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APPENDIX F

DATA OBTAINED FROM PREVIOUS SITE INVESTIGATIONS

(SECTION 6.0 OF NUS WORK PLAN
PREVIOUSLY SUBMITTED IN NOVEMBER 1983)

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6.0 ENVIRONMENTAL CONCENTRATIONS

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6.1 Air

An air sampling program was conducted at the site on November 16 and 17, 1982 by the Environmental Response Team (ERT) from EPA Region III. Ten onsite locations and two background locations were sampled using calibrated portable air pumps with different capturing media for various chemical groups. These media were analyzed for total organics, organic solvents, aromatic amines, inorganic acids, PCBs, and metal particulates. No airborne vapor/gas contaminants were present above the detection limits.

Air samples were collected in the crawl spaces of houses adjacent to the landfill using similar collection equipment as the onsite air survey. Grab samples were collected and analyzed using a Photovac 10A10 portable gas chromatograph (GC). The samples that gave a response were sampled with the pumping system for a longer period of time. Table 6-1 presents the analytical results, which indicate that some form of hydrocarbons were present in all samples. Since there were compounds present at or slightly above the GC's detection limit, but not in sufficient concentration to be identified on a GC/MS, all compounds detected in a sample were totalled and reported as total hydrocarbons (as if it were toluene). The offsite sampling did not show the presence of compounds in sufficient concentrations to be identified on a GC/MS with the exception of carbon tetrachloride in one sample (<20 µg) in a 600 mg charcoal tube (ERT, 1983b).

6.2 Soil

Table 6-2 lists the locations and descriptions of soil samples collected at or near the site by various agencies. PADER collected three soil samples from on site and four samples from adjacent, offsite property. ERT collected soil samples from 23 locations on site, some of which were sampled at various depths. ERT sampling locations are shown on Figure 6-1. The analytical results are presented in Tables 6-3, 6-4, 6-5, and 6-6.

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TABLE 6-1
MILLCREEK SITE
OFFSITE AIR ANALYSES

<u>Sampling Location</u>	<u>Total Hydrocarbons (mg/m³ air)</u>	<u>Total Hydrocarbons as Toluene (ppm)</u>	<u>Aromatic Amines</u>	<u>Carbon Tetrachloride</u>	<u>Chlorinated Hydrocarbons</u>
Knost 3123 W. 13th St.	0.49	0.13	N/A	N/A	N/A
Oros 1322 Harper Dr.	0.27	0.07	N/A	N/A	N/A
Fedorchak 3269 W. 14th St.	0.18	0.05	N/A	N/A	N/A
Root 1332 Harper Dr.	0.1	0.0003	BDL	N/A	BDL
Hetric 1326 Harper Dr.	0.11	0.03	BDL	<20 µg	BDL

Less than
BDL: Below detection limit
N/A: Not available
mg/m³: milligrams per cubic meter
ppm: parts per million
µg: micrograms

Source: Turpin, R., February 22, 1983.

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TABLE 6-2

MILLCREEK SITE
SOIL SAMPLE LOCATIONSORIGINAL
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<u>Sample Code</u>	<u>Sample Location or Number</u>	<u>Description</u>	<u>Date</u>	<u>Sampler</u>
SMC01	Middle of site	Oily waste	3/23/82	PADER
SMC02	Composite of site		7/28/82	PADER
SMC03	50 yd south-Well 1	Sample at 6-in intervals (18 in. to 24 in.)	7/29/82	PADER
SMC04	Sample #1	Samples at surface, 1 ft, 4 ft	11/82	ERT
SMC05	Sample #2	Samples at surface, 1 ft, 4 ft	11/82	ERT
SMC06	Sample #3	Surface - saturated silt muck 1 ft - saturated gray clay muck 4 ft - saturated gray clay, sand	11/82	ERT
SMC07	Sample #4	Surface - black loam 1 ft - black silt fill 4 ft - black silt fill	11/82	ERT
SMC08	Sample #5	Surface - black silt fill 1 ft - black silt fill	11/82	ERT
SMC09	Sample #6	Surface - black muck 1 ft - light brown clay, silt 4 ft - saturated fine brown sand	11/82	ERT
SMC10	Sample #7	Surface - black clay, silt 1 ft - brown clay, silt 4 ft - saturated sand	11/82	ERT
SMC11	Sample #8	Surface - black muck 1 ft - clay 4 ft - brown sand	11/82	ERT
SMC12	Sample #9	Surface - black muck, peat 1 ft - brown clay, silt 4 ft - saturated brown muck	11/82	ERT
SMC13	Sample #10	Surface - black clay 3 ft - brown saturated 6 ft - brown sand, loam	11/82	ERT
SMC14	Sample #11	Surface - black clay, sand 1 ft - saturated brown sand 4 ft - brown gravel, loam	11/82	ERT

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<u>Sample Code</u>	<u>Sample Location or Number</u>	<u>Description</u>	<u>Date</u>	<u>Sampler</u>
SMC15	Sample #12	Surface - saturated black sand 1 ft - saturated brown clay 4 ft - gray sand, silt	11/82	ERT
SMC16	Sample #13	Surface - saturated brown sand, silt 3 ft - saturated brown clay, sand 6 ft - saturated gray gravel, sand	11/82	ERT
SMC17	Sample #14	Surface - brown silt loam 3 ft - light brown clay 6 ft - saturated brown clay	11/82	ERT
SMC18	Sample #15	Surface - brown loam 1 ft - saturated black muck 4 ft - saturated gray gravel, sand	11/82	ERT
SMC19	Sample #16	Surface - black loam 6 ft - saturated brown sand, silt	11/82	ERT
SMC20	Soil Sample #17	Surface - brown loam 6 ft - saturated gray sand, clay	11/82	ERT
SMC21	Soil Sample #18	Surface - black fill, sand, gravel	11/82	ERT
SMC22	Sample #19	Surface - black loam	11/82	ERT
SMC23	Sample #20	Surface - black fill	11/82	ERT
SMC24	Sample #21	Surface - black fill	11/82	ERT
SMC25	Sample #22	Surface - black fill	11/82	ERT
SMC26	Sample #23	Surface - black loam	11/82	ERT
SMC27	Oros backyard	Composite	10/26/82	PADER
SMC28	George backyard	Composite	10/26/82	PADER
SMC29	Hetrick backyard	Composite	10/26/82	PADER
SMC30	Front yards	Composite	10/26/82	PADER

Sources: PADER, March 23, 1982; PADER, July 29, 1982; PADER, July 29, 1982;
 PADER, October 26, 1982; ERT, April 1983.

ERT: Environmental Response Team
 PADER: Pennsylvania Department of Environmental Resources



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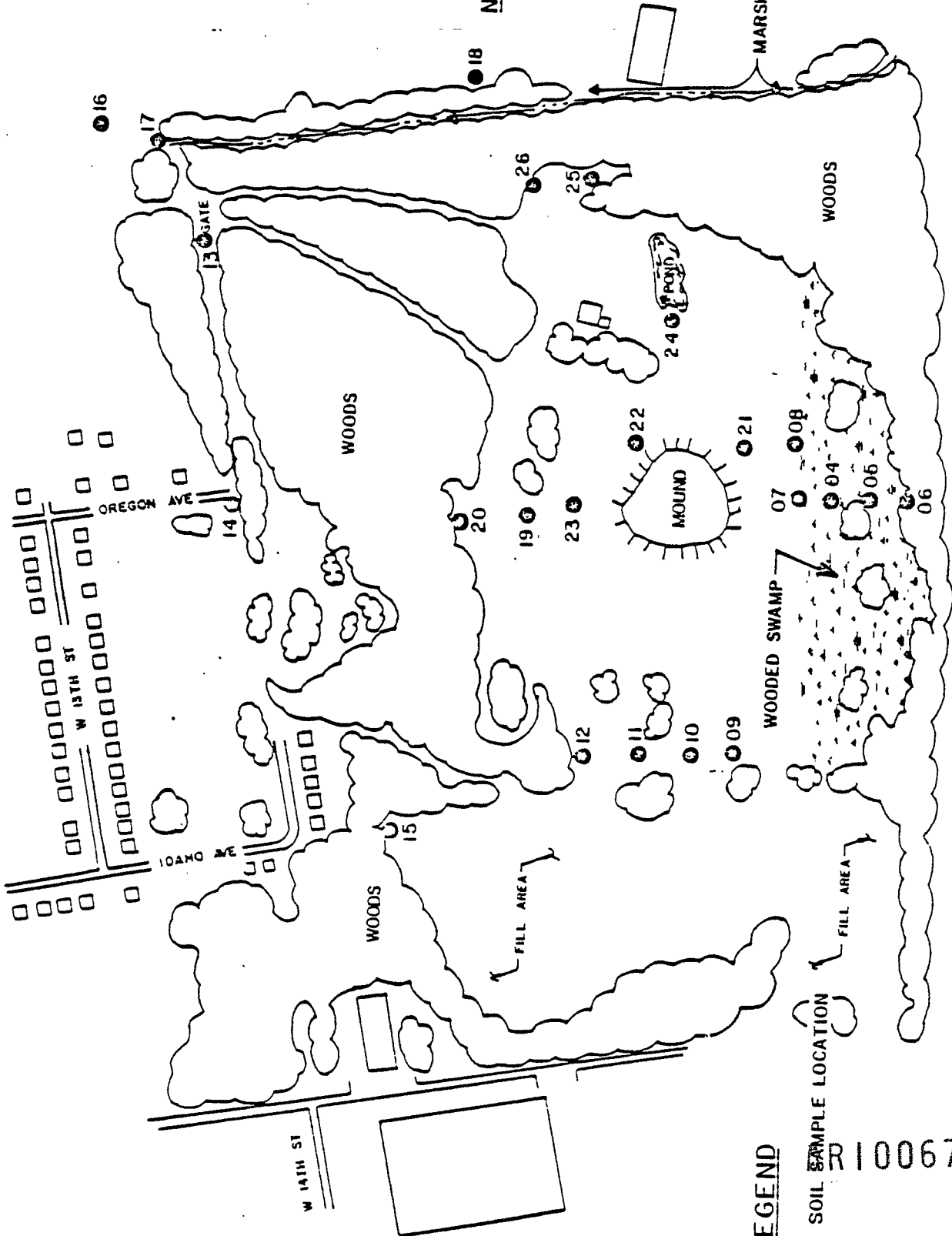
NOTE

SEE TABLE 6-2 FOR
DESCRIPTIONS OF SOIL
SAMPLING

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FIGURE 6-1



**SOIL SAMPLING LOCATIONS (SMC)
MILLCREEK SITE, MILLCREEK TOWNSHIP, PA**

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TABLE 6-3

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MILLCREEK SITE
SOIL ANALYSES - METALS, INORGANICS

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Parameter	Sample Number ¹		
	SMC01 (mg/kg)	SMC02 (mg/kg)	SMC03 (mg/kg)
Oil	--	0.266	35,712
pH	--	8.0	--
Total Organic Carbon	--	8	--
Chemical Oxygen Demand	--	<5	--
Cyanide (total)	<0.1	0.3	--
Cyanide (free)	--	<0.1	--
Phenols	--	<0.1	--
Ammonia (as N)	--	12	--
Arsenic	--	13	--
Cadmium	2.8	6	--
Chromium	103	82	--
Copper	--	11,944	--
Lead	140	1,331	--
Mercury	--	103	--
Nickel	--	956	--
Selenium	--	<0.2	--
Silver	--	4	--
Zinc	--	6,639	--
Barium	--	62	--
Iron	--	24,777	--
Molybdenum	--	0.66	--

--: Not analyzed
 <: Less than
 mg/kg: milligrams per kilogram

¹See Table 6-2 and Figure 6-1 for sample locations

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Sources: PADER, March 23, 1982; PADER, July 28, 1982; PADER, July 29, 1982.

TABLE 6-4

MILLCREEK SITE
SOIL ANALYSES - EP TOXICITY RESULTS

(red)

Parameter	Sample Number ¹			
	SMC01		SMC02	
	Soil (mg/l)	EP Leachate (mg/l)	Soil (mg/kg)	EP Leachate (mg/l)
Arsenic	--	--	13	0.005
Barium	--	--	62	0.05
Cadmium	2.8	<0.01	6	<0.01
Chromium	103	0.02	82	<0.01
Copper	--	--	11,944	8.22
Lead	140	0.07	1,331	0.20
Mercury	--	--	103	<0.002
Nickel	--	--	956	<0.02
Selenium	--	--	<0.2	<0.01
Silver	--	--	4	<0.01
Zinc	--	--	6,639	12.73

mg/l: milligrams per liter

mg/kg: milligrams per kilogram

<: Less than

--: Not analyzed

¹See Table 6-2 and Figure 6-1 for sample locations

Sources: PADER, March 23, 1982; PADER, July 29, 1982

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TABLE 6-5

MILLCREEK SITE
SOIL ANALYSES - PCBs, PESTICIDES, VOLATILE ORGANICS

Parameter	Sample Number ¹									
	SMCO3 6 in.	Surface	SMC 13 3 ft	6 ft	SMC 16 3 ft	6 ft	SMC 17 6 ft	SMC 21 Surface	SMC 23 Surface	SMC Sur
PCB-1248	12	--	--	--	--	--	--	165	269*	31
Chloroform	NA	88	73	--	--	--	--	--	--	--
1,1-Dichloroethane	NA	--	--	--	--	--	--	--	--	4
Toluene	NA	--	--	--	1	--	--	--	--	--
1,2-Dichloroethylene	NA	--	7	438	8	689	--	--	--	--
1,1,1-Trichloroethane	NA	--	--	--	1	--	--	--	--	--
1,1,2-Trichloroethylene	NA	28	122	713	33	--	--	--	--	--

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All analyses in micrograms per kilogram (µg/kg)

- PCB: Polychlorinated biphenyl
- NA: Not Analyzed
- : Not detected, detection limit unknown
- *: Not confirmed by GC/MS

¹See Table 6-2 and Figure 6-1 for sample locations

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TABLE 6-6
MILLCREEK SITE
SOIL ANALYSES - ACID AND BASE/NEUTRAL EXTRACTABLE ORGANICS

Parameter	Sample Number 1							
	SMC09	SMC8* Surface	1 ft	SMC19	SMC20	SMC21	SMC22	SMC23
Phenol	400	--	--	--	--	--	--	560
4-Methyl phenol	800	--	--	--	--	--	--	--
Acenaphthylene	--	--	--	--	--	--	--	--
Anthracene	--	--	--	--	--	--	--	--
Benzo(a)anthracene	--	--	--	--	920	1,500	1,000	--
Benzo(a)pyrene	--	--	--	--	--	1,600	1,900	--
Benzo(g,h,i)perylene	--	--	--	--	--	2,600	2,200	--
Benzo(k)fluoranthene	--	--	--	--	--	7,700	1,500	--
Bis(2-ethylhexyl)phthalate	400	--	--	--	--	--	--	--
Butyl benzyl phthalate	--	--	--	--	--	--	--	--
Chrysene	--	--	--	--	1,100	1,200	1,800	--
1,2-Dichlorobenzene	--	--	--	--	--	--	--	--
Diethyl phthalate	--	--	--	--	--	--	--	--
Dibutyl phthalate	--	--	--	--	--	--	--	--
Diisobutyl phthalate	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	--	--	--	1,200	--	--	--	--
Fluoranthene	1,500	480	560	--	960	1,200	1,400	--
Fluorene	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	2,900	--	--
Naphthalene	400	--	--	--	--	--	--	--
Phenanthrene	2,200	--	--	--	--	1,200	900	--
Pyrene	1,500	440	--	--	920	1,200	1,100	--
Benzo(b)fluoranthene	--	--	--	--	960	2,400	2,000	--
Dibenzofuran	--	--	--	--	--	--	--	--

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TABLE 6-6
MILCREEK SITE
SOIL ANALYSES - ACID AND BASE/NEUTRAL EXTRACTABLE ORGANICS
PAGE TWO

Parameter	Sample Number ¹									
	SMC24	SMC25	SMC26	SMC27	SMC28	SMC29	SMC30			
Fluorol	--	--	6,800	--	--	--	--	--	--	--
4-Methyl phenol	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	--	--	--	2	20	<1	7(E)			
Anthracene	560	760	--	4	10(E)	<1	10(E)			
Benzo(a)anthracene	--	--	1,800	20	100	4	50			
Benzo(a)pyrene	--	520	3,000	15	100	2	40			
Benzo(g,h,i)perylene	--	--	--	10	90	2	110			
Benzo(k)fluoranthene	800	1,200	--	40	200	9	60			
Bis(2-ethylhexyl)phthalate	--	--	--	--	300	90	240			
Butyl benzyl phthalate	440	--	--	20	40	4	--			
Chrysene	--	--	--	10	20	2	30			
1,4-Dichlorobenzene	--	--	--	--	--	1	--			
Diethyl phthalate	--	--	--	240	220	320	80			
Dimethyl phthalate	--	--	--	4	--	3	--			
Di-n-butyl phthalate	--	--	--	420	680	260	540			
Di-n-octyl phthalate	--	--	--	--	--	--	--			
Fluoranthene	--	--	--	40	--	6	70			
Fluorene	920	2,700	--	--	--	--	--			
Indeno(1,2,3-c,d)pyrene	--	--	--	--	100	2	90			
Naphthalene	440	600	1,200	40	30	6	40			
Phenanthrene	--	--	--	--	90	8	130			
Pyrene	--	1,900	1,100	30	100	4	60			
Benzo(b)fluoranthene	1,600	920	--	--	--	--	--			
Dibenzofuran	480	520	--	--	--	--	--			

All analyses in micrograms per kilogram (µg/kg).
* Surface samples except where noted.
-- Not Detected, detection limit unknown
E: Estimated

¹See Table 6-2 and Figure 6-1 for sample locations

Sources: PADEP, October 26, 1982; ERT, April 1983.

Of the three onsite samples collected by PADER, SMCO1 and SMCO2 were analyzed for metals and were leached using the RCRA extraction procedure and analyzed. SMCO2 was also analyzed for other inorganic compounds. SMCO3 was analyzed for oil and PCB. SMCO1 and SMCO2 contained metals at various concentrations. SMCO3 contained 12 µg/kg of PCB (as Aroclor 1248) and 35,712 mg/kg of oil.

The samples that PADER collected off site (SMC 27 through SMC 30) were analyzed by GC/MS for priority pollutant organics. No acid extractables, volatiles, PCBs, or pesticides were detected in the four samples. All four samples contained numerous base/neutral extractables. The concentrations ranged from <1 µg/kg for acenaphthylene to 680 µg/kg for di-n-butyl phthalate.

Samples SMCO4 through SMCO8, collected by ERT, had water extracts from them analyzed using the Microtox System. The Microtox is intended for use in determining the acute toxicity of aqueous samples. The system uses a special strain of bioluminescent bacteria. A photomultiplier tube measures the relative light output of these organisms before and after exposure to serial dilutions of a sample. Toxicity is indicated by a percent decrease in light output. The results from duplicate samples are averaged to calculate a normalized percent light decrease (NPLD) corresponding to each dilution. Marginal toxicity is sometimes indicated by an increase in light output due to biostimulation of the bacteria (ERT, 1983b). The results of the Microtox System analysis are shown in Table 6-7.

Samples SMCO9 through SMC26, collected by ERT, were analyzed for organic priority pollutants. Base/neutral extractable compounds were detected in SMCO9 and SMC20 through SMC26. Volatile organics were detected in SMC13, SMC16, SMC17, and SMC26. PCB was detected in SMC21, SMC23, and SMC26. The volatile organics appeared to penetrate further into the ground and to accumulate in the saturated zone, in contrast to the base/neutral extractable compounds.

Especially evident were 1,2-trans-dichloroethylene and trichloroethylene, which appeared in deeper soils while absent from the surface soils. The base/neutral extractable compounds were generally confined to the top foot of soil.

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TABLE 6-7

MILLCREEK SITE
MICROTOX RESULTS
(NORMALIZED PERCENT LIGHT DECREASE)

Soil Water Extract Dilutions (%)	Blank	Sample Number ¹					
		SMCO4		SMCO5		SMCO6	
		Surface	4 ft	Surface	4 ft	Surface	4 ft
5.7	2.8	12.1	5.2	0.4	4.7	8.8	+0.9
11.3	5.6	16.2	3.8	1.3	3.0	1.7	+2.8
22.5	6.1	22.2	8.2	8.6	9.0	7.4	13.5
45.0	16.2	35.9	17.6	18.5	16.7	20.9	16.3
							15.5

Soil Water Extract Dilutions (%)	Blank	Sample Number ¹							
		SMCO7		SMCO8 (surface)		SMCO8 (1 ft)			
		Surface	4 ft	REP 1	REP 2	REP 3	REP 1	REP 2	REP 3
5.7	4.5	0.0	0.4	8.1	21.4	10.3	4.4	3.6	+2.1
11.3	3.4	9.3	+6.8	11.3	21.1	3.2	+3.2	5.8	1.0
22.5	+4.1	6.5	3.8	14.3	38.6	29.3	3.6	11.1	9.1
45.0	9.8	23.6	3.9	24.0	42.8	34.1	17.7	27.6	18.8

REP: Light increase
Replicate

¹See Table 6-2 and Figure 6-1 for sample locations

Source: LRI, April 1983.

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6.3 Groundwater

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Table 6-8 lists the locations of groundwater samples collected by various agencies. PADER collected 14 groundwater samples at or near the Millcreek Site, ERT and TAT collected 12 onsite groundwater samples, and a Technical Advisory Team (TAT) collected 3 groundwater samples off the site. Analytical results are presented in Tables 6-9, 6-10 and 6-11.

Millcreek Township had installed 5 monitoring wells on its portion of the site. Nine additional wells were installed around the site for the ERT investigation. Three public drinking water wells (Yoder Wells) and two private wells were also sampled.

PADER sampled the township monitoring wells in July 1982. These samples (GWMC01, GWMC03, GWMC04, GWMC08, and GWMC09) were analyzed for all priority pollutants and other inorganic parameters. Some metals and volatile organics were detected in the five wells at varying concentrations. PADER resampled two of the wells (GWMC04 and GWMC07) in January 1983. Metals and volatile organics were detected again, in addition to low concentrations (23 ug/l) of isophorone and bis(2-ethylhexyl)phthalate, base/neutral extractables, in GWMC04.

PADER sampled all five township monitoring wells (GWMC26 through GWMC30) in April 1983 and analyzed them for gross alpha and gross beta radioactivity. The very low levels measured were below drinking water standards and do not indicate a radioactivity hazard.

ERT and TAT sampled three of the five wells installed by the township and the nine additional onsite wells (No. 6-14) in December 1982. These samples (GWMC02, GWMC06, and GWMC10 through GWMC19) were analyzed for metals, volatile organics, and polynuclear aromatic hydrocarbons (PAH's). No PAH's were detected. Volatile organics were detected in GWMC02, GWMC06, and GWMC11 through GWMC16. Metals were detected in every sample.

TAT sampled the Yoder public drinking water supply wells in February 1983. These samples (GWMC20 through GWMC22) were analyzed for priority pollutant organic

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TABLE 6-8

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MILLCREEK SITE
GROUNDWATER SAMPLE LOCATIONS

(red)

<u>Sample Code</u>	<u>Sample Location or Number</u>	<u>Description</u>	<u>Date</u>	<u>Sampler</u>
GWMC01	Twp. Well #1	Black iron casing	7/21/82	PADER
GWMC02	Twp. Well #1	Black iron casing	12/5/82	ERT, TAT
GWMC03	Twp. Well #2	Black iron casing	7/21/82	PADER
GWMC04	Twp. Well #2	Black iron casing (not purged)	1/12/83	PADER
GWMC05	Twp. Well #3	Black iron casing	7/21/82	PADER
GWMC06	Twp. Well #3	Black iron casing	12/5/82	ERT, TAT
GWMC07	Twp. Well #3	Black iron casing	1/12/83	PADER
GWMC08	Twp. Well #4	Black iron casing	7/21/82	PADER
GWMC09	Twp. Well #5	Black iron casing	7/21/82	PADER
GWMC10	Twp. Well #5	Black iron casing	12/5/82	ERT, TAT
GWMC11	Well #6	PVC	12/5/82	ERT, TAT
GWMC12	Well #7	PVC	12/5/82	ERT, TAT
GWMC13	Well #8	PVC	12/5/82	ERT, TAT
GWMC14	Well #9	PVC	12/5/82	ERT, TAT
GWMC15	Well #10	PVC	12/5/82	ERT, TAT
GWMC16	Well #11	PVC	12/5/82	ERT, TAT
GWMC17	Well #12	PVC	12/5/82	ERT, TAT
GWMC18	Well #13	PVC	12/5/82	ERT, TAT
GWMC19	Well #14	PVC	12/5/82	ERT, TAT
GWMC20	Yoder Well #1	Public water supply	2/83	TAT
GWMC21	Yoder Well #2	Public water supply	2/83	TAT
GWMC22	Yoder Well #3	Public water supply	2/83	TAT
GWMC23	Knot 3133 W. 12th Street	Private well	12/14/82	PADER

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TABLE 6-8
MILLCREEK SITE
GROUNDWATER SAMPLE LOCATIONS
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<u>Sample Code</u>	<u>Sample Location or Number</u>	<u>Description</u>	<u>Date</u>	<u>Sampler</u>
GWMC24	Kraschneske	Kitchen faucet	7/1/82	PADER
GWMC25	Kraschneske	Private well	11/18/80	ECHD
GWMC26	Twp. Well #1	Black iron casing	4/11/83	PADER
GWMC27	Twp. Well #2	Black iron casing	4/11/83	PADER
GWMC28	Twp. Well #3	Black iron casing	4/11/83	PADER
GWMC29	Twp. Well #4	Black iron casing	4/11/82	PADER
GWMC30	Twp. Well #5	Black iron casing	4/11/83	PADER

PADER: Pennsylvania Department of Environmental Resources
ECHD: Erie County Health Department
TAT: Technical Advisory Team
ERT: Environmental Response Team

Sources: Vrenna, C., January 12, 1981; PADER, July 1, 1982; PADER, July 21, 1982; PADER, December 14, 1982; PADER, January 12, 1983; Dreisch, R., February 1, 1983; Austin, J., February 2, 1983; Kayser, S., February 16, 1983; Sammons, B., February 18, 1983; ERT, April 1983; PADER, April 11, 1983.

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TABLE 6-9

MILLCREEK SITE
GROUNDWATER ANALYSES - INORGANICS

Parameter	Sample Number ¹									
	GWMC01	GWMC03	GWMC04	GWMC05	GWMC07	GWMC08	GWMC09	GWMC23	GWMC25	GWMC26
pH (units)	7.0	6.9	6.9	7.2	7.0	7.2	7.0	6.7	7.9	
Specific conductance (µmho/cm)	860	1,150	1,096	775	721	810	1,320	532		
Color	--	--	--	--	--	--	--	--	0	
Turbidity (L.T.U)	--	--	--	--	--	--	--	--	0.1	
Alkalinity	395	525	503	327	250	336	601	117	129	
Hardness	--	--	--	--	--	--	--	--	112	
Sulfate	70	150	70	70	50	80	170	100	19	
Chloride	50	70	40	50	41	71	80	11	44	
Chemical oxygen demand	36	75	131	25	38	44	69	--	--	
Biochemical oxygen demand	--	--	--	--	--	--	--	--	--	
Oil	0.8	1.0	--	1.0	--	1.4	1.0	69	--	
Total Solids	--	--	--	--	--	--	--	--	--	
Total dissolved solids	--	--	604	--	392	--	--	444	152	
Fluoride	--	--	--	--	--	--	--	--	--	
Nitrate	--	--	--	--	--	--	--	--	0.1	
									0.01	

All analyses in milligrams per liter (mg/l) except where noted.

