Baker

03.01 - 9/26/96 - 02912

Baker Environmental, Inc.
Airport Office Park, Building 3
420 Rouser Road
Coraopolis, Pennsylvania 15108

(412) 269-6000
FAX (412) 269-2002

September 26, 1996

Commander
Atlantic Division
Naval Facilities Engineering Command
1510 Gilbert Street (Building N-26)
Norfolk, Virginia 23511-2699

Attn: Ms. Katherine H. Landman
Navy Technical Representative
Code 18232

Re: Contract N62470-89-D-4814
Navy CLEAN, District III
Contract Task Order (CTO) 0373 Mod 01
Groundwater Sampling Report, Tarawa Terrace
MCB Camp Lejeune, North Carolina

Dear Ms. Landman:

Baker Environmental, Inc. (Baker) is pleased to submit this letter report for the groundwater sampling activities completed at Tarawa Terrace, MCB Camp Lejeune on August 19, 1996. The paragraphs which follow provide details concerning the site location and background, project objective, sampling methodology, analytical results, and conclusions.

SITE LOCATION AND BACKGROUND

The following section provides general information regarding site location and background. For further background data and general project information refer to LANTDIV's Request for Proposal (RFP) Appendix A Scope of Work dated August 15, 1996 and Baker's Final Implementation Plan and Fee Proposal dated September 3, 1996.

The site is located along highway 24 in Jacksonville, North Carolina at Tarawa Terrace, MCB Camp Lejeune. As depicted in Figure 1, the site is bounded on the north by North Carolina Highway 24 and on the south by railroad tracks. The areas east and west of the site are wooded. The area in which the monitoring wells are located is covered by tall grass.

The site originally consisted of six above ground cylindrical tanks used for the purpose of storing liquid propane gas. In 1984 the piping systems leading to the tanks were modified so that the tanks could be used to store used oil. The storage of used oil in the tanks was ended when it was determined that hazardous waste constituents were introduced into the tanks. Since this discovery, the six above ground tanks and associated piping have been removed from the site.

In 1992 and 1993, the firm of O'Brien and Gere, Inc. collected groundwater and soil samples at the site. This sampling episode produced concentrations which exceeded standards set forth by the North Carolina Department of Environment, Health, and Natural Resources (NC DEHNR). These findings made it necessary to perform additional soil and groundwater sampling at the site.

The additional soil sampling at the site was completed by Dewberry and Davis, Inc. The results of this sampling demonstrated soil contaminant levels which were below EPA Region III's Risk Based Concentrations. Based on these findings MCB, Camp Lejeune recommended that no further action be taken to remediate the site. However, upon review of the soil analytical data, the NC DEHNR determined that further evaluation of the groundwater was necessary. This determination by the state of North Carolina initiated the work presented in this report and covered under CTO-373 Mod 01.

PROJECT OBJECTIVE

The objective of CTO-0373 Mod 01 is to establish whether further investigative or remedial action is warranted for the site at Tarawa Terrace. This objective has been met by reviewing background information and collecting groundwater samples from eight existing monitoring wells. The groundwater samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) according to (EPA Method 8020) and semivolatile organic compounds (SVOCs) via contract laboratory program (CLP) methodology.

SAMPLING METHODOLOGY

Groundwater samples were collected from eight of twelve existing monitoring wells. This included monitoring wells TT-MW01, TT-MW02, TT-MW03, TT-MW04, TT-MW05, TT-MW06, TT-MW07, and TT-MW08. The samples were collected to confirm the presence of contaminants and evaluate the overall groundwater chemistry. Low flow pumping was used to purge the water from the wells while dedicated Teflon bailers were used for sample collection. Prior to purging, a static water level measurement from each well was obtained. The total well depth was recorded to the nearest 0.1 foot using a decontaminated steel tape. The static water level and well depth measurements were used to calculate the volume of water in each well.

A minimum of five well volumes were removed during the purging activities prior to sample collection. Measurements of pH, specific conductance, temperature, and turbidity were taken after each well volume was removed to ensure that the groundwater characteristics had stabilized before sample collection. The groundwater field parameters measured during sample collection are provided in Table 1.

