene	mg/kg dw	860U	
2,4,6-Trichlorophenol	mg/kg dw	860U	
2,4,5-Trichlorophenol	mg/kg dw	860U	
2-Chloronaphthalene	mg/kg dw	860U	
2-Nitroaniline	mg/kg dw	4400U	
Dimethylphthalate	mg/kg dw	860U	
Acenaphthylene	mg/kg dw	860U	
3-Nitroaniline	mg/kg dw	4400U	
Acenaphthene	mg/kg dw	860U	
2,4-Dinitrophenol	mg/kg dw	4400U	
4-Nitrophenol	mg/kg dw	4400U	
Dibenzofuran	mg/kg dw	860U	
2,4-Dinitrotoluene	mg/kg dw	860U	
2,6-Dinitrotoluene	mg/kg dw	860U	
Diethylphthalate	mg/kg dw	860U	
4-Chlorophenylphenyl ether	mg/kg dw	860U	
Fluorene	mg/kg dw	860U	
4-Nitroaniline	mg/kg dw	4400U	

STL-5

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
44433-1	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001
44433-1-DL	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001

Parameter	Units	Lab Sample IDs 44433-1	44433-1-DL
TCL Semivolatiles (8270)			
4,6-Dinitro-2-methylphenol	mg/kg dw	4400U	
N-Nitrosodiphenylamine	mg/kg dw	860U	
4-Bromophenylphenyl ether	mg/kg dw	860U	
Hexachlorobenzene	mg/kg dw	860U	
Pentachlorophenol	mg/kg dw	4400U	
Phenanthrene	mg/kg dw	860U	
Anthracene	mg/kg dw	860U	
Di-n-butylphthalate	mg/kg dw	860U	
Fluoranthene	mg/kg dw	860U	
Pyrene	mg/kg dw	360J	
Butylbenzylphthalate	mg/kg dw	860U	
3,3'-Dichlorobenzidine	mg/kg dw	1700U	
Benzo(a)anthracene	mg/kg dw	860U	
bis(2-Ethylhexyl)phthalate	mg/kg dw	860U	
Chrysene	mg/kg dw	440J	
Di-n-octylphthalate	mg/kg dw	850J	
Benzo(b)fluoranthene	mg/kg dw	860U	
Benzo(k)fluoranthene	mg/kg dw	860U	
Benzo(a)pyrene	mg/kg dw	120J	
Indeno(1,2,3-cd)pyrene	mg/kg dw	110J	
Dibenzo(a,h)anthracene	mg/kg dw	97J	
Benzo(g,h,i)perylene	mg/kg dw	180J	
Carbazole	mg/kg dw	860U	
Dinoseb	mg/kg dw	860U	
2,4-Dichlorophenol	mg/kg dw	860U	
Surrogate - Phenol-d5 *	%	87 %	
Surrogate - 2-Fluorophenol *	%	94 %	
Surrogate - 2,4,6-Tribromophenol *	%	56 %	

STL 6

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
44433-1	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001
44433-1-DL	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001

Parameter	Units	Lab Sample IDs 44433-1	44433-1-DL
TCL Semivolatiles (8270)			
Surrogate - Nitrobenzene - d5 *	%	98 %	
Surrogate - 2-Fluorobiphenyl *	%	100 %	
Surrogate - Terphenyl-d14 *	%	105 %	
Dilution Factor		10	
Prep Date		05/26/04	
Analysis Date		06/07/04	
Batch ID		0526D	
TCL Pesticides			
alpha-BHC	mg/kg	0.25U	2.5U
beta-BHC	mg/kg	0.25U	2.5U
delta-BHC	mg/kg	0.25U	2.5U
gamma-BHC (Lindane)	mg/kg	0.25U	2.5U
Heptachlor	mg/kg	0.25U	2.5U
Aldrin	mg/kg	0.25U	2.5U
Heptachlor epoxide	mg/kg	0.25U	2.5U
Endosulfan I	mg/kg	0.25U	2.5U
Dieldrin	mg/kg	0.50U	5.0U
4,4'-DDE	mg/kg	4.0P	9.9DP
Endrin	mg/kg	0.50U	5.0U
Endrin aldehyde	mg/kg	0.50U	5.0U
Endosulfan II	mg/kg	0.50U	5.0U
4,4'-DDD	mg/kg	23EP	61DP
Endosulfan sulfate	mg/kg	0.50U	5.0U
4,4'-DDT	mg/kg	87E	88DP
Endrin ketone	mg/kg	0.50U	5.0U
Methoxychlor	mg/kg	2.5U	25U

STL-7

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
44433-1	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001
44433-1-DL	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001

Parameter	Units	Lab Sample IDs 44433-1	44433-1-DL
TCL Pesticides			
alpha-Chlordane	mg/kg	0.25U	2.5U
gamma-Chlordane	mg/kg	0.25U	2.5U
Toxaphene	mg/kg	25U	250U
Surrogate - DCB *	%	1850 %*X	0 %D
Surrogate - 2,4,5,6-Tetrachloro-m-xylene (TCMX) *	%	115 %	0 %D
Dilution Factor		5	50
Prep Date		05/25/04	05/25/04
Analysis Date		06/09/04	06/09/04
Batch ID		0525P	0525P
PCB's			
Aroclor-1016	mg/kg	5.0U	50U
Aroclor-1221	mg/kg	10U	100U
Aroclor-1232	mg/kg	5.0U	50U
Aroclor-1242	mg/kg	87	160D
Aroclor-1248	mg/kg	5.0U	50U
Aroclor-1254	mg/kg	350EP	8700P
Aroclor-1260	mg/kg	610EP	1600D
Surrogate - TCX *	%	115 %	0 %D
Surrogate - DCB *	%	1850 %*X	0 %D
Dilution Factor		5	50
Prep Date		05/25/04	05/25/04
Analysis Date		06/09/04	06/09/04
Batch ID		0525P	0525P

STL-8

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
44433-1	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001
44433-1-DL	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001

Parameter	Units	Lab Sample IDs 44433-1	44433-1-DL
Chlorinated Herbicides			
2,4-D	mg/kg	0.083U	
2,4-DB	mg/kg	0.083U	
2,4,5-T	mg/kg	0.083U	
2,4,5-TP (Silvex)	mg/kg	0.083U	
Dalapon	mg/kg	20U	
Dicamba	mg/kg	0.20U	
Dichloroprop	mg/kg	1.0U	
Pentachlorophenol	mg/kg	31	
MCPA[(4-chloro-2-methylphenoxy)-acetic acid]	mg/kg	20U	
MCPP[2-(4-chloro-2-methylpheno xy)-propanoic acid]	mg/kg	20U	
Surrogate-DCAA *	%	0 %D	
Dilution Factor		10	
Prep Date		05/27/04	
Analysis Date		06/10/04	
Batch ID		0527R	
TAL Metals (6010)			
Aluminum	mg/kg	39	
Antimony	mg/kg	1.9U	
Arsenic	mg/kg	0.93U	
Barium	mg/kg	310	
Beryllium	mg/kg	0.37U	
Cadmium	mg/kg	0.20B	
Calcium	mg/kg	300	
Chromium	mg/kg	270	
Cobalt	mg/kg	1.1	

