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FIELD INVESTIGATIONS OF **UNCONTROLLED HAZARDOUS WASTE SITES**

FIT PROJECT

RECEIVED MAY 0 5 1983

TE OF DELAWARE

MANAGER'S OFFICE

TASK REPORT TO THE ENVIRONMENTAL PROTECTION AGENCY CONTRACT NO. 68-01-6056

MAY 🕹 1983

RECEIVED

WATER SUPPLY

Well Drilling at

Delaware Sand and Gravel Landfill New Castle, Delaware TDD No. F3-8202-04C EPA No. DE-17

Revision Date: October 8, 1982

Presented to: Linda Y. Boornazian, Acting DPO EPA Region III

Prepared by: ecology onment, inc. env anr

International Specialists in the Environmental Sciences

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Well Drilling

at Delaware Sand and Gravel Landfill New Castle, Delaware TDD No. F3-8202-04C EPA No. DE-17

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SECTION 1

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Well Drilling

at Delsware Sand and Gravel Landfill New Castle, Delaware TDD No. F3-8202-04C EPA No. DE-17

SUMMATION AND FINDINGS

1.1 SUMMATION

The Delaware Sand and Gravel Landfill is located approximately two miles southwest of the City of New Castle, Delaware and immediately east of the Army Creek Landfill (DE-01). But both landfills are interconnected hydrogeologically, only divided topographically by the Army Creek.

The Delaware Sand and Gravel Landfill was alleged to contain drums of industrial chemical liquid waste. The purpose of this effort was to evaluate the contamination contribution of the Delaware Sand and Gravel site. Accordingly, three monitoring wells and two boreholes were developed during the period of June 28 to July 14, 1982. Groundwater sampling program was performed on July 14, 1982. The subsequent analytical results indicated the following:

o The groundwater flow direction in the study area is generally from the northwest to the southeast. This is the same pattern observed in November 1981.

o The groundwater elevation measured approximately 14 feet below mean sea level (MSL) in the drum-pit area.

o Groundwater sample (B-1), near the drum-pit area showed contamination as follows:

Lead (120 ppb) 1,2 Dichloroethane (1,500 ppb) Trichloroethylene (27 ppb) Benzene (180 ppb) Phenol (360 ppb) Methylene Chloride (4,000 ppb) Toluene (1,200 ppb) Ethylbenzene (16 ppb)

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o Groundwater sample (B-4), near the refuse area, downgradient of the drum-pit area showed contamination as follows:

Benzene (57 ppb) Toluene (880 ppb) Ethylbenzene (18 ppb)

o The groundwater sample of Well #39, near the recovery well #13 did not contain significant levels of priority pollutants, except lead (320 ppb), arsenic (120 ppb) and nickel (60 ppb).

o Groundwater and cutting samples of B-5 did contain a small amount of pollutants that were similar to the pollutants of the drum-pit area. This could be due to groundwater fluctuation in this area.

o A soil cutting sample from B-2, located in the drum-pit area, showed a concentration of 262 ug/g (ppm) of PCB-1248.

o Trace amounts of ethylene and toluene were found in the stained soil near the entrance of the landfill.

1.2 FINDINGS

The observations cited above indicate that the groundwater and soil have been contaminated by the drum-pit area.

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SECTION 2

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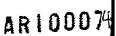
FIELD TRIP REPORT

2.1 INTRODUCTION

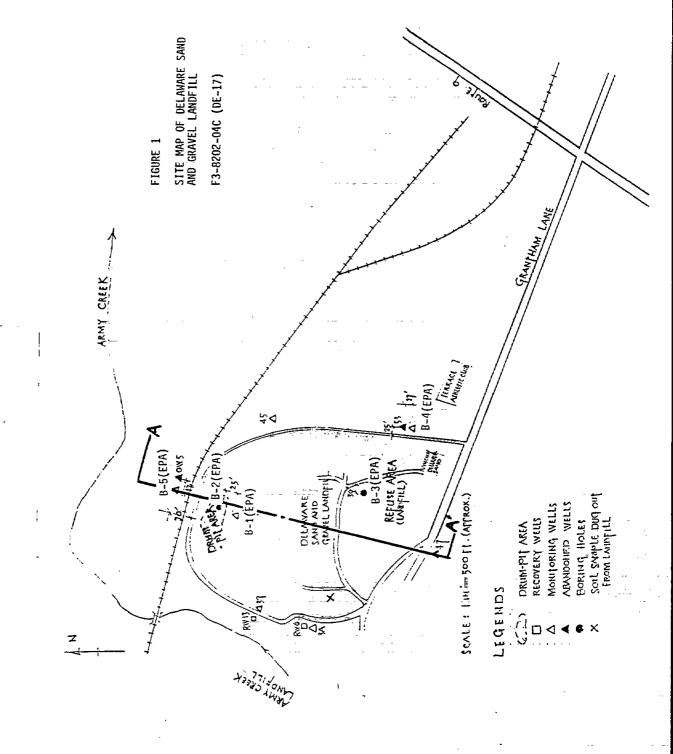
The Field Investigation Team, Region III (FIT III) developed a subcontract to drill three monitoring wells and two boreholes (See Figure 1), to better assess the constituents of contamination from Delaware Sand and Gravel Landfill Site, based upon recommendations of a previous hydrogeologic study (TDD No. F3-8108-11B).

On June 28 through July 14, 1982, the subcontractor, A. C. Shultes and Sons, Inc., a licensed driller in Delaware, drilled five holes under the supervision of FIT III. After drilling was completed, FIT III conducted sampling of the groundwater and the drilling cuttings and forwarded the samples to the labs for analyses. The FIT III members included Frank Quirus, Loren Lasky, Doug Taylor, Bill Wentworth, David Nickerson, Jim Vogel, Terrence Shannon and C. K. Lee.

The weather conditions for the operation period were sunny, hot and humid with occasional thunderstorms. The air temperature ranged 85° to 95° F.



2-1



2.2 CONTACTS

Christine Hladchuk EPA Region III 6th and Walnut Streets Philadelphia, PA 19106 (215) 597-2193

Lisa A. Hamilton Department of Natural Resources and Environmental Control Edward Tatnall Building Dover, DE 19901 (302) 736-5739

Dave Clark New Castle County Engineer Public Building 11th and King Streets Wilmington, DE 19801 (302) 366-7800

Charles Hurd Amoco Chemical Corporation P.O. Box 312 New Castle, DE 19720 (302) 322-1878 Timothy Rafferty, Lawyer Custom House Plaza, Suite 514 Wilmington, DE 19801 (302) 656-8295 Changed 302 - 239 - 2305

Vincent DellAversano, Owner Delaware Sand and Gravel Company 229 Granthem Lane New Castle, DE 19720 (302) 328-3491

Charlie Kramer (Drillers) Dale Godsil Jim Schultes Ted Budzynski A.C. Schultes and Sons, Inc. 664 South Evergreen Avenue Woodbury, NJ 08096 (609) 845-3656

2.3 PERTINENT COMMENTS

Robert J. Touhey, DNERC Manager -

o In a letter of June 22, 1982 to Walter Lee, Chief of EPA III, Mr. Tohew approved the plan for the drilling work to monitor the Delaware Sand and Gravel site.

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Emil Onuschak, Chairman, Delaware State Board of Registration of Geologists -

o In his letter of June 8, 1982 to Christine Hladchuk, EPA Region III, Project Officer, it stated that independent geologists with whom a federal agency contracts to do geological work in Delaware must be under the supervision of a geologist who is an employee of the federal government.

o EPA Region III appointed Stephen Platt as a Federal Geologist to supervise the drilling work at the Delaware Sand and Gravel site.

Dave Clark, New Castle County Engineer -

o In a telephone conversation of July 6, 1982, he gave verbal permission for drilling Well B-4 which is adjacent to the abandoned Well #53.

o Mr. Clark also mentioned that Well B-4 is on property that now belongs to Vincent DellAversano.

Timothy Rafferty, Lawyer for Delaware Sand and Gravel Company -

o In a telephone conversation of March 29, 1982, he stated that Delaware Sand and Gravel Company had granted permission to enter its property for the drilling work.

o In a telephone conversation of July 14, 1982, he said that the owner, Vincent DellAversano did not want split samples.

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o A sample receipt was sent to Timothy Rafferty on July 21, 1982 for Mr. DellAversano's signature (See Document #11). But it had not yet been returned when this report was prepared.

Vincent DellAversano, Owner of Delaware Sand and Gravel Company -

o Mr. DellAversano was on site the morning of July 6, 1982. He was paid by Schultes for installing an access path to the B-4 site.

Charles Hurd, Amoco Chemicals -

o Amoco Chemicals Corporation granted permission to access and drill Well B-5 on its property (See Document #10),

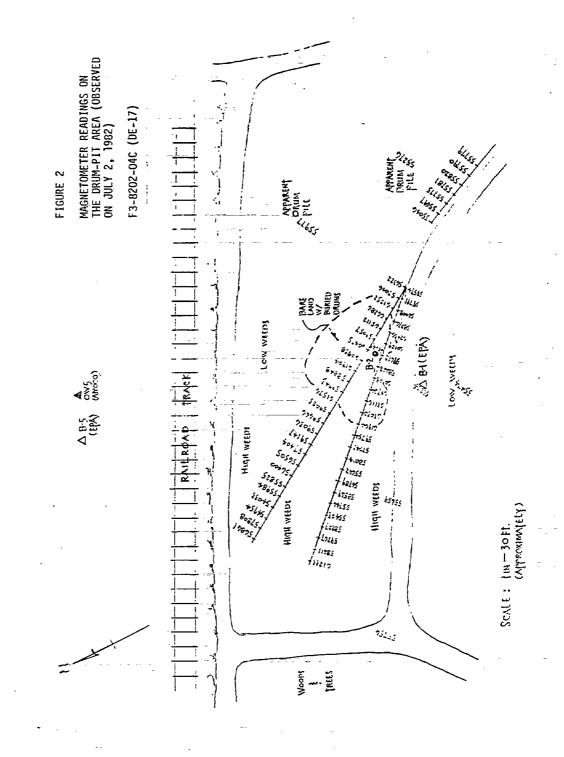
o A sample receipt was supplied to Amoco (See Document #12).

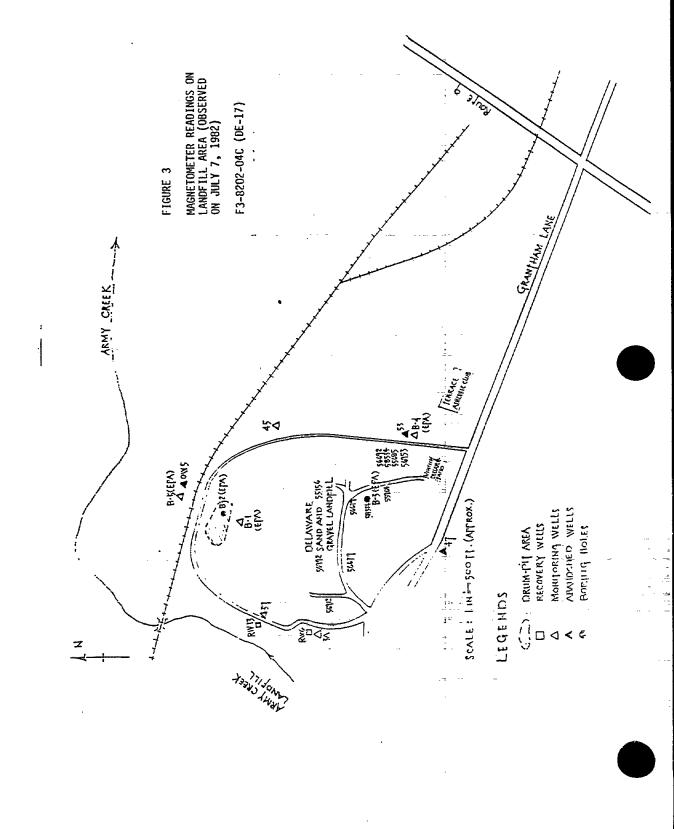
2.4 MAGNETOMETER SURVEY

A "Unimag II" magnetometer was used to search for concentrations of buried magnetic (ferrous metal) objects in the drum-pit area, as well as in the refuse (landfill) area. These magnetometer surveys of selected locations were performed on July 2 and July 7, 1982.

The drum-pit area was a dumpsite for disposing industrial waste. A scan of the area with the HNU was conducted prior to the magnetometer survey on July 2, 1982. No readings above background level were detected on the surface of the site. Magnetic intensity measurements from the instrument's digital readout, in gamma, were recorded every 5 ft. along lines delineated in Figure 2. The general

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reading in the drum-pit area was about 56,000 gamma. Areas with readings of greater than 60,000 gamma were arbitrarily considered as indicative of high metal concentration. The drum burial area is within the defined limits on Figure 2.

Scattered readings on the refuse (landfill) area are presented in Figure 3. A general background level in this area is also approximately 56,000 gamma. Few high readings above 58,000 gamma were recorded on the southeastern part of the landfill, but no correlating evidence was found to determine an exact location of buried drum concentrations.

2.5 DRILLING PERFORMANCE

The firm of A. C. Schultes and Sons, Inc., Woodbury, NJ was selected as the subcontractor on this project. Schultes operated a rotary drilling rig and an auger rig for boring the holes. The total drilling cost was \$16,104.

Five holes were drilled during the period from June 28 to July 14, 1982. These were the following (See Figure 1 and Well Logs Figure 4 through 8).

o Well B-1 was installed on the southern side of the boundary path, outside of the drum-pit area. The drilled depth of this hole is 55 feet. This borehole is cased with a 4-inch steel pipe with a 10 ft. screen installed between 30 and 40 feet below grade.

o Borehole B-2 is located approximately in the center of the drum-pit area, about 25 ft. from Well B-1. B-2 was drilled 20 feet through the waste pit, and then filled with bentonite and cement after completion of the drilling.

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o Borehole B-3 is located in the center of the refuse or landfill area. The borehole was drilled to a 33-foot depth and filled with bentonite and cement after completing the hole.

o Well B-4 is located about 27 ft. from abandoned Well #53, on the southwestern part of the owner's property. The well was drilled to 102 feet and cased with 4" steel pipe, and screened between 85 and 95 feet below the ground surface.

o Well B-5 was installed about 17 ft. from *a*bandoned well #0W5, on the northwestern side of the drum-pit area. The well is 150 feet deep and cased with a 4-inch steel pipe, screened between 110 to 120 feet below the ground surface.

1.2.1

Ecology and Environment, Inc. conducted a training session in the use of respiratory protective equipment and decontamination procedures at the Region III office on June 22, 1982. The drillers did wear personal protective clothing and respiratory protective equipment while drilling at the B-1, B-2 and B-3 sites.

Ecology and Environment, Inc. monitored ambient air with HNU continuously during drilling operations. No readings above background were detected in the ambient air. Some positive readings above the split spoon sampler and at the head of holes B-1 and B-2 were noted. Strong chemical odors were noted during drilling on the drum-pit area.

The drilling equipment was cleaned and rinsed with high pressure hot water prior to drilling the first hole, between subsequent holes and after completing the last hole.

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The drilling spoils, cuttings and the water generated in connection with the drilling work were dispersed on the ground. This process was discussed and agreed to by EPA Region III and the landowners (See Document #6).

The boreholes B-2 and B-3 were backfilled with bentonite and cement after completion (See Figures 5 and 6). The annular space for each newly installed well was sealed with bentonite and cement from 2 feet above the top of the screen to the ground level (See Figures 4, 7 and 8). Each well had 4-inch diameter stainless steel casing and screen, plus a protective steel outer casing at the surface with a locking cap. Detailed information on the drilling work, and observed groundwater elevations are listed in Table 1. A contour map of the observed groundwater elevations is shown in Figure 10 which indicates that the groundwater flow direction is south-easterly, with an approximate hydraulic gradient 0.02 ft. per ft. at the drum-pit area.

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*Ground surface elvoyations are estimated from the record of nearby wells.

	_	_							
		Remarkes	strong smell	strong smell		smell			
CHONDWATER LEVEL OBSERVED ON JULY 4, 1982		Ft., MSL	-14.2	ţ	ŧ	-23.5]4.3	-21.5	-20.5
GROUNDAR OBSERVED ON			29.7	1	I	51.0	29.8	29.9	45.7
	Top of Casing Flavier	(ft.,HSL)	+15.5	I	ſ	+27.5	+15.5	+8.4	+25.2
	Height Above Ground	(ft.)	1.5	ł	ł	2.7	2.2	2.0	1.1
CASING	Screen	((tr.)	30-40 (Lol unb i a Format ion)	j	j	85-95 (Potomac Formation)	110-120 (Potomac Formation)	78-118 (Potomac Formation)	100–115 135–145 (Potomac Format ion)
		Material	Steel	I	i	Steel	Steel	PVC	DVC
	I nside Di anoter	(ins.)	4	1	t	4	4	4	4
	Depth of) ((tt.)	55	30	£	102.5	150	132	156
	Ground * Surface Elevation	(ft., MSL)	аргох. +14.0	approx. +14.0	0	+24.8	+13.3	+6.4	+24.1
	Date of	Drilling	07/09/82 - 07/14/82	07/12/82	- 28/£1/0	07/06/82 - 07/09/82	06/28/82 - 07/01/82	Existing	Existing
		Furtion	Monitoring Well	Boring Hole	Boring Hole	Monitoring, Well	Monitoring Well	Monitaring Well	Monitoring Well
		Location	B-1 (EPA)	B-2 (EPA)	B-3 (EPA)	B-4 (EPA)	B-5 (EPA)	83	#45

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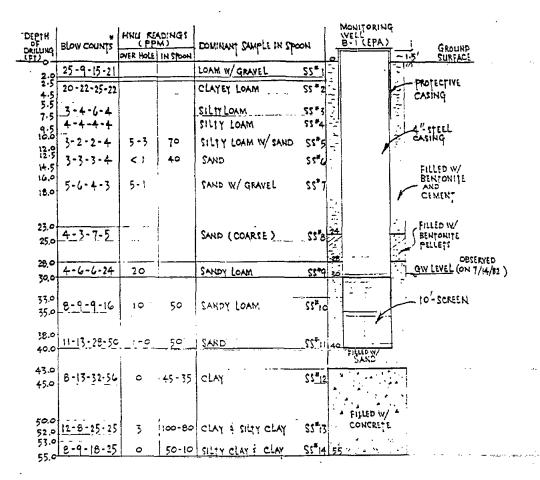
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Delaware Sand and Gravel Landfill TDD No. F3-8202-04C, EPA No. DE-17

1747-19-14

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DRILLER : A C. SCHULTES & SONS, INC. DATE GTARLED : JULY 9, 1982 _____COMPLETED : JULY 14, 1982 METHOD OF ADVANCING BORING : AUGER DEPTH OF WELL : 40 FLE: DEPTH OF GROUNDIVALER BELOW TOP OF CASING : 29-6 FT.