-- Not detected, detection limit unknown.

µmho/cm: micro mho per centimeter

¹See Table 6-8 for sample locations.

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Sources: Vreuma, C., January 12, 1981; PADER, July 21, 1982; PADER, December 14, 1982; PADER, January 12, 1983.

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TABLE 6-10
MILLCREEK SITE
GROUNDWATER ANALYSES - METALS, CYANIDE, PHENOLS

Parameter	Sample Number ¹									
	GWMC01	GWMC02	GWMC03	GWMC04	GWMC05	GWMC06	GWMC07	GWMC08	GWMC09	GWMC09
Antimony	NA	0.25	NA	NA	NA	--	NA	NA	NA	NA
Arsenic	<0.01	--	<0.01	0.05	0.022	--	0.01	0.017	0.02	0.02
Beryllium	NA	--	NA	NA	NA	--	NA	NA	NA	NA
Cadmium	0.008	--	0.007	0.003	<0.001	--	0.003	0.001	0.002	0.002
Chromium	0.01	--	0.01	0.05	0.01	--	0.01	0.02	0.04	0.04
Copper	0.09	0.05	0.35	1.21	0.27	0.04	0.16	0.46	0.16	0.16
Lead	0.026	0.07	0.19	0.5	0.091	0.05	0.1	0.19	0.056	0.056
Mercury	<0.001	--	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001
Nickel	0.01	--	0.06	0.15	0.07	--	0.03	0.09	0.09	0.09
Selenium	<0.01	NA	<0.01	<0.01	<0.01	NA	<0.01	<0.01	<0.01	<0.01
Silver	<0.01	--	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01
Zinc	0.11	0.08	0.24	1.01	0.33	0.04	0.2	0.54	0.24	0.24
Cyanide	<0.01	NA	<0.01	<0.01	<0.01	NA	<0.01	<0.01	<0.01	<0.01
Phenols	0.002	NA	0.002	0.004	0.002	NA	0.003	0.002	0.002	0.002
Aluminum	3.4	NA	9.2	21.1	12.26	NA	6.06	5.26	11.8	11.8
Barium	0.64	NA	0.77	2.31	0.56	NA	0.8	0.57	0.81	0.81
Iron	19.1	NA	37.8	93.5	49	NA	41.2	23.7	55.6	55.6
Manganese	0.89	NA	1.81	4.34	1.55	NA	1.24	0.77	1.96	1.96
Tellurium	NA	--	NA	NA	NA	--	NA	NA	NA	NA

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TABLE 6-10
 MILLCREEK SITE
 GROUNDWATER ANALYSES - METALS, CYANIDE, PHENOLS
 PAGE TWO

Sample Number¹

Parameter	GWMC10	GWMC11	GWMC12	GWMC13	GWMC14	GWMC15	GWMC16	GWMC17	GWMC18
Antimony	--	0.31	--	0.32	0.25	0.25	0.25	0.38	0.25
Arsenic	--	--	--	0.09	--	--	--	--	--
Beryllium	--	--	--	--	--	--	--	--	--
Cadmium	--	--	--	0.013	--	--	--	--	0.013
Chromium	0.025	0.04	0.025	0.04	0.025	0.05	0.17	0.025	0.19
Copper	0.16	0.09	0.08	0.10	0.09	0.19	0.16	0.10	0.09
Lead	0.08	0.07	0.07	0.13	0.08	0.12	0.10	0.08	0.50
Mercury	--	--	--	0.50	--	--	--	--	--
Nickel	0.08	0.08	0.05	0.05	0.08	0.15	0.18	0.05	0.10
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	--	--	--	--	--	--	--	--	--
Zinc	0.15	0.14	0.12	0.16	0.43	0.28	0.11	0.21	0.21
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenols	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tellurium	--	--	--	0.31	--	--	--	--	--

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TABLE 6-10
MILL CREEK SITE
GROUNDWATER ANALYSES - METALS, CYANIDE, PHENOLS
PAGE THREE

Parameter	Sample Number ¹						
	GWMC19	GWMC20	GWMC21	GWMC22	GWMC23	GWMC25	
Antimony	0.50	NA	NA	NA	NA	NA	NA
Arsenic	--	<0.002	<0.002	<0.002	<0.01	NA	NA
Beryllium	--	NA	NA	NA	NA	NA	NA
Cadmium	0.04	<0.001	<0.001	<0.001	<0.001	NA	NA
Chromium	1.12	<0.002	<0.002	<0.002	0.01	0.01	0.01
Copper	0.10	NA	NA	NA	0.12	<0.61	<0.01
Lead	0.44	<0.002	<0.002	<0.002	<0.01	<0.01	NA
Mercury	--	<0.0002	0.0003	<0.0002	<0.001	<0.01	<0.01
Nickel	0.65	NA	NA	NA	<0.01	<0.01	NA
Selenium	NA	<0.002	<0.002	<0.002	<0.01	NA	NA
Silver	--	<0.001	<0.001	<0.001	<0.01	NA	NA
Zinc	1.45	NA	NA	NA	0.07	0.025	NA
Cyanide	NA	NA	NA	NA	<0.01	NA	NA
Phenols	NA	NA	NA	NA	0.005	NA	NA
Aluminum	NA	NA	NA	NA	0.33	NA	NA
Barium	NA	0.46	0.267	0.57	0.35	NA	NA
Iron	NA	NA	NA	NA	2.48	NA	NA
Manganese	NA	NA	NA	NA	0.55	NA	NA
Tellurium	--	NA	NA	NA	NA	NA	NA

All analyses in milligrams per liter (mg/l).
 NA: Not Analyzed.
 --: Not detected, detection limit unknown.
 <: Less than.
 >: Greater than.

¹See Table 6-8 for sample locations.

Sources: Vrenna, C., January 12, 1981; PADER, July 21, 1982; PADER, December 14, 1982; PADER, January 12, 1983; Dreisch, R., February 1, 1983; Austin, J., February 2, 1983; Kayser, S., February 16, 1983; Sammons, B., February 18, 1983; ERT, April 1983.

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TABLE 6-11
MILLCREEK SITE
GROUNDWATER ANALYSES - VOLATILE ORGANICS

Parameter	Sample Number ¹							
	GWMC01	GWMC02	GWMC03	GWMC04	GWMC05	GWMC06	GWMC07	GWMC08
Chloroethane	--	--	10	>350*	--	--	--	--
Chloroethylene	>200*	--	>200*	28	80	--	13	13
Chloroform	--	--	--	--	--	--	--	--
1,1-Dichloroethane	98	29	>1,000*	>2,000*	41	60	21	--
1,2-Dichloroethane	10	--	30	14	3	--	--	--
1,1-Dichloroethylene	--	--	60	50	--	--	--	--
1,2-Dichloroethylene	>400*	--	>200*	41	61	--	49	37
Dichloromethane	PT	--	--	--	PT	--	--	PT
Ethyl benzene	11	12	--	--	--	--	--	--
Methylene chloride	--	--	--	--	--	--	--	--
Tetrachloroethylene	1*	--	1*	--	--	--	--	--
Toluene	--	--	80	18	--	--	--	--
trans-1,2-Dichloroethylene	--	180	--	--	--	93	--	--
1,1,1-Trichloroethane	>700*	100	>5,000*	>4,000*	29	47	22	--
1,1,2-Trichloroethane	--	--	13	13	--	--	--	--
Trichloroethylene	--	--	--	--	--	--	--	--
Trichlorofluoromethane	--	--	--	--	--	--	--	--
Vinyl chloride	--	110	--	--	--	61	--	--

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ORIGINAL
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TABLE 6-11
MILK MILK SITE
GROUNDWATER ANALYSES - VOLATILE ORGANICS
PAGE TWO

Parameter	Sample Number ¹									
	GWMC09	GWMC11	GWMC12	GWMC14	GWMC15	GWMC16	GWMC21	GWMC22		
Chloroethane	--	--	--	--	--	--	--	--	--	--
Chloroethylene	>500*	--	--	--	--	--	--	--	--	--
Chloroform	--	400	--	--	--	--	--	--	--	--
1,1-Dichloroethane	>200*	--	68	--	--	--	--	--	--	--
1,2-Dichloroethane	42	--	--	--	--	--	--	--	--	--
1,1-Dichloroethylene	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethylene	>600*	--	--	--	--	--	--	--	--	--
Dichloromethane	PT	--	--	--	--	--	--	--	--	--
Ethyl benzene	--	--	--	--	--	--	--	--	--	--
Methylene chloride	--	470	--	22	--	--	--	--	--	--
Tetrachloroethylene	--	--	--	--	--	--	--	--	--	--
Toluene	--	--	--	54	--	--	--	--	--	--
trans-1,2-Dichloroethylene	--	--	26,000	150	11,000	280	--	--	--	0.2*
1,1,1-Trichloroethane	>500*	--	--	36	--	--	--	--	--	--
1,1,2-Trichloroethane	1*	--	--	--	--	--	--	--	--	--
Trichloroethylene	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	--	--	--	--	--	--	--	--	1-10*	--
Vinyl chloride	--	--	--	110	--	--	--	--	--	--

All analyses in micrograms per liter (ug/l).

- * Estimated
- : Not detected, detection limit unknown.
- PT: Possible Trace
- <: Less than.
- >: Greater than.

¹See Table 6-8 for sample locations.

Sources: PADER, July 21, 1982; PADER, January 12, 1983; Dreisch, R., February 1, 1983; ERT, April 1983.

compounds and some metals. Barium was detected in all the samples. Mercury was detected near the detection limit in GWMC21. No organics were detected in GWMC20. Trichlorofluoromethane was detected in GWMC21 at a concentration between 1 ug/l and 10 ug/l. 1,1,1-Trichloroethane was estimated at a concentration of 0.2 ug/l in GWMC22.

PADER sampled private wells owned by Knost (GWMC23) in December 1982 and Kraschneske (GWMC24) in July 1982. The Kraschneske well (GWMC25) was sampled by Erie County in November 1980. GWMC23 was analyzed for inorganics and priority pollutants. No organics were detected. GWMC24 was analyzed for organic priority pollutants; the results were negative. GWMC25 was analyzed only for inorganics.

6.4 Surface Waters

Table 6-12 lists locations where surface water and sediment samples were collected by various agencies. PADER collected six surface water samples at or near the site. The EPA collected two surface water samples on site, while Ecology and Environment, Inc. (E & E) collected two sediment samples. The ERT and TAT collected four surface water samples. The Erie County Health Department (ECHD) collected six samples from Marshalls Run and one sample from the swamp. The analytical results from all samplings are presented in Table 6-13 through 6-16.

The onsite pond was sampled once by PADER (SWMC01) and once by EPA (SWMC02). SWMC01 was analyzed for inorganics and priority pollutants while SWMC02 was analyzed for priority pollutants. Small quantities of various metals were detected in both samples. Trace quantities of organics were detected in both samples.

The drainage ditch (SWMC03) north of the site was sampled by ERT and TAT and analyzed for metals, volatile organics, and polynuclear aromatic hydrocarbons (PAHs). All of the PAHs tested for were base/neutral extractable compounds. No volatiles or PAHs were detected, but some metals were.

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The drainage ditch (SWMC04) separating the Halmi and Riehl properties was sampled once by PADER and analyzed for inorganics and priority pollutants. Phenol (1.4 ug/l) and pentachlorophenol (0.3 ug/l) were detected along with metals and other inorganics.

Water from the south swamp was sampled once by EPA (SWMC05), once by ECHD (SWMC07), and once by ERT and TAT (SWMC08). The swamp sediment was sampled once by E & E (SWMC06). SWMC05 and 06 were analyzed for priority pollutants. SWMC08 was analyzed for metals, volatile organics, and PAHs. SWMC07 was analyzed for pH, oil, and metals. Metals were detected in all samples. SWMC06 contained phenol (220 ug/kg) and tetrachloroethylene (5 ug/kg). No volatiles or PAHs were detected in SWMC08. No organics were detected in SWMC05.

PADER collected two water samples from Marshalls Run, one upstream (SWMC10) and one downstream (SWMC11) of the Millcreek Township portion of the site. E & E collected a stream sediment sample from Marshalls Run (SWMC09). The aqueous samples were analyzed for organic priority pollutants. Diethyl phthalate (0.5 ug/l) was detected in SWMC10. SWMC09 was analyzed for priority pollutants. No volatiles were detected. Numerous metals and base/neutral extractables were detected along with lesser numbers of PCB, pesticides, and phenol.

Marshalls Run, upstream of the site, was sampled once by PADER (SWMC12) and once by ERT and TAT (SWMC13). Both samples were analyzed for priority pollutants while more inorganics were analyzed for in SWMC12. Some metals and volatile organics were detected in both samples.

Marshalls Run, downstream of the site, was sampled once by PADER (SWMC14), once by ECHD (SWMC16), and once by ERT and TAT (SWMC15). SWMC14 was analyzed for priority pollutants; SWMC15 for metals, volatiles, and PAHs; and SWMC16 for inorganics and metals. Various metals were detected in all samples. Volatile organics were detected in SWMC14.

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The Erie County Health Department conducted a study of Marshalls Run (red) the source to Lake Erie. Macroinvertebrates were collected in addition to water samples at five locations (SWMC 17 to 21). Samples were analyzed for inorganics and metals.

6.5 Biota

The Erie County Health Department conducted a stream survey of Marshalls Run in June 1982. The survey involved water sample collection along with macroinvertebrate collection. From this survey, the department concluded that the stream exhibits a depressed macroinvertebrate population, and that the presence of contaminants in the stream has contributed to this depressed state. It also recommended that a more comprehensive study be conducted (Wellington, 1982).

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APPENDIX G

WELL LOCATION, SCREEN SETTING, TEST PIT LOCATIONS,
AND SAMPLE LOCATION RATIONALE

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MONITORING WELL LOCATION AND SCREEN SETTING RATIONALE

Well No.	Location/Rationale	Screen Setting/Rationale
15A	East Site - To check GW quality in alleged dumping area near swamp	Screened entire thickness of prime water bearing zone
16A	Mid Site - To check GW quality on downgradient edge of W. Central Site	Screen placed to monitor GW quality in sand and gravel deposit within the till
16B	Same as 16A	Screen placed to monitor GW quality in the sandy deposits above the till
17A	S. Site - To check GW quality in area where no information existed concerning possible dumping activities	Screen placed to monitor GW quality in lower portion of saturated zone
17B	Same as 17A	Screen placed to monitor GW quality in upper portion of saturated zone
18A	S.W. Site - To check GW quality of downgradient edge of S.W. section of site	Screen placed to monitor GW quality in lower portion of saturated zone
18B	Same as 18A	Screen placed to monitor GW quality in upper portion of saturated zone
19A	Mid Site - To check GW quality at downgradient edge of central site area	Screen placed to monitor GW quality in principal water bearing zone at the location

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MONITORING WELL LOCATION AND SCREEN SETTING RATIONALE
PAGE TWO

Well No.	Location/Rationale	Screen Setting/Rationale
20A	Mid Site - To check GW quality in middle of site, adjacent to two alleged dumping areas	Screen placed to monitor GW quality in lower portion of saturated zone
20B	Same as 20A	Screen placed to monitor GW quality in upper portion of saturated zone
21A	Across Marshall's Run - To check GW quality in fill area of trucking co. parking lot	Screen placed to monitor GW quality in lower portion of saturated zone
21B	Same as 21A	Screen placed to monitor GW quality in upper portion of saturated zone
22A	In ballpark parking lot - To check GW quality S.-S.W. of site, near W. Branch of Marshall's Run	Screen placed to monitor GW quality in lower portion of saturated zone
22B	Same as 22A	Screen placed to monitor GW quality in middle portion of saturated zone
22C	Same as 22A	Screen placed to monitor GW quality in upper portion of saturated zone
23A	North edge of site - To check GW quality downgradient of known contaminated area	Screen placed to monitor GW quality in sandy deposit within till (red)

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MONITORING WELL LOCATION AND SCREEN SETTING RATIONALE
PAGE THREE

<u>Well No.</u>	<u>Location/Rationale</u>	<u>Screen Setting/Rationale</u>
23B	Same as 23A	Screen placed to monitor GW quality in saturated zone above the till
24A	Near RR tracks S.E. of site - To provide upgradient water quality samples	Screen placed to provide background GW quality sample from lower portion of saturated zone
25A	Across 12th Street - To check GW quality at a distance downgradient of site	Screen placed to monitor GW quality in lower portion of saturated zone
25B	Same as 25A	Screen placed to monitor GW quality in upper portion of saturated zone

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SPLIT-SPOON SOIL SAMPLE RATIONALE

Soil Sample	Boring No.	Depth	Rationale
MC-SS-001	16A	6.0'-7.0'	Soil sample from the natural soils directly below the fill on site
MC-SS-002	16B	4.5'-6.0'	Soil sample from the fill directly above natural soils
MC-SS-003	17A	3.0'-4.5'	Soil sample - typical of fill in the area
MC-SS-004	18A	3.0'-4.5'	Soil sample from the fill directly above natural soils
MC-SS-005	18B	4.5'-6.0'	Soil sample of the natural soils directly below the fill
MC-SS-006	20A	3.0'-4.5'	Soil sample from fill, containing discolored soils
MC-SS-007	20A	6.0'-7.5'	Soil sample from fill-natural soil interface
MC-SS-008	21A	9.0'-10.5'	Soil sample from natural ground, near the water table
MC-SS-009	22A	3.0'-4.5'	Soil sample from fill-natural soil interface, at the water table
MC-SS-010	23A	9.0'-10.5'	Soil sample from natural soils, within the water table
MC-SS-011	23A	12.0'-13.5'	Soil sample from natural soils, within the water table

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SPIII-SPOON SOIL SAMPLE RATIONALE
PAGE TWO

<u>Soil Sample</u>	<u>Boring No.</u>	<u>Depth</u>	<u>Rationale</u>
MC-SS-012	24A	12.0'-13.5'	Soil sample from natural soils, within the water table
MC-SS-013	25A	9.0'-12.0'	Soil sample from natural soils, at top of the water table
MC-SS-014			Blank - potting soil

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SURFACE SOIL SAMPLE RATIONALE

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<u>Sample</u>	<u>Rationale</u>
SO-001	Near Small Willow Clump S.W. of Central Mound where dumping observed by PANDER Personnel
SO-002	Dark Stained area south of drum stage area
SO-003	Stream bed for drainageway adjacent to W. 17th St. near baseball fields where drums were observed earlier in the year
SO-004	Stream bed of the north wet weather drainage ditch behind W. 13th St.
SO-005	Barren area in woods behind W 13th St. contains car battery pile and old railroad-ties
SO-006	Pile of rubble (looks like coal waste) behind well 19A 2-3CY
SO-007	Barren furnace dust pile in center of site
SO-008	Near Pallet pile where PANDER reported possible bulk dumping
SO-009	Barren sandy soil adjacent to Well 14
SO-010	On Sitter property by pile of 5 slag drums
SO-011	Barren area within a grassy area near slag drums
SO-012	Stained soil on Halmi property near swamp
SO-013	Stained soil on Sitter property near front end loader
SO-014	Stained soil in Drum Stage Area
SO-015	Stained Soil near gas well on Halmi property
SO-016	In area of alleged bulk dumping or drum burial near dead twisted tree SW of central mound
SO-017	500 ft. North of SO-016
SO-018	In former open pit area behind homes on W. 14th St.

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SURFACE SOIL SAMPLE RATIONALE
PAGE TWO

<u>Sample</u>	<u>Rationale</u>
SO-019	In barren fill adjacent to swamp
SO-020	In barren fill adjacent to swamp behind dead, twisted tree
SO-021	In area suspected of bulk dumping SE of central mound near 3 drums
SO-022	In pond area at outflow to intermit pond
SO-023	By wreckage of Green Ford Pinto - Area of suspected Bulk Dumping
SO-024	Stained soil near access road
SO-025	On dike between ponds
SO-026	1326 Harper Drive Hetrick in area flooded by Marshall's Run - Shallow Soil
SO-027	Same as SO-026 but deep soil to collect potential contamination by GW Discharge
SO-028	1413 Honeywood LN - Groeger - area downgradient of site - wet throughout year - Shallow Soil
SO-029	Same as 028 but deep soil
SO-030	3227 W. 13th St. - Churchill - Back by stream bed of we weather drainage ditch - downgradient and within flooding of ditch
SO-031	Same as SO-030 but deep
SO-032	3071 W. 12th St. - Mazza - In garden, wet spot throughout the year - elevated OVA readings
SO-033	Same as SO-032 but deep - downgradient
SO-034	Shallow Soil - Background - Frontier Park
SO-035	Deep Soil - Background - Frontier Park
SO-036	Shallow Garden Sample - Al Nobbs Transmission

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SURFACE WATER/SEDIMENT SAMPLE RATIONALE

<u>Samples</u>	<u>Location/Rationale</u>
SW-01/SD-01	Marshall's Run upstream of outflow from culvert beneath the railroad tracks
SW-02/SD-02	SW-02-Dry sediment taken at Marshall's Run converge with northern wet weather drainage ditch
SW-03/SD-03	Downstream Marshall's Run - North of West 12th Street. Appeared to be collection of road drainage.
SW-04/SD-04	West Branch of Marshall's Run - Downstream
SW-05/SD-05	Onsite Pond
SW-06/SD-06	In swamp near SO-19
SW-07/SD-07	In swap near Sittler Property
SW-08/SD-08	In lowland marshy area near the end of Marshall's Road. SW-08-Dry
SW-09/SD-09	In lowland marshy area between the Riehl and the Halmi property near MW-14. SW-09-Dry
SW-010/SD-010	West Branch of Marshall's Run upstream near baseball fields
SW-010A/SD-010A	Duplicates of SW-010 and SD-010

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TEST PIT LOCATION RATIONALE

<u>Test Pit</u>	<u>Location/Rationale</u>
TP-1	Near wreckage of Green Ford Pinto - reported area of bulk dumping
TP-2	East side of foundry sand mound reported area of burial/bulk dumping
TP-3	Same as TP-2
TP-4	Same as TP-2 and TP-3
TP-4A	In an effort to delineate the areal extent of a high OVA reading layer TP-4A and 5 were excavated
TP-5	See TP-4A
TP-6	Near area previously excavated by ERT to locate a drum
TP-7	In lowland oily area previously found to contain PCB
TP-8	8 and 8A were in the area west of the mound reported to have drums buried
TP-9	Same as TP-8
TP-10	Near small willow clump where PADER personnel noted bulk dumping

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TEST PIT LOCATION RATIONALE
PAGE TWO

<u>Test Pit</u>	<u>Location/Rationale</u>
TP-10A	Continued excavation in area reportedly containing buried drums
TP-11	Same as TP-10A
TP-12, 13, and 14	In area of dead twisted tree - bulk or buried dumping reporting in the area
TP-15	In wooden pallet area report to have bulk dumping
TP-16	Excavation exploraton of the Halmi property
TP-17	Excavation in the area of the gas well explosion and stained soil area

Soil samples taken from test pits either represented saturated samples, samples exhibiting elevated OVA reading, samples from near buried drums or in some cases actual drum contents (solids).