STL-9

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
44433-1	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001
44433-1-DL	EE-11 NAPL	OIL	05/20/04	05/19/04 10:15	SDN001

Parameter	Units	Lab Sample IDs 44433-1	44433-1-DL
TAL Metals (6010)			
Copper	mg/kg	0.60B	
Iron	mg/kg	140	
Lead	mg/kg	380	
Magnesium	mg/kg	8.7B	
Nickel	mg/kg	43	
Potassium	mg/kg	29B	
Selenium	mg/kg	0.93U	
Silver	mg/kg	0.93U	
Sodium	mg/kg	36B	
Thallium	mg/kg	0.93U	
Vanadium	mg/kg	6.6	
Zinc	mg/kg	15	
Dilution Factor		1	
Prep Date		06/01/04	
Analysis Date		06/02/04	
Batch ID		0601A	
Mercury (7471)			
Mercury	mg/kg	0.026B	
Dilution Factor		2	
Prep Date		06/04/04	
Analysis Date		06/07/04	
Batch ID		0604S	

STL-10

Order Number: S444433

These test results meet all the requirements of NELAC. All questions regarding this test report should be directed to the STL Project Manager who signed this test report.

SW-846, Test Methods for Evaluating Solid Waste, Third Edition, September 1986, and Updates I, II, IIA, IIB, and III.

U = Indicates that the compound was analyzed for but not detected.

J = The flag "J" indicates the presence of a compound that meets the identification criteria, but the result is less than the sample RL and greater than the MDL.

D = Result is from a secondary dilution.

E (Organic) = Result exceeded the upper calibration limit.

P = Identification of target analytes using GC methodology is based on retention time. Although two dissimilar GC columns confirmed the presence of the target analyte in the sample, relative percent difference is >40 %. Thus, viewer discretion should be employed during data review and interpretation of results for this target compound.

X = Surrogate recovery outside established limits.

B (Inorganic) = This flag indicates the reported value was obtained from a reading that was less than the Project Reporting Limits but greater than or equal to the Method Detection Limit (MDL).

S = The reported value was determined by the Method of Standard Additions (MSA).

The Pesticide, PCB and Herbicide surrogate compounds were not recovered due to required dilution levels and have been denoted as "0 %D" in the LIMS report for the following sample(s): 44433-1DL.

The analysis of Diosxins and Furans was subcontracted to STL West

Sacramento for analysis. Please refer to the report attachement for these results.

WASTE, 8280A, Dioxins/Furans

STL-13

STL SAVANNAH

Client Sample ID: EE-11 NAPL

Trace Level Organic Compounds

Lot-Sample #...: G4E210394-001 Work Order #...: GGT1A2AA Matrix.....: WASTE
Date Sampled...: 05/19/04 Date Received..: 05/21/04
Prep Date.....: 06/09/04 Analysis Date..: 06/10/04
Prep Batch #...: 4161625
% Moisture.....:

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	2.9	ng/g	SW846 8280A
Total TCDD	ND	3.6	ng/g	SW846 8280A
1,2,3,7,8-PeCDD	ND	33	ng/g	SW846 8280A
Total PeCDD	ND	33	ng/g	SW846 8280A
1,2,3,4,7,8-HxCDD	ND	10	ng/g	SW846 8280A
1,2,3,6,7,8-HxCDD	77 J		ng/g	SW846 8280A
1,2,3,7,8,9-HxCDD	ND	27	ng/g	SW846 8280A
Total HxCDD	300		ng/g	SW846 8280A
1,2,3,4,6,7,8-HpCDD	2400		ng/g	SW846 8280A
Total HpCDD	4500		ng/g	SW846 8280A
OCDD	19000 E		ng/g	SW846 8280A
2,3,7,8-TCDF	ND	20	ng/g	SW846 8280A
Total TCDF	ND	20	ng/g	SW846 8280A
1,2,3,7,8-PeCDF	ND	3.4	ng/g	SW846 8280A
2,3,4,7,8-PeCDF	ND	7.2	ng/g	SW846 8280A
Total PeCDF	ND	20	ng/g	SW846 8280A
1,2,3,4,7,8-HxCDF	ND	59	ng/g	SW846 8280A
1,2,3,6,7,8-HxCDF	ND	17	ng/g	SW846 8280A
2,3,4,6,7,8-HxCDF	ND	18	ng/g	SW846 8280A
1,2,3,7,8,9-HxCDF	ND	10	ng/g	SW846 8280A
Total HxCDF	400		ng/g	SW846 8280A
1,2,3,4,6,7,8-HpCDF	750		ng/g	SW846 8280A
1,2,3,4,7,8,9-HpCDF	78 J		ng/g	SW846 8280A
Total HpCDF	3500		ng/g	SW846 8280A
OCDF	3900		ng/g	SW846 8280A

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	80	(25 - 150)
13C-2,3,7,8-TCDF	82	(25 - 150)
13C-1,2,3,6,7,8-HxCDD	77	(25 - 150)
13C-1,2,3,4,6,7,8-HpCDF	83	(25 - 150)
13C-OCDD	98	(25 - 150)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
37Cl4-2,3,7,8-TCDD	89	(25 - 150)

NOTE(S):

J Estimated result. Result is less than the reporting limit.

E Estimated result. Result concentration exceeds the calibration range.

STL-14

Laboratories
ENVIRONMENTAL SERVICES

June 24, 2004

James A. Kearley
Groundwater Services, Inc.
2211 Norfolk, Suite 1000
Houston, Texas 77098

Re: Fluid Properties Data
PTS File No: 34379
Monsanto / Sauget Area 1

Dear Mr. Kearley:

Please find enclosed Fluid Properties Data from analyses conducted upon fluids received from your Monsanto / Sauget Area 1 project. An electronic version of the data has previously been sent to your attention via the Internet. All analyses were performed by applicable ASTM, EPA or API methodologies. The remaining fluids are currently in storage and will be disposed at sixty days from project completion.

PTS Laboratories, Inc. appreciates the opportunity to be of service. If you have any questions or require additional information, please give me a call at (562) 907-3607.

Sincerely,
PTS Laboratories, Inc.

Michael Mark Brady, R.G.
Project Manager

Encl.