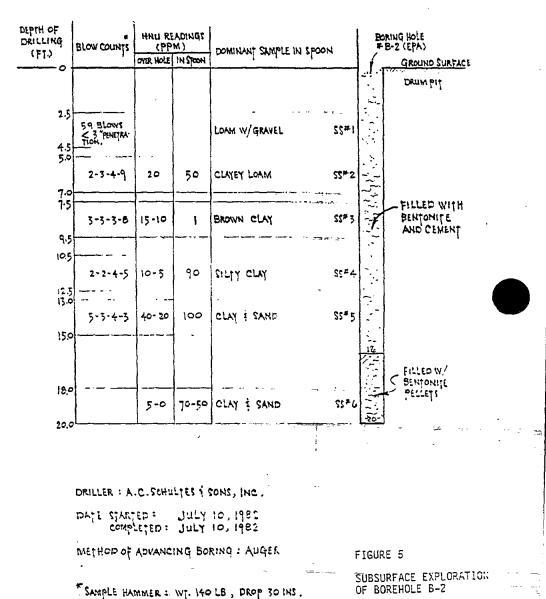
* SAMPLE HAMMER'S WT. 140 LB., DROP 30 INS .

FIGURE 4

SUBSURFACE EXPLORATION OF MONITORING WELL B-1

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F3-8202-04C (DE-17)



SAMPLE HAMMER : WJ. 140 LB , DROP 30 INS .

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F3-8202-04C (DE-17)

DEPTH OF	SPLIT	Spoon	- BLOW COUNTS	HNU RIADINGT OVER HOLE	DOMINANT SAMPLE	N SPOON	BORING	
DRILLING		DEPTH	······································	(PPM)			B-3(EP/	
	4						<i></i>	LANDFILL
-	- \$5#1	3'-5'	1-3-14-8	0	LOAM & REFUSE	- `‹		
5	-) \$\$*2	5'-7'	14-15-8-44	0	SILTY CLAY			
	- \$\$#3	7'-9'	7-11-74FOR3	0	SLupge			
10	<u>s;*4</u>		1-4-8-10	۰.	SLUDGE W/ WHITE	POWDER	~~	
	-] 55#5	11-13'	4-19-2-3	0	SLUDGE		1	FILLED W/
15	-) 55*6	13'-15'	3-1-5-8	0	WET SLUDGE W/SM	eLL		BENTONITE AND CEMENT
.,	-) \$\$*7 -/	15'-17'	5-6-15-18	٥	MIXTURES		» ¹ (₁)	(
20	- 							
25	- - 22*8 -'	25'-27'	3-5-7-5	٥	SLUDGE W/ SMELL			
30	-		•			ļ		Tuirpiul
	-! 55#9	31'-33'	7-9-15-32	•	BLACK SLUDGE	·····		FILLED W/ BENJON: TE PELLETS
55		••• • 5778				1) i
	DRILLEI	R: A.0	L.SCHULTES	SON	INC.			
7	DATE ST	ARTED	: JULY 13, ED : JULY	1982		FIGURE	6	
-			ICING BORING				FACE E	XPLORATION B-3
	* SAMPI	E HAMM	ER : 147. 140	LBS, D	ROP 30 INS ,	F3-820	2-040	(DE-17)

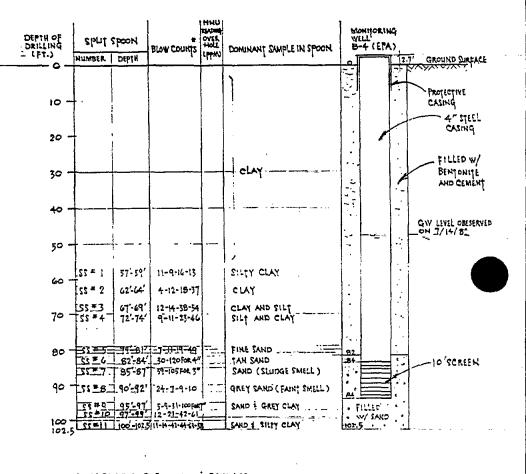
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DRILLER : A.C. SCHULTES : SONS INC. DATED STATTED : JULY 6, 1982 COMPLETED : JULY 9, 1982 METHOD OF ADVANCING BORING : AUGER DEPTH OF WELL : 94 Ft. DEPTH OF GW BELOW TOP OF CASING : 51 FT.

* SAMPLE HAMMER : IVT 140 LBS, DROP 30 THS.

FIGURE 7

SUBSURFACE EXPLORATION OF MONITORING WELL B-4

F3-8202-04C (DE-17)

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F3-8202-04C (DE-17)

DRILLER : A.C. SCHULTES : SONGING. DATED STARTED : JUNE 28. 1982 COMPLETED : JULY 1, 1982 METHOD OF ADVANCING BORING : ROTARY BY DEPTH OF WELL : 120 Ft. DEPTH OF GROUNDWATER BELOW TOP OF CASING : 29.8 FT.

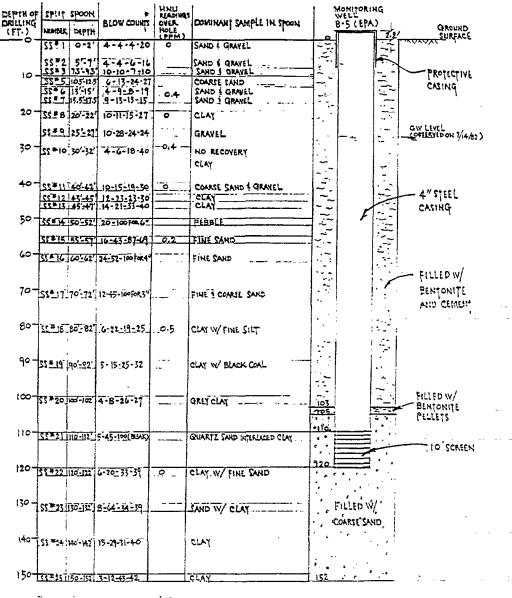
* SAMPLE HAMMER : WT 140 LBS, DROP 30 INS.

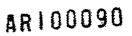
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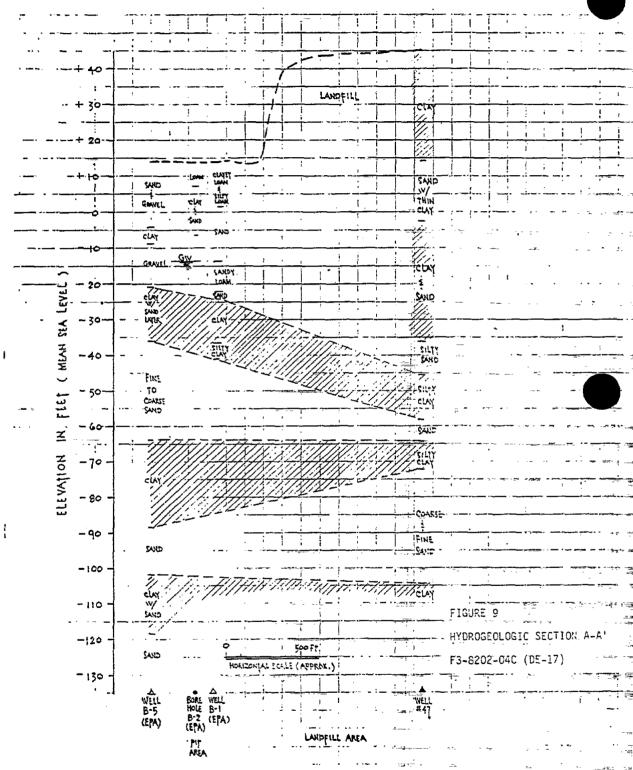
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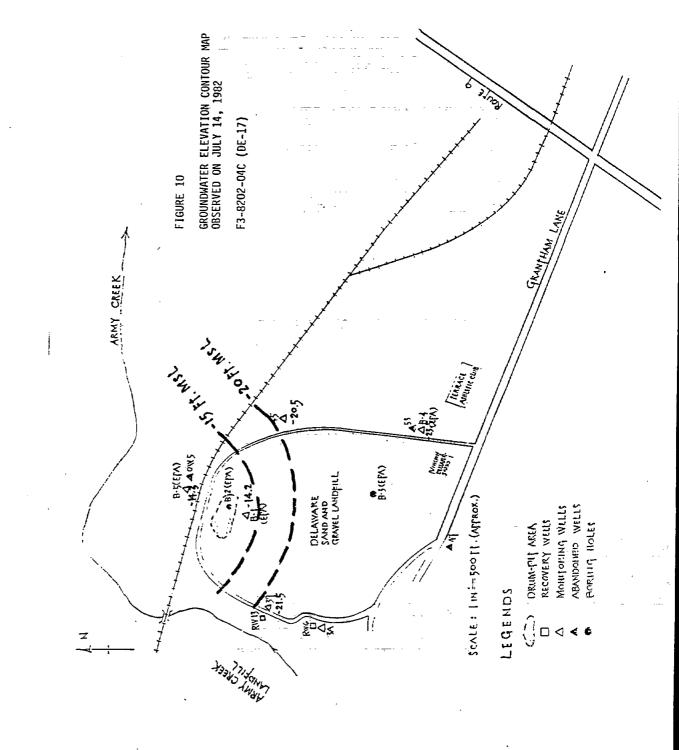
FIGURE 8

SUBSURFACE EXPLORATION OF MONITORING WELL B-5









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2.6 SOIL AND WATER SAMPLING

The sample locations are designated on Figure 1.

The soil (cutting) sampling from the split spoon sampler was performed by Ecology and Environment, Inc. field personnel. The procedure for decontaminating samplers consisted of: 1) brushing the sampler in water after emptying the cuttings, 2) cleaning the sampler with drinking quality water, 3) rinsing the sampler with acetone, and 4) jetting distilled water for final rinse.

A total of tweleve soil drilling (See Table 2) samples were submitted to labs for analysis.

Drilling Hole	No. of Split Spoon	Depth Below Ground (ft.)
B-1	SS #5 SS #11	10 - 12.5 38 - 40
B-2	SS \$2 SS \$4 SS \$5 SS \$6	5 - 7 $10.5 - 12.5$ $13 - 15$ $18 - 20$
B-3	SS #6 SS #8	13 - 15 25 - 27
B-4	SS #3 SS #6 and #7	67 - 69 82 - 87
B-5	SS #12	43 - 45
Stained Soil Area Near Entrance to Landfill		0.5

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Five groundwater samples were obtained on July 14, 1982. A "fast turn-around" time of 14 days was arranged for analyses of:

Inorganic Pollutants At:

Versar, Inc. 6621 Electronic Drive Springfield, VA 22151

Organic Pollutants At:

Mead Technology 5 Triangle Drive Research Triangle Park North Carolina 27709

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TABLE 2 - SAMPLE LOG Page 1 of 3

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Well Drilling at Delaware Sand and Gravel Landfill Thn No. 23-2002-04/5 504 No. 52-25

			TDD No. F3-8202-04C, EPA No. DE-17	A No. DE-17				
		Traffic		SAMPLED		ITEMS	ITEMS FOR ANALYSIS	S
Location	Location of Sampling	Report No.	Sample Description	Date	Time	Organics	Inorganic	Cyanide
	B-1, SS #5	C-1525				×		
	(10-12.5 ft. below ground)		Drilling and cutting	07/09/82	1255	 		• • × •
Monitoring Well #B-1	B-1.					- ×		
	(38-40 ft.)	МС-9089	Urilling and cutting	07/12/82	0920		×	
		<u> </u>				*		
	B-1, GW	MC-9114	Water	07/14/82	1000	 		
	B-2. SS #2	<u> </u>				x		1
	(5-7 ft.)	MC-9090	Boring and cutting	07/12/82	1330			
	B-2.5		•			X	i L	
#B-2	ft.)	NC-9091	Boring and cutting	07/12/82	1345		×	. ×
	8-2, 55 #5	- c-1614 -	-	-		×		
	(13-15 ft.)	MC-9092	boring and cutting	07/12/82	1350		ĸ	
	B-2, SS #6					×		
	(18-20 ft.)	MC-9093	poring and cuting	07/12/82	14 00			×

SAMPLE LOG	2 of 3
TABLE 2 -	Page

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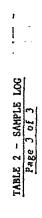
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Well Drilling at Delaware Sand and Gravel Landfill TDD No. F3-8202-045, EFA No. DE-17 ·

	_		_	÷	÷.			•			_					:	
	S	Cyanide				 ≯ 	<			 × 	ł					× 	- X -
	ITEMS FOR ANALYSIS	Inorganic		X			1	1						X		×	X
	ITEMS	Organice	x		×		X		x		×		×		×		<u>x</u>
	LED	Time		1600		1655		1030		1520		1030		1030		1715	0950
-	SAMPLED	Date		07/13/82		07/13/82		07/14/82		07/06/82		07/07/82		07/14/82		06/29/82	07/14/82
	• •	Sample Description		boring and cutting		Boring and cutting		pitos		Drilling and cutting		Drilling and cutting	-	warer	-	DFILLING and cutting	Water
	Traffic	Report No.	C-1617	MC-9094	c-1616	MC-9095	C-1620	MC-9112	<u> </u>	MC-9086	- 0-1524	HC-9087	<u> </u>	MC-9118	C-202-C-2	MC-202-C-1	C-1618 MC-9111
		Location of Sampling	B-3, SS #6	(13-15 ft.)	B-3, SS #8	(25-27 ft.)	Stained area near entrance	below ground	B-4, SS #3	(67-69 ft.)	Well #B-4 and #7	(82-87 ft.)	B-4 GW	-	1-5. 5S #12	(43-45 ft.)	B-5 GW
		Location (Borehole	6 - 1 8		11,350.1				Well #B-4		- ·		Monitoring	Well #B-5	•

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Well Drilling at Delaware Saud and Gravel Landfill TDD No. F3-8202-04C, EPA No. DE~17

	Traffic		SAMPLED		ITEHS	ITEHS FOR ANALYSIS	
Location of Sampling	Report No.	Report No. Sample Description	Date	Time	Organics	Time Organics Inorganic Cyanide	Cyanide
Well #39	C-1621	Vat ev	na/11/10	001 E	<u>X</u>		
			70/17/10			Y	X
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				X		
Ctu Tiam	MC-9117	Water	07/14/82	0930			 ×
	C-202-C-3				X		
Blanks	MC-202-C-4	Water	07/01/82	1			 × ×
	C-1625				×		
	_ HC-9191	Water	07/14/82	F			
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SECTION 3

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SEPA	POTÈNTIAL HAZARDOUS SITE INSPECTION R			REGION III	SITE HUMBER (In he estified at the set of th
tion on this form to develop a "ile. He sure to include all a	Complete Sections I and III throug Testative Disposition (Section II) propriate Supplemental Reports i System; Hazerdous Weste Enforc	. File this fo is the file. Su	rm in its entirety in built a copy of the i	the region forms to: 1	al Hazardous Waste Log J.S. Environmental Pro-
	1. SITE IDE	NTIFICATIO			
Delaware Sand and G	ravel Landfill		antham Lane		
		D. STATE	IE. ZIP CODE	TF. 20081	TY NAME
New Castle		DE	19720	Nev	v Castle
G. SITE OPERATOR INFORMATI 3. NAME	DN			1 2. TELE	PHONE NUMBER
Vincent_DellAversan	٥			302	2-328-3491
3. STREET	4. CITY	· · · · · · · · · · · · · · · · · · ·		8. STAT	E C. ZIF CODE
229 Grantham Lane	New Ca	stle	- 	DE	19720
1. NAME				1. TELE	PHONE NUMBER
3. elity				4. 37 4 1	E . ZIP CODE
SITE DESCRIPTION				I	<u>, </u>
TYPE OF OWNERSHIP					
1. FEDERAL	STATE 3. COUNTY	A. MUNICIPA	L 🕅 B. PRIVA	TE	
	I. TENTATIVE DISPOSITI				
LESTIMATE DATE OF TENTA DISPOSITION (mai, day, à yr.)	TIVE B. APPARENT SERIOUSNE	SS OF PROBLE I I MEDIUM		–	NONE
August 25, 1982		A			
T. PREPARER INFORMATION		1 3. TELEPH	ONE NUMBER	1 3. BATE	(sto., day, \$ 7%)
C. K. Lee		609-66			t 18, 1982
	III. INSPECTIO	N INFORMAT	ION		
L PRINCIPAL INSPECTOR INFO	RMATION	1 2. TITLE			
C. K. Lee		Hydrol	ogist		
S. OREANIZATION					PHONE NO. (THE LOOS & NO.
LCO 1099 AND ENVIRON	ment, Inc., FIT Region	111		009-0	65-1515
I. NAME	2. 046	ANIZATION		3.	TELEPHONE NO.
Frank Quirus, Loren Doug Taylor, Bill	Lasky				
Wentworth, David Nickerson, Jim Vogel	. Ecology and Envi	ronment		600-6	65-1515
		connenc, i		1 002-0	00-1010
and Terrence Shannor	1			1	
and Terrence Shannor		kers, ree(dente)			
and Terrence Shannor	I ERVIEWED (corporate officiale, work 2. TITLE & TELEPHONE N		3.	ADDRESS	
and Terrence Shannor	ERVIEWED (composaie officiale, wor 2. TITLE & TELEPHONE N	o,	20 (upatha-	ADDRESS	
and Terrence Shannor 	CERVIEWED (corporate officiate, wor 2. TITLE & TELEPHONE N O Owner of Delaware	o,	a 29 Grantham	ADDRESS	ew_Castle
and Terrence Shannor 	Derviewed (corporate officiate, wor 2. TITLE & TELEPHONE N Owner of Delaware Sand and Grave)	o	229 Grantham DE 19720	Lane. N	ew_Castle
And Terrence Shannor 	Derviewed (corporate officiate, wor 2. TITLE & TELEPHONE N Owner of Delaware Sand and Grave)	o		ADDRESS	ew_Castle
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And Terrence Shannor 	Derviewed (corporate officiate, wor 2. TITLE & TELEPHONE N Owner of Delaware Sand and Grave)	o		ADDRESS Lane. N	ew_Castle
And Terrence Shannor 	Derviewed (corporate officiate, wor 2. TITLE & TELEPHONE N Owner of Delaware Sand and Grave)	o		Lane. N	ew_Castle