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ORIGINAL DRAFT
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APPENDIX H

CHEMICAL ANALYTICAL RESULTS

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TABLE II-1
ON-SITE SURFACE SOIL CONTAMINANTS
SAMPLED BY NUS CORPORATION (4/18/84)
MILICIEK SITE
(All Values in µg/kg; Except Metals and Oil and Grease, mg/kg)

PP#	CAS No.	Sample No.	Contaminant	MC-SO-014	MC-SO-002	MC-SO-24	MC-SO-25	MC-SO-023	MC-SO-021	MC-SO-022	MC-SO-007
Organics - Volatile Fraction		Traffic Report - Org		C9353	C9341	C9364	C9365	C9363	C9361	C9362	C9346
Organics - Acid Fraction		Location		Drum Stage Area	Drum Stage Area	Soil	Dike Between Ponds	Near Pinto	Near Swamp	Near Shallow Pond	Furnace
Base/Neutral Fraction				Area	Area	Stained	Ponds	Near	Near	Near	Dust Pile
(86V)	108 08-3		toluene (2.5)	26							
(49V)	75 69 4		fluorotrifluoromethane (2.5)	12				5.8	4.54		22
(11V)	71 55 6		1,1,1-trichloroethane (2.5)	19				4.5	5.4		4.2
(44V)	75 09 2		Methylene Chloride (2.5)								
Organics - Acid Fraction											
(65A)	108 95 2		Phenol			73	36		200	39	31
Base/Neutral Fraction											
(55B)	91 20 3		Naphthalene (10)								
(10)	81 52 6		2-Methylnaphthalene (20)								
(39B)	81 32 9		Acenaphthalene (10)								
(72B)	206 44 0		fluoranthene (10)	4000							
(73B)	56 55 3		benzofluoranthene (10)								
(74B)	50 33 8		benzofluoranthene (20)								
(75B)	205 99 7		benzofluoranthene (20)								
(76B)	207 08 9		benzofluoranthene (20)								
(78B)	318 01 9		Chrysene (10)	9,600		970		1300	1,300	800	
(79B)	120 12 7		Anthracene (20)	4,700		440		800		800	
(81B)	181-24-2		benzofluoranthene (20)								
(83B)	85 01 8		Phenanthrene (10)								
(84B)	183 39 5		indeno(1,2,3-cd)pyrene (20)								
(84B)	179-00-0		Pyrene (10)								
(68B)	84 74 2		Di n butyl phthalate (10)								
(69B)	117 84 0		Di n octyl phthalate (10)								
(66B)	117 81 7		bis(2-ethylhexyl)phthalate (10)	460		480	430	2,700	2,700	1,300	

AR100704

A A-186

ORIGINAL

(red)

DRAW 1

TABLE II
ONSHORE SURFACE SOIL CONTAMINANTS
SAMPLED BY NUS CORPORATION (8/18/84)
MILCHIK SITE
(All Values Presented in µg/kg; Except Metals and Oil and Grease, mg/kg)
PAGE THREE

PP#	CAS No	Contaminant	Organics - Volatile fraction		Organics - Acid fraction		Organics - Base/Neutral					
			Sample No Traffic Report-Orig f R - Inorg. Location	MC-SO-019 C9358 MC2689 Near Twisted Pit Area	MC-SO-020 C9359 MC2690 Near Twisted Pit Area	MC-SO-20A C9360 MC2691 Duplicate	MC-SO-005 C9344 MC2654 Barren Area Bg- Wind W. 12th St	MC-SO-018 C9357 MC2688 Former Open Pit Area	MC-SO-001 C9340 MC2650 Near Willow Clump	MC-SO-008 C9347 MC2657 Near Palfot Pit	MC-SO-006 C9345 MC2655 Rubble Pile Near Well 19A	
(85V)	108 88-3	Toluene (2.5)				4.8						
(89V)	75 69-4	Fluorotrichloromethane (2.5)	4J	4.1			9.3	7.8				
(11V)	71 55-6	1,1,1-Trichloroethane (2.5)										
(44V)	75 09-2	Methylene Chloride	B2	65	230	24	650	16	30			
<u>Organics - Acid fraction</u>												
(65A)	108 95-2	Phenol (10)										
<u>Organics - Base/Neutral</u>												
(85B)	91 20-3	Naphthalene (10)										
	91 57-6	2 Methyl-naphthalene (20)								400		
(10)	81 32-9	Acenaphthalene (10)								410		
(39B)	206 44-0	Fluoranthene (10)			570							
(24)	56 55-3	Benzo(a)anthracene (10)										
(24B)	50 33-8	Benzo(a)pyrene (20)										
(24B)	205 99-7	Benzo(b)fluoranthene (20)										
(24B)	207 08-9	Benzo(k)fluoranthene (20)										
(76B)	318 01-9	Chrysene (10)										
(78B)	120-12-7	Anthracene (10)										
(79B)	181-24-7	Benzo(g)hperylene (20)										
(81B)	85 01-8	Phenanthrene (10)										
(83B)	103-19-5	Indeno(1,2,3-cd)pyrene (20)			420							
(84B)	129 00-0	Pyrene (10)			640							
(68B)	84-74-2	Di-n-butyl phthalate (10)										
(69B)	117 84-0	Di-n-octyl phthalate (10)										
(66B)	117 81-7	Di-(2-ethylhexyl)phthalate (10)										

AR100705

A-181

ORIGINAL

(red)

DRAWN

TABLE 11.1
 GMSH SUBFACE SOIL CONTAMINANTS
 SAMPLED BY NUS CORPORATION (8/18/84)
 MILWAUKEE SHI
 (All Values Presented in µg/kg, Except Metals and Oil and Grease, mg/kg)
 PAGE TWO

PPZ CAS No Pesticides/PCBs	Sample No Traffic Report-Orig T.R. Inorg. Location	MC-SO-014 C9353 Drum Stage Area	MC-SO-002 C9341 MC2651 Drum Stage Area	MC-SO-24 C9364 MC2695 Stained Soil	MC-SO-25 C9365 MC2696 Dike Between Ponds	MC-SO-023 C9363 MC2693 Near Pond	MC-SO-021 C9361 MC2694 Near Swamp	MC-SO-022 C9362 MC2692 Near Shallow Pond	MC-SO-007 C9346 MC2656 Furnace Dust/Pile
(1110) 11096 82 5 PCB 1260 (4.0)		31,000	3,000	2,100	6,300	2,000		2,000	
(1108) 12672-29-6 PCB 1248 (4.0)									
(1039) 319 85 7 BHC beta (4.0)									
Inorganics									
Copper		4,032	2,242	10,595	9,305	5,170	19,455	12,325	231
Lead		613	298	1,756	862	900	887	996	1,321
Manganese		1,093	319	140	165	417	778	209	14,260
Iron		74,355	15,035	8,305	7,670	18,085	21,470	8,600	35,240
Zinc		1,628	926	5,455	2,533	3,045	1,360	2,865	2,398
Aluminum		3,708	3,225	3,618	2,228	3,012	4,294	2,316	1,740
Antimony (10)		1.0	1.1	1.8	3.6		2.8		
Arsenic		1.5	3	3.0	1.3	1.7	2.0	0.6	6
Barium (5)		95	29	18	13	45	52	16.5	39
Beryllium (0.25)		0.4		0.8	0.4	0.8	1.0	1.2	1.3
Cadmium (0.005)		0.9	0.7	0.95	0.8	0.95	1.0	0.8	0.9
Chromium		29	20	11.0	14.5	22	34	21	820
Cobalt (2.5)		4.0	3.0	3.3	5	2.5	8.0	5	
Mercury (0.1)			3.0		0.1				0.4
Nickel		418	123	205	401	80	670	512	269
Selenium (0.1)		1.5	6.0	3.5	3.0	1.3	0.1	0.1	
Silver (0.5)							16.0	3.5	3.5
Thallium (0.5)		44	17	20	16	67	208	61	1.2
Tin (10)									86
Vanadium (10)		52,000	980	2,700	400	1,900	570	1,400	280
Oil and Grease									

AR100706

PP#	CAS No. Pesticides/PCBs	Sample No. Traffic Report Org I R-Inorg Location	MC-SO-019 C9358 MC2889 Full Adja- cent Swamp	MC-SO-020 C9359 MC2690 Near Twisted Tree	MC-SO-20A C9360 MC2691 Duplicate	MC-SO-005 C9344 MC2654 Barren Area Bu- hind W. 12th St.	MC-SO-018 C9357 MC2688 Former Open Pit Area	MC-SO-001 C9340 MC2650 Near Willow Clump	MC-SO-008 C9347 MC2657 Near Pallet Pile	MC-SO-006 C9345 MC2655 Rubble Pile Near Well 19A
(111P)	11096 B2 5	PCB 1260 (4)	98	310	560	320				
(110P)	12672-29-6	PCB 1248 (4)								
(103P)	319 85-7	BHC-beta (4)								

Contaminant	MC-SO-019	MC-SO-020	MC-SO-20A	MC-SO-005	MC-SO-018	MC-SO-001	MC-SO-008	MC-SO-006
Copper	8,390	7,995	9,625	5,720	423	156	268	191
Lead	867	1,046	1,089	1,095	93	163	49	93
Manganese	142	142	132	110	140	194	5,605	141
Iron	5,545	7,655	7,140	7,305	14,520	6,750	14,685	14,520
Zinc	3,417	3,804	3,865	5,250	10.5	163	115	3.0
Aluminum	3,149	4,666	3,370	2,790	627	1,653	6,430	103
Antimony (10)	1.4		2.5		2.2			
Arsenic	1.0	1.7	1.0	1.5	25	1.5	1.7	1.5
Barium (5)	14	21	24	17.5	11.5	18	73	16
Beryllium (0.25)			0.3					
Cadmium (0.05)	0.9	0.95	1.1	1.0	0.13	0.6	2	
Chromium	9.5	13	14	5.5	91	9.5	402	162
Cobalt (2.5)	4.0	5.5	3		24			10
Mercury (0.1)				0.1				
Nickel	421	346	368	30	5,955	18	234	2,604
Selenium (0.1)	2.5	2.5	2.5		0.5			
Silver (0.5)								
Thallium (0.5)		86	130	2.1	5.4		5.0	2.6
Tin (1.0)	780	1,200	910	3,900	19	1,100	293	16
Vanadium (10)					7,900		170	010

Oil and Grease

(red)

ORIGINAL

AR100707

A-188

TABLE 11-1
 ONSITE SURFACE SOIL CONTAMINANTS
 SAMPLED BY NUS CORPORATION (8/18/94)
 MILWAUKEE SITE
 (All Values Presented in µg/kg, Except Metals and Oil and Grease, mg/kg)
 PAGE 11V

PT#	CAS No.	Contaminant	Sample No. Traffic Report-Org I.R.-Inorg. Location	MC-SO-012 C9351 MC2661 Stained Soil Habit Property	MC-SO-013 C9352 MC2662 Slitter Property	MC-SO-015 C9354 MC2664 Near Hahn Gas Well	MC-SO-016 C9355 MC2665 Bulk Dumping Area	MC-SO-017 C9356 MC2666 Bulk Dumping Area	MC-SO-003 C9342 MC2652 Near Ballfield	MC-SO-004 C9343 MC2653 Behind W. 13th Street	MC-SO-010 C9349 MC2659 Slitter Property
(86V)	67-64-1	Acetone (50)				65					
(88V)	108-88-3	Toluene (2.5)			2.9	24		11			11
(89V)	75-69-4	Fluorotrichloromethane (2.5)				2.9		3.2			
(91V)	71-55-6	1,1,1-Trichloroethane (2.5)									
(94V)	75-09-2	Methylene Chloride (2.5)		52	110	140	40	100	340		100
<u>Organics - Acid Fraction</u>											
(65A)	108-95-2	Phenol (10)			560						
<u>Organics - Base/Neutral</u>											
(55B)	91-20-3	Naphthalene (10)		690	980						
(61)	81-32-9	2-Methylnaphthalene (20)									
(30B)	206-44-0	Acenaphthalene (10)									
(72B)	56-55-3	Fluoranthene (10)		3,500	1,100						
(73B)	50-33-8	Benzo(a)anthracene (10)		5,000	1,400						
(74B)	205-99-2	Benzo(b)pyrene (20)		85,000	1,700						
(75B)	207-08-9	Benzo(k)fluoranthene (20)		350,000	1,800						970
(76B)	318-01-9	Chrysene (10)		5,700	1,800						970
(78B)	120-12-7	Anthracene (10)			1,700						400
(79B)	101-24-2	Benzo(g)hperylene (20)		11,000							
(81B)	85-01-8	Phenanthrene (10)		1,300	570						
(83B)	103-39-5	Indeno(1,2,3-cd)pyrene (20)		10,000	1,400						
(84B)	129-00-0	Pyrene (10)		6,100	1,700						
(82B)	53-70-3	Dibenzo(a,h)anthracene (20)		3,400							
(60B)	84-74-2	Di n-butyl phthalate (10)				72,000					
(63B)	117-84-0	Di n-octyl phthalate (10)				9,100					
(66B)	117-84-0	Di(2-ethylhexyl)phthalate (10)					760				

ORIGINAL
(red)

ARI00708

UNSATURATED SOIL CONTAMINANTS
 SAMPLED BY NUS CORPORATION (8/18/84)
 MICHIGAN SITE

(All Values Presented in µg/kg, Except Metals and Oil and Grease, mg/kg)
 PAGE SIX

DRAW 1

PP#	CAS No. Pesticides/PCBs	Sample No. Traffic Report Org 1 R-berg Location	MC-SO 012 C9351 MC2661 Stained Soil Haltal Property	MC-SO-013 C9352 MC2662 Sitter Property	MC-SO 015 C9354 MC2664 Near Haltal Gas Well	MC-SO-016 C9355 MC2665 Bulk Dumping Area	MC-SO-017 C9356 MC2666 Bulk Dumping Area	MC-SO-003 C9342 MC2652 Near Ballfield	MC-SO-004 C9343 MC2653 Behind W. 13th Street	MC-SO-010 C9349 MC2659 Sitter Property
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(111P) 11096-82 5 PCB 1260 (4.0)
 (110P) 12672 29 6 PCB 1248 (4.0)
 (103P) 319 85 7 BHC-beta (4.0)

17

bergberg

Contaminant	39	28	36	179	25	15.5	39	80
Copper	16	22	29	190	50	36	20	54
Lead	460	1,277	2,835	2,835	391	363	76	1,215
Manganese	19,255	8,740	11,160	20,725	7,345	13,335	6,810	35,430
Iron	30	21	60	193	101	98	69	57
Zinc	2,187	2,880	5,205	2,134	3,170	6,060	4,953	3,539
Aluminum	2.0	1.5	1.7	1.5	2.5	6	7	2.0
Antimony (1.0)	27	55	42.5	36	29	64	155	40
Arsenic	0.25	0.7	3.0	4.8	0.3	0.3	0.45	0.7
Barium (5)	0.18	0.16	0.7	0.6	0.3	0.5	0.9	0.4
Beryllium (0.25)	35	33	430	76	19	9.5	7.0	267
Cadmium (0.05)	3.0	32	86	60	5.5	4.5	0.1	4.5
Chromium	60	0.1	0.1	0.1	0.1	18	11.5	109
Cobalt (2.5)	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.6
Mercury (0.1)	19	12	312	410	19,000	300	12	6.0
Nickel	690	362	57,000	60	60	60	920	86
Selenium (0.1)								690
Silver (0.5)								
Ithallium (0.5)								
tin (1.0)								
Vanadium (1.0)								

Oil and Grease

6.0
 .86
 890

ORIGINAL
 (red)

AR100709

A-191

ORIGINAL
(red)

01041

TABLE I
ONSITE SURFACE SOIL CONTAMINANTS
SAMPLED BY NUS CORPORATION (8/10/84)
MILCHIK SITE
(All Values Presented in µg/kg; Except Metals and Oil and Grease, mg/kg)
PAGE SEVEN

Sample No MC-SO-009 MC-SO-011
Traffic Report Org. C9348 C9350
T. R. Inorg. MC2658 MC2660
Location Near Darren Area
Well 14 Near Swamp

PP#	CAS No	Contaminant	MC-SO-009	MC-SO-011
(86V)	108 88-3	Toluene (2.5)	4.9	
(49V)	75-69-4	fluorotrichloromethane (2.5)	4.2	
(11V)	71-55-6	1,1,1-Trichloroethane (2.5)		
(44V)	75-09-2	Methylene Chloride (2.5)	59	21 RI

Organics - Acid Fraction

(65A)	108 95-2	Phenol (10)		860
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Organics - Base/Neutral

(55B)	91-20-3	Naphthalene (10)		
	91-52-6	2-Methylnaphthalene (20)		
(10)	81-32-9	Acenaphthalene (10)		
(38B)	206-34-0	fluoranthene (10)		
(72B)	56-55-3	benzo(a)anthracene (10)		
(74B)	50-33-8	benzo(a)pyrene (20)		
(74B)	205-99-2	benzo(b)fluoranthene (20)		
(75B)	207-08-9	benzo(k)fluoranthene (20)		
(76B)	318-01-9	Chrysene (10)		
(78B)	120-12-7	Anthracene (10)		
(79B)	181-24-2	benzo(g)heliopyrene (20)		
(81B)	85-01-8	Phenanthrene (10)		
(83B)	183-39-5	Indeno(1,2,3-cd)pyrene (20)		
(84B)	179-00-0	Pyrene (10)		
(68B)	84-74-2	Di n butyl phthalate (10)		
(69B)	117-84-0	Di n-octyl phthalate (10)		
(66B)	117-81-7	Bis(2 ethylethyl)phthalate (10)		

AR100710

A-192

DRAFT

ORIGINAL
(red)

TABLE II
ON-SITE SURFACE SOIL CONTAMINANTS
SAMPLED BY NUS CORPORATION (8/18/84)
MILCHLIK SHI
(All Values Presented in µg/kg, Except Metals and Oil and Grease, mg/kg)
PAGE THREE

Sample No
Traffic Report- Org.
I. R. Inhof
Location

MC-SO-009
C9348
MC2650
Near
Well 14

MC-SO-011
C9350
MC2660
Barren Area
Near Swamp

PPM CAS No
Pesticides/PCBs

Contaminant

(110P) 11096 83-5 PCB 1260
(110P) 12672 29-6 PCB 1248
(103P) 319-85-7 DHC beta

Inorganics

Copper	0.350	10.420
Lead	964	887
Manganese	144	778
Iron	8,220	21,470
Zinc	35.3	1,360
Aluminum	2,554	4,047
Antimony (1.0)		2.8
Arsenic	1.0	2.0
Barium (5)	23	24
Beryllium (0.25)		
Cadmium (0.05)	0.7	0.9
Chromium	14	66
Cobalt (2.5)	5.0	4.5
Mercury (0.1)		0.8
Nickel	443	725
Selenium (0.1)		
Silver (0.5)	3.0	3.5
Thallium (0.5)		
Tin (1.0)		1.2
Vanadium (1.0)		
Oil and Grease	1,100	550

Note: Values in parentheses are method detection limits
RT: Reported during data validation process because of reagent blank contamination.

100711

A-193

ORIGINAL
(red)

DRAFT

TABLE II-2
SUBSURFACE SOIL CONTAMINANTS (TEST PIT SAMPLES)
MUS RESULTS
MILLCRICK SITE
(All Values Presented in µg/kg. Except Metals and Oil and Grease Values, (mg/kg))

PP#	CAS No.	Contaminant	Sample No	TP-001	TP-002	TP-003	TP-004	TP-005	TP-006	TP-007	TP-008
Organics - Volatile Fraction			Traffic Report-Orig	C9660	C9661	C9662	C9663	C9664	C9665	C9666	C9667
			IR-Inorg.	MC2597	MC2598	MC4146	MC4147	MC4148	MC4149	MC4149	MC4150
			Depth	8.0 ft	9.0 ft	3.0 ft	3.25 ft	11.5 ft	2.5 ft	1.3 ft	
				(2.01)	(1.89)	(1.7)	(1.07)	(1.94)	(2.09)	(2.76)	(1.08)
(00V)	75-01-4	Vinyl Chloride (6.0)									
(01V)	79-01-6	Trichloroethene (3.0)									
(30V)	156-60-5	1,2-dichloroethene (6.0)									
(41V)	75-09-2	Methylene Chloride (3)									
	67-64-1	Acetone (6.0)									
(4V)	591-78-6	2-hexanone (6.0)									
	71-43-7	Benzene (3)									
(06V)	108-88-3	Toluene (3)									
(30V)	100-31-4	Ethylbenzene (3)									
		Total Xylenes (3)									
Organics - Acid Fraction											
(65A)	108-95-2	Phenol (40)									
	106-41-5	4-Methyl Phenol (40)									
(34A)	105-67-9	2,4-Dimethyl Phenol (40)									

AR100712

A-194

ORIGINAL
(red)

TABLE II 2
SUBSTRATE SOIL CONTAMINANTS (BEST PIT SAMPLES)
NUS HUSUS IS MITCHUK SITE
(All Values Presented in µg/kg. Except Metals and Oil and Grease Values. (mg/kg))
PAGE TWO

PP#	CAS No.	Contaminant	Sample No	IP 009	TP-010
Organics	Volatile Fraction	Traffic Report-Orig	C3068	MC4151	C9669
		Depth	MC4151	MC4152	
			2.5 ft	1.5 ft	
(89V)	75-01-4	Vinyl Chloride (6 0)	(1 9)	(1 89)	
(82V)	79-01-6	Trichloroethene (3 0)			
(30V)	156-60-5	1,2-dichloroethene (6 0)			
(44V)	75-09-2	Methylene Chloride (3)	133B R	50.3B R	
	67-63-1	Acetone (6 0)	113B R	46.4B R	
(4V)	591-78-6	2-hexanone (6 0)			
(86V)	71-43-2	Benzene (3)	11.2 R	9.9 R	
(30V)	100-80-3	Toluene (3)			
	100-41-4	Ethylbenzene (3)			
		Total Xylenes (3)			
Organics	Acid Fraction		(9 4)	(9 4)	
(65A)	108-95-2	Phenol (40)			389 R
(34A)	106-44-5	4 Methyl Phenol (40)			
	105-67-9	2,4 Dimethyl Phenol (40)			

AR100713

ORIGINAL
(red)

TABLE H 2
SUBSURFACE SOIL CONTAMINANTS (LEAST FIVE SAMPLES)
NUS HILLS MILITARY SITE
(All Values Presented in µg/kg; Except Metals and Oil and Grease Values, (mg/kg))
PAGE THREE

Organic - Base/Neutral Fraction	Sample No Traffic Report-Ord TR Inorg Depth	TP-001 C9660 MC2596	TP-002 C9661 MC2597	TP-003 C9662 MC2598	TP-004 C9663 MC4146	TP-005 C9664 MC4147	TP-006 C9665 MC4148	TP-007 C9666 MC4149	TP-008 C9667 MC4150
(55B) Naphthalene (40)	91 20 3	1,400	737	116K	348K				273K
(55B) 2-Methylnaphthalene (40)	91 57 6	1,950	520	207K	233K				208K
(110) Acenaphthene (40)	83 32 9		697		124K				168K
(77B) Acenaphthylene (40)	708 96 8			90K					
(79B) Anthracene (40)	120 12 7		3,540						659
(72B) Benz(a)anthracene (40)	56 55 3		4,590		1,830				1,510
(82B) Dibenzo(a,h)anthracene (40)	53 70 3		1,800		1,530				544
(81B) Phenanthrene (40)	85 01 8	417	3,090	209K					398
(80B) Fluorene (40)	86 73 7		402	78K					
(39B) Fluoranthene (40)	206 44 0		4,710		52K				1,710
(74B) Benzo(b)fluoranthene (40)	205 99 2		11,000		1,740				3,410
(75B) Benzo(k)fluoranthene (40)	207 08 9				5,540				

AR100714

A-196

ORIGINAL
(red)

TABLE B-2
SUBSURFACE SOIL CONTAMINANTS (ULST PIT SAMPLES)
NUGS IN SLOTTED METAL CANS
(All Values Presented in µg/kg, Except Metals and Oil and Grease Values, (mg/kg))
PAGE FOUR

Organics	Base/Neutral Fraction	Sample No. Traffic Report-Org	1P-009 C9668 MC4151	TP-010 C9669 MC4152
		IR-org.	2.5 ft	1.5 ft
			Depth	Depth
(550)	01 20 3 Naphthalene (40)		438	318K
	01 57 6 2 Methyl-naphthalene (40)		343	209K
(10)	03 32 9 Acenaphthene (40)			92.5K
(770)	208-96-8 Acenaphthylene (40)			162K
(780)	170 12-7 Anthracene (40)			599
(720)	56 55 3 Benzo(a)anthracene (40)			
(820)	53 70 3 Dibenz(a,h)anthracene(40)			
(810)	85-01-8 Phenanthrene (40)		249K	
(800)	86 73 7 Fluorene (40)			
(300)	206 44 0 Fluoranthene (40)		354K	1.200
(740)	205 99 2 Benzo(b)fluoranthene (40)		80J	1.650
(750)	207 08 4 Benzo(k)fluoranthene (40)			

ARI00715

A-197

ORIGINAL
(red)

TABLE II 2
SUBSURFACE SOIL CONTAMINANTS (BEST PIT SAMPLES)
NUS III SUELS MILCHLIK SHT.
(All Values Presented in ug/kg; Except Metals and Oil and Grease Values, (mg/kg))
PAGE FIVE

PPM	CAS No.	Contaminant	Sample No Traffic Report-Org. TR-Inorg. Depth	TP-001 C9660 MC2598 7.0 ft	TP-002 C9661 MC2597 8.0 ft	TP-003 C9662 MC2599 9.0 ft	TP-004 C9663 MC4146 3.0 ft	TP-005 C9664 MC4147 3.25 ft	TP-006 C9665 MC4148 11.5 ft	TP-007 C9666 MC4149 2.5 ft	TP-008 C9667 MC4150 1.3 ft
(269)	218-01-9	Chrysene (40)									
(830)	129-00-0	Pyrene (40)									
(730)	50-32-8	Benzo(a)pyrene (40)									
(830)	193-39-5	Indeno(1,2,3-cd)pyrene (40)									
(790)	191-24-2	Benzo(g,h,i)perylene (40)									
(860)	112-64-9	Fluoranthene (40)									
(670)	117-81-7	Di(2-ethylhexyl)phthalate (40)									
(680)	85-68-7	Di(2-ethylhexyl)phthalate (40)									
(680)	64-74-2	Di-n-butyl phthalate (40)									
(690)	117-84-0	Di-n-octyl phthalate (40)									
		Organics - Pesticides/PCBs									
(110P)	12672-29-6	PCB 1248 (10)									
(111P)	11096-02-5	PCB 1260 (20)									
(106P)	53469-21-9	PCB 1242 (20)									
(107P)	11097-69-1	PCB 1254 (40)									

mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1.600	1.350	3.150	3.570	14.300	4.150	3.360	1.790	1.600	451	1,070	500
1.380	908	5,680	1,190	1,270	848	6,520	172K R1	6.0	700	6.0	700
410*	6,600*	6.0	700	6.0	700	6.0	700	6.0	700	6.0	700
16,000	1,200	9,500	450	7.0	450	6.0	200	6.0	200	6.0	200
100	100	100	100	100	100	100	100	100	100	100	100

Additional Information

Note: Results relayed to NUS from USEPA's Central Regional Laboratory.

AR100716

ORIGINAL
(red)

TABLE II-2
SUBSTRATE SOIL CONTAMINANTS (EAST PIT SAMPLES)
NUS IN SURTIS MICHIEK SHL
(All Values Presented in µg/kg, Except Metals and Oil and Grease Values, (mg/kg))
PAGE SIX

PPM	CAS No.	Contaminant	Sample No. Traffic Report-Orig IR-Inorg.	IP 009 C9668 MC4152	TP-010 C9669 MC4152
		Depth	2.5 ft		1.5 ft
(260)	218-01-9	Chrysene (40)			587
(440)	129-00-0	Pyrene (40)			754
(230)	50-32-8	benzo(a)pyrene (40)	264K		
(830)	183-39-5	Indeno(1,2,3-cd)pyrene (40)	957		
(790)	191-24-2	Benzo(g,h,i)perylene (40)	503		
	132-64-9	Dibenzofuran (40)	506		
(660)	117-81-7	bis(2-ethylhexyl)phthalate (40)	474 RI		579 RI
(670)	85-68-7	butylbenzyl phthalate (40)	331K		2,110
(680)	84-74-2	Di-n butyl phthalate (40)	353K		257K
(690)	117-84-0	Di-n octyl phthalate (40)			3,930

Organics - Pesticides/PCBs

(1100) 12672-29-6 PCB 1248 (10)
(1110) 11096-82-5 PCB 1260 (20)

Additional Information:

pH (Standard Units) 6.0 6.0
Oil and Grease 660 990

Notes:

- 1 Values in parentheses adjacent to contaminant names are instrument detection limits.
- 2 Values in brackets are correction factors. Multiplication of the correction factor and the given instrument detection limit will yield the method detection limits for each fraction of each sample. Correction factor accounts for necessary dilutions and percent moisture.
- 3 B Lab qualifier indicating compound was detected in reagent blank.
- 4 J Lab qualifier indicating value is an approximation.
- 5 K Lab qualifier indicating compound detected below method detection limit.
- 6 R Rejected during data validation process, detection limits did not satisfy requirements of contract.
- 7 RI Rejected during data validation because of reagent blank contamination.