8100 Secura Way – Santa Fe Springs, CA 90670
Phone 562.907.3607 Fax 562.907.3610
www.ptsgeolabs.com

PTS Laboratories

Groundwater Services, Inc.
PTS File No: 34379

VISCOSITY, SPECIFIC GRAVITY and DENSITY DATA

(METHODOLOGY: ASTM D1481 ASTM D445. API RP40)

PROJECT NAME: Monsanto / Sauget Area 1
PROJECT NO: G-2876-104

SAMPLE ID	MATRIX	TEMP. (°F)	SPECIFIC GRAVITY	DENSITY (g/cc)	VISCOSITY (centistokes)	VISCOSITY (centipoise)
EE-11 NAPL	Water	70	1.0053	1.0033	1.005	1.009
		100	1 0041	0.9971	0.702	0.700
		130	1 0086	0.9944	0.528	0.525
EE-11 NAPL	NAPL	70	0 8917	0.8899	26.4	23.5
		100	0.8858	0.8796	12.5	11.0
		130	0 8831	0.8707	7.19	6.26

INTERFACIAL / SURFACE TENSION DATA

(METHODOLOGY: DuNuoy Method - ASTM D971)

PROJECT NAME: Monsanto / Sauget Area 1
PROJECT NO: G-2876-104

PHASE PAIR		TEMP., (°F)	INTERFACIAL TENSION, (Dynes/centimeter)
SAMPLE ID / PHASE	SAMPLE ID / PHASE		
EE-11 NAPL (Water)	Air	79	58.3
EE-11 NAPL (NAPL)	Air	79	29.8
EE-11 NAPL (Water)	EE-11 NAPL (NAPL)	79	15.4

QUALITY CONTROL DATA

PHASE PAIR:	DI WATER / AIR
TEMPERATURE, °F:	79
IFT, MEASURED:	72.6
IFT, PUBLISHED:	71.8
RPD:	1.14

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis

Number: 1030-2004050236-001A

James Kearley
Groundwater Services, Inc.
2211 Norfolk Ste 1000
Houston TX 77098

May 20, 2004

Sample ID:	EE- 11 NAPL	Sampled By:		
Project Name :	Monsanto / Sauget Area 1	Sample Of:	Liquid	
Project Number :	G- 2876	Sample Date:	05/19/2004	10:15
Project Location:		Sample Conditions:		
Sample Point:		PO / Ref. No:		

ANALYTICAL DATA

ASTM D86 Distillation

% Recovery	° F @ 769 mm Hg	Lab Tech.	Date Analyzed
Initial Boiling Point	517	MES	05/20/04
5	530		
10	535		
20	542		
30	548		
40	556		
50	565		
60	576		
70	598		
80	640		
90	690		
95	NR		
Final Boiling Point	700		
Volume % Recovery	95		
Volume% Residue	5		
Volume % Loss	0		

Comments: Visual color is dark straw. Loss and residue observed. Temperatures uncorrected for barometric pressure. Sample experienced decomposition @ 700°F.

Bob Rannals
Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP or GPA guidelines for quality assurance, unless otherwise stated

SPL-1

Serial Number 38353

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

○ STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

☒ Alternate Laboratory Name/Location
SPL Laboratories
8800 Interchange
Houston, TX 77054

Phone: (713) 660-0901
Fax: (713) 660-8975

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
Monsanto / Sauget Area 1	G-2876	IL

STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Cheryl Foreman		

CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
James Kearney	(713) 522-6300	(713) 522-8010

CLIENT NAME	CLIENT E-MAIL
Groundwater Services, Inc	

CLIENT ADDRESS: 2211 Norfolk, Ste 1000 Houston, TX 77098

COMPANY CONTRACTING THIS WORK (if applicable):

PAGE 1 OF 1

STANDARD REPORT DELIVERY ○

DATE DUE _____

EXPEDITED REPORT DELIVERY (SURCHARGE) ○

DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT: 1

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	ASTM D-86 Generate Boiling Point Curves	NUMBER OF CONTAINERS SUBMITTED	REMARKS
5-19-04	1015	EE-11 NAPL	G				X	1		

1 of 3

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	5-19-04	1830						

RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
[signature]	5/20/04	11:20						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

4LBS

STL8240-680 (12/02)

16840 Barker Springs #302
Houston, Texas 77084

(281) 578-2289
Fax: (281) 578-2295
villalanti@earthlink.net

Triton Analytics Corp.

Reference Laboratories

- Hydrocarbon
- Chemical
- Environmental

Dan Villalanti, *Pres.* • Joe Raia, *Lab Director* • Calvin Blakley, *Mass Spec* • Jeanne Malloy, *GC*

September 15, 2004 Laboratory Reference: TAC 3895(A)

James Kearley
Groundwater Services, Inc.
2211 Norfolk, Suite 1000
Houston, TX 77098

Dear Mr. Kearley:

The High-temperature Simulated Distillation (HTSD) results for your sample identified below are enclosed and were reported to you earlier by Email 8/10/04.

EE-11 Oil from Monitoring Well

The boiling characteristics of this sample did not show any significant contribution of hydrocarbon materials in the range of gasoline, kerosene or jet fuel, however there was a significant portion of material in the diesel range as shown in the overlay HTSD chromatogram of the sample with a diesel fuel sample. There is also a second boiling region of material present in the C23 carbon number range which is more characteristic of a vacuum gas oil or heavier oil.

When we received the sample it appeared homogenous, but also appeared to contain some water. Prior to sampling we centrifuged the sample for 10 minutes to isolate the hydrocarbon layer. The proportion of water to hydrocarbon present is shown in the enclosed photograph of the vial of the centrifuged sample . Please note in the photo some sediment at the bottom of the vial which we tested but did not appear to be magnetic. Also included in this data package for reference are an illustration of the distillation characteristics of fuels and a table of properties of typical crude oil fractions.