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EPA No. DE-17 TDD No. F3-8202-01 **Continued From Front** III. INSPECTION INFORMATION (continued) D. GENERATOR INFORMATION (source of weeld) I. NAME 1. TELEPHONE NO. 3. ADDRESS 4. WASTE TYPE BENERATED no record E. TRANSPORTER/HAULER INFORMATION 1. NAME 1. TELEPHONE NO. ADDRESS 4.WASTE TYPE TRANSPORTED no record F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL 1. NAME 1. TELEPHONE NO. S. ADDRESS not applicable G. DATE OF INSPECTION H. TIME OF INSPECTION I. ACCESS GAINED BY: (credentials must be shown in all example (mon day, & yn) lune 28-luly 13 days 📑 1. PERMISSION 2. WARRANT 14 182 MEATHER (Marine) Surry, hot, humid and occasionally thunderstorms. Air temperature ranged from 85° to 95°. IV. SAMPLING INFORMATION . Mark 'I' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available. Z. SAMPLE 4. DATE 1. SAMPLE TYPE TAKEN (merk'X') 3. SAMPLE SENT TO: HESULTS turn around A. GROUNDWATER Versar, Inc. and Mead Technology time 14 X days 1. SURFACE WATER C. WASTE 4. Att -5 #PILL E. 201L A. VEGETATION L. OTHER (PHEI/1 drilling and cutting Versar, Inc. and Mead Technology X E. FIELD MEASUREMENTS TAKEN (... Indianciivity, explanivity, PH, att.) 1. LOCATION OF MEASUREMENTS 3. RESULTS 1. TYPE Monitored when started No readings. Explosimeter drilling. Monitored continuously No readings above background were detected in ambient air. Higher readings on some parts during drilling operations. NU Drum-pit area and of the drum-pit area. . refuse area. Unimag II Magnetometer Continue On Page 3 EPA Ferm T2070-3 (10-79) PAGE 2 OF 10

C PROTOCI I. YTE OF PROTOCI I. YTE OF PROTOCI I. YTE OF PROTOCI CD. SERVICE AND DE SA RENAL ECOLOGY AND ERVICOTOMENT, Inc. S. STREATED I. LATIVE (REPAIR SERVICE) I. SOUCH SERVICE) I. LATIVE SERVICE) I. LATIVE SERVICE) I. LATIVE SERV	Continued From Page 2		IV. SAM	PLING INFOR	MATIO	N (continued)		
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□. LATIVE (These induction of examples of induction of the service of service of the service of service of service of service of service of service induction of the service of				V. SITE INFO	RMAT	ION		
IN0 I YES(specify generator's foundation Size Code): C. AREA OF SITE (in serve) D. ARE THERE BUILDINGS ON THE SITE: shout 10 acres I. NO I Y YES(specify): Owner's garage VI. CHARACTERIZATION OF SITE ACTIVITY Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes. X A. TRANSPORTER B. STORER Y. C. TREATER D. DISPOSER I. AND I. PILE I. PILTATION I. LANDFILL I. ATAU I. PILE I. PILTATION I. LANDFILL I. ATAUC I. PILE I. PILTATION I. LANDFILL I. ATAU I. PILE I. PILTATION I. LANDFILL I. ATAU I. PILE I. PILTATION I. LANDFILL I. ATAUE I. PILE I. CANDFALMENTER COMMENT I. INGUNERTOUCHT I. ATAUE I. PILE I. CANDFALMENTER COMMENT I. INGUNERTOUCHT I. ATAUE I. PILE I. CAN	1. ACTIVE (These inductria municipal aires which are being for waste treatment, storage, or on a continuing basis, even if in	used disposi	eites which no		(The whee	ee eitee that include such in a no regular or continuing us	cide • of	nte like "miržiški damping" the aize far weste disposal
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PA Ferm T2978-3 (18-79) PAGE 3 OF 10 Continue On Reverse	1. Are records of wastes svallabl				enton e i			
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trichloroethy]	~~~			x	1		x	1		7	9-01-6		27	ug/l
LT ICHTOFUELINI	ene			<u> </u>		++	<u>^</u>	+			5-01-0	·	<u> </u>	1 44/ 1
РСВ				x	Ì		х			1109	9769-1		262	uq/a
PUB	·			<u> </u>		+	<u> </u>	+				<u> </u>	.02	
benzene				x		X				7	1-43-2	1	80	l
			-	<u>^</u>	<u> </u>				· · · · ·		1-40-2		00	
toluene				x			x	1		10	8-88-3	1,2	200	1/pu
<u></u>					İ	++		1						
lead		1	Y I			<u> </u>		1		743	39-92-1	1	20	ug/l
phenol			X							10	8-95-2	3	860	ug/1
					1			1						
·····				VI	П. НА	ZARD	DES	CRIPT	ION	_				. –
FIELD EVALUATION	HAZARD	DESCRIPT								te that	the listed haz	erd exist	ts. Descri	be the
nazard in the space pr														
Y A. HUMAN HEALT	H HAZARD	5						,						<u>-</u> -
											Methylene		-	Butyl-
		1,2 Dict	lor	roeth	me	Irichl	oro	ethyle	ne <u>B</u>	enzen	e Chloride	Pheno	phth	alate
													•	
TSCA Cancer			X				X			X				
Experienced Care	inogen										x	Х		
Experienced Muta		•	X											
Experienced Tera			X											x
PA Ferm 72070-3 (10-7	7)	_				AGE 4	OF	10				Conti	nue On Pa	#* 5

?

Continued From Page 4		EPA No. DE-1
VIII.	HAZARD DESCRIPTION (continued)	
not reported		
C. WORKER INJURY/EXPOSURE	······	
not known		
D. CONTAMINATION OF WATER SUPPLY		
Amoco wells shut down in 1975, du	ue to contamination.	
	•	
E. CONTAMINATION OF FOOD CHAIN		
		:
not reported		
F. CONTAMINATION OF GROUND WATER		
1,2 Dichloroethane, trichloroethy Table 3) were found in ground wa	ylene, benzene and other priority poll ater sampling on July 14, 1982.	utants (see
Amoco wells shut down due to cont	tamination.	
G. CONTAMINATION OF SURFACE WATER		
none observed		l
		1

	TOD No. F3-8202-0**	EPA No.
Continued From Front	· ·	··········
H. DAMAGE TO FLORA/PAUNA	VIII. HAZARD DESCRIPTION (continued)	
 Parts of the drum-pit area	a and the landfill area are without vegetat	ive cover.
1. FISH KILL		
none reported		
none observed but strong c	hemical odors were detected during drilling	g at the
drum-pit area.		
X. HOTICEABLE ODORS		
n		
but no readings above back	ed during drilling phase of B-1, B-2, B-3 a ground detected by HNU.	ina 8-4
L. CONTAMINATION OF SOIL		
DCP shows? suggestion and	other priority pollutants were found in th	e soil
samples of drilling at the	other priority pollutants were found in th drum-pit area.	
N. PROPERTY DAMAGE		
none observed		
1016 00561 YEU		
1		
EPA Form T2070-3 (10-79)	PAGE & CF 10	Continue On Page 7
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Continued From Page 6	VIII, HAZARD DESCRIPTION (continu	820 <u>2-</u> **	EFA NO
N. FIRE DE EXPLOSION		<u></u>	
~			
Fires occurred in 1969.			
Fires occurred in 1969.			
D. SPILLS/LEAKING CONTAINERS/F	RUNOFF/STANDING LIQUID		
not observed			
P. SEWER, STORM DRAIN PROBLEMS	<u></u>		·
		· ·	
not observed			
•			
Q. EROSION PROBLEMS			<u></u>
		1	
not observed			
T R. INADEQUATE SECURITY			
No converting france and the			
No security fence and sit	e is easily accessed.	:	
S. INCOMPATIBLE WASTES			
unknown			
PA Fem T2070-3 (10-79)	PAGE 7 OF 10		Continue On Revers
• •			

AR100104 -

TDD No. F3-8202- 1C

EPA No. DE-17

		VIII HATARD DEL	CRIPTION (continued)			
T. MONIGHT DUMPING		TH. ARLAND DES	CRIPTION (Continues)			
not known						
U. DTHER (specily):				-	· ·	
not applicable						
not appricable						
					,	
	•					
_						
-						
	IX. I	POPULATION DIREC	TLY AFFECTED BY S	ITE		
	_	APPROX. NO.	C. APPROX. NO. OF PE	OPLE	D. APPROX. NO. OF BUILDINGS	E. DISTANCE TO SITE
ALLOCATION OF POPULATION	OFFE	OPLE AFFECTED	AFFECTED WITHIN UNIT AREA		AFFECTED	(specity units)
LIN RESIDENTIAL AREAS		+ 100 000	To sound by Au		an Hatau Cara	
		11 100,000 peop	le served by Ar	tes	an water Lompa	ny
IN COMMERCIAL GR INDUSTRIAL AREAS	abou	it 100,000 péop	le served by Ar	test	an Water Compa	ny
IN PUBLICLY		Grantham Lane		<u> </u>		
3- TRAVELLED AREAS	Rout	P 9 & R. R. tri	<u>ćk varies</u>		<u> </u>	50-1,000 ft
4. PUBLIC USE AREAS (parks, echesie, stc.)	no					
		X. WATER AND	HYDROLOGICAL DA	TA		1
A. DEPTH TO GROUNDWATER(pro- varies 25-50 ft.	ity unit]	southeaste	-	1	OUNDWATER USE IN	
D. POTENTIAL YIELD OF AQUIFER	t	E. DISTANCE TO DRU	NKING WATER SUPPLY	Arte	<u>esian Water Co</u> Rection to DRINKIN	MDANV
-		about 4,000 f	eure)	1	theasterly	
G. TYPE OF DRINKING WATER SUP						
1. NON-COMMUNITY	2. COMMU > 15 CC	NITY (specity saws): SNNECTIONS	New Castle			
	4. WELL					
PA Ferm 72070-3 (10-79)		PAGE	8 OF 10		Contin	e On Page 9

TDD No. F3-8202 4C

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		X. WATER AND HYDROLOGICAL DATA (continued)	
1. WELL	2. DEPTH (apecily unit)	(prezimity to population/buildings)	NOH-COM- MUNITY (MARK 'X')
Amoco_well	about 150 ft.	Route 9 - it shut down due to contamination	X
Gonzon	145 ft.	Grantham Lane	x
V. DellAve	sano 135 ft	Grantham Lane	<u> </u>
MECEIVING WA I. NAME Delaware Ri Army_Creek	ver and	2. SEWERS	
		River is classified as interstate stream zone 5.	
		XI. SOIL AND VEGITATION DATA	
	ATED FLOODWAY		
A. GVERBUR	1'X1	B. BEDROCK (specity below) C. G THER (spec	
1. SAND LOAM 2. CLAY	· X So	lid rock below Potomac Formation.	
3. GRAVEL		•	
		XIII. SOIL PERMEABILITY	
A. UNKNOWN	E (10 to .1 cm/sec.) EA	B. VERY HIGH (100,000 to 1000 cm/sec.) []] G. HIGH (1000 to 10 cm/sec.) D. Z. LOW (.1 to .002 cm/sec.) [] F. VERY LOW (.001 to .001 to .0	•
TI 1. YES		DUMENTS by infiltration to recharge groundwater	
I. YES	🛛 2. НО 3. С	DMMENTS: groundwater	
. ESTIMATE & D	SLOPE 2. 3	PECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.	
lace than 9	CAL DATA	erally to south, but the ground surface was change and landfi	
OTHER GEOLO			-
hickness.		by the Columbia Formation, ranging from 30 to 60 f ying Potomac Formation consits of stream-deposited ilt.	

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EFA Form T2070-3 (10-74)

PAGE S OF 10

A.R 100106

TDD No. F3-8202- C

EPA NO. DE-17

			. OATE	E. EXFIRATION		(Mark 'X')				
Continued From From XIV. PERMIT INFORMATION List all applicable permits held by the sits and provide the related information. A. PERMIT TYPE (eduRETALState.AFDEL.etc.) B. ISSUING C. PERMIT DATE (eduRETALState.AFDEL.etc.) P. INCOMPL (eduRETALState.AFDEL.etc.) State Permit DN REC - 1969 1976 - State Permit DN REC - 1969 1976 - XV. PAST REGULATORY OR ENFORCEMENT ACTIONS XV. PAST REGULATORY OR ENFORCEMENT ACTIONS - - NONE XY FES (summerize to this spece) Closed by State Court action in December 1979. - -										
State Permit	DN REC	-	1969	1976						
			-{			<u> </u>	+			
losed by State Cou	rt action in	December 197								
losed by State Cou	rt action in	December 1979	ð.							
Closed by State Cou	rt action in	December 1979).							
Closed by State Cou	rt action in	December 1979								
Closed by State Cou	rt action in	December 1979								
Closed by State Cou	rt action in	December 1979).							

PAGE 10 OF 10

EPA Ferm 72070-3 (10-79)

TDD No. F3-8202-04C

EPA No. DE-17

		INSTRUCTION
	LANDFILLS SITE INSPECTION REPORT (Supplemental Report)	Answer and Explain as hiressay.
I. EVIDENCE OF SITE	INSTABILITY (Ermann, Setting, Sink Hales, orc)	
× ··· □ ···	Sink holes were observed in nit-drum area	
	OPER DISPOSAL OF BULK LIQUIDS, SEMI-SOLIDS AND SLUDGES INTO THE L.	ANDFILL
X * E >		
· · · · · ·	F CELL LOCATION AND CONTENTS AND BENCHMARK	
D YES X NO	•	
WASTES SURROUND	D BY SORBENT MATERIAL	
1 YE# X NO		
DIVERSION STRUCT	IRES ARE EFFECTIVELY CONSTRUCTED AND PROPERLY MAINTAINED	
LIVES XNO	,	
	ING OF WATER ON SITE	
□ *Es X *0		
EVIDENCE OF IMPA	DER/INADEQUATE DRAINING	
X YES DNO-		
	TE COLLECTION SYSTEM (11 "Yes", specily Type)	
LI YER XNO	No leachate collection system.	
SURFACE LEACHAT	E SPRING	
RECORDS OF LEACH	ATÉ ANALYSIS	
TYES STHO		
CAS MONITORING	<u>, , , , , , , , , , , , , , , , , , , </u>	
X TES CINO		
GHOUNDWATER HO	ITORING WELLS	
	ANE LINER INSTALLED	
DYES NO NO	· · · · · · · · · · · · · · · · · · ·	
	IENT MEASURES (Clay Baltom, Sides,als)	
TYES DENO		
FIXATION (Stabilizat	ON OF WASTE	
<u> </u>	E OF INACTIVE PORTION OF FACILITY	
TYES DONO		
COVER(Type)		1
layey loam.		
ILA. THICKNESS		
	•	
aries and unkr	own.	
	· · · · · · · · · · · · · · · · · · ·	
	ability 50-75 ft./day of fine to coarse sand in Col	umbia Formation.
·····		
SE. DAILY APPLICA	10N	
TYES NO NO		
7 \		
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τ X		:
		······
Form: T2070-3E (10-79		1

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SECTION 4

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		- <u>INSLE 3</u>			nmard		OKGANIC	- ANNE	1202	1	-tik	mpund	TER SW	UPLES	(\underline{r})	cour.	μu
		FRIORITY FOLLUTAITS	AMADIA	VALUES FOR	PLOTECTIAL)	e			NO DUL	JULY	14	, 1982					
	ł	EDIUADIO	M. DLE	WOLER SUP			B-1						1	T	1		71 -
	_		NOT NO	Dak Jakics			PAWEL	EXWE	I B-2	4~~	- 3]	10000 45	<u> </u>				
	1	BEANDOR MONTENE	_						1		1	1		!			1
	72	(SHAD TO EST CARE STORE STORE			11,01	•			1			1		1			
	[]	BEDDOMETHANE		-	11,00	6			1	1				1			i
	14	CATE SAN TETRACHHRUDE	0.40	s	35,20	00			1	1							1
	Alteritation	CHISNEFONIA	0.19		21,90	0	•		1	1				1			1
	19	D. EKOISTHIO: INETHANE			h 11,00	_			1	1				1			<u> </u>
	Ē	DICH SOM FLUSTICANE *			11,00				1	† – –	; 			- †∙-			· † - ·
	15	NETTYL CHICKIDE (<u> </u>	11.02				† T	-	<u> </u>						1
		NETHYLLIS CHURDER		+	111, 241		4,000			<u>†</u> ·	+ -						
	3	TISHEROFLUGACUUTIAN		+	11,000				· · · · ·								
	E						<10		·	·	┝┈╌┤						
	-	CHEADETHENE		<u> </u>						 	 			;			<u> </u>
		LI-DICHLANETHAVE		÷. <u> </u>	-4						<u>∤</u>						• - •
		1.2-DICHLEOETHERE	0.94-	,	20,00	_	1,500				├ ──;						
		ויי-שתהופביוארדיד	0.633		11,60	0			<u>.</u>								
	3	1.2-זאיש-אישיניפעריביארבי	<u> </u>	<u> </u>	11,60	<u>•</u>		·····	;								
	-	HEXASTICITETHANE	1.9	1 -	544	0			;								
	Ē	1.1.2.2-TORACILLADOHANE	6.17	1 -	2,400	>			1		ļ		•				-
	CILINANNED	TERASHURLETHYLENE	0.8	·	240				· · · ·		· .						
	Ĩ	I.I.I- REPUTE MARE	1	1841.5	L 18,000	2					,				1-		
	ະ	LI.2-TUNESEWALE	0.6	-	9,400	T											
		TEICHLEEDWLERE	2.7	·	45,000		27		· · ·		•						ő
		VIIIYL CHISRIDE	1 _		47				······································						·	-	
15	5]			1	5,700	_										_	
		1.2-DISCHARTINE	-	1 87	244									••••			
		HELLCHEPPEUTADIENE	1.45		9.3	1-											
		HEXAGE IN CONCLIGNTINEDE		206	5.2	+					,						
		PI(2- GOARTHOXY) NET AN	:/	1 8.08													•
	1	IENC-GARLINGT JAST -NE	1	; 1	<u> </u>	+											·
	÷	B: (2-CHIPOENYL)ETHER	4.03	·	1						<u> </u>			-			
	Ż.	Bis 12-CHURDISSTROMY DEMER		: 24.7	1928.000	2		•			!						
	¥.	2-CHLOREHYLVENYL ENER *	10,0121 /6/1	· · · · · · · · · · · · · · · · · · ·	<u> i</u>					}							
					<u> </u>	<u> </u>				4					<u> </u>	. .	
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3		A- Chroning MERIENNE THE	<u> </u>		1	<u> </u>										-	
1.	-	EIS (2-E-TLHENL) PHIMLATE	<u> </u>		1							13					
		BUTYL BELEYL PHTHALAE								•							
	ا س	DIETHYL MITHALATE	—	1350 115/	- 1												
	51	DINER IN MITHALATE	- 1	1313 NE/L	-					í					_		
		1-12-BUTL MITHLATE	· · · · · · · · · · · · · · · · · · ·	1 24 NGL	-	1	1	14	18	,		i			1		
	<u>ح</u>	DI-N-OCTYL PHTHALATE						1		1						······	
i		PENZINNE	0.12.74/2		2,500			i		i		i	······		1		
		3.3-DICHARDEONZIDINE	6.0103							1				-	-i-		
	a 415	1.2-DIMENYLHYDRAZINE	42,94/1		076			:		1				· · ·			
		וארוידבוסוניביוזיב אאומב	1.494/1					1			;				-1-		
						·		<u> </u>		+		<u> </u>	1				
Γ		N-NAT: 12004HENYL ANINE	4.9													<u></u>	
<u></u>	-	WHATTERD WARRYL ANINE						·		\rightarrow							
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	2	ACRYLINITRILE	0.058		022,ר	_											
1.		SOPHERENE		5.2vel	117,000]			<u> </u>	
		PHUSIAS BITHENTL (TCES)	1.17970/	-	0.114			1									