Upon completion of purging activities, a decontaminated bottom loading Teflon bailer was lowered into the well for sample collection. Once the bailer was filled, it was removed from the well and groundwater was slowly poured from the bailer directly into laboratory supplied glass containers.

Upon collection of the groundwater samples the following information was recorded, well identification number, sample identification, time and date of sample collection, field sampling personnel, and analytical parameters. This information was recorded in a field logbook and on the sample labels. Immediately following collection, the samples were placed on ice in appropriate coolers. Samples slated for VOC analysis were transported to the on-site laboratory, while samples collected for SVOC analysis were packaged and shipped over night to a fixed based laboratory. Chain-of-custody documentation accompanied the samples to the laboratory. A copy of the original chain-of-custody is included in the attachment.

ANALYTICAL RESULTS

The following sections discuss the results of the analytical data collected at Tarawa Terrace. Each of the samples were analyzed for VOCs using an on-site mobile laboratory (EPA Method 8020) and for SVOCs according to CLP methodology .

One groundwater sample was collected from eight monitoring wells at Tarawa Terrace. In addition to the eight environmental samples, quality assurance/quality control (QA/QC) samples were collected. For ease of discussion the VOCs and the SVOCs results are presented separately.

ENVIRONMENTAL SAMPLE RESULTS

The paragraphs which follow provide the results of environmental samples collected from the eight existing monitoring wells at the site. As mentioned, VOC and SVOC results are presented separately.

Volatile Organic Compounds

Results of the VOC analysis detected only one compound from the samples attributable to site contamination. Total xylenes were detected in monitoring well TT-MW05 at a concentration of 3 µg/L. Results from the remaining samples were below the method detection limits. As shown on Table 2, the concentration of total xylenes in monitoring well TT-MW05 is below both the federal Maximum Contaminant Level (MCL) of 10,000 µg/L and the North Carolina Water Quality Standard (NC WQS) of 530 µg/L.

Semivolatile Organic Compounds

As shown in Table 3, the results of the SVOC analysis noted two compounds that are considered to be related to site activities. Naphthalene was detected in monitoring wells TT-MW04, TT-MW05, TT-MW06, and TT-MW07. The concentrations ranged from a low of 4J µg/L at TT-MW07 to a high of 23 µg/L at TT-MW04. The concentration of naphthalene at monitoring well TT-MW04 slightly exceeds the NC WQS of 21 µg/L. At present, a federal MCL for this compound has not been established.

The compound 2-methylnaphthalene was detected in monitoring wells TT-MW04 at concentrations of 2J µg/L and 1 µg/L, respectively. At present, there are no state or federal standards established for this compound.

In addition to the presence of naphthalene and 2-methylnaphthalene, bis(2-ethylhexyl)phthalate was detected in the samples collected from TT-MW05 and TT-MW06, at concentrations of 7BJ µg/L and 29B µg/L, respectively. This compound is not believed to be related to site contamination as it is a common laboratory contaminant and was detected in the field blank sample. This is discussed further in the sections which follow.

QUALITY ASSURANCE/QUALITY CONTROL SAMPLE RESULTS

Several QA/QC samples were collected during the sampling efforts at the site. The samples are used to assess the overall quality and reliability of the data. The results of the QA/QC sample analysis are discussed below and presented in Tables 4 and 5.

Volatile Organic Compounds

The QA/QC samples included a duplicate sample, a field blank, and a rinsate blank sample. As provided in Table 4, there were no detections of any volatile organic compounds in the sample identified as TT-DUP01-01 which was a duplicate of groundwater sample TT-MW03-01. Likewise, there were no detections noted in the field blank (TT-FB01-01) which was a sample of the distilled water used for decontamination purposes. The VOC chloroform was detected in the rinsate sample at a concentration of 2.0 µg/L. Additional analysis by the on-site laboratory identified the same concentration of chloroform to be present in the laboratory supplied deionized water which was used to collect the rinsate sample.