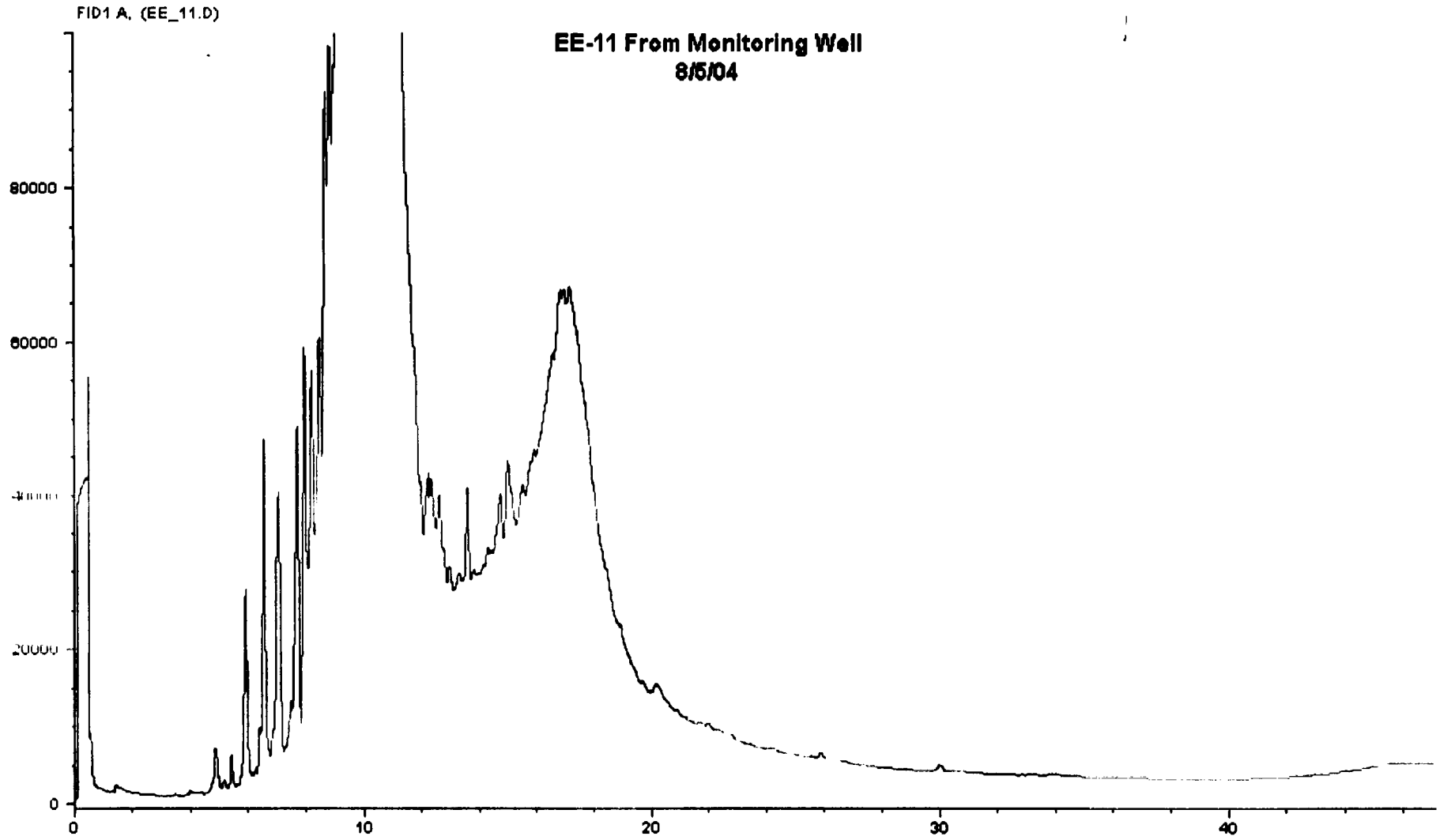
Thank you and please let us know if you have any questions.

Regards,

Dan C. Villalanti

Dan C. Villalanti
DCV/jcr
Enclosures

GIF image 986x529 pixels



TAC-2

========== AC Software version M2.5 ==========
Simdis HT 750 Analyzer

Data File Name: C:\HPCHEM\1\DATA\0809A\009F1201.D
Instrument : 1 Vial : 9
Operator : Triton Analyt. Injection : 1
Acquired on : 09 Aug 04 09:53 PM Seq. line : 12
Processed on : 10 Aug 04 9:26 AM
Sample name : EE-11 RE MW Sample Amt: 0.1024
Methodname : MHC30.MTH ISTD amt : 0.0000
Calc. Based On: ESTD Weight CS2: 4.8756
Sequencename : 0809A Cryogenic sequence

Blank used : C:\HPCHEM\1\DATA\0809A\008F1101.D
BP Calib. used: C:\HPCHEM\1\DATA\0809A\090F0101.D
Reference used: C:\HPCHEM\1\DATA\0809A\095F0301.D

Recovery(%) : 102.4 found, 99.5% recovery assumed
Resp. Factor : 1.520E-10 Threshold set : 100.0
IBP : 430 F Start Elution : 0.00
FBP : > 1351 F End Elut after: 43.30