. TABLE 3 (THE 1/2) SULLIMARY OF ORBAUXC ANALYSES OF GRUNDU WIFE CALL HAL

F3-8202-E

	1		LU-ASSCIEM.	2112292920	e for the sea is	OF ORGANN	SAMPLIN	IL CHO PC	14 14	1982
		PREASURY POLLOWITS	TRACLE	TASK 2XL	1					
<u> </u>	-	·····	SUPERU R	at Term	Y LIFE	EN WEL	IEA WEL	EAUGEL	A837-3	weitte
	12	ELIZEVE	6.66		5,30	a (80	57	<u> </u>		
	L'UNICH	ENHYLLEDIZOJE	1	114 14	12 22 00	0 16	18			
	ž	Toluene		14.3 44	111,50	· (200	880			
. ·	1	ACENAPHTHENE		_	1.70		[
		ACEVAPHTHYLEIDE	<u> </u>			· ·				
į		ANTHRACEIDE			_		1			
	5	PUIZO(2)415" PACENE	- leves-	1		_	1			
	50	POTA (1) FUNKATHONE	13.176/	1	<u> </u>					
	ž.	EDITE())FILWATHOUE EDITE(V)FUNRUTHENE EDITE(U)FFINLENE EDITE(U)PYFENL CHAYSENE	11	1					2	
1	N.	20121 (Uhi) FEILYLEISE	11		1				ý.	1
	5	20120(4) PYPEIX	}		1					
	ة ا	Charlene]]	1.	1			1		
1		DIEL: 20 (a. A) 41 MIRACELLE	P		1		I			
T		FLYMANTHOR		42	3,980		1	1	11	1
.]		FLUOPEILE	hours	1	1	1			-11	
7	t	INTELOCIAL-CALPTRENE	Dian	T	1					
		NAPHTHALEISE	1 -	T =	620	1	†	†		
7	t	PHEIMATHRENE	17 Barth	1	1	1				
	~	PYFENE	J. Parts	1	1	1	i		6	
T	1	CHILLEREDZENE	1	488	250	101	1			<u> </u>
	-7 tr	C-DOULCHOED ZENS	5	1	1	1	1		- <u>;</u> {	
ł		6- JIAITIKTERIJSEIK	11 -	1	1	1	i-			
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	ŝŀ	HEVACHLINCHELIZEI)E	1.72 721	-	250	† †	<u>i</u>	~	1 1	
		, S. A-TRICHLER, SET DZENE			250	††			++	
		4-DINITTUDLUENE	0.11		1 230	1	<u>†</u> -	<u> </u> .	+ +	
1	ξĥ	J.C-DINATE SLIFISE	}			1	†-		++	
		UTTEDEENZENE		19.3 Ne/L	1000	1 - i	<u></u>		1 1	
		L-CHURENAMITHALENE			1,640	<u>├</u>	†-		1 1	
ŢŻ	T	45034	, ;	1.5NH		360 1		- i -	+	
Internal C	t.	4-DIMETHYLAHENCL			2,120	1			/ /	
T		-ekuro-m-cresol	(13.4 1		1	j	<u> </u>	2-1-	
1-		- CHLOROPHENOL	- ;		4,380	1	<u>i</u>		7	
12	15	A-DICHLOROPHENOL	1:	3.cquell	315	1	i		1:	<u>-</u>
	- 1	CALIFICATION		1.01 NE/L	3.2	1			† †	<u> </u>
CilloCottle Links	t	T.S-ERATHACHERD NOUN			3.00	;				
15		4.6 - TRICKLORAPHENOL	1.2		971				┼╍╍┼╌	
1-	1 .	.E-DINETRO-O-CRESCL		13.41	330		<u>i</u>	<u> </u>	+	
1		d humanhlettel	†	70 1	230				+	
╡┋	5	- NTROFHENDL		<u> </u>		<10	<u>-</u>	;	 	
ļ	4	- NTOPHENOL	·		230		<u>}</u>		+	- · ·
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	F	BENDOKHI MONETHANE	1_+	- 1		411.0	00				}			I			1	1		
	15	(Standarth) Proceeding			1	111.0	4.4				1				1 .		,	T	T	_
	₹Ē.	250MONETHANE	T			Un,	440		;		Ţ	TI			1	Τ	1	1	1	
	1 ÿ	CA" SOLV TETRACHIMRIDE CHLAROFORIA DARADUCHLOFORETHANE	6.	0		35/2	200		γ. —		T	1 1							1	
	ĮŽ	CHLEROFORIA	0.1			28,9	00		1.]	0.01	Π.	٦			7-	1		1	~
	巨	SALEDUCHLOF PALTHANE	<u> </u>	-11		h14.0	80	T			1	1			1		1		1	
	1	DEPENDIFLER INETHINE *	1 -	.11		111.0		Т	,	1	1	1 :			1	1-	1	· · · · ·	1	
	13	WEHYL CHLEUDE (GANNE)	1 -	-11		1/1.0	RS	Th	```	<u> </u>	1	1			1		1		1	
	ž	N'ETHYLEN'S CHILDRIDE	5 -	- 11	-	111,1	10	÷	14.16	5.3	10	2.72			1.04 0.0	210.019	0.017		1	
	Ī	TRICHLEROFLUCKEHOMANE	- 1	. 11	~	11,0		1			;	1			1	1-1	1	,,,	1-	
		CHURDETHENE			-	1 -	- 1	,	1		·		1		1	-1	1		1	
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		1,2-DICHLENDERHALL	0.4			20,0	~		10.016		20	ملثدة	-1	-	1	IL.AP			1	
		1.1-DICHLETCETTYLENE	0.63		-	hus		1				1	1		, T	1-		ويتنا ويستني يتنبع		
	2	1.2-TRUX-DIOUSRADITYLENSE	_	-	-	11.6	_	T	i T				-†		· · ·	1-	;		<u> </u>	
7		HEXACHILINSETHANE	1.9	1	1-1	- 	40	1		1	1	1	\uparrow	`~		+	1			
		1.1.2.4-TETRACILLADEHANE	0.1		1=1	1 2.40	_	÷					1			+	;			
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		3.4-DINITIUTUDLUENE	 "	0.11	-+	<u> </u>	<u>9</u>	<u>_</u>	+'	_	+-	<u> </u>	+	<u> </u>	-+	<u> </u>		·	-+		;	÷	+		<u>+</u>
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<u> </u>	<u>, </u>	MAX. VALUES HOLD INICOLA	<u>AJ</u> 	Anc	<u>. †</u>	ATTAL PL	<u>) +n-</u>	<u>/k</u>	F	<u> </u>	<u>ه مل</u> د ا	10.	<u>ندا الد</u>	<u> </u>	19640	<u>NU 1</u>	174	حبه	<u>.in</u> i	<u>)-:-,</u>	<u></u>	. د معاملان	<u>i taxa</u> 1	<u>. ر دنځ</u>	100.
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	4										<u></u>				÷		<u> </u>		<u>-</u> <u></u> - <u></u>		<u> </u>				<u> </u>

TASE 4 (PASE 4/2) SUMMARY OF ORGANIC : ANALYSES OF WITH (SOIL) SAMPLES (I)

F3-8202-04C (DE-17)

	PERMISSIBLE	WAX VALUES FAR /			y the c		μα/L)
NORGANICS	WATTLES .	WORLAWARL LIFE	8-1 (BV)	B-4(EX)	B-5(EPA)	WELL#39	WELL#45
ANTIMONY	(46*)	1,600	<20	<20	< 21	<20	i <ນ
ARSENIC	58 (8,5842)**		10	<10	<10	1 120	<10 :
BERYLIUM	(0,0137)**	5.3	<u> <a< u=""></a<></u>	<2	<u><2</u>	52	<u> < २ '</u>
CADMIUM	10	0,012	<5	<5	(0	10	<5
CHROLUUM	50	0.49	30	<10	10	90	<u> </u>
COPPER	1,000	5.6	40	<81	<20	60	<20
LEAD	50	0.75	120	<40	80	320	<40
NERCURY	$2(6.144^{*})$ (13.4*)	12000.0		<1	<1		<1
NICKEL		<u> </u>	20	- 20	<10	60	<20
SELENIUM	10	35	<10	<20	<20	<20	<10
SILVER	(13*)		< <u>80</u> <10	<20	<10	<2+ <10	<20
MULLIUM		4.0		120			<10
ZINC	5,000	47	<u>210</u>		130	076	60
CYANNE	(30,000 FIED/ 14		N 10	<.10	< 10	< 10	<u>< 10 i</u>
ASPESTO TOTAL MIEUSIS	(30000 HIERAY)	·					·
		(LIONAROUI) 400,1	15,000	450	1,050 1	123,000	510
BARIUM	1,000	1,000(100341000)	15,000	570	60	310 1	70
BORDN	1,000	TTO (REALING)	20	10	< 10	< 100	10 :
CALEUM		150 (0000)	37,600	14.050	10,200	15,500 1	10,600
BALT_	l	200(1002404)	<10	10 1	<10	20 ;	<10 1
IRON	300	1,000	55,000	45,700	41,600	191,000 1	1,560
MASINELIUM			5,200	5,000 1	2,301	4 200	3,600 1
ALANSANESE	. 50	(uensettal) 000 5	450	3,720	480	2,440	14-0
SODIUM			7300	11.900	10,000	11,200	6.600
TIN			<10	<20	< 20	20	<20
NAPEDINA		(0.000 (IKENSATI = 4))	30	<10	<10	170 i	<10
ALKALINITY		1				· · ·	
ANIMONIA		20	1	1		1	i
CHLORIDE	250,000	3		-		1	}
NITRATE	43N 10,000			1			
ettosettosus				<u> </u>		1	
SULFATE	250,000		}				}
DIZZOLYO CXIOCN	≥ 3,000		İ				
TURAL DESKINED SALLINS	500,000			i			i
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STEN : UNALLU	NITS IN JLA/L,E	KOFFT LYOTED (1	URF. FORM	LREWSTER . N	W. 41, 1919	<u> </u>	

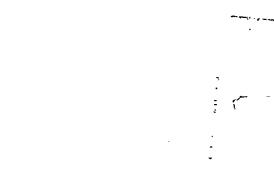
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······	ABLE 6 S	UMMARY OF 1 TY CRITERIA		1 course of and		arring C	- Store H	·•
· •			+	SAMPLING (S& JUNE 28	THRU LU	12 14, 1982	(H#\K#)
	PERMISSIBLE	NAX . VALUES AN	B-(B-1				3 8-4 8-4	-TR-F-LAT
VORGANICS	WATT WAT LES	WATCH AWARL LIFE	53#5 534	1 52* 2 52*4	5145 155*6	23#6 22*	8 55* 3 55"6	7 55 "LU TAT
KIOMITCHA	(46*)	1.600 /	<2 <2		<2 <2	1<2 4		
ARSEINC	50 (0)0002)**		<1 . <1	121 41	121 21	121 21		
BERYLLUM	(0.4+37)**	5.3/	<12 0.4					1<02, <0
CADINICAD	10	0.012	<1.5 <1.5	the second second second second second second second second second second second second second second second s	the second second second second second second second second second second second second second second second s	the second second second second second second second second second second second second second second second s		<1.5 <0.
CHROLIUN	50	0.24	<1 <1	<1 <1	1<11<2	<1 <		<1.<
CCTYER	1.000	5.6	<2 <2		<1 <2 <2			
LEAD	50	0.75	<4 <4		<	<4 4		
	2(0.144 7)	120000	<0.1 <0.1		<	<0.1 <0.		<0.1 : <0
UEF.OURY			Q2 4	1212		····		
NICKEL	(13.4*)	56	**************************************			the second second second second second second second second second second second second second second second s		
SELENICH	10	3/5	<u><1 <1</u>	<1 <1	<u> <1 :<1</u>	1<1 <1	<u> < '< </u>	<u> < <</u>
SILVER	1	/0.12	<2_<2	all a survey of a second second second second second second second second second second second second second se	<u>· <2 · <2</u>	< <u> <</u> < 2		14
THALLIUM	(13*)]	40	<1 <1	<u> </u>	1<1 1<1	1<1<		1<1 <1
_Z100	5,000		< 11	2 2	<u>a</u>	<u>4 i </u>]	<13	<u> < 4</u>
CYANIDE	FREECH (200*)	/3.5	1 <1	<1 <1	1<1 <1	1<11	1<11<1	1<1.<1
ASSESTO	(30,000 FIZ+2/L)**	N/		1		<u> </u>		J
CLCU2H9_ATUT		$\left \right\rangle /$				T T	1	
ALUMINERA	1	((UCHTECHI) 000 (1	90 : 304	90 1 120	80 / 110	100 1 221	01 25 30	1 20 1 100
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TABLE 6 SUMMARY OF INOR PANIC ANALYSES -OF UTTING (SOIL) SAMPLES

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ECOLOGY AND ENVIRONMENT, INC. TOXICOLOGICAL ASSESSMENT SITE: DELAWARE SAND AND GRAVEL TDD NO.: F3-8202-04C EPA NO.: DE-17 DATE: AUGUST 23, 1982

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Based on review of Background Information, Site Observations and Laboratory Analytical Data, the following conclusions are indicated:

There is no indication of an imminent or severe adverse toxicological impact to public health or the environment.

There are possible indication(s) of potential adverse toxicological and/ or environmental impact. A more comprehensive Site Investigation and Sampling Program is recommended.

A review of the information presented herein is sufficient to indicate a potential adverse impact on human health and/or the enivironment. A Toxicological Impact Assessment is included, as follows:

Analyses of on-site monitoring well and split-spoon cutting samples indicates substantial contamination of the underlying groundwater and soil (see Sample Data Summary). The known carcinogenic compound benzene (up to 180 ug/1), and the suspect carcinogens trichloroethylene (up to 27 ug/1), and dichloroethylene (up to 1,500 ug/1) were detected in the monitoring well samples. In addition to other compounds of toxicological concern, lead (up to 320 ug/1), mercury (up to 1 ug/1), and the potentially carcinogenic metals cadmium (up to 10 ug/1) and arsenic (up to 120 ug/1) were identified in the aqueous samples taken from monitoring wells. The affected Columbia and Upper Potomac Formations are the major source aquifers for potable supply. Presently, no wells near the site are used as drinking water sources. For details of groundwater condition refer to the text and hydrogeological reports F3-8108-11B and F3-8108-16B. Consumption of the contaminated groundwater represents a significant risk to human health.

med Kenneth G. Symmer, Ph.D., Toxicologist

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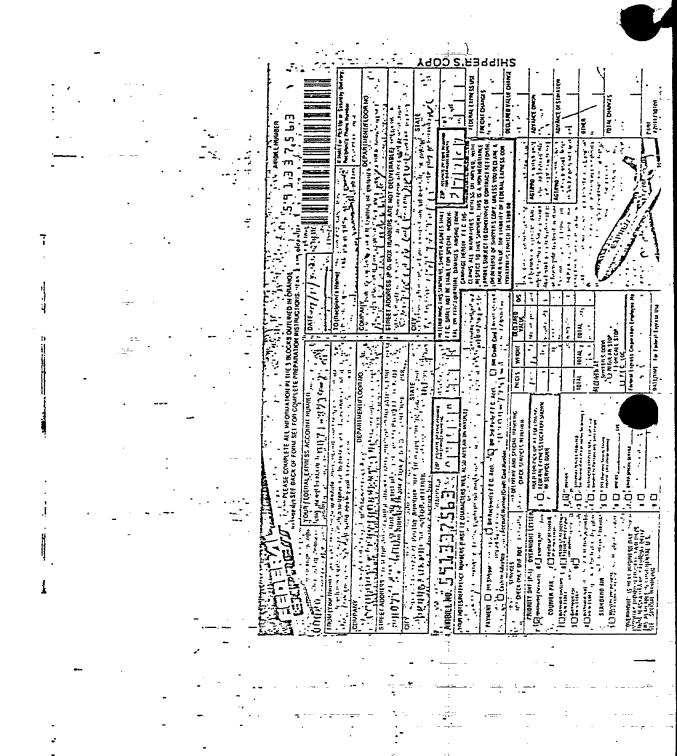