Semivolatile Organic Compounds

As shown in Table 5, some SVOCs were detected in the QA/QC samples. The duplicate sample (TT-DUP01-01) had one detection of bis(2-ethylhexyl)phthalate at a concentration of 26B µg/L. This compound is a common laboratory contaminant and is not believed to be related to site contamination. As noted by the "B" qualifier, this compound was also detected in the field blank sample TT-FB01-01 at a concentration of 19B µg/L. The field blank sample also detected several other SVOC compounds at low concentrations including, phenol, 2-methylphenol, 4-methylphenol, and diethylphthalate. These SVOCs are considered to be laboratory artifacts as well. The equipment rinsate sample (TT-ER01-01) did not detect any SVOCs.

In summary, the detection of the VOC chloroform in the rinsate sample may be attributed to the laboratory supplied deionized water and does not adversely effect the environmental sample results. The detection of the SVOCs are considered to be laboratory artifacts and are not believed to be related to site contamination. Based on the laboratory data and professional judgement, the QA/QC samples demonstrate that the data collected is accurate and applicable to assessing the groundwater quality at the site.

CONCLUSIONS

The laboratory analytical data suggest minimal impact to the groundwater at the Tarawa Terrace site due to the former ASTs and related site operations. Analysis of eight groundwater samples detected xylenes at low concentrations (i.e., below the current state and federal limits for groundwater). Several semivolatile compounds were also detected in the groundwater samples collected at the site. One of the semivolatile compounds, naphthalene, slightly exceeded the NC WQS.

Based on the results of the laboratory analytical data and the previous investigative activities at the Tarawa Terrace site we do not recommend any further investigative or remedial action. The potential sources of the contamination at the site, the former ASTs, have been removed and previous environmental sampling has demonstrated relatively low concentrations of compounds. These facts, coupled with the latest round of groundwater sampling at the site support the decision for no further action.

If a no further action decision is reached by the necessary parties involved, we recommend proper abandonment of all the existing monitoring wells at the site and any necessary restoration associated with the well abandonment.

Baker appreciates the opportunity to serve LANTDIV on this project. If you have any questions regarding this report please do not hesitate to contact me at (412) 269-2055 or Mr. Matthew D. Bartman (Activity Coordinator) at (412) 269-2053.

Sincerely,

BAKER ENVIRONMENTAL, INC.