Analysis results : %Weight versus Boiling point

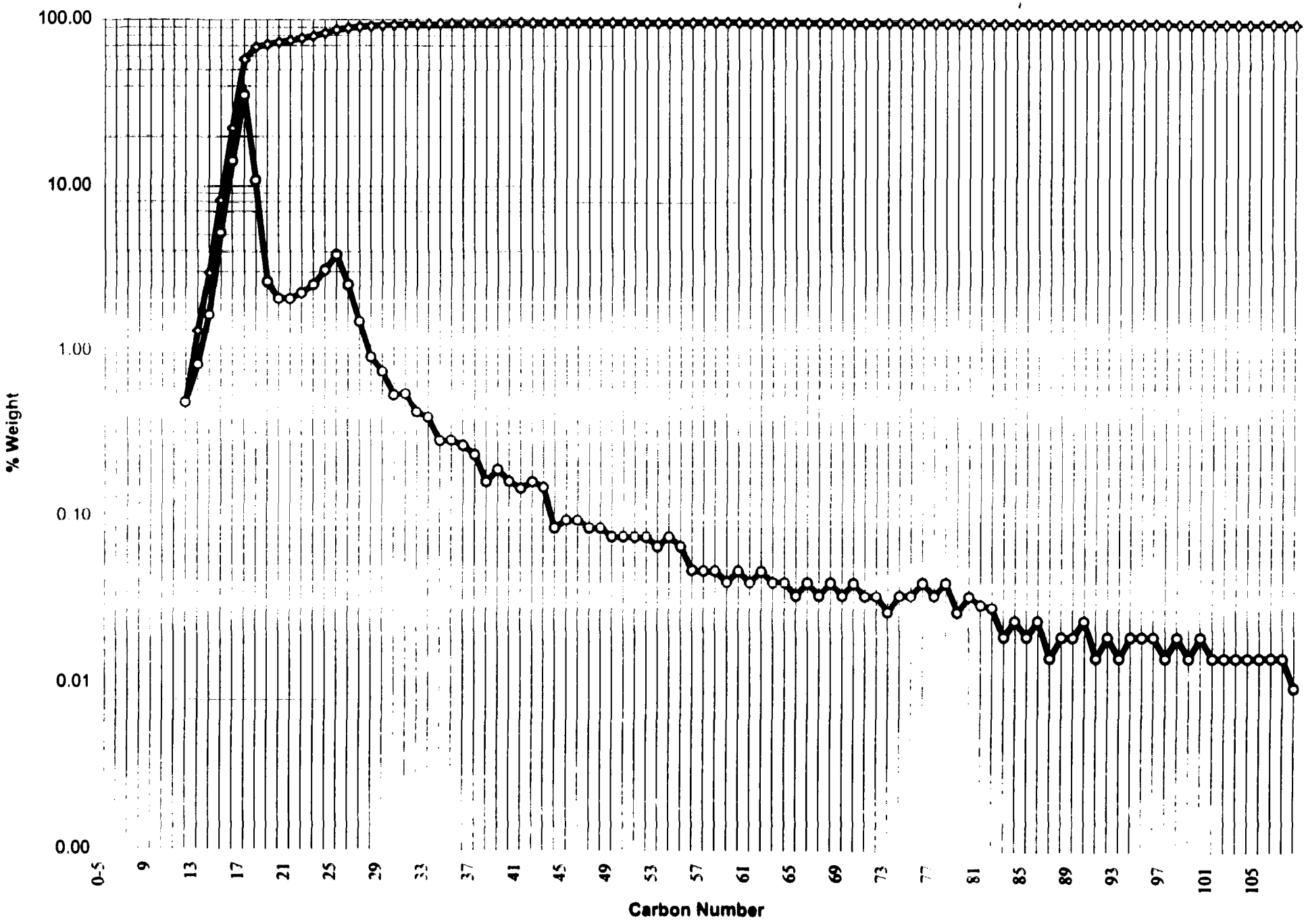
%	BP(F)	%	BP(F)	%	BP(F)	%	BP(F)
1	448	26	552	51	570	76	678
2	469	27	554	52	572	77	689
3	489	28	554	53	572	78	696
4	498	29	556	54	574	79	705
5	505	30	556	55	574	80	714
6	511	31	558	56	574	81	721
7	516	32	558	57	576	82	729
8	520	33	559	58	576	83	734
9	523	34	559	59	577	84	739
10	525	35	561	60	577	85	745
11	527	36	561	61	579	86	748
12	531	37	561	62	579	87	754
13	532	38	563	63	581	88	761
14	536	39	563	64	581	89	766
15	538	40	563	65	583	90	775
16	540	41	565	66	586	91	788
17	541	42	565	67	590	92	802
18	543	43	565	68	595	93	826
19	543	44	567	69	603	94	853
20	545	45	567	70	612	95	887
21	547	46	567	71	622	96	936
22	549	47	568	72	633	97	1002
23	550	48	568	73	646	98	1105
24	550	49	568	74	657	99	1251
25	552	50	570	75	669		

Analysis results : Table of cutpoints

BP(F)	%	BP(F)	%	BP(F)	%	BP(F)	%
480	2.3	750	86.1	900	95.3	1100	98.0
650	73.4	800	91.8	1000	97.0	1200	98.7

TAC-3

EE-11 From Monitoring Well J. Kearly Groundwater Services, Inc. Triton Analytics 281-578-2289



TAC-4

Data File	C:\HPCHEM\1\DATA\0809A\009F1201.D									
Blank analysis	C:\HPCHEM\1\DATA\0809A\008F1101.D									
Calibration analysis	C:\HPCHEM\1\DATA\0809A\090F0101.D									
Reference analysis	C:\HPCHEM\1\DATA\0809A\095F0301.D									
Instrument name	SIMDIS_1									
Operator	Triton Analyt.	Seq. line nr								
Acquired on	8/9/04 21:53	Injection								
Processed at	8/10/04 9:26	Instrument								
Sample name	**EE-11 RE MW**	Vial								
Method name	MHC30.MTH	Weight sample		0.1024	g					
Run type	1	Weight CS2		4.8756	g					
		Weight ISTD								
Sequence name	0809A									
Recovery %	**102.4**	found, 99.5% recovery assumed								
Response Factor	1.52E-10									
			****Data Reduction Lookup Values *****				**Carbon**	**%wt Cu**	**%wt**	Temp Eq
Perc%	BP øC	BP F					**Number**			Carbon#
0.5	221	429.8					**0-5**	**0.00**	**0.00**	97
1	231	447.8					**6**	**0.00**	**0.00**	156
2	243.5	470.3					**7**	**0.00**	**0.00**	208
3	254.1	489.4					**8**	**0.00**	**0.00**	259
4	258.8	497.8					**9**	**0.00**	**0.00**	304
5	263.2	505.8					**10**	**0.00**	**0.00**	345
6	266.4	511.5					**11**	**0.00**	**0.00**	385
7	268.6	515.5	0	0.5	0	429.8	**12**	**0.49**	**0.49**	421
8	270.7	519.3	1	2	447.8	470.3	**13**	**1.32**	**0.83**	455
9	272.7	522.9	2	3	470.3	489.4	**14**	**2.98**	**1.66**	489
10	274.3	525.7	8	9	519.3	522.9	**15**	**8.19**	**5.22**	520
11	275.4	527.7	22	23	548.4	549.7	**16**	**22.46**	**14.27**	549
12	276.8	530.2	57	58	575.4	576.1	**17**	**57.86**	**35.40**	576
13	278.4	533.1	68	69	595.6	603	**18**	**68.73**	**10.87**	601
14	279.6	535.3	71	72	621.9	633.2	**19**	**71.36**	**2.63**	626
15	280.6	537.1	73	74	646	657.1	**20**	**73.45**	**2.09**	651
16	281.6	538.9	75	76	668.5	678.9	**21**	**75.53**	**2.08**	674
17	282.6	540.7	77	78	688.1	696.9	**22**	**77.78**	**2.26**	695
18	283.5	542.3	80	81	713.7	721	**23**	**80.32**	**2.53**	716
19	284.4	543.9	83	84	733.8	739	**24**	**83.42**	**3.11**	736
20	285.2	545.4	87	88	754.5	760.5	**25**	**87.25**	**3.83**	756
21	286.1	547	89	90	767.1	775.9	**26**	**89.78**	**2.53**	774
22	286.9	548.4	91	92	787.3	802.8	**27**	**91.30**	**1.52**	792
23	287.6	549.7	92	93	802.8	825.3	**28**	**92.23**	**0.93**	808
24	288.2	550.8	92	93	802.8	825.3	**29**	**92.99**	**0.76**	825
25	288.8	551.8	93	94	825.3	852.8	**30**	**93.53**	**0.55**	840
26	289.4	552.9	94	95	852.8	887.4	**31**	**94.09**	**0.56**	856
27	289.9	553.8	94	95	852.8	887.4	**32**	**94.53**	**0.43**	871
28	290.4	554.7	94	95	852.8	887.4	**33**	**94.93**	**0.40**	885
29	290.9	555.6	95	96	887.4	935.1	**34**	**95.22**	**0.29**	898
30	291.4	556.5	95	96	887.4	935.1	**35**	**95.52**	**0.29**	912
31	291.9	557.4	95	96	887.4	935.1	**36**	**95.79**	**0.27**	925
32	292.3	558.1	96	97	935.1	1001.8	**37**	**96.03**	**0.24**	937
33	292.7	558.9	96	97	935.1	1001.8	**38**	**96.19**	**0.16**	948
34	293.1	559.6	96	97	935.1	1001.8	**39**	**96.39**	**0.19**	961
35	293.5	560.3	96	97	935.1	1001.8	**40**	**96.55**	**0.16**	972
36	293.9	561	96	97	935.1	1001.8	**41**	**96.70**	**0.15**	982
37	294.3	561.7	96	97	935.1	1001.8	**42**	**96.87**	**0.16**	993
38	294.6	562.3	97	98	1001.8	1105.2	**43**	**97.02**	**0.15**	1004
39	295	563	97	98	1001.8	1105.2	**44**	**97.11**	**0.09**	1013
40	295.3	563.5	97	98	1001.8	1105.2	**45**	**97.21**	**0.10**	1023
41	295.7	564.3	97	98	1001.8	1105.2	**46**	**97.30**	**0.10**	1033
42	296	564.8	97	98	1001.8	1105.2	**47**	**97.39**	**0.09**	1042
43	296.4	565.5	97	98	1001.8	1105.2	**48**	**97.48**	**0.09**	1051