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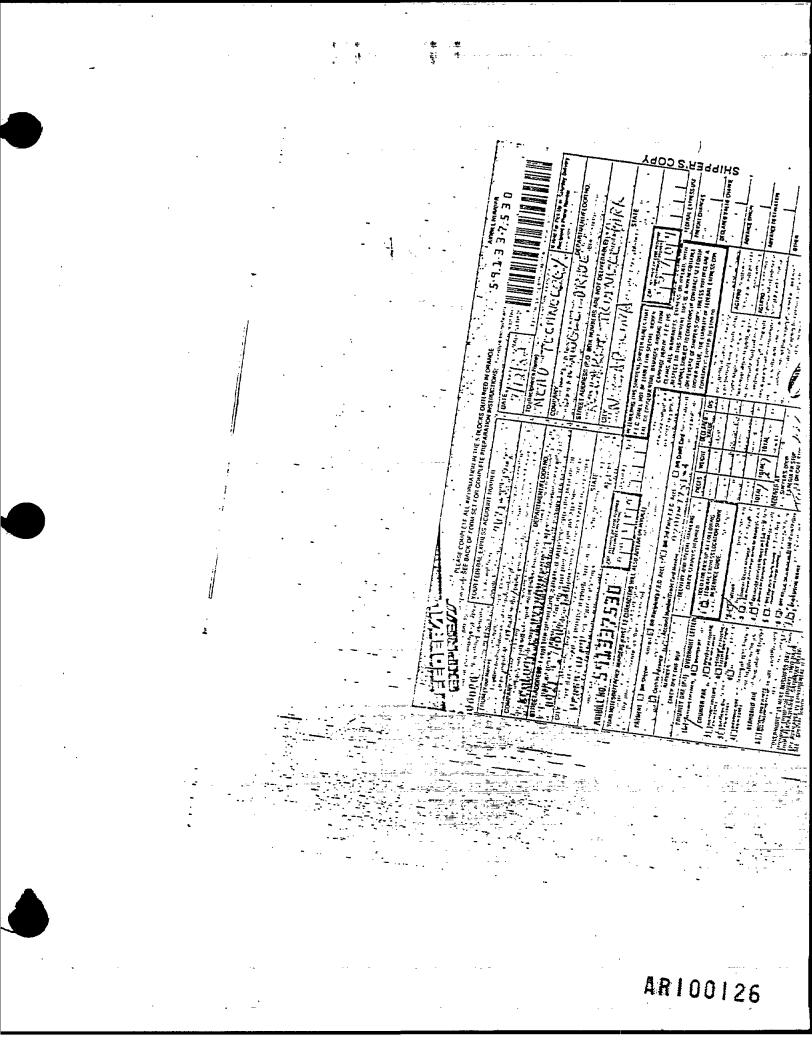
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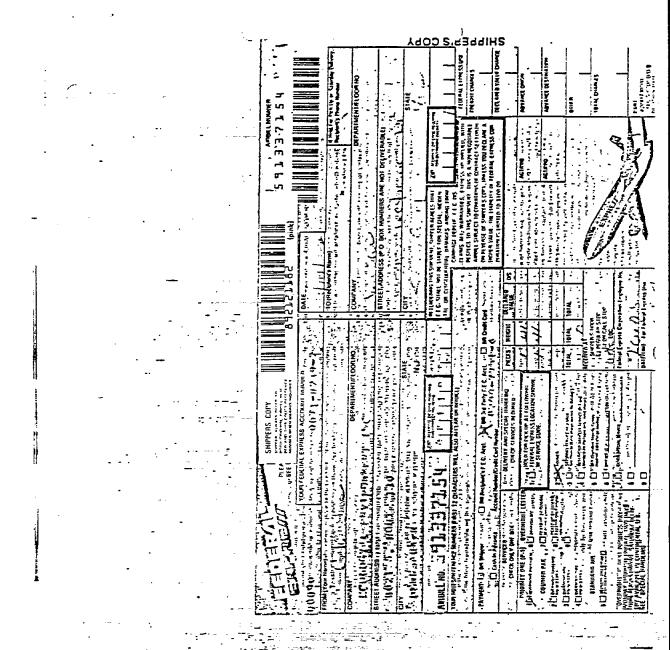
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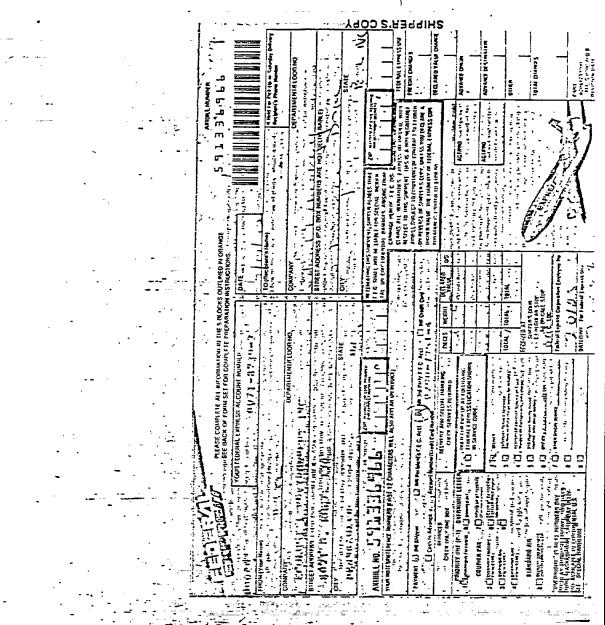
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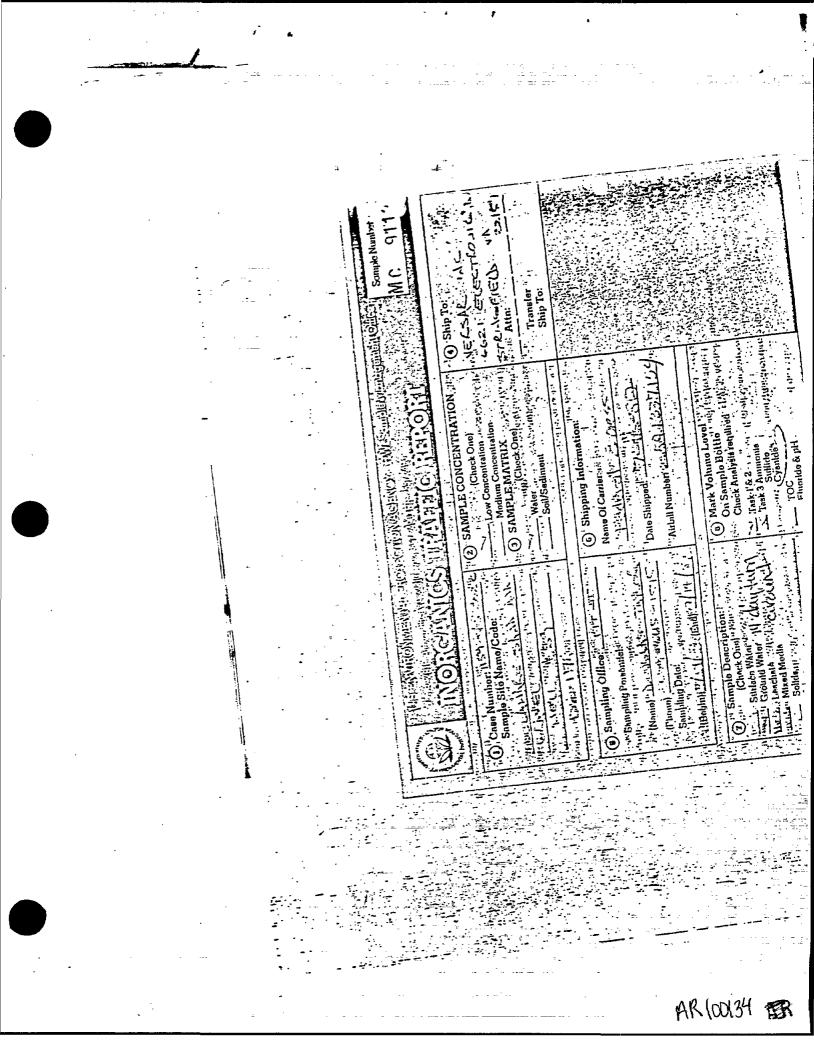
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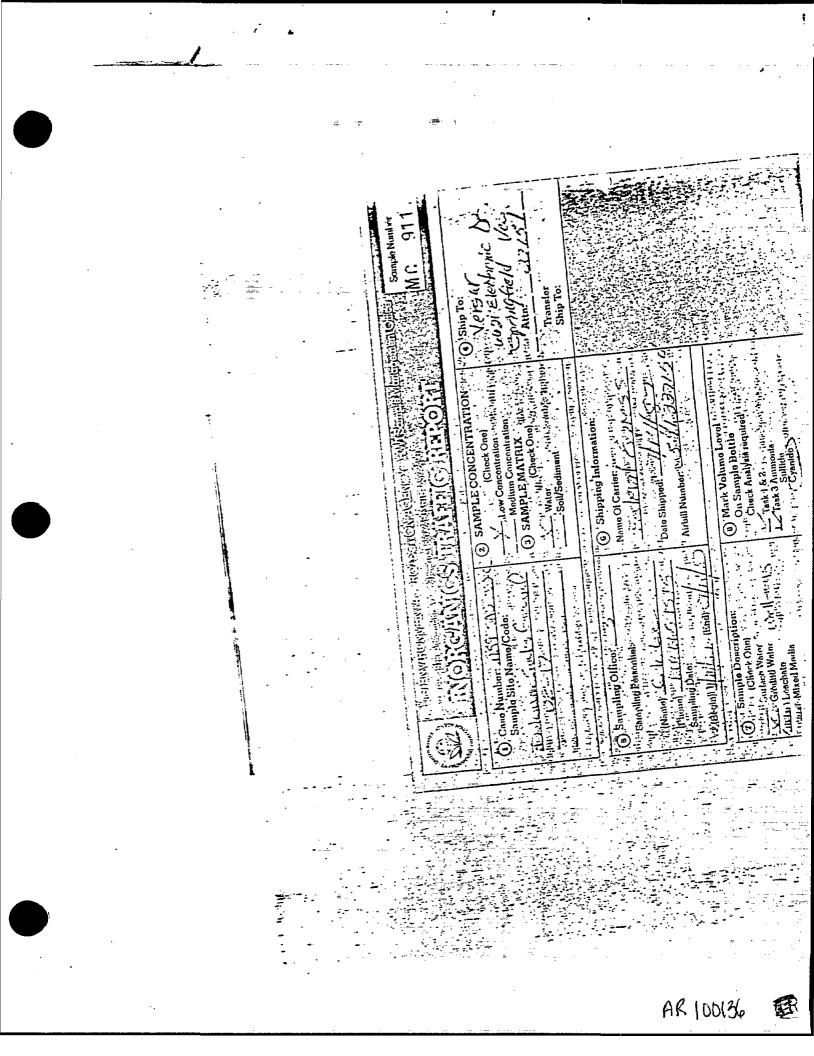


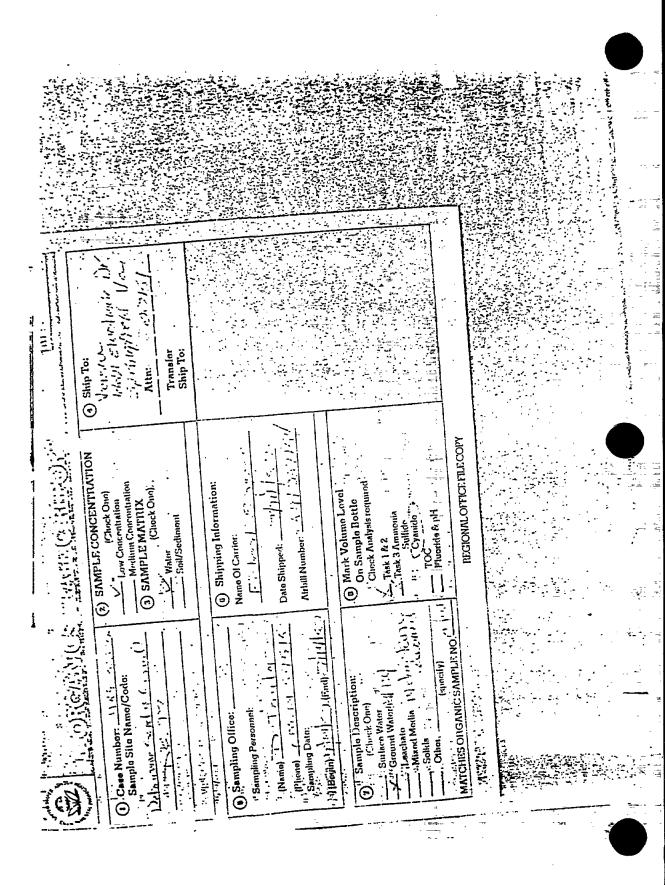
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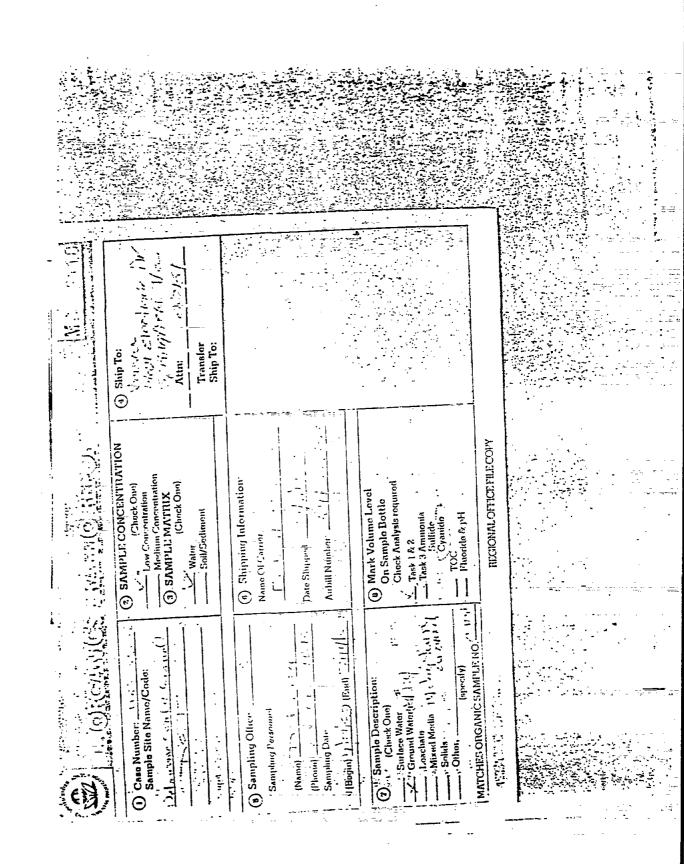
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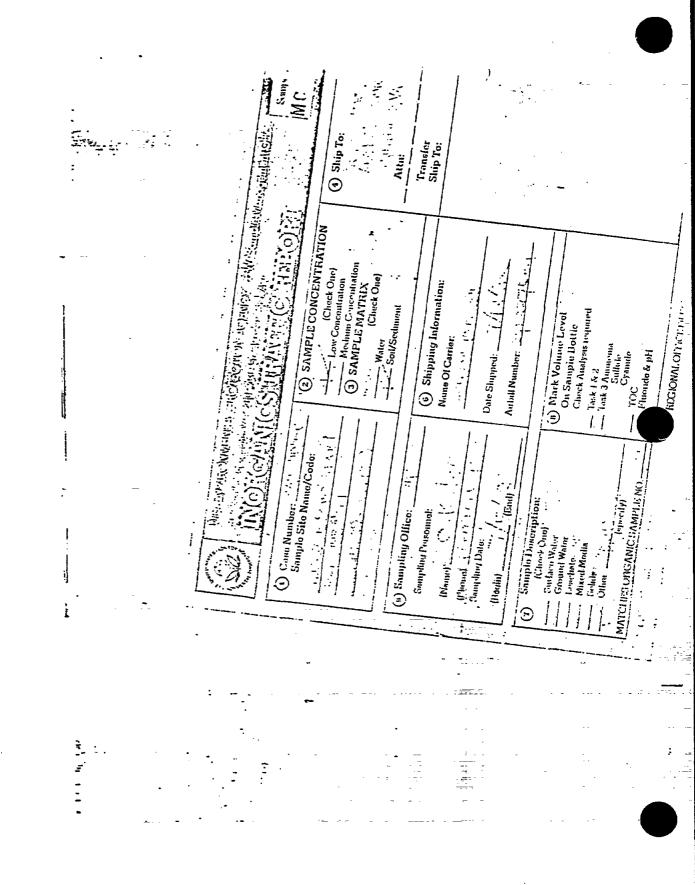
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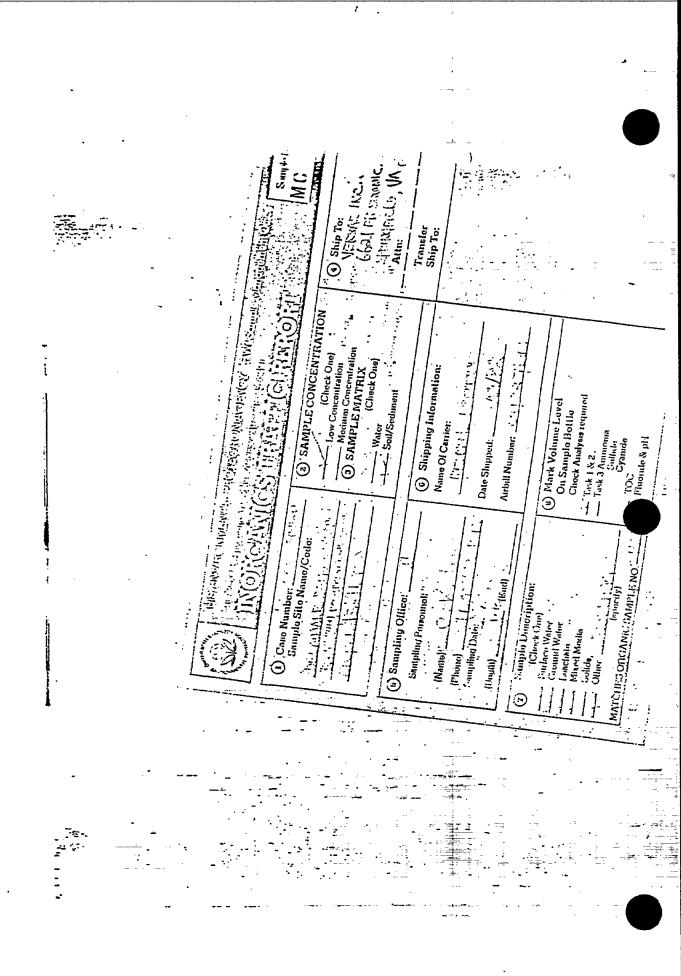
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Sengle Viewber -C <u>1513</u> 1(45) 443 4:45 4 ⓒ 귀귀부분이 남태 ase Number El Solo -(2) SAL-PLE CONCENTRATION 🕣 Ship To: (Check One) Low Concentration _ Medium Concentration Sumple Site Name/Code: 2 6.6 6 6 2 Attn: 3 SÄMPLE MATRIX ברב הבכים ביורים (Check One) Transfer _, Water _ Scil/Sediment Ship To: . . . A (Fogienal Office: ____ (5) For each sample collected specify number of containers used and mark volume level Sampling Personnal: on each bottle.--1.000 ()(I.T.B) Number of Appendicture Containers Total Volume Containers (Phone) Water Sample y Date; (Extractable) Wzter (End) $(\nabla C A)$ Er .al 17...1. - Vigning Information . ÷ Soil/Seilment Water 77 (Ext, VOA) Name of Carrier Cther . Date Shipped: i dell'attan 1 / 274 - 1 / 274 E . Anno 62 🗓 Sampla Description 🕃 Sample Location 는 한 *63¹¹42* _ Surface Water Mixed Metia Solids . Ground Water and in the . . 1 Other (sparify). 2 Laachaie . . • parial Handling Instructions: **₩1157** 5 e 2 Special (interstations bazerdous nature) _ 525-..... iy Tin Grend م کی در ایک س 4. مى مەرىپىرى ئىرىمىدىن مەرىمىمى مەرىمى REGIONAL OFFICE FILE COPY