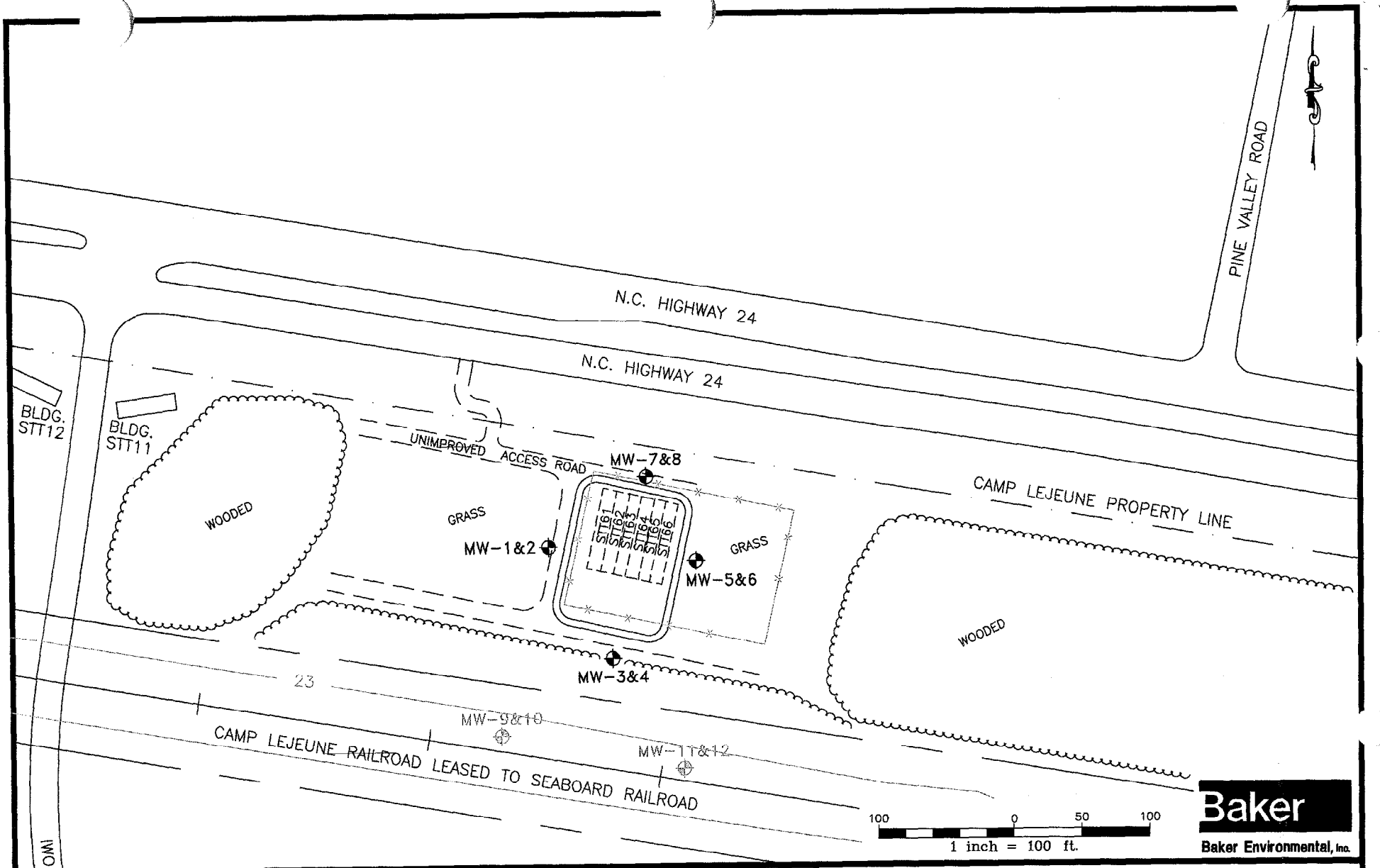
Jeffrey P. Tepsic

Jeffrey P. Tepsic
Project Manager

JPT/rw
Attachments

cc: Ms. Beth Collier, Code 02115 (w/o attachments)
Ms. Lee Anne Rapp, P.E., Code 18312 (w/o attachments)
Mr. Mick Senus, MCB Camp Lejeune, (w/attachments)

FIGURE



LEGEND

MW-1&2 MONITORING WELL NEST LOCATION (SAMPLED)

MW-9&10 MONITORING WELL NEST LOCATION (NOT SAMPLED)

FORMER LOCATION OF FENCE LINE

FORMER ABOVEGROUND STORAGE TANK

SOURCE: LANTDIV, JAN. 1992 & O'BRIEN & GERE ENGINEERS, INC., 1992

FIGURE 1
EXISTING SITE CONDITIONS
TARAWA TERRACE
CTO-0373
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

373001WP

TABLES

TABLE 1

SUMMARY OF FIELD PARAMETERS
FOR GROUNDWATER SAMPLING
TARAWA TERRACE
MCB, CAMP LEJEUNE, NORTH CAROLINA

Well Number/ Date of Measurement	Measuring Time	Well Volumes	Purge Volumes (gals.)	Field Parameters			
				Specific Conductance µmhos/cm	Temperature (°C)	pH (S.U.)	Turbidity (N.T.U.)
TT-MW01 08/19/96	0848	1	2	119	21.6	5.64	2.2
	0856	2	4	113	21.3	5.56	1.5
	0910	3	6	112	21.6	5.72	1.5
	0921	4	8	112	21.5	5.65	1.4
	0935	5	10	112	21.5	5.59	1.1
TT-MW02 08/19/96	1005	1	4.5	138	19.9	5.61	129
	1023	2	9	135	20.4	5.47	38
	1047	3	13.5	133	21.1	5.45	46
	1102	4	18	128	20.8	5.40	46
	1125	5	22.5	128	20.9	5.46	32
TT-MW03 08/19/96	1158	1	2	122	24.2	5.28	>200
	1209	2	4	110	24.1	5.31	75
	1223	3	6	107	23.6	5.31	90
	1237	4	8	107	23.8	5.26	45
	1249	5	10	106	23.7	5.30	17
TT-MW04 08/19/96	1350	1	4	112	22.7	5.45	57
	1402	2	8	87	20.9	5.36	62
	1416	3	12	86	20.6	5.09	64
	1429	4	16	86	20.3	5.33	53
	1445	5	20	87	20.3	5.28	36
TT-MW05 08/19/96	1650	1.8	1	65	23.6	4.81	2
	1700	4	2	66	23.2	4.81	14
	1712	6	3	66	23.0	5.01	7
	1720	8	4	66	23.2	4.80	4.3
	1733	10	5	66	23.1	5.18	3.5
TT-MW06 8/19/96	1521	4	1	66.5	20.6	4.79	118
	1537	8	2	66	21.6	4.84	30
	1553	12	3	66	20.5	4.81	5.5
	1615	16	4	66	20.3	4.84	3
	1635	20	5	65	21.2	4.90	3
TT-MW07 08/19/96	1912	1	2	93	22.8	5.49	35
	1920	2	4	91	22.7	5.50	36
	1930	3	6	91	22.7	5.43	8.4
	1939	4	8	92	22.7	5.44	5.2
	1949	5	10	88	22.8	5.41	4