ARI 007

4-197

ORIGINAL

(red)

TABLE II 2
 SUBSURFACE SOIL CONTAMINANTS (TEST PIT SAMPLES)
 NUS-SOUTH MITCHELL SITE
 (All Values Presented in µg/kg, Except Metals and Oil and Grease Values, (mg/kg))
 PAGE SEVEN

Pit #	CAS No.	Contaminant	Sample No.		Traffic Report-Orig		Depth		TP-001		TP-002		TP-003		TP-004		TP-005		TP-006		TP-007		TP-008	
			TR-100g	TR-100g	7.0 ft	8.0 ft	9.0 ft	3.0 ft	3.25 ft	11.5 ft	2.5 ft	13 ft												
		Copper	205	38.5	38.5	55	156.5	18	8,350	101.5														
		Lead	60	95	17	55	291	9.5	2,375	505														
		Manganese	191	970	65	448	550	148.5	411	1,835														
		Iron	10,450	25,900	3,055	39,350	18,400	28,600	20,900	26,900														
		Zinc	318	142	299.5	75	10,350	70	7,750	258														
		Aluminum	5,600	4,110	2,500	3,655	7,550	7,200	20,350	7,500														
		Antimony (0.38)	7.5	8	3.35	4.25	10	15	[0.85]	4.35														
		Arsenic	33	32.5	9	20.5	49.5	60	85	9.5														
		Barium	0.35	0.3	[0.05]	[0.1]	0.25	0.25	0.35	104.5														
		Beryllium	0.35	1.9	0.055	0.34	1.9	[0.043]	10	0.6														
		Cadmium	13	26.5	5	30	37.5	10.5	60	1.2														
		Chromium	[2.35]	3.2	3.85	3.9	3.75	6	12	50														
		Cobalt	0.145	0.255	6	41	26	15	0.415	3.6														
		Mercury (0.09)	38	90	0.65	0.65	0.455]	[0.225]	4	[0.365]														
		Molybdenum (0.1)	1.2	0.135]	[0.135]	[0.225]	[0.455]	[0.225]	4	[0.365]														
		Silver	[0.135]	[0.135]	[0.225]	[0.225]	[0.455]	[0.225]	4	[0.365]														
		Thallium (0.13)	20	[7]	[2.05]	[4.35]	[9]	16	55	8.5]														
		Uw (0.95)	20	[7]	[2.05]	[4.35]	[9]	16	55	8.5]														
		Vanadium	20	[7]	[2.05]	[4.35]	[9]	16	55	8.5]														

ARI00718

A-100

ORIGINAL

(red)

TABLE H 2
 SUBSURFACE SOIL CONTAMINANTS (HLSI PH SAMPLIS)
 NUS RUSUIS MILITARY SITE
 (AN Values Presented in µg/kg; Except Metals and Oil and Grease Values, (mg/kg))
 PAGE THREE

PP#	CAS No.	Contaminant	Sample No	IP 009	TP-010
			Traffic Report -Org	C9668	C9669
			I.R.-Inorg.	MC4151	MC4152
			Depth	2.5 ft	1.5 ft
		<u>Inorganics</u>			
		<u>Metals</u>			
		Copper		34	820
		Lead		60	252
		Manganese		256	905
		Iron		18,400	30,400
		Zinc		70	220
		Aluminum		3,570	5,700
		Antimony (0.38)		[0.65]	8
		Arsenic		7.5	8
		Barium		25	60
		Beryllium		[0.15]	0.35
		Cadmium		0.325	0.385
		Chromium		31.5	50
		Cobalt		[1.8]	3.65
		Mercury (0.09)		17.5	0.225
		Nickel		[0.365]	41.5
		Selenium (0.1)			1.4
		Silver			
		Thallium (0.13)			
		Tin (0.95)		[3.55]	22.5
		Vanadium			[7]

Notes:
 1 Values in parentheses adjacent to contaminant names are instrument detection limits.
 2 Values in brackets were corrections above the method detection limit but below the contract required detection limit

AR100719

#-101

ORIGINAL
(red)

TABLE W 2
SUBSURFACE SOIL CONTAMINANTS (TEST PIT SAMPLES)
NUS RESURFACING SITE
(All Values Presented in µg/kg; Except Metals and Oil and Grease Values, (mg/kg))
PAGE NINE

PP#	CAS No	Contaminant	TP-012 C9672 MC4155 2.5 ft	TP-013 C9673 MC4156 1.0 ft	TP-014 C9674 MC4157 1.5 ft	TP-015 C9675 MC4158 5.0 ft	TP-016 C9676 MC4159 5.5 ft	TP-017 C9677 MC4160 4.5 ft	TP-018 C9678 MC4161 4.3 ft	TP-019 C9679 MC4162 Blank
(44V)	75-09-2	Methylene Chloride	630	308	138 RI	338	1208	238 RI	518	2008
<u>Organics - Acid Fraction</u>										
(65A)	108-95-2	Phenol (370-390)	270J		320J		1,100	700		
(14A)	51-20-5	4 Methylphenol (560-590)	250J					470J		
	95-38-7	2,4 Dimethylphenol (520-550)	190J					310J		
		2-Methylphenol (370)	210J					240J		
<u>Organics - Base/Neutrals</u>										
(65B)	91-20-3	Naphthalene (370)	360J	370			520	1,300		
(81B)	91-57-6	2-Methylnaphthalene (390)	360	190J	1,200		410	1,300	66J	
(16)	83-32-9	Acenaphthene (370-390)	390	310J	690		380	2,000	100J	
(80B)	86-71-7	Fluorene (370-390)	96J				99J	250J		
(78B)	120-12-7	Anthracene (370-390)						420		
(39B)	206-44-0	Fluoranthene (370-390)	180J				150J	4,300		
(64B)	129-00-0	Pyrene (5, 6, 3, 9)	180J				200J	5,500		
(72B)	56-55-3	Benzo(a)anthracene (370-390)	140J					8,600		
(74B)	205-99-2	Benzo(b)fluoranthene (370-390)	320J	1,200				16,000		
(75B)	207-08-9	Benzo(k)fluoranthene (370-390)						14,000		
(73B)	50-32-8	Benzo(a)pyrene (370-390)		690				10,000		
(83B)	193-39-5	Indeno(1,2,3-cd)pyrene (370-390)						2,600		
(82B)	53-70-3	Dibenz(a,h)anthracene (370-390)								

AR100720

TABLE II 2
SUBURBAN SOIL CONTAMINANTS (USE PI SAMPLES)
NUS HESUR IS MITCHELL SMI
(AB Values Presented in $\mu\text{g}/\text{kg}$. Except Metals and Oil and Grease Values, (mg/kg))
PAGE 11N

Sample No.	IP-011	IP-011A
Traffic Report Org	CJ670	C9671
TR -logy	MC4153	MC4154
Depth	2.0 ft	Duplicate

PP#	CAS No.	Contaminant		
<u>Organics - Volatile Fraction</u>				
(44V)	75 09 2	Methylene Chloride	200H	51B
<u>Organics - Acid Fraction</u>				
(65A)	108 95 2	Phenol (370 390)	130J	170J
	106 44 5	4 Methylphenol (560 590)	200J	230J
(34A)	51 28 5	2,4 Dimethylphenol (520-550)		
	95 48 7	2 Methylphenol (370)		
<u>Organics - Base/Neutrals</u>				
(54B)	91 20 3	Biphenylene (370)	300J	
	91 57 6	2 Methylnaphthalene (390)	310J	350J
(810)	85 01 8	Phenanthrene (390)	590	710
(110)	83 32 9	Acenaphthene (370-390)	68J	76J
(806)	86 73 7	Fluorene (370 390)	76J	100J
(700)	120 12 7	Anthracene (370-390)		
(390)	206 43 0	Fluoranthene (370-390)	770	850
(840)	129 00 0	Pyrene (370-390)	740	830
(728)	56 55 3	Benzo(a)anthracene (370-390)	500	680
(740)	205 99 2	Benzo(b)fluoranthene (370-390)	1,160	890
(750)	207 08 9	Benzo(k)fluoranthene (370 390)	560	
(730)	50 32 8	Benzo(a)pyrene (370 390)	710	950
(830)	183 39 5	Indeno(1,2,3-cd)pyrene (370-390)		
(820)	53 70 3	Dibenzo(a,h)anthracene (370 390)		

Note:
1 Values in parentheses are method detection limit ranges associated with these samples

AR100721

ORIGINAL
(red)

TABLE II-2
SUBSURFACE SOIL CONTAMINANTS (BEST PIT SAMPLES)
NUS IN SULIS MITCHELL SITE
(All Values Presented in µg/kg; Except Metals and Oil and Grease Values, (mg/kg))
PAGE ELEVEN

PP#	CAS No.	Contaminant	Sample No. Traffic Report-Orig I.R.-Inorg. Depth	TP-012 C9672 MC4155 2.5 ft	TP-013 C9673 MC4156 10 ft	TP-014 C9674 MC4157 1.5 ft	TP-015 C9675 MC4158 5.0 ft	TP-016 C9676 MC4159 5.5 ft	TP-017 C9677 MC4160 4.5 ft	TP-018 C9678 MC4161 4.3 ft	TP-019 C9679 MC4162 Blank
(798)	191 24 2	Benzo(g,h,i)perylene (370-390)									
(799)	218 01 9	Chrysene (370-390)									
(770)	208 96 8	Acenaphthylene (370-390)		230J							
(690)	117-84-0	Di n-octyl phthalate (370-390)						6,900			
(680)	84 74 2	Di n-butyl phthalate (370-390)			340J					160J	93J
(670)	85 68 7	Di n-butyl phthalate (370-390)									
(668)	117 81 7	Benzyl butyl phthalate (520-550)									
(718)	131 11 3	Bis(2-ethylhexyl)phthalate(390)		320J	960	1,200		530	380	270J	220J
(58)	192 87 5	Diethylphthalate (370-390)			50J						
		Benzidiazole (2000-2100)									
Pesticides/PCBs											
(110P)	12672-29 6	PCB 1248 (200)			3,380			857			181
(111P)	11096-82 5	PCB 1260 (400)									
	60 57 1	Dieldrin (40)									
Additional Information											
		Oil and Grease		8.0 670	7.8 1,300	7.8 1,700	7.2	8.9 61.0	7.5 400	7.3 190	6.7 550

ARI00722

A-104

ORIGINAL
(red)

TABLE II 2
SUBSURFACE SOIL CONTAMINANTS (FLEST PIT SAMPLES)
NUS RI SUR IS MELUKUTK SII
(All Values Presented in ug/kg; Except Metals and Oil and Grease Values, (mg/kg))
PAGE TWELVE

PIT #	CAS No.	Contaminant	Sample No.	
			Traffic Report-Orb	TP-011
			TR-1099	C9670
			Depth	MC4153
				2.0 ft
(799)	191-24-2	Benzof(g,h,i)perylene (370-390)		450
(670)	85-60-7	Benzyl butylphthalate (520-550)		120J
(760)	210-01-9	Chryson (376, 390)		660
(770)	208-96-8	Acenaphthylene (370-390)		790
(680)	117-84-0	Di-n-octyl phthalate (370-390)		69J
(690)	04-74-2	Di-n-butyl phthalate (370-390)		
(50)	192-87-5	Benzidine (2000-2100)		
	132-64-9	Dibenzofuran (370-390)		
<u>Pesticides/PCBs</u>				
(1100)	17672-29-6	PCB 1248 (200)		
(1110)	11096-02-5	PCB 1260 (400)		
	60-57-1	Dieldrin (40)		

Additional Information:
pH (Standard Units)
Oil and Grease

AR100723

ORIGINAL
(red)

TABLE II 2
SUBSURFACE SOIL CONTAMINANTS (BEST PI SAMPLES)
NUS HILLS MILITARY SITE
(All Values Presented in µg/kg; Except Metals and Oil and Grease Values, (mg/kg))
PAGE THREE

	Sample No. Traffic Report Org. Depth	TP-012 C9672 MC4155 2.5 ft	TP-013 C9673 MC4156 1.0 ft	TP-014 C9674 MC4157 1.5 ft	TP-015 C9675 MC4158 5.0 ft	TP-016 C9676 MC4159 5.5 ft	TP-017 C9677 MC4160 4.5 ft	TP-018 C9678 MC4161 4.3 ft	TP-019 C9679 MC4162 Blank
Inorganics									
Copper		55	8,150	530	5.0	48.5	14.5	20,500	11.5
Lead		310	945	166.5	10	23	13.5	1,205	6.5
Manganese		510	222.5	322	75	1,330	146.5	158	85
Iron		30,800	10,150	23,750	11,050	35,150	19,100	14,400	5,650
Zinc		180	3,825	585	55	36	11.5	7,450	25.5
Aluminum		4,715	7,600	5,350	6,100	5,900	2,165	17,400	2,740
Antimony (0.30)		1.25	1.2					2.7	
Arsenic		7	6	6	4.35	6	2.8	3.95	6.5
Barium		27.5	24	26.5	33	27	14	24.5	29
Beryllium		(0.2)	(0.1)	(0.15)	(0.2)	(0.15)	(0.05)	(0.2)	(0.1)
Cadmium		0.9	2.05	0.43	(0.0425)	0.075	0.065	4.25	0.175
Chromium		4.6	19.5	23.5	8.5	190.5	25.5	10.5	4.05
Cobalt		2.8	5.5	(2.05)	3.6	6	(2.4)	33	(2.05)
Mercury (0.09)		20	0.175	1.25					
Nickel			495	32.5	11.5	225.5	16	160	6
Selenium (0.1)				0.315					(0.035)
Silver (0.13)			2.95	0.55	(0.455)	1.5		7	(0.4)
Thallium (0.13)									
Tin (0.95)		8.5	130.5	5					
Vanadium		71	(4.3)	(4.7)	10	50	(6)	313	(7.5)

AR100724

M-102

ORIGINAL
(red)

TABLE 10 2
SUBURBAN SOIL CONTAMINANTS (TEST PIT SAMPLES)
NHS RESULTS MILCROK SITE
(All Values Presented in mg/kg, Except Metals and Oil and Grease Values, (mg/kg))
PAGE FOURTEEN

Inorganics... Metals	Sample No		IP 011 C9670 MC4153 2.0 ft	IP-011A C9671 MC4154 Duplicate
	Traffic Report-Orig	IR Inorg		
Copper	183.5			179.5
Lead	263.5			297
Manganese	825			970
Iron	32,750			65,500
Zinc	230.5			162.5
Aluminum	5,700			6,750
Antimony (0.30)	1.05			(0.95)
Arsenic	7.5			10.5
Barium	95			60
Beryllium	0.25			(0.2)
Cadmium	416			1
Chromium	60			164
Cobalt	4.65			6
Mercury (0.09)	45			0.1
Nickel				90
Selenium (0.1)	0.95			(0.32)
Silver (0.13)				
Thallium (0.13)				
Tin (0.95)	0.5			8
Vanadium	(7.5)			(8.5)

Notes:
1 Values in parentheses are instrument detection limits
2 Values in brackets were identified above the method detection limit but below the contract required detection limit

100725

A-107

TABLE H-3
 SUBSURFACE SOIL CONTAMINANTS (WELL BORINGS)
 SAMPLED BY NUS CORPORATION (7/17/84)
 MILCHIEK SHI
 (All Values Presented in µg/kg. Except Metals and Oil and Grease, mg/kg)
 PAGE TWO

PP#	CAS No. Oil and Grease	Contaminant	SS-000 C9765 MC1965 Blank	SS-001 C9744 MC1944 16A, 6-7 ft	SS-002 C9745 MC1945 16B, 4-5-6 ft	SS-003 C9746 MC1946 17A, 3-4-5 ft	SS-004 C9747 MC1947 18A, 3-4-5 ft	SS-005 C9761 MC1961 18B, 4-5-6 ft	SS-006 C9762 MC1962 20A, 3-4-5 ft	SS-007 C9763 MC1963 20A, 6-7-5 ft
	1,760	Aluminum		6,050	5,500	1,630	2,450	4,750	760	5,750
	2.1	Antimony (10)		2.7	3.6	0.0	1.4	2.4		2.1
	22.2	Arsenic (0.5)		141	110	16.5	10.3	47		198
	0.25	Barium (5)		0.5	0.7			0.3	0.3	
	0.15	Beryllium (0.25)		0.6	0.7	0.23	0.12	0.2	0.13	1.1
	3.2	Cadmium		8.3	7.7	38	17	23.5	2.2	10.5
		Chromium		3.6	2.6	3.9		4.8		3.3
	9.5	Cobalt (2.5)		18.0	20.5	26.7	8.5	15.3	172.5	2010
	4,055	Copper		6,075	5,550	33,200	4,110	17,000	9,150	6,315
	2.8	Iron		8.8	16	31	6.4	5.5	7.2	182
	67.3	Lead		49.5	80.5	620	201	382	112	94
	5.0	Manganese		12.5	9.7	126	13.8	20.3	77.5	975
	0.2	Nickel					0.1		0.1	0.1
	0.8	Selenium (0.1)					0.6			
		Silver (0.5)								
	1.2	Titanium (10)		10.7	10.8		0.3	17.6	1.7	7.2
	12.8	Vanadium (10)		48.5	46.3	43.2	14.5	42.5	52.5	565
		Zinc								

ORIGINAL
 (red)

AR100726

TABLE II 3
SUBSURFACE SOIL CONTAMINANTS (WELL BORINGS)
SAMPLED BY NUS CORPORATION (7/17/83)
MILCHIK SITE

(All Values Presented in ng/kg. Except Metals and Oil and Grease, mg/kg)

PP#	CAS No.	Contaminant	SS-000 C9/85 MC1965 100K	SS-001 C9/744 MC1944 16A, 6-7 ft	SS-002 C9/745 MC1945 16B, 4-5 ft	SS-003 C9/746 MC1946 17A, 3-4.5 ft	SS-004 C9/747 MC1947 10A, 3-4.5 ft	SS-005 C9/761 MC1961 10B, 4.5-6 ft	SS-006 C9/762 MC1962 20A, 3-4.5 ft	SS-007 C9/763 MC1963 20A, 6-7.5 ft	
(14V)	71-43-2	Benzene (5)									
(16V)	108-88-3	Toluene (5)									
(10V)	156-60-5	1,2-Dichloroethene (5)									
(44V)	75-09-2	Methylene Chloride (5)									
Organics - Acid Fraction											
(740)	205-90-2	Benzo(b)fluoranthene (20)									
(750)	207-08-9	Benzo(k)fluoranthene (20)									
(720)	56-55-3	Benzo(a)anthracene (10)									
(730)	50-32-8	Benzo(a)pyrene (20)									
(760)	218-01-9	Chrysene (20)									
(790)	191-74-2	Benzo(g,h,i)perylene (20)									
(810)	85-01-8	Phenanthrene (10)									
(840)	193-39-5	Indeno(1,2,3-cd)pyrene (20)									
(840)	129-00-0	Pyrene (10)									
(390)	206-43-0	fluoranthene (10)									
(780)	170-12-7	Anthracene (10)									
(800)	86-73-7	fluorene (10)									
(650)	91-20-3	Naphthalene (10)									
(660)	117-81-7	1,2,4-trimethylbenzene (10)									
(680)	141-74-2	Di-n-butylphthalate (10)									
(700)	66-2	Dibutylphthalate (10)									
(630)	117-84-0	Di-n-octyl phthalate (10)									
Organics - Base/Neutral Fraction											
(107V)	11897-69-1	PCB 1254 (0.1)									

ORIGINAL
(red)

100727

A-107

DRAFT

TABLE 11-3
 SUBSURFACE SOIL CONTAMINANTS (WELL BORINGS)
 SAMPLED BY NUS CORPORATION (7/1/84)
 MILWAUKEE SOIL
 (All Values Presented in ng/kg. Except Metals and Oil and Grease, mg/kg)
 PAGE THREE

PP#	CAS No.	Contaminant	Sample No. Traffic Report-Orig. TR-Orig.	SS-008 C9764 MC1964 21A, 9-10.5 ft.	SS-009 C9766 MC1966 22A, 3-4.5 ft.	SS-010 C9767 MC1967 23A, 9-10.5 ft.	SS-011 C9768 MC1968 23A, 12-13.5 ft.	SS-012 C9769 MC1969 24A, 12-13.5 ft.	SS-013 C9770 MC1970 25A, 9-12 ft.	SS-013A C9771 MC1971 25A, 9-12 ft.	SS-014 C9772 MC1972 Blank
		<u>Organics - Volatile Fraction</u>		[0.57]	[0.57]	[0.54]	[0.76]	[0.61]	[0.57]	[0.58]	
(4V)	71-43-2	Benzene (5)									
(6V)	108-88-3	Toluene (5)					6.63	3K			
(30V)	156-60-5	1,2-dichloroethene (5)					7.64				
(44V)	75-09-2	Methylene chloride (5)			3.25 RI	3K RI	4.00 RI	14.6 RI	7.45 RI	5.71 RI	20.7 RI
		<u>Organics - Acid Fraction</u>									
		<u>Organics - Base/Neutral Fraction</u>		[152]	[58.1]	[47.5]	[56.3]	[48.7]	[52.8]	[48.7]	
(44)	205-99-2	Benzo(b)fluoranthene (20)		3,040K							
(75)	207-08-9	Benzo(k)fluoranthene (20)		3,040K							
(28)	56-55-3	Benzo(a)anthracene (10)		1,520K							
(73)	50-32-8	Benzo(a)pyrene (20)		3,040K							
(60)	218-01-9	Chrysene (20)		3,040K							
(79)	191-24-2	Benzo(g,h,i)perylene (20)		3,040K							
(81)	85-01-6	Phenanthrene (10)		1,520K							
(83)	193-39-5	Indeno(1,2,3-cd)pyrene (20)		1,520K							
(84)	129-00-0	Pyrene (10)		1,520K							
(38)	206-44-8	Fluoranthene (10)		1,520K							
(78)	176-12-7	Anthracene (10)		1,520K							
(55)	91-20-3	Naphthalene (10)		1,520K							
(70)	59-66-2	Benzyolphthalate (10)		1,520K							
(65)	81-81-7	Oct-2-ethoxyphthalate (10)		1,520K RI	581K RI	475 RI	563K RI		528K RI	487K RI	1,520K RI
(68)	81-74-2	Di-n-butylphthalate (10)		1,520K RI	581K RI	475 RI	563K RI		528K RI		1,520K RI
		<u>Organics - Pesticide/PCB Fraction</u>									
(107)	1097-69-1	PCB 1254 (0.1)									

ORIGINAL
(red)

100728

TABLE H 3
 SUBSURFACE SOIL CONTAMINANTS (WELL BORINGS)
 SAMPLED BY NUS CORPORATION (7/17/84)
 MILLER EK SHI
 (All Values Presented in µg/kg; Except Metals and Oil and Grease, mg/kg)
 PAGE FOUR

DRAFT

PP#	CAS No.	Contaminant	SS-008 C9764 MC1964 21A, 9-10.5 ft	SS-009 C9766 MC1966 22A, 3-4.5 ft	SS-010 C9767 MC1967 23A, 9-10.5 ft	SS-011 C9768 MC1968 23A, 12-13.5 ft	SS-012 C9769 MC1969 24A, 12-13.5 ft	SS-013 C9770 MC1970 25A, 9-12 ft	SS-013A C9771 MC1971 25A, 9-12 ft	SS-014 C9772 MC1972 Blank
		Aluminum	1,045	5,820	3,250	3,210	3,270	4,870	4,300	1,270
		Antimony (1.0)								
		Arsenic	2.7	2.0	1.5	3.0	3.3	3.3	1.9	2.3
		Barium (5)		21.0	15.0	17.4	20.5	35.0	33.2	20
		Beryllium (0.25)		0.4					0.0	0.3
		Cadmium (0.05)		0.19	0.00	0.17	0.13	0.15	0.12	0.18
		Chromium	2.1	7.5	4.9	5.4	4.9	7.3	6.6	2.6
		Cobalt (2.5)		4.5	3.2	3.6	4.3	3.2	3.0	
		Copper	6.5	19.0	17.1	25.5	14.5	22.6	21.0	5.5
		Iron	3,795	11,400	7,800	9,200	9,950	10,500	9,500	3,000
		Lead	3.6	5.3	4.2	5.8	7.6	5.8	4.0	1.8
		Manganese	176	106.0	259	500	143.0	79.0	63.0	55.0
		Mercury (0.1)								
		Nickel	3.5	13.5	8.8	8.8	10.3	10.0	9.5	3.8
		Selenium (0.1)								
		Silver (0.5)								
		Tin (0.5)								
		Tin (1.0)	1.35							
		Vanadium (10)								
		Zinc	17.5	50.0	40.0	45.0	44.2	40.4	39.0	10.6

Notes: Subsurface soils (SS) are samples of cuttings taken with a split-spoon sampler.
 The location shown at the top is the monitoring well and the depth over which a composite sample was taken.
 K - Actual value, within limitations of this method, is less than the actual value given
 C - Value corrected for blank concentration
 Values in parenthesis are the instrument detection limits for a given compound.
 Values in brackets are correction factors which account for dilution of samples; multiplication of the instrument detection limit by the appropriate correction factor, for that fraction will yield the method detection limit for a given compound of a given sample
 (1) - Rejected during data validation process because of reagent blank contamination
 (2) - Rejected during data validation process, matrix spike recoveries below contract specifications.

AR100729

ORIGINAL
 (red)

A-110

A-112

TABLE B 4
 GROUNDWATER CONTAMINANTS
 SAMPLED BY NUS CORPORATION (8/14/04)
 MILCUTK SH
 (All Values Presented in µg/l)
 PAGE TWO

Sample No. Traffic Report - Organic Traffic Report - Inorganic Monitoring Well No.	Upgradient	Major Volatile Groundwater Contamination Area and Downgradient Onsite and Offsite Wells					
	MW-034 C9377 MC2687 MW-21B	MW-011 C9313 MC2623 MW-4	MW-006 C9307 MC2617 MW-1	MW-007 C9308 MC2618 MW-3	MW-005 C9306 MC2616 MW-5	MW-004 C9305 MC2615 MW-2	MW-010 C9312 MC2622 MW-6

Inorganics - HSI Heavy Metals (Continued)

Cobalt	(4.6)							
Mercury	(0.05)							
Nickel	(5.2)	0.22						
Selenium	(1.9)							
Silver	(3.8)							
Thallium	(4.1)							
Tin	(15)	39		234	24			36
Vanadium	(15)							
Zinc	(2.1)		26	11	21	12		12
Copper	(5.4)							

- Notes:
- 1 Values listed in parentheses are instrument detection limits.
 - 2 Denotes quantitated from a secondary ion
 - 3 Less than (-) values depict substances detected below detection limit provided.
 - 4 K indicates compound detected below the method detection limit

ORIGINAL
 (red)

AR100731

TABLE
GROUNDWATER CONTAMINANTS
SAMPLED BY NIUS CORPORATION (8/14/84)
MILL CREEK SITE
(All Values Presented in ug/l)
PAGE FIVE

PP#	CAS No.	Contaminant	Remaining Onsite and Offsite Wells								
			MW-013 C9315 MC2625 MW-8	MW-014 C9316 MC2626 MW-12	MW-012 C9314 MC2624 MW-13	MW-008 C9308 MC2618 MW-14	MW-008A C9310 MC2620 MW-14	MW-023A C9327 MC2637 MW-16B	MW-021 C9325 MC2635 MW-17B		
(16V)	75-00-3	Chloroethane									
(13V)	75-35-3	1,1-dichloroethane									
(10V)	107-06-2	1,2-dichloroethane									
(28V)	75-35-4	1,1-dichloroethene									
(30V)	156-60-6	1,2-dichloroethane									
(87V)	79-01-6	Trichloroethane									
(11V)	71-55-6	1,1,1-trichloroethane									
(88V)	75-01-4	Vinyl chloride									
(44V)	75-09-2	Methylene chloride	36		36	5.3	75	410C	360C		
<u>Base/Neutral Fraction</u>											
(59B)	78-59-1	Isophorone									
(70B)	84-66-2	Diethyl phthalate									
(68B)	84-74-2	Di-n-butyl phthalate	41		23						

TABLE 11-4
 GROUNDWATER CONTAMINANTS
 SAMPLED BY NUS CORPORATION (8/14/84)
 MILLCREEK SITE
 (All Values Presented in µg/l)
 PAGE SIX

PPM	CAS No.	Contaminant	Remaining Onsite and Offsite Wells																			
			MW-013 C9316 MC2825 MW-8	MW-014 C9316 MC2628 MW-12	MW-012 C9314 MC2824 MW-13	MW-008 C9309 MC2619 MW-14	MW-008A C9310 MC2620 MW-14	MW-023 C9327 MC2637 MW-16B	MW-023A C9332 MC2642 MW-16B	MW-01 C932E MC263	MW-17											
		Iron		10,100	20,800	1,610	1,370															
		Manganese	100	1,630	519	1,910	1,920															
		Cadmium																				
		Aluminum																				
		Antimony																				
		Arsenic																				
		Barium																				
		Beryllium																				
		Chromium																				
		Cobalt																				
		Mercury																				
		Nickel																				
		Selenium																				
		Silver																				
		Thallium																				
		Tin																				
		Vanadium																				
		Copper																				
		Zinc																				

Notes: Values listed in parentheses are instrument detection limits.
 Indicates result corrected for reagent blank contamination.