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44	296.7	566.1	97	98	1101.8	1105.2	49	97.55	0.08	1059
45	297.1	566.8	97	98	1101.8	1105.2	50	97.63	0.08	1067
46	297.4	567.3	97	98	1101.8	1105.2	51	97.71	0.08	1075
47	297.8	568	97	98	1101.8	1105.2	52	97.79	0.08	1083
48	298.1	568.6	97	98	1101.8	1105.2	53	97.85	0.07	1090
49	298.5	569.3	97	98	1101.8	1105.2	54	97.93	0.08	1098
50	298.9	570	97	98	1101.8	1105.2	55	98.00	0.07	1105
51	299.3	570.7	98	99	1105.2	1250.1	56	98.05	0.05	1112
52	299.7	571.5	98	99	1105.2	1250.1	57	98.10	0.05	1119
53	300.1	572.2	98	99	1105.2	1250.1	58	98.14	0.05	1126
54	300.5	572.9	98	99	1105.2	1250.1	59	98.18	0.04	1132
55	301	573.8	98	99	1105.2	1250.1	60	98.23	0.05	1139
56	301.5	574.7	98	99	1105.2	1250.1	61	98.27	0.04	1145
57	301.9	575.4	98	99	1105.2	1250.1	62	98.32	0.05	1152
58	302.3	576.1	98	99	1105.2	1250.1	63	98.36	0.04	1158
59	302.7	576.9	98	99	1105.2	1250.1	64	98.41	0.04	1164
60	303.1	577.6	98	99	1105.2	1250.1	65	98.44	0.03	1169
61	303.5	578.3	98	99	1105.2	1250.1	66	98.48	0.04	1175
62	304	579.2	98	99	1105.2	1250.1	67	98.52	0.03	1180
63	304.6	580.3	98	99	1105.2	1250.1	68	98.56	0.04	1186
64	305.3	581.5	98	99	1105.2	1250.1	69	98.59	0.03	1191
65	306.4	583.5	98	99	1105.2	1250.1	70	98.63	0.04	1197
66	308	586.4	98	99	1105.2	1250.1	71	98.67	0.03	1202
67	310.3	590.5	98	99	1105.2	1250.1	72	98.70	0.03	1207
68	313.1	595.6	98	99	1105.2	1250.1	73	98.73	0.03	1211
69	317.2	603	98	99	1105.2	1250.1	74	98.76	0.03	1216
70	322.4	612.3	98	99	1105.2	1250.1	75	98.80	0.03	1221
71	327.7	621.9	98	99	1105.2	1250.1	76	98.84	0.04	1227
72	334	633.2	98	99	1105.2	1250.1	77	98.88	0.03	1232
73	341.1	646	98	99	1105.2	1250.1	78	98.92	0.04	1238
74	347.3	657.1	98	99	1105.2	1250.1	79	98.94	0.03	1242
75	353.6	668.5	98	99	1105.2	1250.1	80	98.98	0.03	1247
76	359.4	678.9	99	99.5	1250.1	1351.2	81	99.01	0.03	1252
77	364.5	688.1	99	99.5	1250.1	1351.2	82	99.04	0.03	1258
78	369.4	696.9	99	99.5	1250.1	1351.2	83	99.06	0.02	1262
79	374.3	705.7	99	99.5	1250.1	1351.2	84	99.08	0.02	1267
80	378.7	713.7	99	99.5	1250.1	1351.2	85	99.10	0.02	1271
81	382.8	721	99	99.5	1250.1	1351.2	86	99.13	0.02	1276
82	386.5	727.7	99	99.5	1250.1	1351.2	87	99.14	0.01	1279
83	389.9	733.8	99	99.5	1250.1	1351.2	88	99.16	0.02	1283
84	392.8	739	99	99.5	1250.1	1351.2	89	99.18	0.02	1287
85	395.7	744.3	99	99.5	1250.1	1351.2	90	99.21	0.02	1292
86	398.5	749.3	99	99.5	1250.1	1351.2	91	99.22	0.01	1295
87	401.4	754.5	99	99.5	1250.1	1351.2	92	99.24	0.02	1299
88	404.7	760.5	99	99.5	1250.1	1351.2	93	99.26	0.01	1302
89	408.4	767.1	99	99.5	1250.1	1351.2	94	99.28	0.02	1306
90	413.3	775.9	99	99.5	1250.1	1351.2	95	99.30	0.02	1310
91	419.6	787.3	99	99.5	1250.1	1351.2	96	99.32	0.02	1314
92	428.2	802.8	99	99.5	1250.1	1351.2	97	99.33	0.01	1317
93	440.7	825.3	99	99.5	1250.1	1351.2	98	99.35	0.02	1321
94	456	852.8	99	99.5	1250.1	1351.2	99	99.37	0.01	1324
95	475.2	887.4	99	99.5	1250.1	1351.2	100	99.39	0.02	1328
96	501.7	935.1	99	99.5	1250.1	1351.2	101	99.40	0.01	1331
97	538.8	1001.8	99	99.5	1250.1	1351.2	102	99.41	0.01	1334
98	596.2	1105.2	99	99.5	1250.1	1351.2	103	99.43	0.01	1337
99	676.7	1250.1	99	99.5	1250.1	1351.2	104	99.44	0.01	1340
99.5	732.9	1351.2	99	99.5	1250.1	1351.2	105	99.46	0.01	1343
			99	99.5	1250.1	1351.2	106	99.47	0.01	1346
			99	99.5	1250.1	1351.2	107	99.49	0.01	1349
			99	99.5	1250.1	1351.2	108	99.50	0.01	1351