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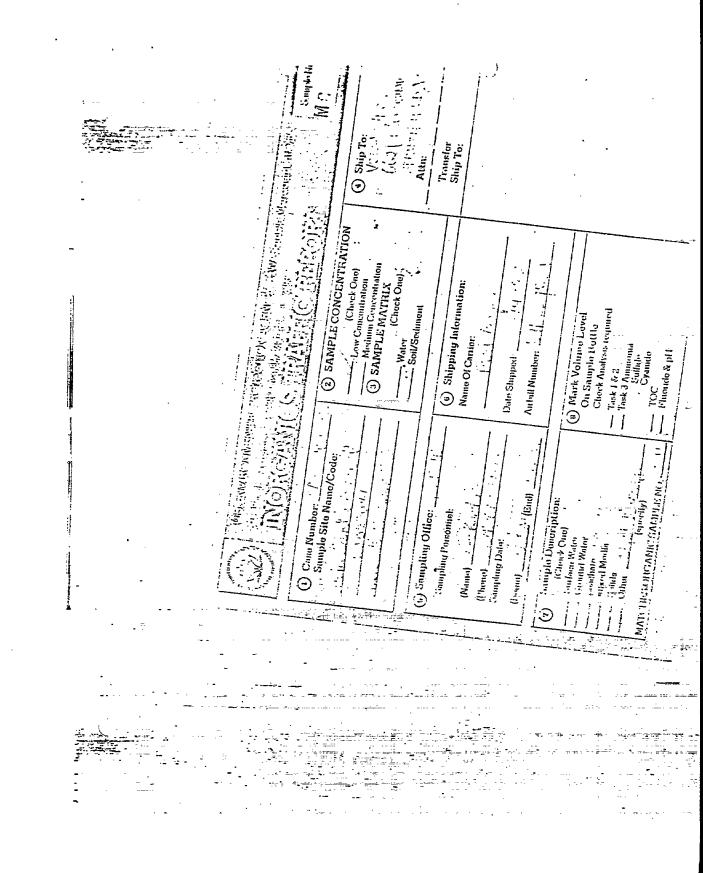
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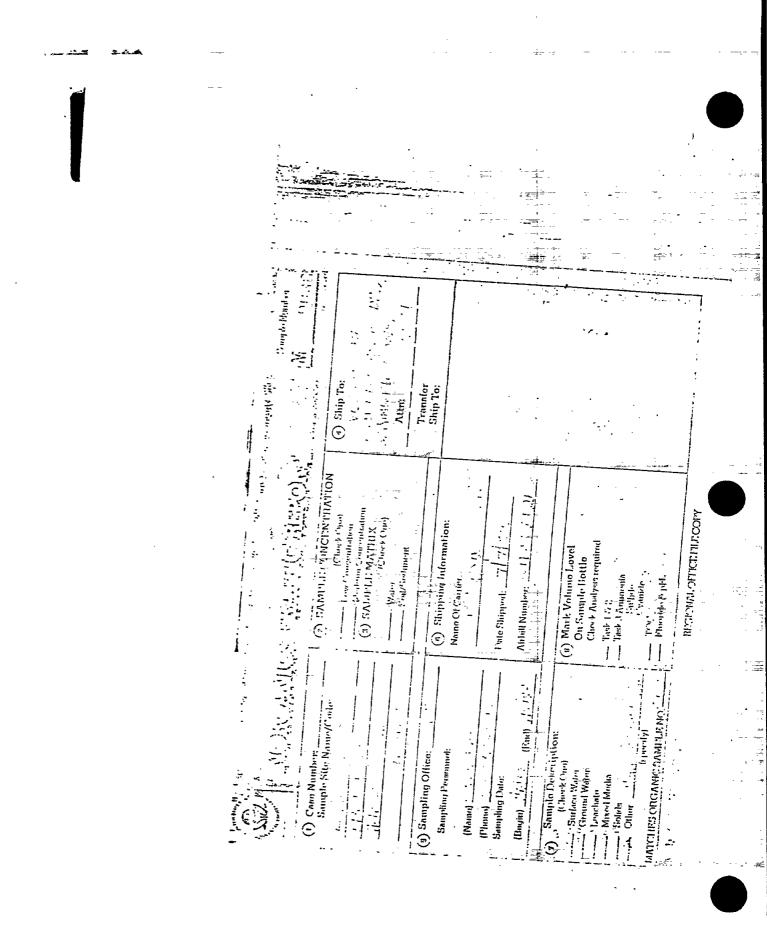
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EPA Form 5700-20A (Rev. 5-82) Replaces previous editions and EPA Forms 5700-1A, B, C, and D, all of which are obsolete.

(-construction) A. PERSONNEL 2. FRINGE BENEFITS 3. TRAVEL 4. EQUIPMENT 5. SUPPLIES 6. CONTRACTUAL (DETSONAL SETVICES) 7. CONSTRUCTION 8. OTHER 9. TOTAL DIRECT CHARGES	0 1,000 6,550 3,500
2. FRINGE BENEFITS 3. TRAVEL 4. EQUIPMENT 5. SUPPLIES 6. CONTRACTUAL (DETSONAL SERVICES) 7. CONSTRUCTION 6. OTHER	0 1.000 6.550 3.500
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6. CONTRACTUAL (PERSONAL SERVICES) 7. CONSTRUCTION 6. OTHER	
7. CONSTRUCTION 6. OTHER	
8. OTHER	362,464
	0
S. TOTAL DIRECT CHARGES	0
	373,514
10. INDIRECT COSTS: RATE "BASE	
	\$373,514
11_TOTAL (Shere: Recipient. 0 7. Federal 100 7.)	
12. TOTAL APPROVED ASSISTANCE AMOUNT	s 373,514
TABLE 3 - PROGRAM ELEMENT CLASSIFICATION (Non-construction)	n/a
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14. 11.	
13. TOTAL APPROVED ASSISTANCE AMOUNT	s
TABLE C - PROGRAM ELEMENT CLASSIFICATION (Construction)	n/a
1. ADMINISTRATION EXPENSE	
2. PRELIMINARY EXPENSE	
3. LAND STRUCTURES, RIGHT-OF-WAY	
4. ARCHITECTURAL ENGINEERING BASIC FEES	
S. OTHER ARCHITECTURAL ENGINEERING FEES	
6. PROJECT INSPECTION FEES	
7. LAND DEVELOPMENT	
. RELOCATION EXPENSES	
9. RELOCATION PAYMENTS TO INDIVIDUALS AND BUSINESSES	
10. DEMOLITION AND REMOVAL	
11. CONSTRUCTION AND PROJECT IMPROVEMENT	
12. EQUIPMENT	
ta. MISCELLANEOUS	
14. TOTAL (Lines 1 theu 13)	
15. ESTIMATED INCOME (If applicable)	······································
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IS. NET PROJECT AMOUNT (Line 14 minus 15)	
17 LESS: INELIGIBLE EXCLUSIONS	
18. ADD: CONTINGENCIES	
13 TOTAL (Share: Recipient)7. Federal7.)	
	AR300176

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PART III-AWARD CONDITIONS

GENERAL CONDITIONS

The recipient covenants and agrees that it will expeditiously initiate and timely complete the project work for which assistance has been awarded under this agreement, in accordance with all applicable provisions of 40 CFR Chapter I, Subpart B. Therecipient warrants, represents, and agrees that it, and its contractors, subcontractors, employees and representatives, will comply with: (1) all applicable provisions of 40 CFR Chapter I, Subchapter B, INCLUDING BUT NOT LIMITED TO the provisions of Appendix A to 40 CFP Part 30, and (2) any special conditions set forth in this assistance agreement or any assistance amendment pursuant to 40 CFR 30,425.

b. SPECIAL CONDITIONS:

(For cooperative agreements include identification or summarization of EPA responsibilities that reflect or contribute to substantial involvement.)

- 1. EPA awards this cooperative agreement in accordance with the Federal Grant and Cooperative Agreement Act of 1977. This agreement is subject to all applicable EPA assistance regulations.
- 2. The recipient agrees to submit quarterly progress reports to the EPA Project Officer. These reports shall cover expenditures to date and expenditures since the previous report, estimates of work completed (as a percentage of the total work to be done on that activity) with a description of the basis for the estimates, estimated variance (cost and time) expected at project completion based on current project status, as well as an itemization of expenditures by cost category.
- 3. The recipient agrees to submit to Mr. Francis R. Snock, Chief, Grants Management Section, a completed EPA Form 6005-1 within 15 days after the end of each Federal fiscal quarter during which the recipient or its contractors award any subagreements to minority or women's businesses.
- 4. The recipient agrees to the following conditions in accepting this cooperative agreement for the letter of credit method of financing:
 - a. Cash drawdowns will occur only when needed for disbursements.
 - b. Timely reporting of cash disbursements and balances will be provided as required by the EPA Letter of Credit Users Manual.
 - c. The same standards of timing and reporting will be imposed on secondary recipients, if any.
 - d. When a drawdown under the letter of credit occurs, the recipient will show on the back of the voucher (Form TFS-5401) the Cooperative Agreement number, the appropriate EPA account number, and the drawdown amount applicable to each activity account (see attached "Instructions for Using the Superfund Account Number Under Cooperative Agreements"). The eighth digit of the account number (see item 39, page 1 of the Cooperative Agreement) is the code to the appropriate activity assignment:

L - Remedial Planning, consisting of the following subactivities:

- Remedial Investigation/Feasibility Study

- Remedial Design
- R Remedial Implementation, consisting of the following subactivities:

- Remedial Action

Carling and States of Particles

- Operation and Maintenance
- Initial Remedial Measure



EPA Form 5700-20A (Rev. 8-79)

PAGE 3 OF 4

- 4. (continued)
 - e. When funds for a specific activity have been exhausted but the work under the activity has not been completed, the recipient may not drawdown from another activity or site account without written permission from the EPA Project Officer and Award Official.
 - f. Funds remaining in an account after completion of an activity may either be returned to the EPA or adjusted to another activity or site at EPA's discretion.
 - g. When a subactivity is completed, the recipient will submit a Financial Status Report (Standard Form 269) within 90 days to Mr. Francis R. Snock, Chief, Grants Management Section.

Failure on the part of the recipient to comply with the above conditions may cause the <u>unobligated</u> portions of the letter of credit to be revoked and the financing method changed to a reimbursable basis.

Federal funds will be released to the recipient utilizing the letter of credit payment method. The entire amount awarded will be released upon receipt by EPA of the signed Assistance Agreement.

- 5. The recipient agrees to submit a detailed estimate of personnel costs to EPA prior to the commencement of site activities.
- 6. The recipient agrees to submit a site-specific Quality Assurance Plan for EPA approval prior to commencement of any field activities such as sampling and well drilling. The recipient, with EPA's assistance, will incorporate EPA's current Quality Assurance Requirements in the plan.

Division for Headquarters awards and to the appropriate Grants Administrations Office for State and local awards within 3 calendar weeks after receipt or within any extension of time as may be granted by EPA. Receipt of a written refusal or failure to return the properly executed document within the prescribed time, may result in the withdrawal of the offer by the Agency. Any change to the Agreement by the recipient subsequent to the document being signed by the EPA Award Official which the Award Official determines to materially alter the Agreement shall void the Agreement.		ASSISTANCE IDENTIFICATION NO.
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pr Hoily 716187 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY **REGION III** 6TH AND WALNUT STREETS C PHILADELPHIA, PENNSYLVANIA 19 5 1984 JUL 3 DNREC SECRETA **VRY'S OFFICE** CERTIFIED MAIL Re: V-003299-01 9 1934 Delaware Department of Natural Resources and Environmental Control Honorable John E. Wilson, III, Secretary Department of Natural Resources and Environmental Control

89 Kings Highway P.O. Box 1401 Dover, Delaware 19901

Dear Mr. Wilson

I am pleased to inform you that I have approved your application and an award of \$373,514 under the Comprehensive Environmental Response, Compensation and Liability Act of 1980. This award is for the implementation of the remedial investigation and feasibility study for the Delaware Sand and Gravel hazardous waste site.

This award is made subject to the terms and conditions of the enclosed Assistance Agreement. The original copy of the agreement should be signed and returned to Mr. Frank Snock, Chief, Grants Management Section, within twenty-one days of your receipt. The copy should also be signed and retained for your files.

If any additional assistance is required, please contact your EPA Program Manager, Mr. Dominic DiGiulio, at 215/597-2193.

Sincerely,

RECEIVED

JUL 10 1984

WATER SUPPLY BRAN

homas P. Kichler Regional Administrator

Enclosure

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SECRETARY'S OFFICE

STATE OF DELAWARE DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL BY KINGS HIGHWAY

P. O. BOX 1401 DOVER, DELAWARE 19901

TELEPHONE: (302) 736 - 4403

OFFICE OF THE SECRETARY

July 16, 1984

Mr. Frank Snock Chief, Grants Management Section U.S. Environmental Protection Agency Region III 6th & Walnut Streets Philadelphia, Pennsylvania 19106

Dear Mr. Snock:

Enclosed you will find the signed Assistance Agreement for the remedial investigation and feasibility study for the Delaware Sand and Gravel hazardous waste site.

We are looking forward to the opportunity to participate in the C.E.R.C.L.A. program as a state lead management action. Thank you for the attention you've given this matter.

Should you require any further assistance, please contact Ms. Marilyn Plitnik of our Water Supply Branch at (302) 736-5739.

Sincerely,

John E. Wilson, III

Secretary

JEW/MAP/ks

Enclosure

cc: Marilyn A. Plitnik Thomas P. Eichler

			Γ Λ	ent # 1
			Award	Document
	E AMENDMENT			ASSISTANCE 1.D. NO. V-003299-01
(Opt Please read instr	tional) ructions on revers	(e)		AMENDMENT NO.
NOTE: The original Amendment with one copy mus			Administration	P
assistance awards and to the Grants Administration or within any extension of time as may be granted the Amendment may be incurred prior to the execution Receipt of a written refusal, or failure to receive mination of consideration of the Assistance Amend	n Branches for St in writing by EPA ion of the Assista ve the properly es	tate and local, assistance. A. Except as may be off since Amendment by the p	e awards within erwise provide arties thereto.	3 weeks after receipt d, no costs as a result of
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DESCRIPTION OF AMENDMENT. PURSUANT TO EPA A	03RL45	LATION 40 CER 30.900 "	41,85	DCN: V85014
 A. The EPA Award amount is hereby increased by \$385,527, from \$373,514 to \$759,041, utilizing FY-85 funds. This amendment is for the remedial investigation and feasibility study at Delaware Sand and Gravel hazardous waste site. B. The approved allowable budget categories are as follows: Personnel Piringe Benefits Travel Equipment South and the second and the se				
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AWARD APPROVAL OFFICE		ORGANIZATION	ISSUING OFFIC	
Regional Administrator (3RAOO)		Grants Manageme	ent Section	(3PM32)
ADDRESS		ADDRESS	on TTT	
U. S. EPA, Region III 841 Chestnut Building		U. S. EPA, Region III 841 Chestnut Building		
Philadelphia, Pennsylvania 19107		Philadelphia, 1		a 19107
RECIPIENT ORGANIZATION				
NAME		ADDRESS		
Delaware Department of Natural Res	ources	P. O. Box 1401		
and Environmental Control		89 Kings Highwa	•	
		Dover, Delaward		
Except as provided herein all terms and conditions and in full force and effect and subject to all appli	icable provisions	of 40 CFR Chapter 1, S	ubpart B.	
SIGNATURE OF AWARD OFFICIAL	TYPED NAME			DATE
	OF THE DESIGN	ATED RECIPIENT ORC	ANIZATION	
SIGNATURE DEMUL		vilson HH 13 Bern	B ^{azy}	October 15, 1985
EPA Form \$700-208 (Rev. 11-79)	1004982	DITION IS OBSOLETE.		Page 1 of 2

η,

- C. The approved allowable budget period cost of \$759,041 includes:
 - 1. Non-Federal funds of \$-0-
 - 2. Federal FY-84 funds of \$373,514 previously awarded
 - 3. Federal FY-85 funds of \$385,527 being awarded by this amendment.

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- D. The Assistance Agreement is hereby amended by adding the following special condition:
 - 8. A provisional indirect cost rate of 19.54% has been budgeted in this Assistance Agreement, but is subject to a renegotiated rate by the cognizant Federal agency or at final audit.

All other terms and conditions remain unchanged.

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AMENDMENT NUMBER 1 TO CONTRACT FOR PERSONAL SERVICES CONTRACT NUMBER CERCLA 85-1 DATED OCTOBER 25, 1984

The above referenced contract between the Delaware Department of Natural Resources and Environmental Control and Dunn Geoscience Inc. is amended as follows:

By deleting Paragraph 6, Effective Date and Time of Performance, thereof in its entirety and insert in lieu thereof the following:

6. Effective Date and Time of Performance.

The services of the CONTRACTOR are to commence as soon as practicable after the execution of this Contract and shall be undertaken and completed in such sequence as to assure their expeditious completion in the light of the purposes of this Contract, but in any event all of the services required hereunder shall be completed no later than August 30, 1985, unless extended by Formal Amendment to this Contract. Final reports shall be delivered on the completion date specified above. The Contractor agrees to pay the Department liquadated damages in the amount of fifty dollars for each day the final report is late, which amount may be withheld by the Department from any final payment.

IN WITNESS WHEREOF, the Department and the Contractor have executed this Amenda to be effective as of the 8th day of November 1984.

> DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

BY:

DUNN GEOSCIENCE INC

AMENDMENT NUMBER 2 TO CONTRACT FOR PERSONAL SERVICES CONTRACT NUMBER CERCLA 85-1 DATED OCTOBER 25, 1984

The above referenced contract between the Department of Natural Resources and Environmental Control and Dunn Geoscience, Inc. is hereby amended as follows:

- A. By amending paragraph 7a. by deleting the amount "Two Hundred Eighty-seven Thousand Seven Hundred Twenty-six Dollars (\$287,726)" and inserting in lieu thereof the amount of "Two Hundred Ninety-two Thousand One Hundred Sixty-one Dollars (\$292,161)".
- B. By amending paragraph 8a. by deleting the amount "\$258,953" and inserting in lieu thereof the amount of "\$262,945".
- C. By amending paragraph 8b. by deleting the amount "\$28,773" and inserting in lieu thereof the amount of "\$29,216".
- D. By amending Task 8 of Attachment A, Scope of Services, by adding the following to the end thereof: "A location map shall be prepared which encompasses both the Delaware Sand and Gravel and Army Creek landfills. Major roads, railways, streams, and landmarks shall be shown on the location map. Monitoring wells and public and industrial water supply wells shall also be shown on the location map. The location map shall be prepared by tracing an enlargement of an existing map or aerial photograph".
- E. By deleting Task 8 of Attachment B in its entirety and substituting in lieu thereof the following:

Task 8 Prepare Topographic and Location Maps

A topographic map and a location map shall be prepared for the Delaware Sand and Gravel remedial investigation and feasibility study. The topographic map shall be site specific, encompassing the site and a small area immediately surrounding the site. The location map shall encompass both the Delaware Sand and Gravel and the Army Creek landfills. Major roads, railways, streams, and landmarks shall be plotted on the location map. Monitoring wells and public and industrial water supply wells shall also be plotted on the location map.