AR 100731B

TABLE H-4
 GROUNDWATER CONTAMINANTS
 SAMPLED BY NUS CORPORATION (8/14/84)
 MILLCREEK SITE
 (All Values Presented in µg/l)
 PAGE SEVEN

		Remaining Onsite and Offsite Wells	
		MW-019	MW-020
		C9323	C9334
		MC2639	MC2644
		MW-18B	MW-22B
			MW-030
			C9335
			MC2645
			MW-22C

Sample No.
 Traffic Report - Organic
 Traffic Report - Inorganic
 Monitoring Well No.

PPA	CAS No.	Contaminant
<u>Organics - Volatile Fraction</u>		
(16V)	75-00-3	Chloroethane (5)
(13V)	75-35-3	1,1-dichloroethane (5)
(10V)	107-08-2	1,2-dichloroethane (5)
(29V)	75-35-4	1,1-dichloroethene (5)
(30V)	156-60-5	1,2-dichloroethene (5)
(87V)	79-01-6	Trichloroethane (5)
(11V)	71-55-6	1,1,1-trichloroethane (5)
(88V)	75-01-4	Vinyl chloride (5)
(44V)	75-09-2	Methylene chloride (5)

Base/Neutral Fraction

(59B)	78-59-1	Isophorone (10)
(70B)	84-86-2	Diethyl phthalate (10)
(68B)	84-74-2	Di-n-butyl phthalate (10)

120C
 130C
 5K
 14
 56

A-113

ORIGINAL
(red)

TABLE H.4
GROUNDWATER CONTAMINANTS
SAMPLED BY NUS CORPORATION (8/14/04)
MILCHIK SITE
(All Values Presented in µg/l)
PAGE EIGHT

PP#	CAS No.	Contaminant	Remaining Onsite and Offsite Wells			
			MW-025 C9329	MW-019 C9323	MW-029 C9334	MW-030 C9335
		Traffic Report - Organic				
		Traffic Report - Inorganic				
		Monitoring Well No.	MC2639	MC2633	MC2644	MC2645
			MW-10B	MW-20D	MW-22B	MW-22C
		Inorganics - HSE Heavy Metals				
		Iron	210	1,160	71	513
		Manganese	423	1,300		426
		Cadmium				
		Aluminum				
		Antimony				
		Arsenic				
		Barium				
		Beryllium				
		Chromium				
		Cobalt				
		Mercury				
		Nickel				
		Selenium				
		Silver				
		Thallium				
		Tin				
		Vanadium				
		Zinc				
		Copper				
			310	162	33	20
						15

Notes: Values listed in parentheses are instrument detection limits.

AR100732

A-114

ORIGINAL
(red)

TABLE II 5
GROUNDWATER CONTAMINANTS (DEEP WELLS)
SAMPLED BY NUS CORPORATION (8/15 - 11/84)
MILCREEK SILL
(All Values Presented in µg/l)

PIZ	CAS No.	Contaminant	Upgradient	Volatiles Area	Downgradient
			MW 033	MW-015	MW-031
			C9338	C9319	C9336
			MC2648	MC2629	MC2646
			MW 21A	MW-23A	MW-25A
<u>Organics - Volatile Fraction</u>					
(16V)	75 00-3	Chloroethane			
(13V)	75 35-3	1,1-Dichloroethane			
(10V)	107 06-2	1,2-Dichloroethane			
(29V)	75 35-4	1,1-Dichloroethene			
(30V)	156 60-5	1,2-Dichloroethene		16	
(87V)	79 01-6	Trichloroethene		5K	
(11V)	71 55-6	1,1,1-Trichloroethane			
(89V)	75 01-4	Vinyl Chloride			
(44V)	75 08-2	Methylene Chloride	44		1,300
<u>Base/Neutral Fraction</u>					
(54B)	78 59-1	Isophorone			
(70B)	84 66-2	Diethylphthalate			
(68B)	84 74-2	Di-n-butyl phthalate			
<u>ISEL Heavy Metals</u>					
		Iron	1,000		2,600
		Manganese	234		302
		Cadmium		137	
		Aluminum			
		Antimony			
		Arsenic			
		Barium	164	125	399
		Beryllium			
		Chromium			

AR100733

A-115

ORIGINAL
(red)

TABLE II 5
GROUNDWATER CONTAMINANTS (DHP WELLS)
SAMPLED BY NUS CORPORATION (8/15-17/84)
MITCHELL SITE
(All Values Presented in ug/l)
PAGE TWO

Upgradient	Volatiles Area	Downgradient
MW-033	MW-015	MW-031
C9330	C9319	C9336
MC2648	MC2629	MC2646
MW-21A	MW-23A	MW-25A

Sample No	Contaminant
Traffic Report-Org	
Traffic Report-Inorganic	
Monitoring Well No.	

PP#	CAS No.	Contaminant	Concentration (ug/l)
		Cobalt	(46)
		Mercury	(0.05)
		Nickel	(52)
		Selenium	(19)
		Silver	(38)
		Iodine	(41)
		Iron	(15)
		Vanadium	(15)
		Copper	(5.4)
		Zinc	(21)

Note: Values in parentheses instrument detection limits

AR100734

A-116

ORIGINAL
(red)

TABLE II 5
GROUNDWATER CONTAMINANTS (DEEP WELLS)
SAMPLED BY NUS CORPORATION (8/15-11/84)
MILCREEK SITE
(All Values Presented in µg/l)
PAGE THREE

Sample No.		Remaining Deep Monitoring Wells							
Traffic Report-Orig		MW-017	MW-022	MW-020	MW-024	MW-026	MW-018	MW-028	MW-027
Monitoring Well No.		C9321	C9326	C9324	C9328	C9330	C9322	C9333	C9331
		MC2631	MC2636	MC2634	MC2638	MC2640	MC2632	MC2643	MC2641
		MW-15A	MW-16A	MW-17A	MW-18A	MW-19A	MW-20A	MW-22A	MW-24A

PP#	CAS No.	Contaminant	Concentration
<u>Organics - Volatile Fraction</u>			
(16V)	75 00 3	Chloroethane	(5)
(13V)	75 35-3	1,1-Dichloroethane	(5)
(10V)	107 06-2	1,2-Dichloroethane	(5)
(23V)	75 35 4	1,1-Dichloroethene	(5)
(30V)	156 60 5	1,2-Dichloroethene	(5)
(87V)	79 01 6	Tetrachloroethene	(5)
(11V)	71 95 6	1,1,1-Trichloroethene	(5)
(88V)	75 01 3	Vinyl Chloride	(5)
(44V)	75 09 2	Methylene Chloride	(5)
<u>Base/Neutral Ion</u>			
(5-4B)	78 59	Isophorone	(10)
(70B)	84 66	Dimethylphthalate	(10)
(68B)	84 74	n-butyl phthalate	(10)
<u>Pesticides/PCB's</u>			
(92P)	50 29 3	4,4'-DDE	(0.01)
			0.037

6.0

5K

230C

86C

6,900

1,400C

100725

A-117

TABLE II 5
 GROUNDWATER CONTAMINANTS (DIEP WELLS)
 SAMPLED BY NUS CORPORATION (8/15-17/84)
 MILITARY SITE
 (All Values Presented in µg/l)
 PAGE FOUR

PP#	CAS No.	Contaminant	Remaining Deep Monitoring Wells															
			MW-017	MW-022	MW-020	MW-024	MW-026	MW-018	MW-028	MW-027	MW-15A	MW-16A	MW-17A	MW-18A	MW-19A	MW-20A	MW-22A	MW-24A
		Traffic Report - Org.	C9321	C9326	C9324	C9328	C9330	C9322	C9333	C9331								
		Traffic Report - Inorganic	MC2631	MC2636	MC2634	MC2638	MC2640	MC2632	MC2643	MC2641								
		Monitoring Well No.	MW-15A	MW-16A	MW-17A	MW-18A	MW-19A	MW-20A	MW-22A	MW-24A								
		Iron	345	74	205	110	192	211	100	155								
		Manganese	563	24	305													
		Cadmium																
		Aluminum																
		Antimony																
		Arsenic																
		Barium	224	223		101		105		287								
		Beryllium																
		Chromium																
		Cobalt																
		Mercury																
		Nickel																
		Selenium																
		Silver																
		Thallium																
		Tin	29	30	29	27	31		37	192								
		Vanadium																
		Copper																
		Zinc						12		58								

ORIGINAL
 (red)

Note: Values in parentheses instrument detection limits

AR100736

A-120

ORIGINAL
(red)

TABLE II-7
SEDIMENT CONTAMINANTS
SAMPLED BY NUS CORPORATION (8/17/84)
MILCHIEK SITE

(All Values Presented in µg/kg. Except Metals and Oil and Grease in mg/kg.)

PP#	CAS No.	Sample No	Uplevation	Marshall's Run Alongside	Downelevation	PCB and Lead Area Southeast Corner	Lead Contaminated Area South Central	Near Sitter Property	Between Halm and Halm Property	Near End of Marshall's Road
		Traffic Report-Organic	MCS-001	MCS-002	MCS-003	MCS-005	MCS-006	MCS-007	MCS-009	MCS-008
		Traffic Report Inorganic	C9376	C9378	C9379	C9381	C9382	C9383	C9385	C9384
		Contaminant	MC2667	MC2668	MC2669	MC2671	MC2672	MC2673	MC2675	MC2674
			Marshall Up	Marshall Down	Marshall W-12	On Site Pond	Swamp	Swamp	Onsite Low Area	Swampy Area
			17	22	43	46	35	810	17	45
						670	760		990	

Organics - Volatile Fraction

(44V) 75 09 2 Methylene chloride (2.5)

Organics - Acid Fraction

(65A) 108 95 2 Phenol (10)

Organics - Base/Neutral Fraction

- (76B) 318 01-9 Chrysene (10)
- (65B) 117-81-7 Bis(2-ethylhexylphthalate) (10)
- (67B) 85 68 7 Benzyl butyl phthalate (10)
- (68B) 84 74 2 Di n butylphthalate (10)
- (69B) 117 84 0 Di n-octyl phthalate (10)
- (84B) 129 00 0 Pyrene (10)
- (72B) 56 55 3 Benzo(a)anthracene (10)
- (39B) 206 34 0 Fluoranthene (10)
- (81B) 85 01 0 Pteranthrene (10)
- (78B) 207-08 9 Benzofluoranthene (20)

Organics - PCBs

(11B) 12672-29 6 PCB 1240 (4)

00739

290PN

170PN

430PN

1,500PN

A-121

ORIGINAL
(red)

TABLE H-7
SEDIMENT CONTAMINANTS
SAMPLED BY NUS CORPORATION (8/17/84)
MULLEN LK SHP
(All Values Presented in µg/kg. Except Metals and Oil and Grease in mg/kg)
PAGE TWO

PP#	CAS No.	Contaminant	Marshall's Run		Downelevation	PCB and Lead Area Southeast Corner	Lead Contaminated Area South Central	Near Sitter Property	Between Haiml and Rehl Property	Near End of Marshall's Road
			Upelavation	Alongside						
		Sample No.	MC-SD-001	MC-SD-002	MC-SD-003	MC-SD-005	MC-SD-006	MC-SD-007	MC-SD-009	MC-SD-008
		Traffic Report-Organic	C9376	C9378	C9379	C9381	C9387	C9383	C9385	C9384
		Traffic Report-Inorganic	MC2667	MC2668	MC2669	MC2671	MC2672	MC2673	MC2675	MC2674
		Contaminant	Marshall Up	Marshall Down	Marshall W-12	On Site Pond	Swamp	Swamp	Onsite Low Area	Swampy Area
Organics - Pesticides										
(93P)	72 55 9	4,4'-DDD (4)	33PN							
(92P)	50 29 3	4,4'-DDT (4)	41PN							
(94P)	72 54-8	4,4'-DDD (4)	42PN							
Inorganics - Metals										
		Copper	30	51	71.1	3,144	5,210	4,798	6,605	19
		Iron	11,230	16,685	11,115	3,675	4,292	8,310	7,335	2,655
		Lead	49	47	72	340	632	570	672	19
		Manganese	223	299	182	50	89	120	146	54
		Zinc	137	137	103	1,223	2,168	2,040	2,406	40
		Aluminum	4,543	5,370	2,790	1,555	2,235	3,177	2,615	3,649
		Antimony (10)	6.5	7.0	4	1.4	2.0	1.8	1.0	1.3
		Arsenic	53	57	34	0.5	1.3	0.8	1.0	93
		Barium	0.4			14	12	21	12	
		Beryllium (0.25)								
		Cadmium	0.6	0.7	0.45	0.5	0.77	0.7	0.7	0.5
		Chromium	0.5	14	13	7	7	13	11	8.5
		Cobalt (2.5)	6.0	5.0	3.0			3.0	3.0	
		Mercury (0.1)								
		Nickel	13.5	19	42	119	214	167	394	0.1
		Selenium (0.1)			0.1					9.0
		Silver (0.5)				0.6	1.5	1.5	1.5	0.25
		Thallium (0.5)								
		Tin (1.0)			1.2	70	109	60	71	
		Vanadium (10)		10						

AR100740

M-100

ORIGINAL
(red)

TABLE II /
SEDIMENT CONTAMINANTS
SAMPLED BY NUS CORPORATION (0/17/04)
MHECHIK SHH
(All Values Presented in µg/kg; Except Metals and Oil and Grease in mg/kg)
PAGE THREE

Sample No Traffic Report-Organic Traffic Report-Inorganic Contaminant	Marshall's Run		Downelevation	PCB and Lead Area Southeast Corner	Lead Contaminated Area South Central	Near Sittor Property	Between Halmi and Hieh Property	Near End of Marshall's Road
	Up-elevation	Alongsite						
PP# CAS No	MC-SD 001 C9376 MC2667 Marshall Up	MC-SD-002 C9378 MC2668 Marshall Down	MC-SD 003 C9379 MC2669 Marshall W-12	MC-SD-005 C9381 MC2671 On Site Pond	MC-SD-006 C9387 MC2672 Swamp	MC-SD-007 C9383 MC2673 Swamp	MC-SD-009 C9385 MC2675 Onsite Low Area	MC-SD-008 C9384 MC2674 Swampy Area
Oil and Grease	3,400	1,800	5,800	1,800	540	600	1,000	300

AR100741

4-12-3

ORIGINAL
(red)

TABLE H-7
 SEDIMENT CONTAMINANTS
 SAMPLED BY NDS CORPORATION (8/17/84)
 MILCHIEK SITE
 (All Values Presented in µg/kg; Except Metals and Oil and Grease in mg/kg)
 PAGE FOUR

P#	CAS No.	Contaminant	West Branch of Marshall's Run	
			Adjacent Site	Downstream
		Sample No.	MCSD-010	MCSD-010A
		Traffic Report-Organic	C9306	C9387
		Traffic Report-Inorganic	MC2676	MC2677
		Contaminant	Marshall West Up Dup	MCSD-010 Marshall West

Organics - Volatile Fraction

(44V) 75 09-2 Methylene chloride (2.5) 25 16 RI 15 RI

Organics - Acid Fraction

(65A) 108 95-2 Phenol (10)

Organics - Base/Neutral Fraction

(66B) 117 81-7 bis(2-ethylhexyl)phthalate (10) 630 11,000
 (67H) 85 68-7 Benzyl butyl phthalate (10) 590 5,600
 (68H) 84-74-2 Di-n-butylphthalate (10)
 (69H) 117-84-0 Di-n-octyl phthalate (10)
 (84H) 129 00-0 Pyrene (10)
 (72H) 56 55-3 Benzo(a)anthracene (10)
 (39H) 206 44-0 Fluoranthene (10)
 (81H) 85 01-8 Phenanthrene (10)

Organics - PCBs

(110P) 72-2-29 6 PCB 1248 (4)

Organics - Pesticides

(93P) 55-9 4,4'-DDE (4)
 (92P) 50-29-3 4,4'-DDE (4)
 (94P) 72-54-8 4,4'-DDE (4)

AR 100742

A-124

ORIGINAL
(red)

TABLE II 7
SODIUM CONTAMINANTS
SAMPLED BY NUS CORPORATION (8/17/84)
MILCREEK SITE
(All Values Presented in µg/kg; Except Metals and Oil and Grease in mg/kg)
PAGE TWO

West Branch of Marshall's Run		
Adjacent Site		Downstream
MC-SD-010	MC-SD-010A	MC-SD-004
C9386	C9387	C9380
MC2676	MC2677	MC2670
Marshall West	Dup MCSD-010	Marshall West

PP#	CAS No.	Contaminant	Sample No	Traffic Report-Organic	Traffic Report-Inorganic
-----	---------	-------------	-----------	------------------------	--------------------------

Inorganics - Metals

Copper	24	20	22		
Iron	11,060	10,950	6,340		
Lead	19	15	48		
Manganese	95	133	106		
Zinc	59	63	83.5		
Aluminum	5,290	5,155	3,223		
Antimony (1.0)					
Arsenic	2.5	2.5	3.5		
Barium	31	29	54		
Beryllium (0.25)					
Cadmium	0.6	0.65	1.1		
Chromium	7	7.0	7		
Cobalt	3.5	4.0	5.5		
Mercury (0.1)					
Nickel	18	18	17		
Selenium	0.15		0.1		
Silver (0.5)					
Thallium (0.5)					
Tin (1.0)	1.4				
Vanadium (10)		7.0			
Oil and Grease	1,500	1,000	5,100		

Notes
Values in parenthesis are instrument detection limits
PN - Pesticide/PCB not confirmed by GC/MS
RI - Rejected during data validation process because of reagent blank contamination

ARI00743

M-100

TABLE DATA
 Metallurgy Laboratory Section
 Mill Creek Drum Removal, SRO Case No. R3-1

Sample No.	CR No.	Date	Asenic µg/g	Barium µg/g	Cadmium µg/g	Chromium µg/g	Lead µg/g	Nickel µg/g	Selenium µg/g	Silver µg/g	Sodium µg/g
80032001	80032001	8/11/50	23	95	9.1	<4.1	45	53	20	<4.1	18,000
80032002	80032002	8/11/50	27	95	8.7	<4.1	50	58	20	<4.1	2,100
80032003	80032003	8/11/50	22	780	11	10	490	57	27	<4.1	2,000
80032004	80032004	8/11/50	29	84	9.6	<4.0	88	52	17	<4.0	2,000
80032005	80032005	8/11/50	24	1,600	92	28	15,000	100	23	6.4	2,400
80032006	80032006	8/11/50	26	110	8.7	<3.9	55	59	21	3.9	2,300
80032007	80032007	8/11/50	9.7	120	8.2	<3.9	62	66	20	<3.9	2,300
80032008	80032008	8/11/50	13	100	8.8	4.0	56	64	29	<4.0	3,200
80032009	80032009	8/11/50	17	120	13	2,900	37	460	11	<3.8	1,600
80032010	80032010	8/11/50	27	99	11	<4.1	28	70	26	7.0	2,000
80032011	80032011	8/11/50	27	330	8.8	7.6	64	64	1	<4.0	2,300
80032012	80032012	8/11/50	24	100	9.1	7.9	83	58	29	<4.1	15,000
80032013	80032013	8/11/50	28	100	15	<3.8	42	50	5	5.4	2,200
80032014	80032014	8/11/50	150	160	27	460	130	240	3	11	4,000
80032015	80032015	8/11/50	100	98	45	16,000	3,600	27,000	3	490	2,000
80032016	80032016	8/11/50	140	96	56	7,200	2,900	14,000	1	350	2,000
80032017	80032017	8/11/50	110	99	61	13,000	3,400	25,000	3	370	1,900

ORIGINAL
(red)

THIS TABLE HAS BEEN REPRODUCED AS RECEIVED. PORTIONS OF IT ARE UNRELIABLE.

AR100744

FIELD DATA
 Wheeling Laboratory Section
 Hill Creek Drum Removal, SMO Case No. RJ-1

W.L. No.	Q.L. No.	Q.L. No.	CRL No.	Collection Date	Arsenic µg/g	Barium µg/g	Cadmium µg/g	Chromium µg/g	Lead µg/g	Nickel µg/g	Selenium µg/g	Silver µg/g	Sodium µg/g
840120621	287685		84032018	3/15/71	500	1,600(116)	13(*)	13,000(**)	5,400(149)	27,000(**)	1,100(66.2)	40(*)	3,400(109)
840120622	28770		84032019	3/15/71	24	110	11	13	25	57	19	7.3	2,400
840120623	28771		84032020	3/15/71	27	110	11	13	53	57	23	7.8	2,400
840120624	28772		84032021	3/15/71	49	160	15.6	8.8	39	60	24	9.2	2,600
840120625 (R.B.)	C-5292		84032022		73	350	47	34	120	98	164	25	6,000
840120626 (R.S.)	Con.		84032023		58	620	24	23,000	740	82	39	18	6,500
8405020660	Con. 5-21		84041905		0.3	590	1,000	890	750	620	1.2	99	950
8405020661	C-5929		84041906		0.3	140	18	<10	<3	<20	11	<10	910
8405020656	28753		84041901	8/12/66	<0.3	13	2.3	<1.0	<0.3	<2.0	1.0	<1.0	120
8405020657	28753B		84041902	8/12/66	<0.3	13	2.6	1.6	<0.3	2.0	0.8	1.0	130
8405020658	287531		84041903	8/12/66	<0.3	14	1.7	1.0	<0.3	2.0	0.7	1.0	110
8405020659	287535		84041904	8/12/66	150(60.0)	110(38.7)	250(99.1)	260(104)	230(92.0)	180(71.2)	210(83.7)	94(37.2)	100(***)

NOTE: Values in parenthesis represent the percent recovery of the spike for that particular element.

*Not recovered

**Spike not reportable due to large dilution

***Not spiked

ORIGINAL
 (red)

AR100745

PREPARED HAZARDOUS WASTE EXTRACT CUSTODY RECORD

Region No.		Regional Contact		Station Location		Collection		X-Ray/IR	Extracts Prepared			Phase No.	Comments
3	3	NEIC Project No.	2331	Mill Creek	Date	Time	KOH Fusion		Total Mercury (in duplicate)	Strong Acid	Method 3050		
Sample Number	Region Station Number												
35684	01			Station #3, Oil - M	12-8-85	11:35	X					74	8403-001
35751	01			Station #3, Oil - M	12-8-85	12:00	X					75	8403-002
35752	03			Station #3, Volatile - S	12-8-85	12:10	X					75	8403-003
35753													
35754	04			Station #3, Oil - M	12-8-85	12:15	X					77	8403-004
35755	02			Station #3, Oil - M	12-8-85	12:35	X					77	8403-005
35756	06			Station #3, Oil - M	12-8-85	12:35	X					77	8403-006
35757	07			Station #3, Oil - M	12-8-85	12:35	X					77	8403-007
35758	08			Station #3, Oil - M	12-8-85	12:40	X					77	8403-008
35759	09			Station #3, Oil - M	12-8-85	12:50	X					77	8403-009
35760	10			Station #3, Oil - M	12-8-85	12:55	X					77	8403-010
35761	11			Station #3, Oil - M	12-8-85	12:55	X					77	8403-011

Sample Phases:
01 Water Miscible Liquid
02 Solid
03 Non Water Miscible Liquid

Date / Time
3/18/89 11:30
3/18/89 12:30
3/18/89 12:30

Received by (signature)
Date / Time
3/18/89 11:00
3/18/89 11:00
3/18/89 12:00

Received by (signature)
Date / Time
3/18/89 11:00
3/18/89 11:00
3/18/89 12:00

Shipped via Federal Express
Airbill no. 77759511
Sealed for shipment
Relinquished by (signature)
Date / Time
3/18/89 11:00
3/18/89 11:00
3/18/89 12:00

Gene Woratation
Account No. 9100

ARI00746

ORIGINAL
(red)

ORIGINAL
(red)

A-128

Contract Laboratory Program
 Contract Laboratory Program
 Denver Federal Center, Bldg. 53, Box 25227
 Denver, Colorado 80225

PREPARED HAZARDOUS WASTE EXTRACT CUSTODY RECORD

Region No.	Regional Contact	Station Location		Collection		X-Ray 'R	Extracts Prepared				Phase No.	Comments
980 Case No.	WIC Project No.	Date	Time	Date	Time		KOH Fusion	Total Mercury (in duplicate)	Strong Acid	Method 3050		
25713		12/13	11:00	12/13	11:00	X					01	8403-012
25714		12/13	11:00	12/13	11:00	X					01	8403-013
25715		12/13	11:00	12/13	11:00	X					02	8403-014
25716		12/13	11:00	12/13	11:00	X					02	8403-015
25717		12/13	11:00	12/13	11:00	X					02	8403-016
25718		12/13	11:00	12/13	11:00	X					02	8403-017
25719		12/13	11:00	12/13	11:00	X					01	8403-018
25720		12/13	11:00	12/13	11:00	X					01	8403-019
25721		12/13	11:00	12/13	11:00	X					01	8403-020
25722		12/13	11:00	12/13	11:00	X					02	8403-021
25723		12/13	11:00	12/13	11:00	X					02	8403-022
25724		12/13	11:00	12/13	11:00	X					01	8403-023
Shipped via Special Express Airbill no. 112184525 Sealed for shipment Reimprished by (signature) [Signature]		Date / Time 3/19/87 11:00	Received by (signature) [Signature]	Date / Time 3/19/87 11:00	Received by (signature) [Signature]	Date / Time 3/23/87 8:00	Sample Phases: 01 Water Miscible Liquid 02 Solid 03 Non Water Miscible Liquid		Date / Time 3/17/87 11:00			

ARI00747

A-129

ORIGINAL
(red)

Contract Laboratory Program
Denver Federal Center, Bldg. 53, Box 25227
Denver, Colorado 80225

PREPARED HAZARDOUS WASTE EXTRACT CUSTOMY RECORD

Region No. ()	Regional Contact	SMD Case No.		NEIC Project No.		Station Location		Collection		Extracts Prepared				Phase No.	Comments
Sample Number	Region Station Number	Date	Time	Date	Time	X-Ray/IR	KOH Fusion	Total Mercury (in duplicate)	Strong Acids	Method 3050					
13	13	3/28/89	11:31	3/28/89	11:31										
13	13	3/28/89	11:31	3/28/89	11:31										
Shipped via Federal Express Airbill no. 1138888888 Reinforced for shipment Reinforced by (signature) ADAM MATHIAS		3/28/89 11:31		3/28/89 11:31		Received by (signature) [Signature]		Date / Time 3/28/89 8:18		Sample Phases: 01 Water Miscible Liquid 02 Solid 03 Non Water Miscible Liquid					
(Signature) [Signature]		3/28/89 12:05		3/28/89 12:05		Received by (signature) [Signature]		Date / Time 3/28/89 8:18							

AR100748

ORIGINAL

(red)

Contract Laboratory Program
 1600 South Broadway, Suite 100
 Denver, Colorado 80202

PREPARED HAZARDOUS WASTE EXTRACT CUSTODY RECORD

Region No.	Regional Contact	Region Station Number	Station Location	Collection Date	Collection Time	Sample Extracts Prepared	Phase No.	COMMENTS
3		03	Lor #3 Light 1-R	12-6-83	1000	X	03	
		03	Triplicate	12-6-83	1000	X	03	
		03	Triplicate	12-6-83	1000	X	03	
		03	Spike	12-6-83	1000	X	03	
			CONCENTRATION			X		
			Reagent Blank			X	RC	

Shipped via Federal Express Arrival no. 3553345366 Sealed for Shipment Not Inquished by (signature) 1/14/84	date / time 1/13/84 0800	Received by (signature) [Signature]	date / time 1/14/84 9:15
10:25 800am	5/1/84 1308	Received by (signature) [Signature]	11/18/84

Sample Phases:
 01 - Water Miscible Liquid
 02 - Solid
 03 - Non Water Miscible Liquid

AR100749

A-131

STATION #11

ORIGINAL

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA (red)	VOLUME
23	11-17-82	Aromatic Amines	-	BDL	Silica (3 stage)	180.0 L
39	11-17-82	Particulates (Metal)	-	BDL	Particulates Filters	288.0 L

STATION #12

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
VOID - NO SAMPLES						

STATION #13

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
27	11-17-82	Organics	-	BDL	Carbon (10 mg)	28.0 L
21	11-17-82	Aromatic Amines	-	BDL	Silica (3 stage)	180.0 L
25	11-17-82	Inorganic Acids	-	BDL	Silica (2 stage)	27.74 L
30	11-17-82	Organics	-	BDL	Carbon (150 mg)	26.22 L
37	11-17-82	Organics	-	BDL	Carbon (150 mg)	9.51 L

METALS DETECTION LIMITS

<u>Analyte</u>	<u>Micrograms of Analyte per Milliliter for 1% Absorption</u>
Lead	2.5
Antimony	12.5
Zinc	1.0
Silver	1.25
Nickel	2.5
Copper	1.25
Arsenic	50.0
Cadmium	1.0
Beryllium	1.0
Selenium	12.5
Tellurium	12.5
Mercury	12.5
Chromium	1.25

AR100750

ORIGINAL

ORGANIC SOLVENTS DETECTION LIMITS

<u>Analyte</u>	Detection Limit in Micrograms per Sample (red)	
	<u>Small C-tube (150 mg)</u>	<u>Large C-tube (600 mg.)</u>
Acetone	16	48
Benzene	1	3
Carbon tetrachloride	2	5
Chloroform	4	11
Dichloromethane	1	4
p-Dioxane	5	15
Ethylene dichloride	3	9
MEK	6	17
Styrene	1	3
Tetrachloroethylene	4	12
1,1,2, trichloroethylene	1	4
Methyl chloroform	1	4
Trichloroethylene	1	4
Toluene	1	3
Xylene	2	6
Total Organic Hydrpcarbons (as toluene)	2	6

AROMATIC AMINES DETECTION LIMITS

<u>Analyte</u>	<u>Micrograms of Analyte</u>
Aniline	10
n,n Dimethylamine	10
p-toluidine	10
2,4-xylidine	10
o-anisidine	10
p-anisidine	10
p-nitroaniline	50

PCB DETECTION LIMITS

Detection limit of 1 microgram of PCB's per section of the sample.