TABLE 1 (Continued)

SUMMARY OF FIELD PARAMETERS
FOR GROUNDWATER SAMPLING
TARAWA TERRACE
MCB, CAMP LEJEUNE, NORTH CAROLINA

Well Number/ Date of Measurement	Measuring Time	Well Volumes	Purge Volumes (gals.)	Field Parameters			
				Specific Conductance µmhos/cm	Temperature (°C)	pH (S.U.)	Turbidity (N.T.U.)
TT-MW08 08/19/96	1755	1	4.2	162	20.6	6.28	153
	1814	2	8.4	138	20.3	6.21	>200
	1830	3	12.6	133	20.1	5.93	>200
	1842	4	16.8	126	20.6	5.69	>200
	1855	5	21	125	20.6	5.60	>200

Notes:

gals = gallons
N.T.U. = Nephelometric Turbidity Units
S.U. = Standard Units
µmhos/cm = micro ohms per centimeter
°C = Degrees Centigrade

TABLE 2
POSITIVE GROUNDWATER RESULTS
VOLATILE ORGANIC COMPOUNDS
TARAWA TERRACE, MCB CAMP LEJEUNE, NORTH CAROLINA

WELL IDENTIFICATION	TT-MW05-01		
Date Collected	08/19/96	Federal	NC
Date Analyzed	08/19/96	MCL	WQS
DETECTED COMPOUND			
Xylenes (Total)	3	10000	530

Concentrations in ug/L
Federal MCL - Federal Maximum Contaminat Level
NC WQS - North Carolina Water Quality Standard

TABLE 3
POSITIVE GROUNDWATER RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
TARAWA TERRACE, MCB CAMP LEJEUNE, NORTH CAROLINA

WELL IDENTIFICATION	TT-MW04-01	TT-MW05-01	TT-MW06-01	TT-MW07-01		
Date Collected	08/19/96	08/19/96	08/19/96	08/19/96	Federal	NC
Date Analyzed	08/19/96	08/19/96	08/19/96	08/20/96	MCL	WQS
DECTECTED COMPOUNDS						
NAPHTHALENE	**23**	11	18	4J	NE	21
2-METHYNAPHTHALENE	2J	10U	1J	9U	NE	NE

Concentrations in ug/L

Federal MCL - Federal Maximum Contaminant Level

NC WQS - North Carolina Water Quality Standard

NE - Not established

U - Not detected at method detection limit

J - Estimated Value

Bold values indicate exceedance of State/Federal criteria

TABLE 4
QUALITY ASSURANCE/QUALITY CONTROL RESULTS
VOLATILE ORGANIC COMPOUNDS
TARAWA TERRACE, MCB CAMP LEJEUNE, NORTH CAROLINA

WELL IDENTIFICATION	TT-DUP01-01	TT-FB01-01	TT-ER01-01
Date Collected	08/19/96	08/19/96	08/19/96
Date Analyzed	08/19/96	08/19/96	08/19/96
DETECTED COMPOUND			
CHLOROFORM	<.1	<.1	2.0

Concentrations in ug/L

TABLE 5
QUALITY ASSURANCE/QUALITY CONTROL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
TARAWA TERRACE, MCB CAMP LEJEUNE, NORTH CAROLINA