The topographic map shall be prepared in accordance with Attachment A of this contract. The location map shall be prepared by tracing an enlargement of an existing map or aerial photo. A reproducible mylar copy of both of these maps shall be delivered to the Department upon task completion.

Contract No. CERCLA 85-1, Amendment 2

IN WITNESS WHEREOF, The Department and the Contractor have executed this Amendment to be effective as of the 15th day of January 1985.

> DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

By: Attest

DUNN GEOSCIENCE, INC.

By: Attest:

AMENDMENT NUMBER 3 TO CONTRACT FOR PERSONNEL SERVICES CONTRACT NUMBER CERCLA 85-1 DATED OCTOBER 25, 1984

The above referenced contract between the Delaware Department of Natural Resources and Environmental Control and Dunn Geoscience, Inc. is amended as follows:

By amending paragraph 6 thereof by deleting the date "August 30, 1985" and inserting in lieu thereof the date "October 30, 1985". All other provisions of paragraph 6 shall remain in force and are not affected by this amendment.

IN WITNESS WHEREOF, the CONTRACTEE and the CONTRACTOR have executed this amendment to be effective as of the 30th day of August, 1985.

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

BY:

DUNN GEOSCIENCE, INC.

nes ATTEST:

AMENDMENT NUMBER 4 TO CONTRACT FOR PERSONAL SERVICES CONTRACT NUMBER CERCLA 85-1 DATED OCTOBER 25, 1984

WHEREAS, the remedial investigation undertaken by the contractor pursuant to this contract has revealed the need to collect much more information than originally anticipated in order to characterize the nature and extent of contamination of the Delaware Sand and Gravel landfill and assess the possible effects on human health and the environment.

WHEREAS, another amendment to the original contract was necessary to incorporate the extensive additional work required.

WHEREAS, Attachments A and B to this amendment have been amended to reflect new and additional work not covered by Attachments A and B to the original contract.

Now therefore by mutual assent of the parties, the above referenced contract as previously amended is further amended as follows:

By adding to line 2, page 1, after the words "Dunn Geoscience Corporation" the following: ", a New York corporation licensed to do business in Delaware".

By adding the following to the end of paragraph 1, <u>Employment of Contractor</u>: "and grant number V-003299-01-2.".

By deleting the following words from paragraph 3, <u>Scope of Services</u> "Attachments A and B" and inserting in lieu thereof: "Amended Attachments A and B".

By amending paragraph 6, Effective Date and Time of Performance: to change the completion date from "October 30, 1985" to "November 30, 1986".

By deleting from paragraph 7, <u>Total Cost and Compensation</u>, the following: "Two Hundred Ninety-two Thousand One Hundred Sixty-one Dollars (\$292,161)" and inserting in lieu thereof "Five Hundred Forty-two Thousand One Hundred and Five Dollars (\$542,105).

By amending paragraph 8 a. by deleting the amount "\$262,945" and inserting in lieu thereof the amount of "\$487,895" and by adding the word "Amended" before Attachments A and B.

By amending paragraph 8 b. by deleting the amount "\$29,216" and inserting in lieu thereof "\$54,210".

By adding a new paragraph as follows:

"23. <u>Prohibition of Contingent Fees.</u> The CONTRACTOR swears it has not employed or retained any company or person, other than a bona fide employee working primarily for the CONTRACTOR, to solicit or secure this agreement, and that it has not paid or agreed to pay any person, company, corporation, individual or firm, other than a bona fide employee working primarily for the CONTRACTOR, any fee, commission, percentage, gift or any other consideration, contingent upon or resulting from the award or making of this agreement. For breach or violation of this section, the DEPARTMENT

shall have the right to terminate the contract without liability and, at its discretion, to deduct from the contract price, or otherwise recover, the full amount of such fee, commission, percentage, gift, or consideration."

By adding a new paragraph as follows:

"24. Notwithstanding other terms and conditions of this contract, it is understood and agreed that the total cost and compensation hereunder shall not exceed the funds made available to the State of Delaware by U. S. Environmental Protection Agency for this project."

By deleting "Attachment A" and "Attachment B" in their entirety and substituting in lieu thereof "Amended Attachment A" and "Amended Attachment B" in their entirety.

All terms and conditions of Contract Number CERCLA 85-1 not heretofore or hereby amended shall remain in full force and effect.

IN WITNESS WHEREOF, the Department of Natural Resources and Environmental Control and the Contractor have executed this Amendment to be effective as of the 1st day of January 1986, provided that a valid executed purchase order has been approved by the Secretary of Finance.

AND ENVIRONMENTAL CONTROL BY:

DEPARTMENT OF NATURAL RESOURCES

ATTEST:

AR300189

DUNN GEOSCIENCE INC.

BY:_____

ATTEST:

Technical Progress Report

Delaware Sand and Gravel Landfill

RI/FS

November 1984

During the month of November, 1984, work has been performed on 10 of the tasks defined in the Department scope of work in contract No. CERCLA 85-1. Initial actions have been taken to schedule work activities, collect literature, define the Health and Safety and Quality Assurance protocols, set up the forms for reporting to the State, and to set up data files on computers. The specific tasks addressed during November include tasks 2, 3, 4, 5, 8, 9, 11, 15, 17 and 24. Details describing the work performed per task are provided below:

Task 2 - Health and Safety Plan

The State of Delaware Health and Safety Plan for RCRA remedial actions was reviewed. The State plan, with minor additions, was considered adequate by Dunn Geoscience. The additions to the State plan were detailed in an addendum which was delivered to the Department on Monday, November 19, 1984. The Department and EPA Region 3 reviewed the plan during the week of November 19th. Verbal approval of the Delaware Sand and Gravel Health and Safety Plan for the Dunn Geoscience RI/FS activities was provided by Steve Young on Monday, November 26, 1984. Written notification of the approval has not been received as of November 30, 1984.

Sixty-nine percent (69%) of this task has been completed as of November 30, 1984. Review of the safety plan by Dunn personnel and written approval from the State are anticipated. This task will be completed in December.

Task 3 - Quality Assurance Plan

The State of Delaware Quality Assurance (QA) Plan was reviewed during the week of November 19, 1984. The State QA Plan, with some changes, was deemed adequate by Dunn Geoscience. The changes to the State plan were detailed in an addendum prepared by Dunn Geoscience. This addendum was Federal Expressed to Steve Young on Monday, November 26, 1984. This modified plan is being reviewed by the Department and EPA Region 3.' Comments on the modified QA plan are anticipated before Tuesday, December 11, 1984.

Eighty-five percent of this task has been completed as of November 30, 1984. This QA plan must be reviewed by the State Laboratory personnel and any Department modifications must be incorporated. This task should be completed in December.

Task 4 - Collect and Evaluate Existing Data

This task was begun the week after the contract between the Department and Dunn was signed (November 12 - 16). All in-house information was collected and reviewed. Appointments were scheduled to review Department files and Delaware Geological Survey (DGS) files during the week of November 19 through 21 (Thanksgiving week). W.J.' Miller and P.W. Hare reviewed the Department files on November 19 and 21 and DGS files on November 21. Much information was collected. All the literature and data collected are being compiled (during the week of November 26 - 30, and ongoing). An appointment was scheduled with Dom DeGuiglio, EPA Region 3, to peruse EPA files on Tuesday, December 4, 1984.

A reference list of all reports and key memos and letters has been and will continue to be prepared by Dunn Geoscience. This reference list is attached for Department and EPA review. It is anticipated that any key references missing from the Dunn Geoscience reference list will be identified by the Department or EPA.

In the compilation of existing data, it was apparent that water level and pumpage data are readily available for the years prior to 1980. The most recent water level and pumpage data are not readily available in the reports and files Dunn Geoscience personnel (Miller and Hare) reviewed. Water-quality data prior to 1980 is available on a scattered basis. Summaries and continuous-time plots (1973 to present) of water quality are not available in the reports and files Dunn Geoscience personnel reviewed. Much, if not all, of this information was collected specifically for the Army Creek Landfill studies. These data are necessary to completely evaluate the Delaware Sand and Gravel Landfill. Much of the data Dunn Geoscience requires should be readily available from New Castle County (NCC) or Roy F. Weston. Since the data are probably on computer files, it would be preferable to obtain a magnetic tape of all the Army Creek water levels, pumpages, and water quality. In a verbal conversation with Steve Young, W.J. Miller requested the Department obtain the Army Creek data from NCC or Weston, or to allow Dunn personnel to contact the County directly. As of November 30, 1984, Dunn has not obtained Army Creek data from the NCC or Weston, nor has permission been granted to directly contact NCC.

Data concerning 1980 to present pumpages, water levels, and water quality for Artesian and Amoco wells should be available from the Department. However, this information was not in the Department's Army Creek or Delaware Sand and Gravel Superfund files.

It is anticipated that more data will be collected. All data will be summarized and plotted (either contour plots or x-y plots). Trends concerning water quality and water levels will be evaluated statistically. Thirty-seven percent (37%) of this task has been completed as of November 30, 1984.

This task is running behind the CPM scheduled data of completion. It should be completed in December. The delay in this task delays Task 15, the model. Information is required from New Castle County. Permission for Dunn to contact the County directly is being considered by the Department.

Task 5 - Site Survey and Surface Geophysics

The preliminary site survey was scheduled for Monday, December 3, 1984. The Dunn Geoscience personnel available to attend the meeting are:

William E. Cutcliffe, CPG	Project Director
William J.'Miller III	RI Project Manager
Paul W. Hare	On-Site Geologist
James P. Behan, P.E.	FS Project Manager
Sander I. Bonvell	Project Chemist
William J. Hall	Engineering Geologist

It is anticipated that Department and EPA Region personnel will be present at the site survey. The site will be inspected and potential monitoring sites selected.

The surface geophysics has been scheduled for the week of December 17, 1984.

Two percent (2%) of this task has been completed as of November 30, 1984.

This task was scheduled earlier than as described on the Project CPM chart. This speed-up in the schedule is to avoid performing geophysics during Christmas week. Task 5 should be completed one week ahead of the CPM scheduled date of completion.

Task 8 - Topographic Mapping

Data Reduction Services has been contacted and a flight for aerial photographs has been scheduled for sometime in December (weather dependent). Ground controls will be established prior to the flight by Richardson personnel.

Less than one percent (1%) of this task has been completed as of November 30, 1984. This task is on schedule and should be completed in January.

Task 9 - Mobilize Field Equipment

Arrangements were made to have a construction/office trailer delivered to the site on Wednesday, December 5, 1984. The trailer is being leased from Hale Trailer and Truck Equipment of Marlton. New Jersey.

-4-

Disposable safety equipment was obtained for the site visit and for subsequent work at the site. This equipment includes disposable coveralls, gloves, paper towels, and boots. This equipment will be billed on a usage basis.

Nine percent (9%) of this task has been completed as of November 30, 1984.

This task is being performed in accordance with the CPM schedule.

Task 11 - Ground Survey

The ground survey of the grid and baseline has been scheduled for the week of December 10, 1984. The grid pattern, intended for easy identification of soil sampling and other monitoring locations, will also be used during the surface geophysics. Richardson personnel will set up the grid and baseline.

Less than one percent (1%) of this task has been completed as of November 30, 1984.

The grid and baseline survey has been moved up in the project schedule to accomodate the geophysical survey. The grid and baseline should be completed during the week of December 17th. The elevations and location surveys for monitoring points will be performed after Task 10.

Task 15 - Model Preparation

The USGS report describing the Martin Quasi-3D model has been reviewed. The input data for the Miller 2D flow model has been put on the Dunn Geoscience computer and is currently being modified. Data from 1978 to the present must be made available to Dunn before the Miller model can be completely updated.

Anticipated actions include updating the Miller flow model to match present data and using input data from the updated Miller 2D flow model in the development of the transport model.

This task is slightly behind schedule because of the lack of readily available pumpages, water levels, and water-quality data from 1978 to the present. This information should be available from the County or Weston.

AR300193

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Task 17 - Progress Reports and Meetings

This document is the first progress report for contract No. CERCLA 85-1. This report details work and expenditures for the month of November, 1984.

Less than one percent (1%) of this task has been completed as of November 30, 1984.

This task is on schedule.

Task 24 - Final Report

Map preparation was started for use during the project. The maps that will be prepared will be used in the final report to highlight special features and sampling points.

Two percent (2%) of this task has been completed as of November 30, 1984.

This task is ahead of schedule. Maps and figures for early reporting are being prepared.

DUNN GEOSCIENCE CORPORATION

100194

-5-

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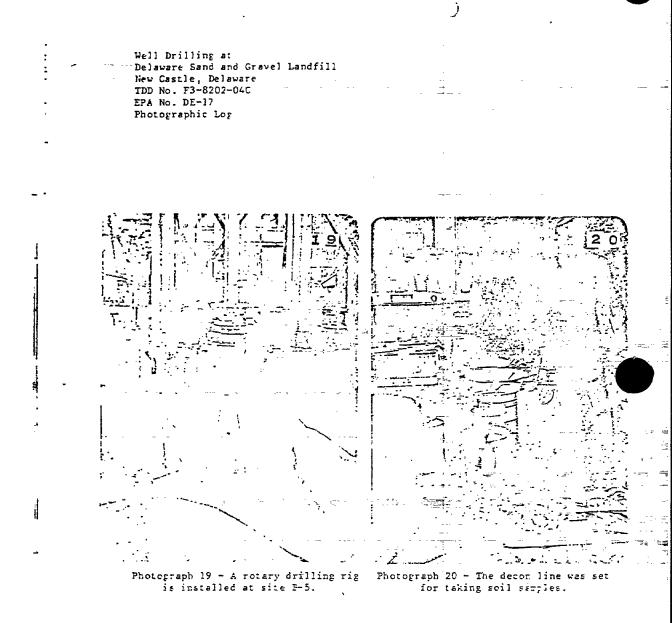
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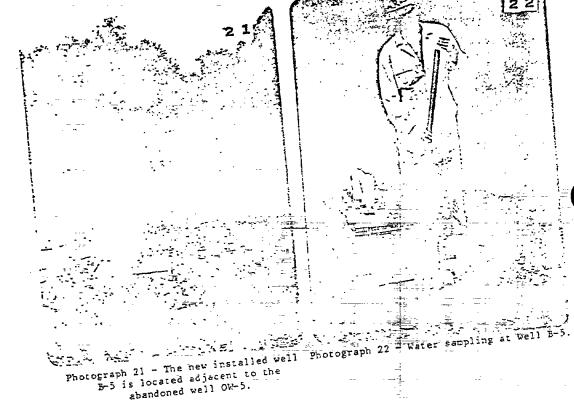
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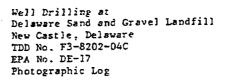
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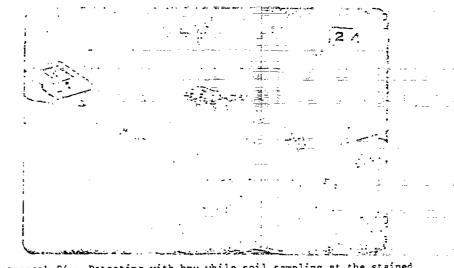


ار بفتة من لت ζ, (near E-3 site) General view of the refuse (laupfill) area

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Photograph 23

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Photograph 24 - Detecting with hnu while soil sampling at the stained are near landfill entrance.

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Well Drilling a: Delaware Sand and Gravel Landfill New Castle, Delaware TDD No. F3-8202-04C EPA No. DE-17 Photographic Log

17HOTO # 23

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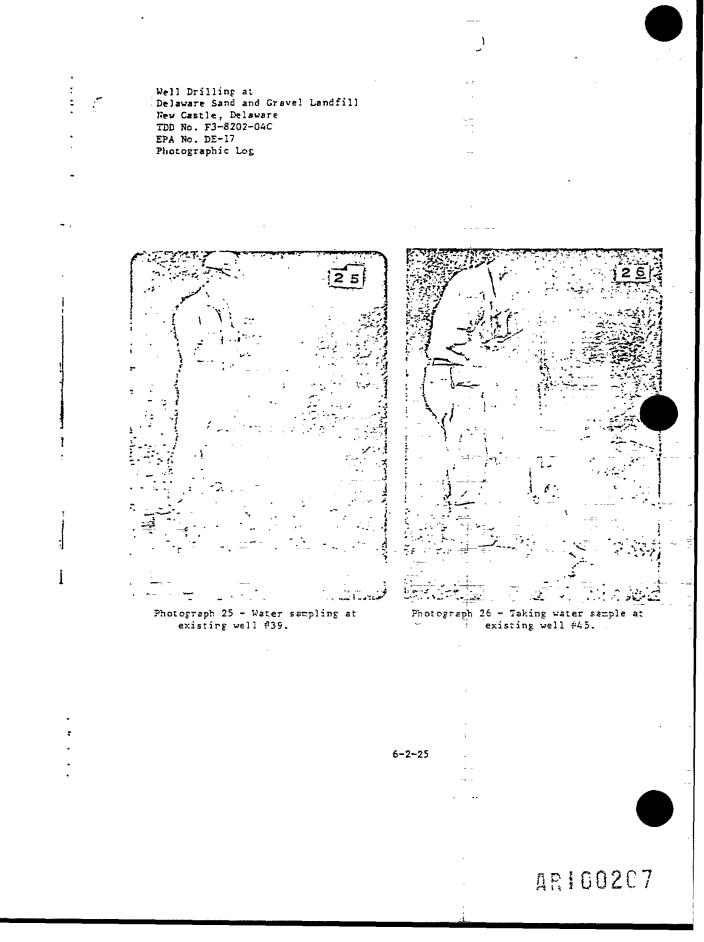
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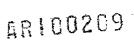
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ATTACHMENT 3

DOCUMENT !! UNITED STATES ENVIRONMENTAL PROTEC RECEIVED REGION III . - -67H AND WALNUT STREETS BRILADELPHIA PENSYLVENA STATE JUN2 4 1982 ecology and environment, inc. Philadelphia (L1 JUN 1 6 1892 Chris Hadel Mr. Bob Touhey, Manager

Water Resources Division Dept. of Natural Resources & Environmental Control Dover, Delaware 19901

Dear Bob:

Attached are copies of the coorespondence between EPA and the Delaware State Board of Registration of Geologists. The letter of June 8 con-firms the procedures that EPA will formally institute regarding the preparation or reports which contain hydrogeological evaluations of sites in Delaware.

As you know, Ecology and Environment has subcontracted A.C. Schultes, to drill additional monitoring wells at the Delaware Sand & Gravel Landfill, New Castle County. This work is tentatively scheduled to commence on June 23, 1982; however, before this work can begin, the E & E office requested a similar letter of confirmation from the DNREC.