AR100751

INORGANIC ACIDS DETECTION LIMITS

(red)

All samples were checked for the presence of six acids: HF, HCL, HBr, HNO₃, H₂SO₄, and H₃PO₄.

The detection limit for acids: 20 micrograms with the exception of hydrochloric acid and hydrofluoric acid, which is 3 micrograms.

The following is a summary of the Thermal desorption/field GC done on-site.

DATE	STATION	MEDIA	VOLUME	ANALYSES	Results	
					Total # Peaks	Total Conc. **
11/16/82	5	Tenax	9.26 L	Total Vapors Gases	1 peak	BDL
11/16/82	3	Tenax	8.8 L	"	2 peaks	BDL
11/16/82	3	Carbon Spheres	55.16 L	"	2 peaks	BDL
11/16/82	1	Carbon Spheres	43.5 L	"	2 peaks	BDL
11/16/82	2	Carbon Spheres	43.86 L	"	1 peak	BDL
11/16/82	4	Carbon Spheres	7.02 L	"	1 peak	BDL
11/17/82	11	Carbon Spheres	101.15 L	"	9 peaks	BDL
11/17/82	13	Carbon Spheres	108.75 L	"	11 peaks	BDL
11/17/82	10	Carbon Spheres	116.25 L	"	11 peaks	BDL

The following is a summary of types of samples collected in the crawl spaces, collection media, volumes and results. The detection limits are the same as those previously mentioned.

STATION - 1326 Harpes

ANALYSES	CONTAMINANT	CONCENTRATIONS
Organics***	1) Milligrams of total hydrocarbon per cubic meter of air.	0.11 mg/m ³
	2) Parts of total hydrocarbon as Toluene per million parts of air	0.03 ppm

AR100752

A-134

ORIGINAL

STATION - 1326 Harpes (cont.)

ANALYSES	CONTAMINANT	CONCENTRATIONS (red)
PCB's	--	BDL
Organics***	Carbon Tetrachloride	Less than 20 micrograms
Aromatic Amines	--	BDL

STATION - 1332 Harpes

ANALYSES	CONTAMINANT	CONCENTRATIONS
Organics***	1. Milligrams of total hydrocarbon per cubic meter of air 2. Parts of total hydrocarbons as Toluene per million parts of air	0.1 mg/m ³ 0.0003 ppm
Aromatic Amines	--	BDL

STATION - 3269 W. 14th

ANALYSES	CONTAMINANT	CONCENTRATIONS
Organics***	1. Milligrams of total hydrocarbon per cubic meter of air 2. Parts of total hydrocarbon as Toluene per million parts of air	0.18 mg/m ³ 0.05 mg/m ³
PCB's	--	BDL

STATION - OROS Residence

ANALYSES	CONTAMINANT	CONCENTRATIONS
Organics***	1. Milligrams of total hydrocarbon per cubic meter of air 2. Parts of total hydrocarbon as Toluene per million parts of air.	0.27 mg/m ³ 0.07 ppm

AR100753

STATION - 3123 W. 13th

(red)

ANALYSES	CONTAMINANT	CONCENTRATIONS
Organics***	1. Milligrams of total hydrocarbon per cubic meter of air	0.49 mg/m ³
	2. Parts of total hydrocarbon as Toluene per million parts of air	0.13 ppm

* BDL = below detection limits

** = total concentrations = time weighted average (TWA) as methane

*** Since one or more very small peaks were observed between the standard organics in NIOSH Method P&CAM 127 by a GC, the extractions were then analyzed by a GC/MS. With the exception of the organic sample from 1326 Harpes, the GC/MS analysis did not reveal any additional information. The GC/MS analysis of the organic sample from station 1326 Harpes revealed the presence of carbon tetrachloride, however, the concentration was below the detection limit.

CONCLUSION:

On-site samples: While the November 16th & 17th air sampling did not reveal the presence of airborne vapor/gas contaminants approaching the PEL's or TLV's, it should not be interpreted to mean that the air was free of potential hazardous contaminants. Since a large portion of the site was not covered by vegetation, potential for exposure to hazardous particulates must be taken into consideration and evaluated against the surface soil samples and personnel job functions. In addition, potential personnel exposure to hazardous gases/vapors must be evaluated since temperature during the sampling periods ranged from 20°F to 49°F and the only positive air sample was a 150 mg carbon tube which was placed inside of a clean black metal pan face down into the soil which was not covered with vegetation.

OFF-SITE OBSERVATIONS

Since there were peaks at or slightly above the GC's detection limit, but not in sufficient concentration to be identified on a GC/MS, I requested the contract lab to total all peaks in a sample and report it as total hydrocarbons (as if it were Toluene). Again, the ambient temperatures must be kept in mind since they ranged from 20°F to 49°F. The only organic identified was Carbon Tetrachloride. While the results are relatively low and do not approach PEL's or TLV's, it should not be interpreted to mean that the air was free of potential hazardous contaminants. It was recommended that a public health official review this data.

AR100754

SAFETY PLAN

Based on the on-site air analyses and site conditions, Level C (red) protection appears to have been the appropriate level of protection for most of the site activities conducted during ERT activities. Once the surface soil samples are analyzed and data available, it may be appropriate to extend the support and contamination reduction areas further into the contaminated area as well designate some portions of the contamination zone as Level D.

cc: Royal Nadeau
Mike Zickler

AR100755

A-137

STATION #5 (BACKGROUND)

ORIGINAL

(red)

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
5-B	11-16-82	Organics	-	BDL	Carbon (150 mg)	16.74 L
9	11-16-82	Aromatic Amine	-	BDL	Silica (3 stage)	180.0 L
12-H	11-16-82	PCB's	-	BDL	Florisil	17.32 L

Station #8 (BACKGROUND)

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
36-K	11-17-82	Organics	-	BDL	Carbon (150 mg)	32.52L
20	11-17-82	Aromatic Amine	-	BDL	Silica (3 stage)	358.0 L
1/38	11-17-82	Particulates (Metals)	-	BDL	Particulates Filters	324.0 L
34-I	11-17-82	Inorganic Acids	-	BDL	Silica (2 stage)	12.66L

Station #1

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
5-F	11-16-82	Organics	-	BDL	Carbon (150 mg)	12.28 L
7	11-16-82	Aromatic Amines	-	BDL	Silica (3 stage)	117.4 L
11-C	11-16-82	PCB's	-	BDL	Florisil	11.43 L
17	11-16-82	Particulates (Metals)	-	BDL	Particulates Filters	174.0 L

Station #2

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
8	11-16-82	Aromatic Amines	-	BDL	Silica (3 stage)	120.2 L
10	11-16-82	PCB's	-	BDL	Florisil	10.52 L

AR100756

STATION #3

ORIGINAL

(red)

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
4-G	11-16-82	Organics	-	BDL	Carbon (150 mg)	9.45 L
6	11-16-82	Aromatic Amines	-	BDL	Silica (3 stage)	141.7 L
13	11-16-82	PCB's	-	BDL	Florisil	12.82 L
16	11-16-82	Particulates (Metals)	-	BDL	Particulates Filters	275.6 L

STATION #4

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
12	11-16-82	Organics	-	BDL	Carbon (150 mg)	10.83 L

STATION #6

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
14-K	11-16-82	Organics	-	BDL	Carbon (150 mg)	11.69 L

STATION #7

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
15-D	11-16-82	Organics	-	BDL	Carbon (150 mg)	12.16 L

STATION #9

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
31-F	11-17-82	Organics	-	BDL	Carbon (150 mg)	35.66 L

STATION #10

SAMPLE #	DATE	ANALYSIS	CONTAMINANT	CONC.*	MEDIA	VOLUME
32-A (in sample)	11-17-82	Organics	-		Carbon (150 mg)	28.27 L
22	11-17-82	Aromatic Amines	-	BDL	Silica (3 stage)	180.0 L
26	11-17-82	Inorganic Acids	-	BDL	Silica (2 stage)	29.08 L

showed presence of 0.059 milligrams/1,1,1 trichloroethane/1.378 mg/m³/0.253 ppm

AR100757

DRAFT

TABLE II-4
 GROUNDWATER CONTAMINANTS
 SAMPLED BY NUS CORPORATION (8/14/84)
 MHCRIK SITE
 (All Values Presented in ug/l)
 PAGE THREE

PP#	CAS No.	Contaminant	Major Volatile Groundwater Contamination Area and Downgradient Onsite and Offsite Wells							
			MW-002	MW-009	MW-016	MW-001	MW-11	MW-25B		
(16V)	75-00-3	Chloroethane								
(13V)	75-35-3	1,1-dichloroethane	< 5							
(10V)	107-06-2	1,2-dichloroethane								
(29V)	75-35-4	1,1-dichloroethene	8.5	6.4	16					
(30V)	156-60-5	1,2-dichloroethene	10,000	3,000	29,000	93			5.1	
(87V)	79-01-6	Trichloroethene	300	5	140					
(11V)	71-55-6	1,1,1 trichloroethane								
(88V)	75-01-4	Vinyl chloride	120	220	200K	6.4				95
(44V)	75-09-2	Methylene chloride	23	310						
<u>Base/Neutral Fraction</u>										
(54B)	78-59-1	Isophorone								
(70B)	84-66-2	Diethyl phthalate	< 10						24	
(68B)	84-74-2	Di-n-butyl phthalate							21	

AR100758

ORIGINAL

(red)

TABLE II-4
GROUNDWATER CONTAMINANTS
SAMPLED BY RUS CORPORATION (8/14/84)
MILCHIK SITE
(All Values Presented in µg/l)
PAGE FOUR

Inorganics - HSE Heavy Metals	Sample No. Traffic Report - Organic Traffic Report - Inorganic Monitoring Well No.	Major Volatile Groundwater Contamination Area and Downgradient Onsite and Offsite Wells				
		MW-002 C9303 MC2613 MW-10	MW-009 C9311 MC2621 MW-7	MW-016 C9320 MC2630 MW-230	MW-001 C9328 MC2612 MW-11	
Iron	(15)	9,320	8,190	4,710	10,600	MW-032
Manganese	(4.0)	1,360	890	722	666	C9337
Cadmium	(0.88)					MC2647
Lead	(1.0)					MW-258
Mercury	(0.2)					
Aluminum	(34)	495				
Antimony	(6.2)					
Arsenic	(4.1)					
Barium	(28)		264	158	155	
Beryllium	(0.3)					
Chromium	(3.3)					
Cobalt	(4.6)					
Mercury	(0.05)					
Fluoride	(5.2)					
Selenium	(1.9)					
Silver	(1.0)					
Thallium	(4.1)					
Tin	(15)		22	21	22	54
Vanadium	(15)					
Zinc	(2.1)				13	61
Copper	(5.4)					

Note: Values listed in parentheses are instrument detection limits
less than (-) values depict substances detected below detection limits.
K indicates compound detected below the method detection limits.

AR100759

DRAFT

ORIGINAL
(red)

APPENDIX I

TENTATIVELY IDENTIFIED COMPOUNDS
DETECTED AT THE MILLCREEK SITE

AR100760

TENTATIVELY IDENTIFIED COMPOUNDS
MILLCREEK SITE
CONCENTRATION (µg/kg)/PERCENT PURITY (if reported)

LAB NO	DESCRIPTION	MC-50-001 C9140	MC-50-002 C9141	MC-50-003 C9142	MC-50-004 C9143	MC-50-005 C9144	MC-50-006 C9145	MC-50-007 C9146	MC-50-008 C9147	MC-50-009 C9148	MC-50-010 C9149
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55011-011	1,1,1-trichloroethane, 1,1,1,2,4-tetrachloro-	1500/45.9									
17001-27-1	undecane, 2,5-dimethyl-	2700/71.7									
17001-27-4	2,5,10-dodecatriene 1,10,1,1,2,11-tetramethyl-(1,4)	4600/77.3									
17001-27-3	undecane, 2,5-dimethyl-	26000/73.4									
5679-05-0	dodecane, 2,5-dimethyl-	15000/72.5									
1464-03-9	1-triethylamine	7700/73.5									
001-29-1	ethane, 1,1-dichloro-	50000/62.4									
5914-05-1	perfluorooctane acid, 10-methyl methyl ester	61000/74.3									
5914-05-2	perfluorooctane acid, 10-methyl methyl ester	5900/57.6									
5914-05-3	perfluorooctane acid, 10-methyl methyl ester	7796.6									
17001-27-1	undecane, 2,5-dimethyl-	1500/45.9									
17001-27-4	2,5,10-dodecatriene 1,10,1,1,2,11-tetramethyl-(1,4)	2700/71.7									
17001-27-3	undecane, 2,5-dimethyl-	4600/77.3									
5679-05-0	dodecane, 2,5-dimethyl-	26000/73.4									
1464-03-9	1-triethylamine	15000/72.5									
001-29-1	ethane, 1,1-dichloro-	7700/73.5									
5914-05-1	perfluorooctane acid, 10-methyl methyl ester	50000/62.4									
5914-05-2	perfluorooctane acid, 10-methyl methyl ester	61000/74.3									
5914-05-3	perfluorooctane acid, 10-methyl methyl ester	5900/57.6									
17001-27-1	undecane, 2,5-dimethyl-	1500/45.9									
17001-27-4	2,5,10-dodecatriene 1,10,1,1,2,11-tetramethyl-(1,4)	2700/71.7									
17001-27-3	undecane, 2,5-dimethyl-	4600/77.3									
5679-05-0	dodecane, 2,5-dimethyl-	26000/73.4									
1464-03-9	1-triethylamine	15000/72.5									
001-29-1	ethane, 1,1-dichloro-	7700/73.5									
5914-05-1	perfluorooctane acid, 10-methyl methyl ester	50000/62.4									
5914-05-2	perfluorooctane acid, 10-methyl methyl ester	61000/74.3									
5914-05-3	perfluorooctane acid, 10-methyl methyl ester	5900/57.6									

500/36.3

640/28.9
1300/57.7
100/44.5
100/44.5
850/27.6
210/15.0
1800/45.6
2000/47.6
720/21.6

830/78.4
2000/79.3
2000/79.3
3100/74.9
1800/52.6
2300/52.7
3100/41.8
1700/58.4
3600/61.9
2200/48.0
4200/58.5

230/70.3
360/62.5
5900/64.7
230/31.8
2100/31.6
3100/33.1
1200/44.5
200/28.1
600/32.6
1900/21.6
3100/21.6
740/42.0

AR100761

ORIGINAL
(red)

A 17c

A 743

ORIGINAL
(red)

TENTATIVELY IDENTIFIED COMPOUNDS
HILLCREEK SITE
CONCENTRATIONS (µg/kg)/PERCENT PURITY (if reported)

MECHANISM	SURFACE SOIL SAMPLES	LAB SAMPLE NO.	SAMPLE LOCATION	MC-50-001 C9310	MC-50-002 C9311	MC-50-003 C9312	MC-50-004 C9313	MC-50-005 C9314	MC-50-006 C9315	MC-50-007 C9316	MC-50-008 C9317	MC-50-009 C9318	MC-50-010 C9319	MC-50-011 C9320
CAS NO.	COMPOUND													
2911-07-8	1-undecyl-2-butyl-													
5200-81-4	heptane, 4-(1-methylbutyl)-													
56558-64-4	benzocyclopentane, 1,4-bis(4-oxocyclohexyl)-													
5003-57-3	1,4-dioxane, 2,3,5-trifluoro-													
112-47-3	1,4-dioxane													
544-64-8	1,4-dioxane, 4,4-dimethyl-													
1203-51-5	1,2-benzisothiazobutylidene acid, butyl 2-methylpropyl ester													
2091-79-4	9-benzobicyclo[3.3.1]nonane													
56554-78-0	7-heptadecanoic acid													
105-87-1	2,6-octadiene-1,8-dithiolane-3,2-dimethyl-, acetate (E)-													
51110-91-1	20,1,6-benzoxazone (5,6D)-one, 3,6-dihydro-													
6106-01-5	3,7,11-trithioatrimethyl-, 4,8,12-trimethyl-													
747-90-0	chloroethane, 1,1-dichloro-													
145-4-05-9	1-heptadecanol													
294-67-7	1,1,1-trichloroethane													
101-41-7	benzene, acetic acid, methylester													
629-96-9	1-cyclohexanol													
200-131-4	III pyrazole													
103-87-2	benzene, acetic acid													
764-48-7	ethanol, 2-(1-phenylethoxy)-													
173-08-0	benzotrichloride, 4-hydroxy-													
114-96-3	benzotrichloride, 4-hydroxy-3-methoxy-													
1002-83-2	pentachloroacetic acid													
510-57-4	benzoic acid, 4-hydroxy-3,5-dimethoxy-													
6314-90-7	5-hepten-2-one													
619-66-4	octadecanol													
5710-70-6	2H-1-benzopyran 1,4,7-triol, 3,4-dihydro-2-(3-hydroxy-													
117-08-9	1-octadecene													
50554-90-7	2-octadecanol													
1354-29-7	pentane, 2,2,3,3-tetramethyl-													
145-50-7	1,3,10-dioxatriene-3,8,11-trimethyl-,/5 (2)-													
107-310-4	benzene, 1-bromo-3-fluoro-													

AR100762

TENTATIVELY IDENTIFIED COMPOUNDS
HILLCREEK SITE
CONCENTRATIONS (ug/kg)/PERCENT PURITY (if reported)

ORIGINAL
(red)

PHOTODUPLICATION SAMPLES

LAB NO	COMPOUND	MHS SAMP NO	LAB SAMP NO	SAMPLE LOCATION	HC 50 001 (9100)	HC 50 002 (9101)	HC 50 003 (9102)	HC 50 004 (9103)	HC 50 005 (9104)	HC 50 006 (9105)	HC 50 007 (9106)	HC 50 008 (9107)	HC 50 009 (9108)	HC 50 010 (9109)	HC 50 011 (9110)
89 01 1	2-ethylhexan-1-one, 2-hydrate, 1-methyl														
9382 49 5	butyl 2-ethyl-2-(4H,4,5-alpha)butyl														
1212 24 2	decane-5-ethyl 5-methyl														
1019 20 4	nonane-2-one, 2,3,5-trimethyl														
141 14 0	6-methyl-2-heptanone														
5402 11 4	0 nonanobutylone, (5-alpha, 31-alpha)														
555 9 13 9	nonanone, 9-methyl														
0107 34 5	1,4-hexanedithiol, 2-[(2-oxo-3-oxopropyl)thio]-														
5073 21 8	1-methyl-2-propyl-1-butanol														
101 41 5	4-tert-butyl-1-butanol														
1009 20 2	1-methyl-2-propyl-1-butanol														
101 39 1	1,4-hexanediol, 1,5-dimethyl														
1012 10 1	9,12,15-trinitrobenzoic acid, dimethyl ester														
1063 20 1	nonanobutyl-1-butanol, dimethyl ester														
170 26 0	nonanobutyl-1-butanol, methyl ester														
57 11 4	nonanobutyl-1-butanol, methyl ester														
17 02 27 1	nonanobutyl-1-butanol, methyl ester														
541 25 2	1,4,5-trimethyl-1-butanol														
112 51 6	1-butanol														
24 05 54 9	1-tridecanol, 1-olefin														
4206 01 4	1-tetradecanol														
11 18 0	1,2-hexanediol, acetic acid, diphenyl ester														
2750 20 1	1,2-hexanediol, acetic acid, dimethyl ester														
129 09 0	1,2-hexanediol, acetic acid, diethyl ester														
2000 05 5	10-undecenoic acid, methyl ester														
5701 33 4	undecanoic acid, methyl ester														
47 13 4	2-naphthalenemethanol, diethyl ether														
17 02 1	0-methyl-2-(2,2,4,4-tetrahydro-2H-pyran-5-yl)ethyl acetate														
120 05 2	2-(2,2,4,4-tetrahydro-2H-pyran-5-yl)ethyl acetate														
04 05 2	2-(2,2,4,4-tetrahydro-2H-pyran-5-yl)ethyl acetate														
205 20 2	2-(2,2,4,4-tetrahydro-2H-pyran-5-yl)ethyl acetate														

AR100763

ORIGINAL
(red)

ILLU ILLI 4PQU
MILK SITE
CONCENTRATION (µg/kg) PERCENT PURITY (if reported)

METHOD SURVEIL MILK SAMPLES

LAB NO.	LAB NAME	LAB LOCATION	MC-50-017 (935)	MC-50-013 (9352)	MC-50-014 (9353)	MC-50-015 (9354)	MC-50-016 (9355)	MC-50-017 (9356)	MC-50-018 (9357)	MC-50-019 (9358)	MC-50-020 (9359)	MC-50-021 (9361)
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55162 61-3	tetraoctane, 1,5,7,8-tetraethyl											
17101 27 3	undecane, 2,5-dimethyl									1400/59.1	740/48.1	
17101 21 0	2,8,10-dodecatriene, 1,0,3,7,11-trimethyl-(2-E)											
17101 27 1	nonane, 2,5-dimethyl											
5679/ 65 0	dodecane, 2,5-dimethyl											
1454 05 9	1-hydroxystyrene											
60 29 7	ethane, 1,1'-oxybis											
5179 00-7	pentadecanoic acid, 14-methyl-methylester											
581 65 3	octadecane											
54033 23-1	decane, 10-methyl											
1200 00 9	octadecane, 2-methyl											
5679/ 69 4	tetradecane, 2,5-dimethyl											
40710 47 7	hextetracontane											
5679/ 65 0	dodecane, 2,5-dimethyl											
1500 95 0	tetradecane, 2-methyl											
137 95 0	decane											
725 64 1	heptadecane, 9-octyl											
5045 14 2	tetradecane, 4-ethyl											
5304 54 2	1,8-hexadecane, 2,3,4,5-tetramethyl											
55103 66 7	2(1H)-benzofuranone, decahydro-4a-methyl-5,6-dioxo-											
611 55 2	(1H)-pyridine, 2-acetyl-6,7-dimethyl											
55001 75 7	undecane, 9-dodecyltetradecahydro											
081 71 0	undecane, 15-Alpha											
172 64 5	dodecane, 15-Alpha											
5255 70 4	undecane, 8-cyclohexyltetradecahydro											
55110 01 5	undecane, 9-dodecyltetradecahydro											
55111 09 6	undecane, 9-dodecyltetradecahydro											
407 06 9	2H-benzopyran 2-one, 5,7-dimethyl											
131 10 0	1,7-bis(methylamino)ethane, diphenyl ester											
55110 47 4	dodecane, 1,2-dibromo											
31001 40 0	tricyclo[4.1.1]undecane 1-carboxylic acid, methyl											
40710 47 7	1-hexetriacontane											
565 59 1	undecane, 2,3-dimethyl											
40710 70 1	octadecane, 1-trimethyl											
581 71 3	1-hydroxystyrene											
54710 15 1	undecane, 2-methyl-1-hydroxyethyl ester, cis											
47411 11 1	1,1,2-trimethylundecane, 2-methyl											

0.000/00.0

15000/48.9

35000/48.9

28000/45.1

1700/32.7

1300/54.3

37000/42.1

AR100766

ORIGINAL
(red)

TENTATIVELY IDENTIFIED COMPOUNDS
MILLCREEK SITE
CONCENTRATIONS (ug/kg)/PERCENT PURITY (if reported)

MSL LAB NO.	MSL LAB NO.	MSL LAB NO.	MSL LAB NO.	MSL LAB NO.	MSL LAB NO.	MSL LAB NO.	MSL LAB NO.	MSL LAB NO.	MSL LAB NO.
183	184	185	186	187	188	189	190	191	192
5001	5002	5003	5004	5005	5006	5007	5008	5009	5010