WELL IDENTIFICATION	TT-DUP01-01	TT-FB01-01	TT-ER01-01
Date Collected	08/19/96	08/19/96	08/19/96
Date Analyzed	08/19/96	08/19/96	08/19/96
DETECTED COMPOUNDS			
PHENOL	10U	140	10U
2-METHLPHENOL	10U	1J	10U
4-METHYLPHENOL	10U	2J	10U
DIETHYLPHTHALATE	10U	3J	10U
BIS(2-ETHYLHEXYL)PHTHLATE	26B	19B	10U

Concentrations in ug/L

U - Not detected at method detection limit

J - Estimated value

B - Detected in blank

ATTACHMENT

V | N Analytics Use Only

3 ØØ1

Custody Transfer Record/Lab Work Request

WESTON MANAGERS / DESIGNERS/CONSULTANTS

Client BAKER ENVIRONMENTAL, INC.
Est. Final Proj. Sampling Date 8/20/96
Work Order #
Project Contact/Phone # M. Bartman /412-269-2053
AD Project Manager D. Woltman
QC ____ Del ____ TAT ____
Date Rec'd ____ Date Due ____
Account #

Refrigerator #
#/Type Container — Liquid / Solid
Volume — Liquid / Solid
Preservatives

ANALYSES REQUESTED →

ORGANIC				INORG			No. of bottles
VOA	BNA	Pest/PCB	Herb	Metal	CN		

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected 1996	Time Collected	WESTON Analytics Use Only										
S - Soil, SE - Sediment, SO - Solid, SL - Sludge, W - Water, O - Oil, A - Air, DS - Drum Solids, DL - Drum Liquids, L - EP/TCLP Leachate, WI - Wipe, X - Other, F - Fish		TT-MWØ2-Ø1			W	8/19	1133		X									2
		TT-MWØ1-Ø1			W	8/19	0940		X									2
		TT-MWØ3-Ø1			W	8/19	1255		X									2
		TT-MWØ4-Ø1			W	8/19	1450		X									2
		TT-MWØ5-Ø1			W	8/19	1740		X									2
		TT-MWØ6-Ø1			W	8/19	1640		X									2
		TT-MWØ7-Ø1			W	8/19	2000		X									2
		TT-MWØ8-Ø1			W	8/19	1900		X									2
		TT-ERØ1-Ø1			W	8/19	1700		X									2
		TT-DUPØ1-Ø1			W	8/19	1355		X									2

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
TT-ERØ1-Ø1 → Bailer

Fed-Ex Airbill # 1369799093

DATE/REVISIONS:
1. ____
2. ____
3. ____
4. ____
5. ____
6. ____

WESTON Analytics Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___ Airbill # ____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
A.P.T.	FED-EX	8/20/96	1800

Relinquished by	Received by	Date	Time

RFW 21-21-001/A-7/91 ____ L372 ____ L373 ____ L375 ____ L377 ____ L378 Ref# ____ Cooler# ____ 381-596a

W | Analytics Use Only

3 001

Custody Transfer Record/Lab Work Request

WESTON MANAGERS/DESIGNERS/CONSULTANTS

Client BAKER ENVIRONMENTAL INC.
Est. Final Proj. Sampling Date 8/20/96
Work Order #
Project Contact/Phone # M. Bartman / 412-269-2053
AD Project Manager D. Woltman
QC ____ Del ____ TAT ____
Date Rec'd ____ Date Due ____
Account #

Refrigerator #

#/Type Container	Liquid	
	Solid	
Volume	Liquid	
	Solid	
Preservatives		

ANALYSES REQUESTED →

ORGANIC: VOA | BNA | Pest/PCB | Herb
INORG: Metal | CN

Not Filtered

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only											
	TT-FB01-01			W	8/19/96	1320		X										2

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

Fed-Ex Airbill # 136979909 3

DATE/REVISIONS:
1. ____
2. ____
3. ____
4. ____
5. ____
6. ____

WESTON Analytics Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # ____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
A.P.T.	FED-EX	8/20/96	1800

Relinquished by	Received by	Date	Time

RFW 21-21-001/A-7/91 ____ L372 ____ L373 ____ L375 ____ L377 ____ L378 Ref# ____ Cooler# ____ 381-596a