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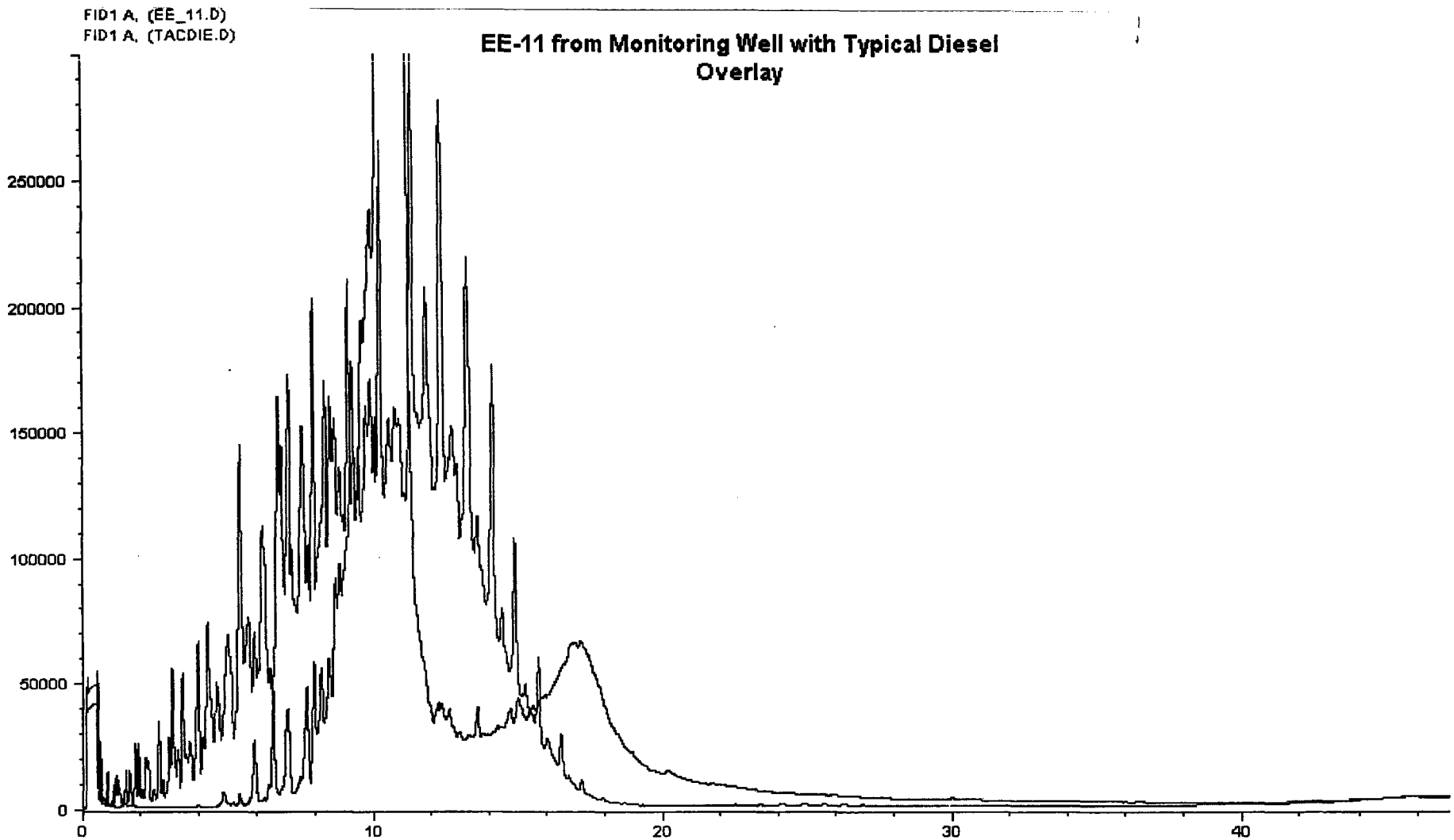
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FID1 A, (TACDIE.D)
EE-11 from Monitoring Well with Typical Diesel Overlay
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50000
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30
40

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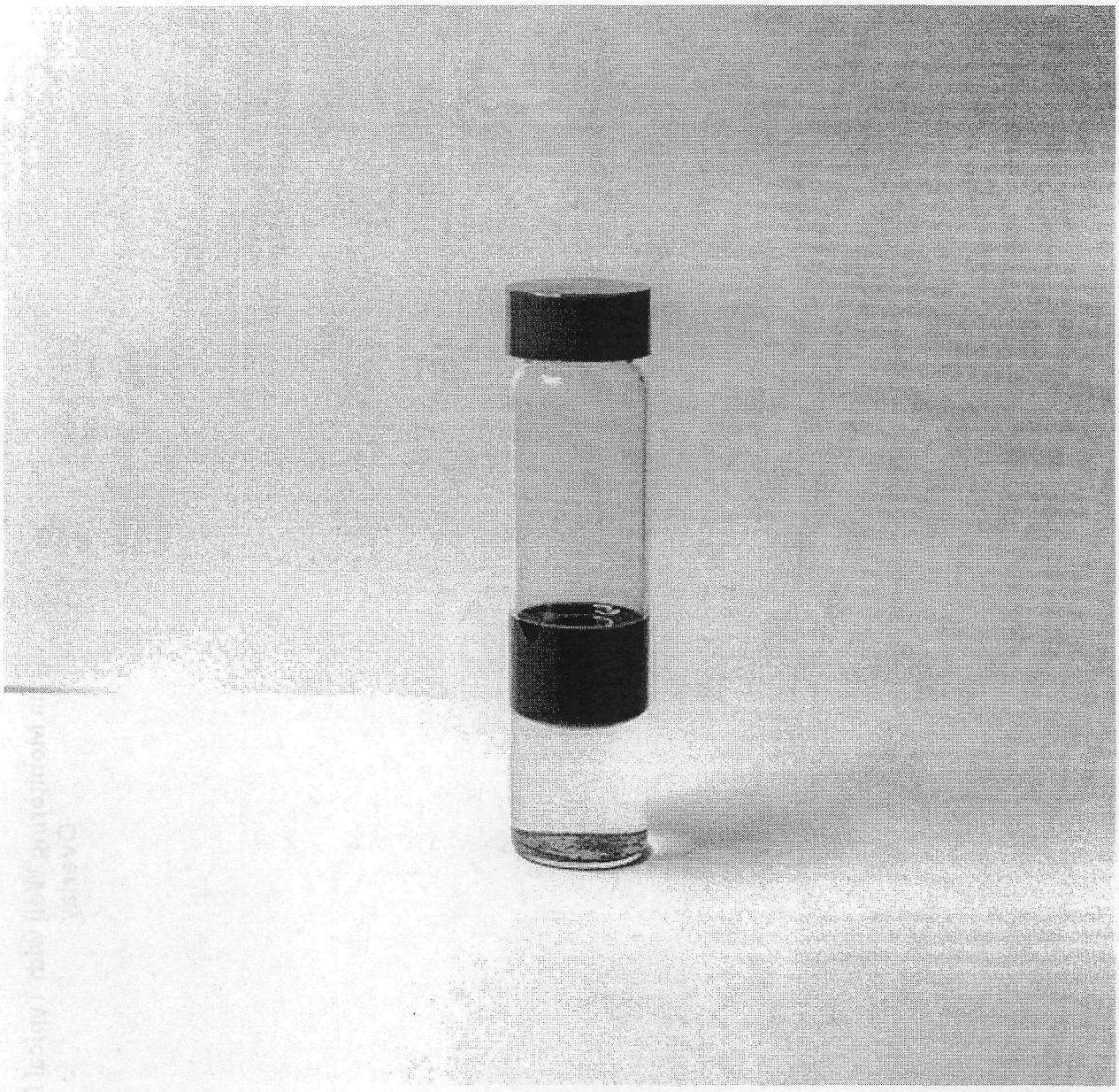