CAS NO.	COMPOUND	CONCENTRATION (ug/kg)	PERCENT PURITY
1911 02 R	1-octanol, 2-butyl		
57096 87 4	heptane, 4 (1-methylbutyl)		
56554 64 4	hexadecane, 1,1,4,4-tetra(methyl)-		
5441 57 1	Cylohexane, 1,1,5,5-tetramethyl		
112 42 5	1-octadecane		
548 63 R	1-tetradecane, acid		
2051 53 5	1,7-bis(methylhexyl)acetic acid, butyl 2-methylpropyl ester		
3991 29 4	9-hexadecanoic acid		
105 4 76 0	7-heptadecanoic acid		
111 09 3	2,6-octadiene, 1-cis		
511 10 1	20-1,8-hexadecanediol, 5(60)-one, 3,4-dihydro		
6088 01 5	3,7,11-tridecatriene, 11e, 4, 8, 12-trimethyl		
740 01 5	cholesterol, 3,5-diene		
1404 05 9	1-decane, acid		
794 62 2	1,5-dodecane		
101 41 7	1-octene, acetic acid, methyl ester		
629 96 9	1-octene, acid		
208 13 1	10-undecane		
101 86 2	heptane, 2,2,4,4-tetramethyl		
764 10 7	ethanol, 2-(1-hexyl)-		
123 08 0	benzylalcohol, 4-methyl-		
121 14 5	benzylalcohol, 4-butyl-3-methyl-		
114 76 1	benzylalcohol, 4-butyl-3,5-dimethyl-		
100 01 2	pentadecanoic acid		
510 57 4	benzoic acid, 4-butyl-3,5-dimethyl		
6714 00 7	5-hepten-2-one		
608 66 4	1-octene, acid		
5706 76 6	20-1,8-hexadecanediol, 3,4,7-triol, 3,4-dihydro 2-(1-hydroxy		
112 10 9	1-octene, acid		
5054 01 2	2-octadecane		

0101 70 1 pentane, 2,2,4,4-tetramethyl
 142 50 8 1,6,10-tridecatriene, 1,8,11-trimethyl-7,8-(Z)
 101 01 5 pentane, 3-butyl-1-fluoro

AR 100767

**TENTATIVELY IDENTIFIED COMPOUNDS
MILLCREEK SITE
CONCENTRATIONS (µg/kg)/PERCENT PURITY (if reported)**

A-149

ORIGINAL
(red)

METHOD	SAMPLE NO.	SAMPLE ID.	MC-50-012	MC-50-013	MC-50-014	MC-50-015	MC-50-016	MC-50-017	MC-50-018	MC-50-019	MC-50-020	MC-50-020A	MC-50-021
			E9351	E9352	E9353	E9354	E9355	E9356	E9357	E9358	E9359	E9360	E9361
MSD	148	148											
MSD	149	149											
MSD	150	150											
MSD	151	151											
MSD	152	152											
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MSD	272	272											
MSD	273	273											
MSD	274	274											
MSD	275	275											
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MSD	277	277											
MSD	278	278											
MSD	279	279											
MSD	280	280											
MSD	281	281											
MSD	282	282											

ORIGINAL
(red)

TENTATIVELY IDENTIFIED COMPOUNDS
HILLCREEK SITE
CONCENTRATIONS (µg/kg)/PERCENT PURITY (if reported)

NUM.	SUBSTRATE	MC-50-011	MC-50-012	MC-50-013	MC-50-014	MC-50-015	MC-50-016	MC-50-017	MC-50-019	MC-50-020	MC-50-020A	MC-50-021
CAS NO	COMPOUND	69351	69352	69353	69354	69355	69356	69357	69358	69359	69360	69361
57-10-1	benzocyclopentadiene			21000/66.2					1000/72.5			
593-85-1	octadecane			26000/70.6		81000/74.6						
610-10-0	heptadecane			4000/67.7		7000/62.8						
610-10-0	hexadecane			4600/74.0		4000/70.8						
610-10-0	pentadecane			2800/69.3								
610-10-0	tetradecane			1800/56.1								
610-10-0	tridecane			4000/32.2								
610-10-0	dodecane			31000/61.5								
610-10-0	undecane			48000/40.9								
107-87-9	benzofuran			36000/41.3								
928-88-7	2-heptanone					5.1/97.1						
110-41-0	2-hexanone					9.2/81.9						
110-41-0	2-pentanone					9.2/85.0						
110-41-0	2-butylone					7.1/81.6						
111-13-7	2-pentanone					10.0/82.7						
698-87-1	4-ethyl-2-pentanone					11.0/78.7						
100-99-1	1,2-dichloroethane					4800/58.0						
7469-40-1	naphthalene					3000/35.7						
5900-44-6	benzene					5100/46.0						
5953-55-4	cyclohexane					4800/53.9						
54011-40-6	heptane					6160/48.8						
1100-57-9	3-hexanone					3800/31.0						
7634-93-9	benzene, 1,1-(1-methyl-1-propyne-1,1-dithiol)					6300/29.8						
17651-53-5	1,2-hydroxyacetophenone					3800/46.0						
88-74-7	1,2-hydroxyacetophenone, dibutyl ester					46800/32.4						
610-15-1	benzamide											
3100-40-9	formic acid											
1171-06-4	benzene, 1-fluoro-3-methyl											
6084-43-9	1,2-dichloroethane, 3-methyl											
6087-05-6	1,2-dichloroethane, 3,7-dithiol											
6087-05-6	1,2-dichloroethane, 3,7-dithiol, 1-methyl											
6087-05-6	1,2-dichloroethane, 3,7-dithiol, 1-methyl, 2-ethyl											
908-57-4	1-hexanone											
908-57-4	2-hexanone											
103-00-0	1-hexanol											
103-00-0	1-heptanol											
103-00-0	1-octanol											
541-76-1	hexane											
55-48-3	benzene, acetic acid, 3-methoxy											
4300-40-6	1,2-dichloroethane, 1,1,1-trimethyl											
9074-11-0	1,2-dichloroethane, 1,1,1-trimethyl, 1-methyl											
1071-26-7	1,2-dichloroethane, 1,1,1-trimethyl, 2,2-dimethyl											
679-98-7	benzofuran											

1700/42.5
830/43.4
890/40.7

1700/23.9
710/46.2
590/15.6
500/11.0
740/10.2
1300/18.3
2900/90.8
1100/34.1
710/49.3
500/85.9
1100/41.6
1800/41.6
690/46.4

4400/13.6
3200/43.0
9000/34.7

AR100770

ORIGINAL
(red)

ENIA ... FUEL ... HILLCREEK SITE
CONCENTRATION (ug/kg)/PERCENT PURITY (if reported)

PHASE SAMPLE SITE SAMPLES

LAB NO	COMPOUND	MC 50 077 C9367	MC 50 075 C9365	MC 50 076 C9366	MC 50 078A C9369	MC 50 077 C9367	MC 50 078 C9368	MC 50 079 C9369	MC 50 078 C9370	MC 50 011 C9371
55187-01-1	tetracontane, 1,5,2,4-trimethyl						410/73.2	1600/65.2		
11801-22-1	undecane, 2,5-dimethyl									
1790-71-4	2,6,10-trimethyltridecane, 1,4,7,10-tetramethyl (1,4)									
1787-27-1	nonane, 2,5-dimethyl									
5679-65-0	decane, 2,5-dimethyl									
1454-05-9	1-heptadecanol									
40-79-7	ethane, 1,1'-oxybis									
5179-00-7	perchloric acid, 10-methyl methylester									
531-45-1	undecane									
30011-21-1	decane, 10-methyl									
1560-00-9	undecane, 2-methyl									
5679-65-0	decane, 2,5-dimethyl									
40210-62-7	undecane, 2,5-dimethyl									
5679-65-0	undecane, 2,5-dimethyl									
1560-00-9	undecane, 2-methyl									
112-95-0	undecane, 2-methyl									
7275-64-1	undecane, 9-methyl									
5005-14-2	undecane, 8-methyl									
5181-54-2	1,4-hexadiene, 4-ethyl									
55101-66-7	2(1H)-benzofuran, 2,3,4,5-tetramethyl									
611-55-2	(1H)-indole, 2-methyl, 3-methyl, 4-methyl, 5-methyl, 6-methyl, 7-methyl, 8-methyl, 9-methyl, 10-methyl, 11-methyl, 12-methyl, 13-methyl, 14-methyl, 15-methyl, 16-methyl, 17-methyl, 18-methyl, 19-methyl, 20-methyl, 21-methyl, 22-methyl, 23-methyl, 24-methyl, 25-methyl, 26-methyl, 27-methyl, 28-methyl, 29-methyl, 30-methyl, 31-methyl, 32-methyl, 33-methyl, 34-methyl, 35-methyl, 36-methyl, 37-methyl, 38-methyl, 39-methyl, 40-methyl, 41-methyl, 42-methyl, 43-methyl, 44-methyl, 45-methyl, 46-methyl, 47-methyl, 48-methyl, 49-methyl, 50-methyl, 51-methyl, 52-methyl, 53-methyl, 54-methyl, 55-methyl, 56-methyl, 57-methyl, 58-methyl, 59-methyl, 60-methyl, 61-methyl, 62-methyl, 63-methyl, 64-methyl, 65-methyl, 66-methyl, 67-methyl, 68-methyl, 69-methyl, 70-methyl, 71-methyl, 72-methyl, 73-methyl, 74-methyl, 75-methyl, 76-methyl, 77-methyl, 78-methyl, 79-methyl, 80-methyl, 81-methyl, 82-methyl, 83-methyl, 84-methyl, 85-methyl, 86-methyl, 87-methyl, 88-methyl, 89-methyl, 90-methyl, 91-methyl, 92-methyl, 93-methyl, 94-methyl, 95-methyl, 96-methyl, 97-methyl, 98-methyl, 99-methyl, 100-methyl									
52101-75-7	undecane, 8-methyl, 9-methyl, 10-methyl, 11-methyl, 12-methyl, 13-methyl, 14-methyl, 15-methyl, 16-methyl, 17-methyl, 18-methyl, 19-methyl, 20-methyl, 21-methyl, 22-methyl, 23-methyl, 24-methyl, 25-methyl, 26-methyl, 27-methyl, 28-methyl, 29-methyl, 30-methyl, 31-methyl, 32-methyl, 33-methyl, 34-methyl, 35-methyl, 36-methyl, 37-methyl, 38-methyl, 39-methyl, 40-methyl, 41-methyl, 42-methyl, 43-methyl, 44-methyl, 45-methyl, 46-methyl, 47-methyl, 48-methyl, 49-methyl, 50-methyl, 51-methyl, 52-methyl, 53-methyl, 54-methyl, 55-methyl, 56-methyl, 57-methyl, 58-methyl, 59-methyl, 60-methyl, 61-methyl, 62-methyl, 63-methyl, 64-methyl, 65-methyl, 66-methyl, 67-methyl, 68-methyl, 69-methyl, 70-methyl, 71-methyl, 72-methyl, 73-methyl, 74-methyl, 75-methyl, 76-methyl, 77-methyl, 78-methyl, 79-methyl, 80-methyl, 81-methyl, 82-methyl, 83-methyl, 84-methyl, 85-methyl, 86-methyl, 87-methyl, 88-methyl, 89-methyl, 90-methyl, 91-methyl, 92-methyl, 93-methyl, 94-methyl, 95-methyl, 96-methyl, 97-methyl, 98-methyl, 99-methyl, 100-methyl									
401-71-0	undecane, 15-methyl									
372-64-5	undecane, 15-methyl									
5575-70-4	undecane, 9-ethyl, 10-methyl, 11-methyl, 12-methyl, 13-methyl, 14-methyl, 15-methyl, 16-methyl, 17-methyl, 18-methyl, 19-methyl, 20-methyl, 21-methyl, 22-methyl, 23-methyl, 24-methyl, 25-methyl, 26-methyl, 27-methyl, 28-methyl, 29-methyl, 30-methyl, 31-methyl, 32-methyl, 33-methyl, 34-methyl, 35-methyl, 36-methyl, 37-methyl, 38-methyl, 39-methyl, 40-methyl, 41-methyl, 42-methyl, 43-methyl, 44-methyl, 45-methyl, 46-methyl, 47-methyl, 48-methyl, 49-methyl, 50-methyl, 51-methyl, 52-methyl, 53-methyl, 54-methyl, 55-methyl, 56-methyl, 57-methyl, 58-methyl, 59-methyl, 60-methyl, 61-methyl, 62-methyl, 63-methyl, 64-methyl, 65-methyl, 66-methyl, 67-methyl, 68-methyl, 69-methyl, 70-methyl, 71-methyl, 72-methyl, 73-methyl, 74-methyl, 75-methyl, 76-methyl, 77-methyl, 78-methyl, 79-methyl, 80-methyl, 81-methyl, 82-methyl, 83-methyl, 84-methyl, 85-methyl, 86-methyl, 87-methyl, 88-methyl, 89-methyl, 90-methyl, 91-methyl, 92-methyl, 93-methyl, 94-methyl, 95-methyl, 96-methyl, 97-methyl, 98-methyl, 99-methyl, 100-methyl									
5511-01-5	undecane, 9-ethyl, 10-methyl, 11-methyl, 12-methyl, 13-methyl, 14-methyl, 15-methyl, 16-methyl, 17-methyl, 18-methyl, 19-methyl, 20-methyl, 21-methyl, 22-methyl, 23-methyl, 24-methyl, 25-methyl, 26-methyl, 27-methyl, 28-methyl, 29-methyl, 30-methyl, 31-methyl, 32-methyl, 33-methyl, 34-methyl, 35-methyl, 36-methyl, 37-methyl, 38-methyl, 39-methyl, 40-methyl, 41-methyl, 42-methyl, 43-methyl, 44-methyl, 45-methyl, 46-methyl, 47-methyl, 48-methyl, 49-methyl, 50-methyl, 51-methyl, 52-methyl, 53-methyl, 54-methyl, 55-methyl, 56-methyl, 57-methyl, 58-methyl, 59-methyl, 60-methyl, 61-methyl, 62-methyl, 63-methyl, 64-methyl, 65-methyl, 66-methyl, 67-methyl, 68-methyl, 69-methyl, 70-methyl, 71-methyl, 72-methyl, 73-methyl, 74-methyl, 75-methyl, 76-methyl, 77-methyl, 78-methyl, 79-methyl, 80-methyl, 81-methyl, 82-methyl, 83-methyl, 84-methyl, 85-methyl, 86-methyl, 87-methyl, 88-methyl, 89-methyl, 90-methyl, 91-methyl, 92-methyl, 93-methyl, 94-methyl, 95-methyl, 96-methyl, 97-methyl, 98-methyl, 99-methyl, 100-methyl									
5511-01-6	undecane, 9-ethyl, 10-methyl, 11-methyl, 12-methyl, 13-methyl, 14-methyl, 15-methyl, 16-methyl, 17-methyl, 18-methyl, 19-methyl, 20-methyl, 21-methyl, 22-methyl, 23-methyl, 24-methyl, 25-methyl, 26-methyl, 27-methyl, 28-methyl, 29-methyl, 30-methyl, 31-methyl, 32-methyl, 33-methyl, 34-methyl, 35-methyl, 36-methyl, 37-methyl, 38-methyl, 39-methyl, 40-methyl, 41-methyl, 42-methyl, 43-methyl, 44-methyl, 45-methyl, 46-methyl, 47-methyl, 48-methyl, 49-methyl, 50-methyl, 51-methyl, 52-methyl, 53-methyl, 54-methyl, 55-methyl, 56-methyl, 57-methyl, 58-methyl, 59-methyl, 60-methyl, 61-methyl, 62-methyl, 63-methyl, 64-methyl, 65-methyl, 66-methyl, 67-methyl, 68-methyl, 69-methyl, 70-methyl, 71-methyl, 72-methyl, 73-methyl, 74-methyl, 75-methyl, 76-methyl, 77-methyl, 78-methyl, 79-methyl, 80-methyl, 81-methyl, 82-methyl, 83-methyl, 84-methyl, 85-methyl, 86-methyl, 87-methyl, 88-methyl, 89-methyl, 90-methyl, 91-methyl, 92-methyl, 93-methyl, 94-methyl, 95-methyl, 96-methyl, 97-methyl, 98-methyl, 99-methyl, 100-methyl									
407-06-9	undecane, 20-methyl, 21-methyl, 22-methyl, 23-methyl, 24-methyl, 25-methyl, 26-methyl, 27-methyl, 28-methyl, 29-methyl, 30-methyl, 31-methyl, 32-methyl, 33-methyl, 34-methyl, 35-methyl, 36-methyl, 37-methyl, 38-methyl, 39-methyl, 40-methyl, 41-methyl, 42-methyl, 43-methyl, 44-methyl, 45-methyl, 46-methyl, 47-methyl, 48-methyl, 49-methyl, 50-methyl, 51-methyl, 52-methyl, 53-methyl, 54-methyl, 55-methyl, 56-methyl, 57-methyl, 58-methyl, 59-methyl, 60-methyl, 61-methyl, 62-methyl, 63-methyl, 64-methyl, 65-methyl, 66-methyl, 67-methyl, 68-methyl, 69-methyl, 70-methyl, 71-methyl, 72-methyl, 73-methyl, 74-methyl, 75-methyl, 76-methyl, 77-methyl, 78-methyl, 79-methyl, 80-methyl, 81-methyl, 82-methyl, 83-methyl, 84-methyl, 85-methyl, 86-methyl, 87-methyl, 88-methyl, 89-methyl, 90-methyl, 91-methyl, 92-methyl, 93-methyl, 94-methyl, 95-methyl, 96-methyl, 97-methyl, 98-methyl, 99-methyl, 100-methyl									
111-10-0	1,7-dimethylundecane, 1,2-dimethyl ester									
55100-32-4	undecane, 1,7-dimethyl									
31001-00-0	undecane, 1,7-dimethyl									
40710-42-7	undecane, 1,7-dimethyl									
565-59-1	undecane, 2,5-dimethyl									
40710-70-1	undecane, 2,5-dimethyl									
591-71-1	undecane, 2,5-dimethyl									
54010-15-1	undecane, 2,5-dimethyl									
6541-11-1	undecane, 2,5-dimethyl									

30/51.0

2192.8

9.80/20.2

AR100771

TENTATIVELY IDENTIFIED COMPOUNDS
HILLCREEK SITE
CONCENTRATIONS (ng/kg)/PERCENT PURITY (if reported)

MLDUM. SURFACE SOIL SAMPLES	LAB NO.	COMPOUND	MIS SAMP. NO. LAB SAMP. NO. SAMPLE LOCATION	MC-50-022 C9362	MC-50-023 C9363	MC-50-024 C9364	MC-50-025 C9365	MC-50-026 C9366	MC-50-028A C9319	MC-50-027 C9367	MC-50-028 C9368	MC-50-029 C9369	MC-50-030 C9370	MC-50-031 C9371
3911 02 B	1-octanol, 2-butyl-	8700/10.1												
52896 87-4	heptane, 4-(1-methyl-2-butyl)-	4900/16.0												
56554 64-4	hexadecane, 1,1,3,5-tetradecyl-	4200/54.2												
5481-52-1	cyclohexanol, 3,5-dimethyl-	2100/77.4												
112 42 5	1-undecanol	520/82.7												
544 63 8	tetradecanoic acid	820/51.8												
17891-33-5	1,2-hexanediol, carbonylic acid, butyl 2-methylpropyl ester	430/75.9												
2091-79-4	9-hexadecenoic acid	450/86.3												
5655 1-78 0	9-hexadecenoic acid	550/62.1												
105 07-3	2,6-octadien-1-ol, 3,7-dimethyl-, acetate, (E)-	750/32.3												
51110 93-1	20-1,6-benzonazocin-5(6H)-one, 3,4-dihydro	800/40.5												
4206 01-5	3,7,11-triethylatetradecane, 4,8,12-trimethyl-	450/52.0												
747 96-0	cholest-1,3,5-diene	13000/65.1												
1454-05-9	1-heptadecanol	1100/39.8												
294-62-2	cyclohexane	1300/70.8												
101 41-7	benzene acetic acid, methyl ester	1800/69.9												
6-9 96-9	1-cyclohexanol	3900/67.1												
208 11 1	1H-pyrazole	530/94.9												
103 87-2	benzene acetic acid													
764 36 7	ethanol, 2-(1-phenylethoxy)-													
123 08 0	benzothiazole, 4-hydroxy-													
121 33 5	benzothiazole, 4-hydroxy-3-methoxy-													
134-96-1	benzothiazole, 4-hydroxy-3,5-dimethoxy-													
1005 84 2	pentadecanoic acid													
510 57-4	benzoic acid, 4-hydroxy-3,5-dimethyl													
6314 00-7	5-hepten-2-one													
610 66-4	6-oxoheptanal													
5796 76 6	2H-1-benzopyran, 1,4,7-trifluoro-3,4-dihydro-2-(3-hydroxy													
117 00-9	1-octadecene													
56554 96-2	7-oxoheptanal													
2154-79-2	pentane, 2,2,1,3-tetrafluoro-													
142 50-7	1,6,10-dodecatriene-3-ol, 2,7,11-trimethyl-, (Z)-													
107 106-9	benzene, 1-bromo-3-fluoro													

M 100

ORIGINAL
(red)

AR100772

780/16.9
1200/73.3
1300/73.2

560/77.2

1100/64.3

730/65.9

530/94.9

ORIGINAL
(red)

TENTATIVELY IDENTIFIED COMPOUNDS
HILLCREEK SITE
CONCENTRATIONS (µg/kg)/PERCENT PURITY (if reported)

MEDIUM	SOURCE	SITE	SAMPLES	MSL CAS NO.	LAB. SAMPLE NO.	ANALYSIS DATE	MSL CAS NO.	LAB. SAMPLE NO.	ANALYSIS DATE	MSL CAS NO.	LAB. SAMPLE NO.	ANALYSIS DATE
GROUNDWATER	SHORELINE	SHR-1	195-61-6	benzene	1,2,4-trimethyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	201-21-7	pyrene	1-methyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	5193-75-3	ethanol	2-(9-oxo-10-oxo-10H-phenanthrene-10-yl)-2H		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	87-05-3	fluorene	anthracene	1-one	MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	205-41-6	benzofluorene	1,2-Dibenzofluorene		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	203-17-3	benzofluorene	1,11-dibenzofluorene		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	195-19-7	benzofluorene	phenanthrene		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	2548-69-7	benzofluorene	1,7-dimethyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	608-51-5	1,1'-binaphthalene			MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	1026-39-5	benzofluorene	anthracene	1-one	MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	205-82-3	benzofluorene	anthracene		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	191-19-5	adamantane	1,2-bis(isopropyl)		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	191-24-2	adamantane	1,2-bis(isopropyl)		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	111-76-2	ethanol	2-butoxy		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	192-70-6	pentadecane	2,6,10,14-tetramethyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	681-08-9	ethyl ether	1,2-bis(isopropyl)-trans		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	1560-08-9	isobutane	2-methyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	1560-08-5	isobutane	2-methyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	5525-90-2	1-bromo-2-methyl	propane		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	55401-55-3	adamantane	11-decyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	207-08-9	benzofluorene	anthracene		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	468-47-6	1,1'-binaphthalene	2,2-dimethyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	55314-01-5	phenanthrene	9-fluorenyl, tetrahydro		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	112-95-8	ethane			MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	10144-17-1	heptadecane	2,6,10,14-tetramethyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386
GROUNDWATER	SHORELINE	SHR-1	55045-10-8	tridecane	6-propyl		MC-50-022	C9382	MC-50-024	C9384	MC-50-026	C9386

AR100774

A-158

ORIGINAL
(red)

TENTATIVELY IDENTIFIED COMPOUNDS
MILLCREEK SITE
CONCENTRATION (µg/kg)/PERCENT PURITY (if reported)

MEQUM: SURFACE SOIL SAMPLES	CAS NO.	COMPOUND	LAB SAMP. NO.	MC-SO-032 C9372	MC-SO-033 C9373	MC-SO-034 C9374	MC-SO-035 C9375	MC-SO-036 C9308
	55162-61-3	tetratentane, 3,5,2,4-trimethyl						
	17101-22-3	undecane, 2,5-dimethyl,						
	37900-71-4	2,6,10-dodecatrien-1-ol, 3,7,11-trimethyl-(Z,E)						
	17382-27-1	nonane, 2,5-dimethyl						
	56292-65-0	dodecane, 2,5-dimethyl						
	1454-85-9	1-heptadecanol						
	60-29-7	ethane, 1,1'-oxybis						
	5129-60-2	pentadecanoic acid, 14-methyl-methylester						
	593-45-3	octadecane						
	54833-23-1	cicusanane, 10-methyl						
	1566-00-9	octadecane, 2-methyl						
	56292-69-4	tetradecane, 2,5-dimethyl						
	40710-42-7	hentetradecanol						
	56292-65-0	dodecane, 2,5-dimethyl						
	1560-95-8	tetradecane, 2-methyl						
	112-95-8	cicusanane						
	7274-64-1	heptadecane, 9-octyl						
	55045-14-2	tetradecane, 4-ethyl						
	51504-54-2	1,4-hexadiene, 2,3,4,5-tetramethyl						
	55103-66-7	2(1H)-benzocyclooctenone, decahydro-4A-methyl,-trans						
	611-55-7	4(1H)-pteridinone, 2-amino-6,7-dimethyl						
	55301-75-7	anthracene, 9-dodecyltetradecahydro						
	481-71-0	cholestaene, (5 Alpha)-						
	372-64-5	disulfide bis (trifluoromethyl)						
	55255-70-4	anthracene, 9-cyclohexyltetradecahydro						
	55334-01-5	phenanthrene, 9-dodecyltetradecahydro						
	55133-89-6	anthracene, 9-butyltetradecahydro						
	487-00-9	2H-1-benzopyran-2-one, 5,7-dimethoxy						
	131-38-0	1,2-benzenedicarboxylic acid, dipentyl ester						
	55134-42-4	dodecane, 1,2-dibromo						
	31083-60-0	tricyclo[4.3.1.1.3.8]undecane-1-carboxylic acid, methyl						
	40710-42-7	1-hentetradecanol						
	565-59-3	pentane, 2,3-dimethyl						
	40710-70-1	octatetradecane, 1-10H						
	591-2144	cyclohexanol, 3-methyl						
	54714-33	butanoic acid, 2-methylcyclohexyl ester, cis						
	42541-343	1,3,2 dioxaseneane, 2-butyl						

AP 00777

ORIGINAL

(red)

41/70.2

TENTATIVELY IDENTIFIED COMPOUNDS
HILLCREEK SITE
CONCENTRATIONS (µg/kg)/PERCENT PURITY (if reported)

MEDIA:	SURFACE SOIL SAMPLES	NUS SAMP. NO.	MC-SO-032	MC-SO-033	MC-SO-034	MC-SO-035	MC-SO-036
		LAB SAMP. NO.	C9372	C9373	C9374	C9375	C9388
		SAMPLE LOCATION					