This letter should be addressed to Walter Lee, and include the following items:

- a) agreement with the general EPA review process over contractor geologists
- specific agreement regarding the location points for the monitoring wells at the Delaware Sand & Gravel Landfill.

On Abril 12, 1982 a meeting was held in Dover, among Lisa Hamilton, Mike Appar, C.K. Lee (E&E), and myself, in order to discuss the hydro-geological study at the Army Creek/Delaware Sand & Gravel Landfills, and specified drilling locations. Initially, Mike requested that six pairs of wells be drilled as opposed to the suggested 5 wells. It was then explained that money for the drilling was limited, and that this task may be followed-up with additional drilling if deemed necessary. At the tonclusion of the meeting it was agreed that this proposal would suffice as an initial step. as an initial step.

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Nr. Bob Touhey Page 2

Please discuss this matter with your staff and forward the necessary letter, as soon as possible to avoid any further delays for the drilling.

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Thank you,

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Chrid Hadduck

Christine Hladchuk Project Officer Superfund/RCRA Compliance Section

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DOCUMENT #2

Mr. Emil Gnuschak, Chairman State Board of Registration of Geologist Delaware State Office Building 820 French Street, 3rd Level Wilmington, DE 19801

Dear Mr. Onuschak:

Thank you for the time and effort you expended in order to clarify my questions on the registration of geologists in Delaware.

From our previous phone conversations, I understand that this state requirement does not extend to federally employed geologist. Also the geologists under contract to the federal goverment need not register in Delaware, if their work is reviewed and concurred upon by a federal geologist.

UNITED STATES ENVIRONMENTAL PROTECTION AGENOM REGION IN 6-4 AND WALNUT STREETS PHILADELPHIA, PENNSYLVAWA 19:06

Please be assured that at all times EPA will contract only licensed drillers, and a state geologist will be involved to review any reports and work scopes prior to the issuance of all necessary permits, or the release of the information.

In order to document our conversations would you please respond in writing to clarify these agreements. Again, I thank you for all your consideration and efforts.

Sincerely, Chris Ella

Christine Hladchük, Project Officer Superfund/RCRA Compliance Section

cc: <u>T. Voltagg</u>io R. Blanco R. Touhey, DNREC J. McGovern, Ecology & Environment

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5002-04A DRUKLEIT # EPA # . De 17

June 8, 1982

STATE OF DELAWARE DEPARTMENT OF ADMINISTRATIVE SERVICES DIVISION OF BUSINESS AND OCCUPATIONAL REGULATION STATE BOARD OF REGISTRATION OF GEOLOGISTS DELAWARE STATE OFFICE BUILDING B20 FRENCH STREET - 3RD LEVEL WILMINGTON, DELAWARE 19801

PHONE: (302) 571 - 3286

Ms. Christine Hladchuk Project Officer Superfund/RCRA Compliance Section U. S. Environmental Protection Agency

Dear Ms. Hladchuk:

6th and Walnut Streets Philadelphia, PA 19106

The Delaware State Board of Registration of Geologists received your letter of May 7th, 1982 and considered it at the Board's May 27th meeting.

As was discussed with you by telephone, and with the advice of its counsel, the Delaware State Board of Registration of Geologists states as its policy that:

(1) Any geologist who is an employee of the Federal government may practice geology in pursuance of his employment in Delaware without registering with this Board.

(2) Independent geologists with whom a Federal agency contracts to do geological work in Delaware either have to be registered in the State, or work under the supervision of a geologist who is so registered or who is an employee of the Federal government pursuing his employment.

(3) In all cases, the name of the geologist who is to be considered responsible for the geologic contents of all written reports, permit applications, etc. must be clearly stated.

In regard to your letter of May 7th, be advised that the Delaware Geologists Registration Act does not apply to well drillers (24 Del. C. 3601).

In the same letter, you use the phrase "... a State Geologist will be involved to review any reports or work scopes prior to the issuance of all

AR100213

Ms. Christine Hladchuk

June 8, 1982

necessary permits, or the release of the information." The Board is unclear as to the meaning of this phrase and requests clarification in this regard.

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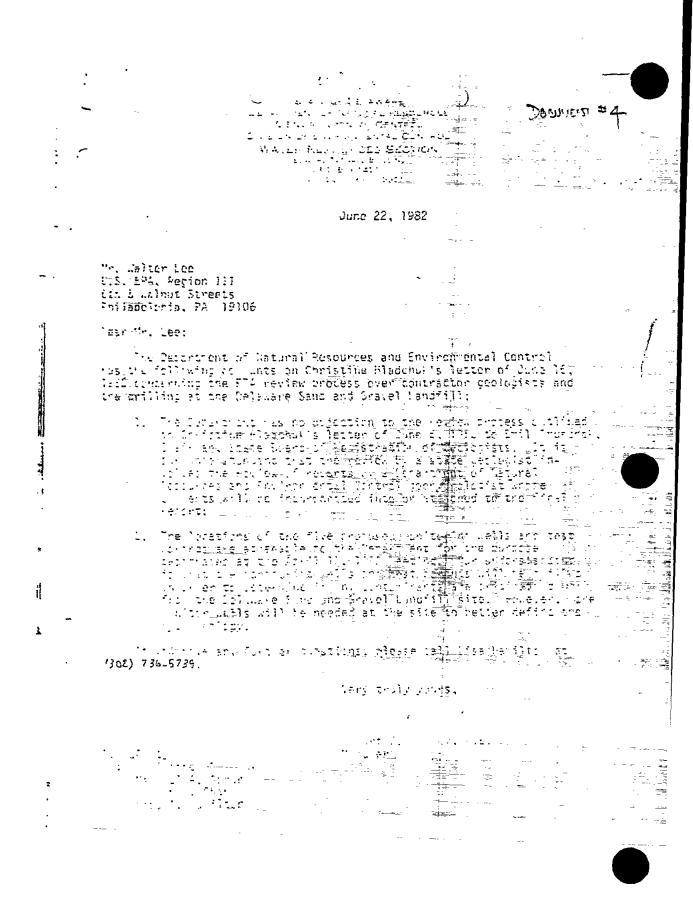
Very truly yours,

DELAWARE STATE BOARD OF REGISTRATION OF GEOLOGISTS

Emil Onuschak, Jr. Chairman

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DOLUMENT # 5

ecology and environment, inc.

8021 ROUTE 130, PENNSAUKEN, NEW JERSEY 08110, TEL. 609-665-1515

International Specialists in the Environmental Sciences

June 23, 1982

Ms. Lisa Hamilton Department of Natural Resources and Environmental Control P. O. Box 1401 Edward Tatnall Building Dover, DE 19901

Re: TDD No. F3-8202-04 Dear Liss:

This is to confirm our phone conversation on June 22, 1982 about the well drilling for Delaware Send and Gravel. Providing you get the information you need from the driller, A. C. Schultes δ Sons, Inc., by Friday, June 25, and that it satisfies the permit requirements, a phone call from Schultes to obtain the permit numbers will allow mobilization on Monday, June 28. The E δ E site representative will be Loren Lasky.

If there are any questions concerning this matter, please contact Loren.

Sincerely yours,

A. H. GILM MED)

Beth Gross

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CC: Linda Young Boornazian, Acting DPO EPA 111

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ecology and environment, inc.

8021 ROUTE 130, PENNSAUKEN, NEW JERSEY 08110, TEL. 609-665-1515

International Specialists in the Environmental Sciences

March 31, 1982

Mr. Timothy Rafferty, Esq. Custom House Plaza Suite 514 Wilmington, Delaware 19801

Subject: Drilling, Sampling and Installation of Monitoring Wells at Delaware Sand and Gravel Landfill, New Castle County, Delaware

Dear Mr. Rafferty:

Ecology and Environment, Inc. (E&E), a New York Corporation with Headquarters at 195 Sugg Road, Buffalo, NY 14225, and with a business office at 8021 Route 130, Pennsauken, NJ 08110, has entered into a contract (Contract #68-01-6056) with the United States Environmental Protection Agency (EPA), dated March 20, 1980, to furnish technical, engineering and managerial services in support of the EPA Field Investigation of Potentially Hazardous Waste Sites.

As discussed with you during our telephone conversations of March 17, 24, 25 and 29, the U. S. EPA Region III has requested that we perform a groundwater monitoring and subsurface geologic study at your client's site, Delaware Sand and Gravel, located in New Castle County, Delaware. I have enclosed a copy of a sketch showing the approximate locations of the proposed drilling (identified as Figure 2). The proposed drilling activities at the site will be of a varied nature and will include the following: B-l) 50 +/- foot deep, 4-inch diameter monitoring well just outside the waste disposal pit, B-2) 20 +/- foot deep test boring adjacent to B-l but within the waste disposal pit area, B-3) 50 +/- foot deep, to deep, 4-inch diameter monitoring well adjacent to existing well #53, and B-5) 150 +/- foot deep, 4-inch diameter to existing well #0W-5. The final depths and locations will be adjusted in the field by E&E personnel. The wells will be permanent installations to monitor groundwater and the test borings will sample subsurface soils. The latter will be backfilled at completion as specified by E&E.

In order that the bidders will be able to estimate the cost to mobilize and demobilize their equipment, it is essential that they be able to make an on-site reconnaissance of the proposed drilling locations. Your client has agreed to permit the bidders access to the site as long as he is informed of their visit ahead of time. The bidders have been directed, therefore, within the drilling specifications to schedule this on-site reconnaissance through you, as agreed.

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Delaware Sand and Gravel Page 2

Furthermore, your client has granted E&E and its drilling subcontractors permission to 1) come on site to do the above mentioned drilling work, and 2) disperse all the drilling spoils/cuttings, water, and other materials generated in connection with the above mentioned work on the ground.

We are now progressing on the basis of understanding of the above discussions. Should there be any corrections, please contact me at my office.

Very Truly yours,

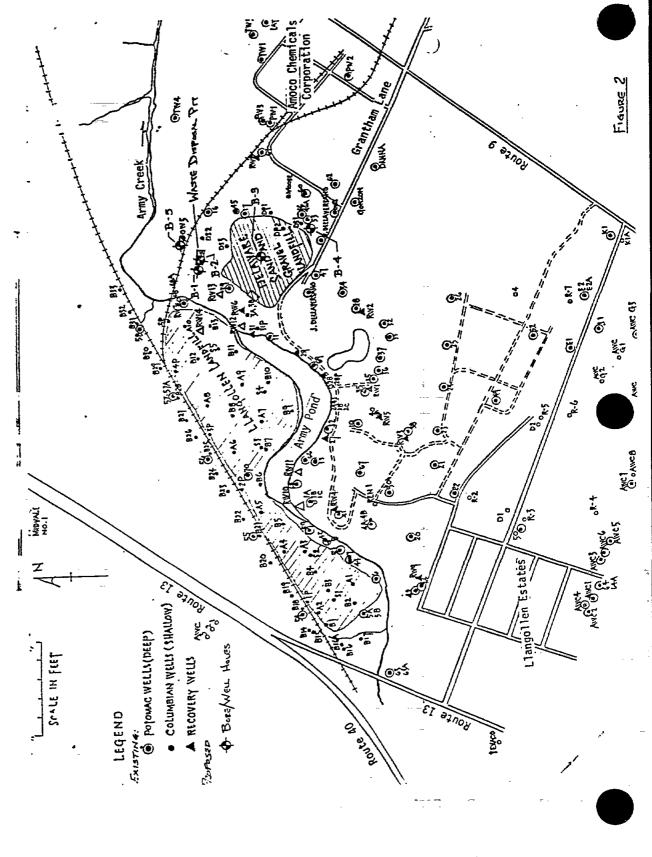
1 Quiso Frank J. Quirus, AFITL III

Enclosure

CC: Linda Young Boornazian, DPO, EPA III Lisa Seglin, EPA III Chris Hladchuck, EPA III

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ecology and environment, inc.

8021 ROUTE 130, PENNSAUKEN, NEW JERSEY 08110, TEL. 609-665-1515

International Specialists in the Environmental Sciences

June 25, 1982

Mr. Timothy Rafferty, Esq. Custom House Plaza Svite 514 Wilmington, DE 19801

Subject: Commencement of Drilling for the Installation Of Monitoring Wells at Delaware Sand and Gravel Landfill, New Castle County, DE TDD No. F3-8202-04B EPA No. DE-17

Dear Mr. Rafferty:

This letter will confirm our phone conversation today concerning our intention to start work at your client's site, Delaware Sand and Gravel Landfill, on Monday, June 28. Four members of Ecology and Environment's technical staff, plus two drillers, are scheduled to be working on site. As agreed, you will notify the site owner, Mr. Vincent Dellaversano, to expect us.

Work will commence at hole number B-4, described and identified on the map in our letter of March 31, 1982. We will gain access for this particular area via Amoco's property, by prior arrangement with Mr. Charles Hurd at the Amoco Chemical Truck Terminal. All the other holes will be accessed directly through the Delaware Sand and Gravel Landfill's property.

We anticipate that the drilling and sampling will take between 10-15 work days, and we will notify you when the project is completed. In the meantime, please contact Mr. Frank Quirus of our office if you have any questions or comments concerning the above work.

Very truly yours, Loren R. Lasky

Geologist, FIT III

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CC: Linda Young Boornazian, Acting DPO, Region III Lisa Seglin, EPA III Chris Hladchuk, EPA III

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ecology and environment, inc. B021 ROUTE 130, PENNSAUKEN, NEW JERSEY 08110, TEL. 609-665-1515

International Specialists in the Environmental Sciences

July 21, 1982

Mr. Timothy Rafferty, Esq. Custom House Plaza Suite 514 Wilmington, DE 19801

Subject: Termination of Well Drilling Work Delaware Sand and Gravel Landfill New Castle County, Delaware TDD No. F3

Dear Mr. Rafferty:

As we discussed in our phone conversations of 14 July and 21 July, Ecology and Environment, Inc. has completed the scheduled well drilling work at the Delaware Sand and Gravel Landfill.

In accordance with EPA procedures, I am enclosing a sample receipt listing the number of samples we collected on Delaware Sand and Gravel Landfill property. Kindly have Mr. DellAversano sign it and then return it to our office.

As per your instructions, your client, Mr. DellAversano, did not want to have a set of split samples. However, we did leave a representative set of soil samples at the DellAversano household on 14 July, as per your request.

Again, please accept our thanks for your assistance and cooperation during this work.

Sincerely,

Loren R. Lasky Geologist/FIT III

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Enclosure

DOCUMEIST

ecology and environment, inc.

8021 ROUTE 130, PENNSAUKEN, NEW JERSEY 08110, TEL. 609-665-1515

International Specialists in the Environmental Sciences

June 24, 1982

Mr. Charles Hurd Amoco Chemicals Truck Terminal Route 9 and River Road New Castle, DE 19720

Re: Access to Amoco's Property for the Drilling of a Groundwater Monitoring Well, Adjacent to Amoco Chemical's Well #OW-5 TDD No. F3-8202-04P. TDD No. F3-8202-04P.

Dear Mr. Hurd:

This letter will confirm our phone conversation today concerning access to Amoco's property for the purpose of drilling a monitoring well.

As agreed, both Ecology and Environment personnel and the drilling crew will check in with you at the Amoco Chemical Truck Terminal on the first day of work. We will sign Amoco release forms and you will unlock the gate allowing us to cross onto Amoco's property.

We anticipate starting work on Monday, June 28, or some time during that week, depending on when the driller receives the required permits.

Attached, please find a copy of an earlier correspondence with Mr. Ray Watrous - of Amoco (now retired) for your information.

Please contact me if you have any questions or comments concerning the above project.

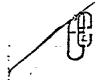
Very truly yours,

Loren R. Lask

Geologist, FIT III

mjo Attachment

CC: Linda Young Boornazian, Acting DPO, EPA III Lisa Seglin, EPA III Chris Hladchuk, EPA III



ecology and environment, inc.

8021 ROUTE 130, PENNSAUKEN, NEW JERSEY 08110, TEL. 609-665-1515

International Specialists in the Environmental Sciences

April 28, 1982

Anioco Chemicals Corporation P. D. Box 312 New Castle, DE 19720

Attention: Mr. Ray Watrous

Subject: Drilling, Sampling and Installation Monitoring Well Adjacent to Amoco Chemicals' Well #OW-5

DOCUMENT #10

AR100223

Dear Mr. Watrous:

As discussed with you over the telephone on March 31, 1982, Ecology and Environment, Inc. (E&E) under a contract (Contract #68-01-6056) with the U.S. EPA is soliciting bids installing monitoring wells on and adjacent to Delaware Sand and Gravel in New Castle County. In addition to wells of the property of Delaware Sand and Gravel, it is proposed to install one well adjacent to #0W-5. Per our discussion, this well is on the Amoco Chemicals Corporation property.

This letter will confirm that Amoco Chemicals Corporation has granted E&E permission to access this well location and drill the proposed monitoring well. Furthermore, excess drilling spoils and water that cannot be discharged back into the well may be dispersed in an orderly manner in the area of the well.

It is our understanding that Amoco Chemicals 13 presently demolishing their plant. As such, coordination of E&E's access to Amoco's property should be arranged via telephone with Mr. Charles Hurd @ (302) 322-1878.

we are progressing on the basis of understanding of the above discussion. Should there be any corrections, please contact me at my office.

Very truly yours Frank J. Quirus, AFITL III

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CC: Linda Young Boornazian, EPA III Lisa Seglin, EPA III Chris Hladchuck, EPA III

DOCUMENT # 11

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ecology and environment, inc.

8021 ROUTE 130, PENNSAUKEN, NEW JERSEY 08110, TEL. 609-665-1515

International Specialists in the Environmental Sciences

— July 21, 1982

Mr. Charles Hurd Amoco Chemicals Truck Terminal Route 9 and River Road New Castle, DE 19720

Dear Mr. Hurd:

I am writing to advise you that Ecology and Environment, Inc. has completed our scheduled well drilling work at the Delaware Sand and Gravel Landfill and on Amoco's property adjacent to the landfill.

In accordance with EPA procedures, I am enclosing a sample receipt which lists the number and type of samples we collected while working on Amoco's property. Would you kindly sign the receipt and return it to our office.

Please accept my thanks for your cooperation and assistance during this work.

Sincerely,

സ Loren Lasky

Geologist/FIT III

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Enclosure

SAMPLE RECEIPT

On <u>June 30</u>, 1982, Ecology and Environment, Inc., representative <u>Loren R. Lasky</u> received permission from <u>C. Hurd</u> to remove material from Amoco property, contained in <u>1</u> 1/2 gallon glass organic sample bottle(s), <u>2</u> 40 ml glass volatile organic sample bottle(s), <u>2</u> 8 oz. glass soil sample jar(s) and <u>2</u> inorganic l quart polyethylene sample bottle(s).

Property Owner, Signature and Date

DOWNENT

7/21/52

Ecology and Environment, Inc. Representative Signature and Date