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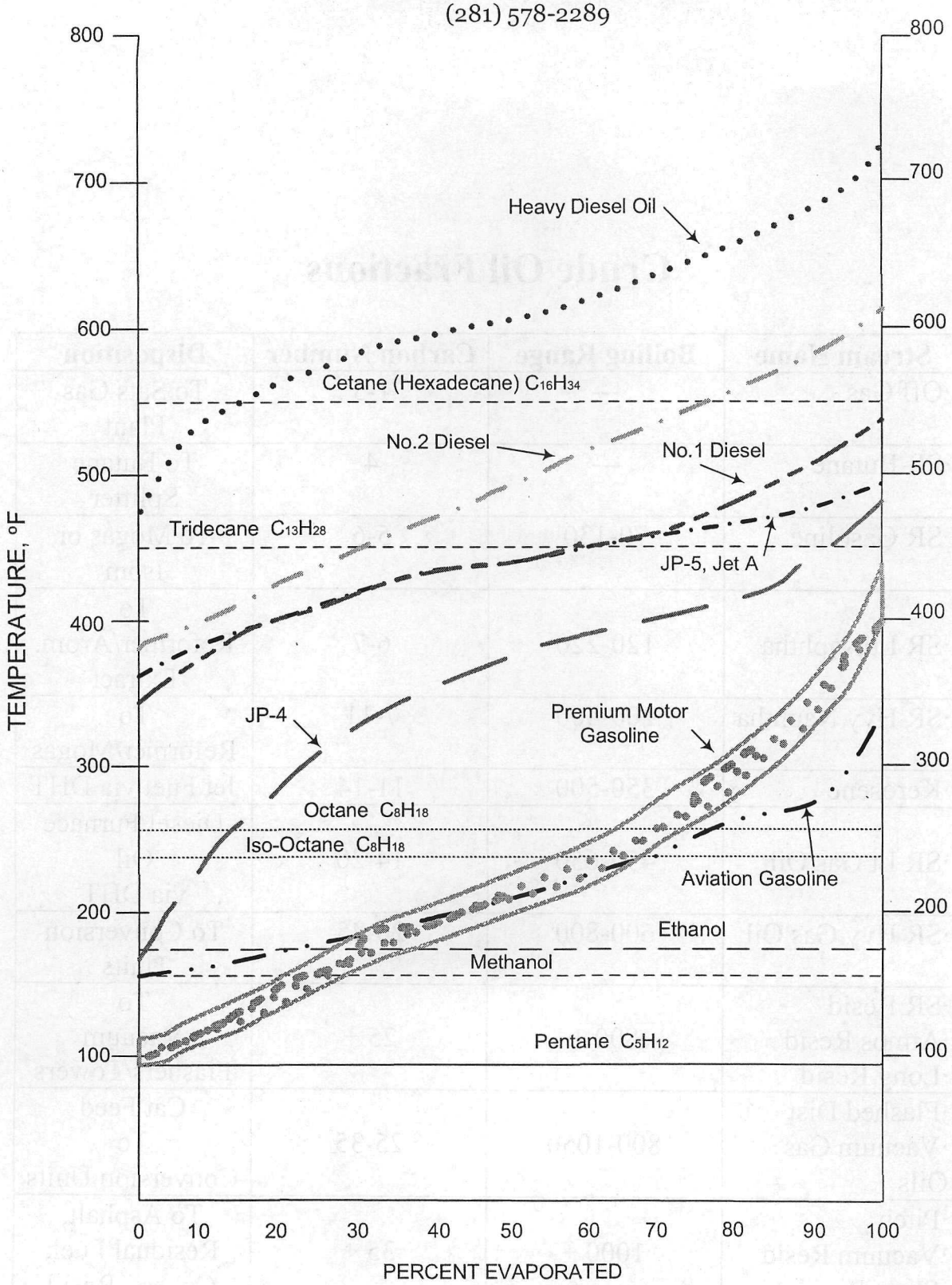
Crude Oil Fractions

Stream Name	Boiling Range	Carbon Number	Disposition
·Off Gas	---	1-3	To Sats Gas Plant
·SR Butane	---	4	To Butane Splitter
·SR Gasoline	70-130	5-6	To Mogas or Isom
·SR Lt Naphtha	120-220	6-7	To Reformer/Arom. Extract
·SR Hvy Naphtha	200-400	7-11	To Reformer/Mogas
·Kerosene	350-500	11-14	Jet Fuel via DHT
·SR Lt Gas Oil	450-650	14-20	Diesel/Furnace Oil via DHT
·SR Hvy Gas Oil	600-800	20-25	To Conversion Units
·SR Resid ·Atmos Resid ·Long Resid	800 +	25 +	To Vacuum Flashers/Towers
·Flashed Dist ·Vacuum Gas Oils	800-1050	25-35	Cat Feed To Conversion Units
·Pitch ·Vacuum Resid ·Short Resid	1000 +	35 +	To Asphalt, Residual Fuel, Cokers, Resid Conversion

Note: SR means Straight Run, i.e., from Crude Unit

Triton Analytics Corp.
(281) 578-2289



Distillation Characteristics of Fuels

TAC-10