CAS NO.	COMPOUND
3913-02-8	1-octanol, 2-butyl-
5286-87-4	heptane, 4-(1-methyl-ethyl)-
5654-64-4	hexadecane, 1,1-bis(dodecycloxy)-
5491-52-1	cyclohexanol, 3,5-dimethyl
112-42-5	1-undecanol
544-63-8	tetradecanoic acid
17851-53-5	1,2-benzenedicarboxylic acid, butyl 2-methylpropyl ester
2091-29-4	9-hexadecanoic acid
5654-78-0	7-heptadecene, 1-chloro-
105-87-3	2,6-octadien-1-ol, 3,7-dimethyl-, acetate, (E)-
51110-93-1	2H-1,6-benzoxazocin-5(6H)-one, 3,4-dihydro
6006-01-5	3,7,11-tridecatrinenitrile, 4,8,12-trimethyl-
747-90-0	cholesta-3,5-diene
1454-85-9	1-heptadecanol
294-62-2	cyclododecane
101-41-7	benzene acetic acid, methylester
629-96-9	1-eicosanol
280-13-1	III-pyrazole
103-82-2	benzene acetic acid
764-48-7	ethanol, 2-(ethenyl-oxo)-
123-08-0	benzaldehyde, 4-hydroxy-
121-33-5	benzaldehyde, 4-hydroxy-3-methoxy-
134-96-3	benzaldehyde, 4-hydroxy-3,5-dimethoxy-
1002-84-2	pentadecanoic acid
530-57-4	benzoic acid, 4-hydroxy-3,5-dimethoxy
6714-00-7	5-hepten-2-one
638-66-4	octadecanal
57396-76-6	2H-1-benzopyran-3,4,7-triol, 3,4-dihydro-2-(3-hydroxy
112-88-9	1-octadecene
5654-96-2	2-octadecanol

1300/78.6
2100/54.0

7154-79-2 pentane, 2,2,3,3-tetramethyl-
142-50-7 1,6,10-dodecatrien-3-ol, 3,7,11-trimethyl-, /5-(2)-/
102-206-9 benzene, 1-bromo-3-fluoro

R100778

ORIGINAL

(red)

TENTATIVELY IDENTIFIED COMPOUNDS
HILL CREEK SITE
CONCENTRATIONS (µg/kg)/PERCENT PURITY (if reported)

MEDIUM: SURFACE SOIL SAMPLES	CAS NO.	COMPOUND	MUS SAMP. NO. LAB SAMP. NO.	MC-SO-032 C9372	MC-SO-033 C9373	MC-SO-034 C9374	MC-SO-035 C9375	MC-SO-036 C9388
	80-71-7	2-cyclopenten-1-one, 2-hydroxy-3-methyl						
	5482-49-4	cholest-24-ENE, (5.alpha., 20X1)-						
	17312-74-2	decane, 5-ethyl-5-methyl-						
	19719-70-1	4-norcarene-2-one, 1,3,5,-tri-tert-butyl-4-oxo-2,5-cyclohexadien-1-yl)methyl-						
	141-14-0	6-octen-1-ol, 3,7-dimethyl-propanoate						
	54-102-31-4	0-homoandrosterane, (5.alpha., 13.alpha.)-						
	55429-83-9	hexacosane, 9-octyl-						
	39707-54-5	1,4-benzenediol, 2-(decahydro-5,5,8a-trimethyl-2-methylene-1-naphthalenyl)-methyl)-, (1R-(1.alpha., 4a.beta., 8a.alpha.))-						
	56771-77-8	4-hexanoic acid, 3-methyl-2,6-dioxo-						
	100-68-5	benzene-(methylthio)-						
	56009-20-2	cyclohexane, 1-(1,5-dimethylhexyl)-4-(4-methylpentyl)						
	18465-99-1	9,12,15-octadecatrienoic acid, 2,3-dihydroxypropylester, (Z,Z,Z)-						
	1732-10-1	nonanedioic acid, dimethyl ester						
	6064-90-0	heneicosanoic acid, methyl ester						
	1731-86-8	undecanoic acid, methyl ester						
	57-11-4	octadecanoic acid						
	17302-27-1	nonane, 2,5-dimethyl-						
	544-25-2	1,3,5-cycloheptatriene						
	112-53-8	1-dodecano						
	2425-56-0	tetradecane, 1-chloro-						
	4706-81-4	2-tetradecanol						
	13-18-000779	1,2-benzenedicarboxylic acid, diphenyl ester						
	27554-26-3	1,2-benzenedicarboxylic acid, dioctyl ester						
	7299-89-0	1,2-benzenedicarboxylic acid, bis(2-ethylbutyl)ester						
	26080-85-5	10-undecenoic acid, octyl ester						
	52783-43-4	nonadecanol						
	473-15-4	2-naphthalenemethanol, decahydro-.alpha.alpha.,.alpha.alpha.,.4a-trimethyl-8-methylene-, (2R-(2.alpha., 4a.alpha., 8a.beta.))-						
	77-02-1	2,4,6(1H,3H,5H)-pyrimidinetrione, 5-(1-methylethyl)-5-2(propenyl)-						560/76.5
	120-75-2	benzothiazole, 2-methyl-						
	84-69-5	1,2-benzenedicarboxylic acid, bis(2-methylpropyl) ester						
	205-99-2	benz[e]acephenanthrylene						

A-161

ORIGINAL
(red)

TENTATIVELY IDENTIFIED COMPOUNDS
MILLCREEK SITE

CONCENTRATIONS (µg/kg)/PERCENT PURITY (if reported)

MEDIUM: SURFACE SOIL SAMPLES

CAS NO.	COMPOUND	NUS SAMP. NO.	MC-SO-031	MC-SO-032	MC-SO-033	MC-SO-034	MC-SO-035	MC-SO-036
		LAB SAMP. NO.	C9372	C9373	C9374	C9375	C9388	C9339
		SAMPLE LOCATION						

95-63-6	benzene 1,2,4-trimethyl							
2381-21-7	pyrene 1-methyl							
5353-25-3	ethanol, 2-(9-octadecenylloxy)-(Z)							
82-05-3	7H-benz[de]anthracen-7-one							
205-43-6	benzo[h]naphtho[1,2-D]thiopene							
203-12-3	benzo[ghi]fluoranthene							
195-19-7	benzo[c]phenanthrene							
2541-69-7	benzo[a]anthracene, 7-methyl							
604-53-5	1,1'-binaphthalene							
4076-39-5	benzo[c]phenanthrene, 1-methyl							
205-82-3	benzo[j]fluoranthene							
193-39-5	ideno[1,2,3-co]pyrene							
191-24-2	benzo[ghi]perylene							
111-76-2	ethanol, 2-butoxy							
1921-70-6	pentadecane, 2,6,10,14-tetramethyl							
693-88-9	aziridine, 1,2,3-trimethyl-frans							
1560-88-9	octadecane, 2-methyl							
1560-84-5	eicosane, 2-methyl							
55255-86-2	1-hexadecanone, 1-cyclopentyl							
55401-55-3	dodecane, 11-decyl							
207-08-9	benzo[k]fluoranthene							
464-42-6	bicyclo[2.2.1]heptan-2-amine, 1,7-trimethyl-endo							
55334-01-5	phenanthrene, 9-dodecyl, tetradecahydro							
112-95-8	eicosane							
18344-329	heptadecane, 2,6,10,14-tetramethyl							
55045-1044	tridecane, 6-propyl							

A 00780

ORIGINAL
(red)

TENTATIVELY IDENTIFIED COMPOUNDS
HILLCREEK SITE
CONCENTRATIONS (µg/kg)/PERCENT PURITY (if reported)

MEDIUM: SURFACE SOIL SAMPLES	CAS NO.	COMPOUND	MUS SAMP. NO. LAB SAMP. NO.	MC-SO-032 C9372	MC-SO-033 C7373	MC-SO-034 C7374	MC-SO-035 C9375	MC-SO-036 C9388
	57-10-3	hexadecanoic acid						
	593-45-3	octadecane						
	638-36-8	hexadecane 2,6,10,14-tetramethyl						
	630-06-8	hexatriacontane						
	55030-62-1	tridecane, 4,8-dimethyl						
	697-40-5	bicyclo[2.2.0]octane, 1-bromo-4-methyl						
	629-95-7	pentacosane						
	55401-65-5	pentatene octahydro-1-(2-octylidetyl)						
	192-97-2	benzo(r)pyrene						
	107-87-9	2-pentanone						
	928-68-7	2-heptanone, 6-methyl						
	110-43-0	2-heptanone						
	111-13-7	2-octanone						
	694-87-1	bicyclo[4.2.0]octa-1,3,5-trien						
	88-99-3	1,2-benzenedicarboxylic acid						
	7469-40-1	naphthalene, 1,2-dihydro-4-phenyl						
	54986-44-6	benzene, (1,3,3-trimethylmonyl)-						
	4443-55-4	cyclohexane, eicosyl-						
	54033-48-6	heptadecane, 3,6,10,15-tetramethyl						
	1888-57-9	3-hexanone, 2,5-dimethyl						
	7614-93-9	benzene, 1,1'-(3-methyl-1-propene-1,3-diylbis)						
	17651-51-5	1,2-benzenedicarboxylic acid, butyl 2-methyl propyl ester						
	84-74-2	1,2-benzenedicarboxylic acid, dibutyl ester						
	610-15-1	benzamide, 2-nitro						
	33010-48-9	iron, tricarboxyl((2,3,4,5-etc.)-2,5-dimethyl-2,4-IE						
	112-86-4	benzene, 1-fluoro-3-1000						
	41093-43-9	1,2-benzisoxalenazole, 3-methyl						
	53432-05-6	3H-purine-2,6-dione, 3,7-diethyl-3,7-dihydro-1-methyl						
	58-72-0	benzene, 1,1'-(1-ethenyl-2-ylidene)tris-						
	930-57-4	cyclopropane, butyl-						
	104-76-7	1-hexanol, 2-hexyl						
	143-08-8	1-nonanol						
	10042-59-8	heptanol, 2-propyl						
	544-76-3	hexadecane						
	55-68-3	benzene acetic acid, 3-methoxy-4-(2,2,3,3,3-pentafluoro)						
	30950-89-	5.alpha.-cholest-1-EN-19-OL						
	4780-40-6	uran, 2,5-bis(1,1-dimethylethyl)						
	9079-31-0	tetradecane, 1-(methylsulfinyl)-						
	1071-26-7	heptane, 2,2-dimethyl						
	629-94-7	hentriecane						

AR 100781

ORIGINAL
(red)

TENTATIVELY IDENTIFIED COMPOUNDS
MILLCREEK SITE
CONCENTRATION (ug/kg)/PERCENT PURITY (if reported)

MEDIUM	SURFACE SOIL SAMPLES	NUS SAMP. NO.	MC-SO-032	MC-SO-033	MC-SO-034	MC-SO-035	MC-SO-036
CAS NO.	COMPOUND	LAB SAMP. NO.	C9372	C9373	C9374	C9375	C9380
		SAMPLE LOCATION					
593-45-3	octadecane						
50834-08-6	heptadecane 2,6,10,15 tetramethyl						
30361-97-8	5-tiazine, 2-(chloromethyl)-4,6-bis(trichloromethyl)						
47604-04-6	cycloheptane, methoxy						
18681-76-4	methylamine-N-(butylhexylidene)						
618-36-8	hexadecane 2,6,10,14 tetramethyl						
47604-04-6	cycloheptane, methoxy						
693-88-9	aziridine, 1,2,3-trimethyl-trans						
6103-50-3	dotecane, 2,2,4,9,11,11-hexamethyl						
486-90-8	7,14-methano-4H, 6H-dipyrido[1,2-A:1,2-E]diazole						
6688-11-5	2H-1,3-benzoxazine, 3-cyclohexyl-3,4-dihydro						
18681-74-2	methylamine, N-(1-ethylhexylidene)						
56666-79-6	3-pyrazolidinone, 1,2,4,5-tetramethyl						
36099-44-2	oxirane, 2-(1,1-dimethylethyl)-cis						
55301-55-3	decosane, 11-decyl						
29833-69-0	1-pentadecene, 2-methyl						
108-88-3	benzene, methyl						
79-34-5	ethane, 1,1,2,2-tetrachloro						
505-34-2	phenol, 3-(1,1-dimethylethyl)						
812-71-3	phenanthrene, 3-methyl						
203-64-5	4H-cyclopenta[def]phenanthrene						
82-05-3	7H-benz[de]anthracen-7-one						
205-43-6	benzo[b]naphtha[1,2-b]thiophene						
204-12-3	benzo[ghi]floranthene						
195-19-7	benzo[c]phenanthrene						
1542-69-7	benz[a]anthracene, 7-methyl						
765-87-7	1,2-cyclohexanedione						
36247-66-8	6,10,14-hexadecatrien-1-ol, 3,7,11,15-tetramethyl-, /R						
205-82-3	benzo[3]fluoranthene						
3790-71-4	2,6,10-dodecatrien, 1-ol, 3,7,11-trimethyl - (Z,E)						
2432-80-6	hexanoic acid, 5-heptyl ester						
3807-41-5	bicyclo[3.3.0]hexane, 4-methylene-1-(1-methylethyl)-						
141-78-7	9-octadecen-1-ol						
57-10-1	hexadecanoic acid						
640-06-8	hexatriacotane						
18102-42-6	palmitaldehyde, diallyl acetal						
10534-44-0	sulfur (mol. 58)						

560/88.1

2400/64.0

00782

ORIGINAL
(red)

TERTIATIVELY IDENTIFIED COMPOUNDS
MILLCREEK SITE
CONCENTRATIONS (µg/kg)/PERCENT PURITY (if reported)

MEMOR: TEST PIT (SUBSURFACE SOILS)

CAS NO	COMPOUND	MUS SAMP. NO.	MC-TP-001	MC-TP-002	MC-TP-003	MC-TP-004	MC-TP-005	MC-TP-006	MC-TP-007	MC-TP-008	MC-TP-009	MC-TP-010
		LAB SAMP. NO.	C9660	C9661	C9662	C9663	C9664	C9665	C9666	C9667	C9668	C9669
		SAMPLE LOCATION	T.P. 1	T.P. 2	T.P. 3	T.P. 4	T.P. 5	T.P. 6	T.P. 7	T.P. 8	T.P. 9	T.P. 10

All IIC's listed as 'Unknown' for all samples on this page.

AR100784

A-146

ORIGINAL
(red)

MEDIUM: SUBSURFACE SOILS

IDENTIATIVELY IDENTIFIED COMPOUNDS
MILLICREEK SITE
CONCENTRATIONS (µg/kg)/PURITY (if reported)

CAS NO.	COMPOUND	NUS SAMPLE NO.	MC-SS-011	MC-SS-012	MC-SS-013	MC-SS-013A	MC-SS-014
		LAB SAMPLE NO.	BORING 23A	BORING 24A	BORING 25A	C9771	C9772
		SAMPLE LOCATION				25A DUP.	BLANK
127-10-4	Tetrachloroethylene						
79-34-5	1,1,2,2-tetrachloroethane	818 J	1230 J	1830 J	1560 J		
123-79-5	hexanedioic acid, diethyl ester	22,400 J	943 J				
79-00-5	1,1,2-trichloroethane		563 J	894 J	945 J		
100-52-7	benzaldehyde						
27554-26-3	1,2-benzene dicarboxylic acid						
240740-77-7	2-methyl, cyclopentanol	966 J	547 J	1250 J	790 J		
544-25-2	1,3,5-cycloheptatriene		668 J				
33467-74-2	2-hexan-1-ol, propanoate		517 J				
10061-02-6	1,3-dichloropropene		730 J	1930 J	1490 J		
1120-72-5	2-methyl cyclopentanone			1020 J	877 J		
2490-48-4	2-methyl, hexadecanol						
75-69-4	methane, trichlorofluoro						21900 J
							51 J

AR100785

A-101

ENIA Y H FILE JOHN
MILBEEK SITE
CONCENTRATION (ug/kg)/PERCENT PURITY (if reported)

ORIGINAL
(red)

METHODS

CAS NO	COMMON	MUS SAMP NO LAB SAMP. NO.	MC-SD-001 C9376	MC-SD-002 C9378	MC-SD-003 C9379	MC-SD-004 C9380	MC-SD-005 C9381	MC-SD-006 C9382	MC-SD-007 C9383	MC-SD-008 C9384	MC-SD-009 C9385	MC-SD-010 C9386	MC-SD-010A C9387 (IMPLICATE)
		SAMPLE LOCATION											
289-16-7	1,2,4-trichlorobenzene											1300/93.1	1200/18.5
2186-70-1	propane, 1-(2-propenyl)-											1700/67.4	3900/18.6
131-10-0	1,2-benzene dicarboxylic acid, dipentyl ester											1300/72.9	2600/44.5
27554-26-3	1,2-benzene dicarboxylic acid, dithiopyl ester											1300/14.2	1300/14.2
2000-05-5	10-sulfolene, 1,4-dithiopyl ester											1600/28.8	1600/28.8
84-69-5	1,2-benzene dicarboxylic acid, bis(2-methylpropyl) ester											1600/10.9	1600/10.9
5005-31-1	pentanal, 3-(hydroxymethyl)-4-4-dimethyl											4000/19.7	5000/19.7
10641-12-0	acetylacetone, 4-(methylphenylidene)-											2900/14.5	2900/14.5
211-74-6	1,1-bis(2-phenyl-2-propenyl)-2-one											1000/41.4	1000/41.4
6570-92-9	pentane, 1-bromo-3,4-dimethyl											1600/43.1	1600/43.1
1062-04-7	pentadecanoic acid											610/67.6	1500/81.3
1102-1-53-3	aspirin											1400/77.1	890/56.6
15093-42-7	urea, 2-phenethyl 1-phenyl-2-thio											820/54.2	950/58.9
111-20-6	ethanol, 2-(tridecyl)-											2100/42.7	2100/42.7
216-70-1	ethanol, 2-(tridecyl)-											52-1/510	1200/73.0
206-99-7	11-oxo-1-undecyl-1,1,1-trifluoroethane											980/73.2	980/73.2
26517-06-4	ether, methyl 1-methoxy-1,1,1-trifluoroethane, 4,8-dimethyl											1100/73.3	1100/73.3
5030-62-1	trichloroethane, 1,1,1-trifluoro-2,2,2-trimethyl											810/63.4	2700/45.7
1921-70-6	pentadecane, 2,6,10,14-tetramethyl											11000/45.0	980/72.0
541-63-8	tetra decanoic acid											1200/18.5	
3674-66-6	phenanthrene, 7,5-dimethyl												
593-45-1	octadecane												
106-07-5	isopropyl alcohol, 2-one												
57-11-4	octadecanoic acid												
1454-05-9	1-bromodecane												
5671-77-8	4-bromo-1,1,1-trifluoroethane												
54302-41-4	0-bromo-1,1,1-trifluoroethane, (5-alpha,11-alpha)-												
294-62-2	1,1,1-trifluoroethane												
1907-54-5	1,1,1-trifluoroethane, 2-(decylidene)-5,5,8,8-tetramethyl-2-one												
5000-67-5	1,1,1-trifluoroethane, 2-(decylidene)-5,5,8,8-tetramethyl-2-one												
54113-96-5	1,1,1-trifluoroethane, 2-(decylidene)-5,5,8,8-tetramethyl-2-one												
2005-79-5	1,1,1-trifluoroethane, 2-(decylidene)-5,5,8,8-tetramethyl-2-one												

ARI00786

IDENTIFIED COMPOUNDS
MILL CREEK SITE
CONCENTRATION (µg/kg)/PERCENT PURITY (if reported)

MECHANISM	SUBSTRATE	MSL SAMPLE NO	MSL LOCATION	MS-SD-001 C9376	MS-SD-002 C9378	MS-SD-003 C9379	MS-SD-004 C9380	MS-SD-005 C9381	MS-SD-006 C9382	MS-SD-007 C9383	MS-SD-008 C9384	MS-SD-009 C9385	MS-SD-010 C9386	MS-SD-011A C9387	MS-SD-011B (MPL/LCALI)
	2,4,6-trinitrophenol, 5-methyl-5-(2-methylpropyl)	2400/04.5								1400/26.9					
5873	pyridine, 2-thionyl-4,5,6-tetra (fluoro)	960/21.5													
420	arsenic, (trifluoromethyl)-	520/16.1													
195	arsenic, (trifluoromethyl)-	950/23.2													
105	arsenic, (trifluoromethyl)-	1700/47.5													
205	arsenic, (trifluoromethyl)-	180/60.3													
540	benzene, arachnoidiphenylene	680/35.5													
541	cyclohexane, dodecyl	890/66.0													
542	cyclohexane, dodecyl	780/38.1													
543	cyclohexane, dodecyl	2600/16.7													
544	cyclohexane, dodecyl	3300/23.8													
545	cyclohexane, dodecyl	8500/66.3													
546	cyclohexane, dodecyl	4600/83.4													
547	cyclohexane, dodecyl	4600/62.0													
548	cyclohexane, dodecyl	2800/48.2													
549	cyclohexane, dodecyl	3900/52.4													
550	cyclohexane, dodecyl	4200/82.8													
551	cyclohexane, dodecyl	13000/75.2													
552	cyclohexane, dodecyl	5600/76.3													
553	cyclohexane, dodecyl	24000/86.0													
554	cyclohexane, dodecyl	29000/84.0													
555	cyclohexane, dodecyl	3700/42.6													
556	cyclohexane, dodecyl	7600/72.4													
557	cyclohexane, dodecyl	5000/33.8													
558	cyclohexane, dodecyl	8200/52.2													
559	cyclohexane, dodecyl	9400/37.8													
560	cyclohexane, dodecyl	440/90.6													
561	cyclohexane, dodecyl	3090/43.5													
562	cyclohexane, dodecyl	1400/40.5													
563	cyclohexane, dodecyl	1000/22.5													
564	cyclohexane, dodecyl	470/36.1													
565	cyclohexane, dodecyl	580/36.9													
566	cyclohexane, dodecyl	930/42.1													
567	cyclohexane, dodecyl	180/41.1													
568	cyclohexane, dodecyl	920/37.6													
569	cyclohexane, dodecyl	640/49.3													
570	cyclohexane, dodecyl	940/51.4													
571	cyclohexane, dodecyl	300/41.0													
572	cyclohexane, dodecyl	660/34.1													
573	cyclohexane, dodecyl	220/32.8													
574	cyclohexane, dodecyl	290/43.4													
575	cyclohexane, dodecyl	2000/42.3													

ORIGINAL
(red)

ARI00788

A-170

ORIGINAL

(103)

TENTATIVELY IDENTIFIED COMPOUNDS
 HILLCREEK SITE
 CONCENTRATIONS (ug/l)/PERCENT PURITY (if reported)

PHIPIH CREEK WATER

CKS NO	EMPIRICAL	MUS SAMP NO. LAB SAMP NO.	MC-HH-000 C9303 EPA-HH-10	MC-HH-002 C9303 EPA-HH-10	MC-HH-005 C9305 EPA-HH-5	MC-HH-006 C9307 EPA-HH-1	MC-HH-007 C9308 EPA-HH-3	MC-HH-008 C9309 EPA-HH-34	MC-HH-010 C9312 EPA-HH-6	MC-HH-011 C9313 EPA-HH-4	MC-HH-012 C9314 EPA-HH-13	MC-HH-013 C9317 EPA-HH-13	MC-HH-000-1 C9317 BLANK
105 00 2	2H-Arylo 2-one, hexahydro-		33/86.8	57/92.8	110/85.8	210/85.8	190/85.8	64/79.1	160/77.1				
141 02 7	indoleacetic acid			130/67.3	340/74.1			93/73.2	29/47.7				
154 08 7	4-nitro-5-methyl-							23/45.3					
170 01 4	2,6,10-trimethyl-1,4,7,10-tetramethyl-												
108 08 4	1,2-dichloroethane, (2-methylpropyl)												
090 4-5	9-nitrofluorene												
92 00 1	9-nitrofluorene												
6-9 05 0	hexachlorocyclopentadiene												
700-1 64 9	2,6,10,14,18,22-tetracosahexane												
105 00 2	2H-Arylo 2-one, hexahydro-												
116 02 9	Cylohexanol, 1,3,5-trimethyl												
101 02 0	9-nitrofluorene, (Z)												
101 02 0	9-nitrofluorene, (Z)												
500 03 0	tetrachloroacetic acid												
133 08 2	9-nitrofluorene, (Z)												
10543 30 0	Sulfur, D01 (SB)												
091 29 4	9-nitrofluorene, (Z)												
1-7 10 4	tetrachloroacetic acid												
60 02 2	6-nitrofluorene, (Z)												
98 50 4	4(1,1-Dimethyl-ethyl)phenol												

MUS/97.8

AR100789

IDENTIFICATION OF IDENTIFIED COMPOUNDS
 HILLS CREEK SITE
 CONCENTRATION (ug/l)/PERCENT PURITY (if reported)

RECIPIENT: GROUNDWATER

U.S. NO.	COMP. NO.	DESCRIPTION	MSL SAMPLE NO.	MSL IDENTIFICATION	MSL ANALYSIS	MSL ANALYSIS	MSL ANALYSIS	MSL ANALYSIS	MSL ANALYSIS
105-60-2	20	azepin-2-one, hexahydro-	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-017
141-07-7	4	dodecanoic acid	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
15918-07-7	4	nonene, 5-methyl	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-015
3790-71-4	4	2,6,10-dodecatrien-1-ol	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
		(2E)	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
1678-98-4	4	cyclohexane, (2-methylpropyl)-	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
5090-4-5	4	9-oxadecanoic acid	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
57-10-3	3	hexadecanoic acid	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
629-05-0	0	1-oclyne	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
786-3-64-9	9	2,6,10,14,18-22-tetracosahexane,	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
		2,6,10,15,19,23 hex	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
105-60-2	2	azepin-2-one, hexahydro	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
136-02-9	9	cyclohexanol, 1,3,5-trimethyl-	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
001-02-0	0	9-oxadecanoic acid, (Z)-	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
534-61-8	8	tridecanoic acid	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
143-28-2	2	9-oxadecanoic acid	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
105-60-2	2	Sulfur, hex (58)	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
2091-79-4	4	hexadecanoic acid	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
177-10-4	4	tetrachloroethene	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
60-12-7	7	6-aminohexanoic acid	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
98-54-4	4	4(1,1-dimethylphenyl)phenol	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016
108-100-1	1	toluene	HC-HW-009	70/82.8	190/04.8	47/69.9			HC-HW-016

A-111

ORIGINAL
 (red)

ARI00790

IDENTIFIED COMPOUNDS
HILLCREEK SITE
CONCENTRATION (ug/l)/PERCENT PURITY (if reported)

4-172

ORIGINAL
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PHOTOCOPY

CAN. NO.	COMPOUND	MUS SAMP. NO.	MUS SAMP. LAB. LOCATION	MUS. NO. 018 (912)	MUS. NO. 019 C9123	MUS. NO. 020 C9124	MUS. NO. 021 C9125	MUS. NO. 022 C9126	MUS. NO. 023 C9127	MUS. NO. 024 C9128	MUS. NO. 025 C9129	MUS. NO. 026 C9130	MUS. NO. 027 C9131	MUS. NO. 028 C9132
105 00 2	2H acetyl 2 imp. hexahydro													
141 00 1	dodecanoic acid													
150 00 7	4-methyl-2-methyl													
170 01 4	2,6,10-dimethyl-1,8,11-trimethyl													
167 00 4	1,2-dichloroethane													
5000 4 5	1-methyl-2-methylpropane													
52 00 1	hexadecanoic acid													
629 00 0	1-octyne													
206 04 9	2,6,10,14,18-tetraoxadecane													
105 00 2	2H acetyl 2 imp. hexahydro													
116 02 9	Cyclohexanol, 1,1,5-trimethyl													
101 02 0	9-methyl-2-methylpropane													
101 02 0	9-methyl-2-methylpropane													
543 01 8	tetradecanoic acid													
141 00 2	9-methyl-2-methylpropane													
10540 50 0	9-methyl-2-methylpropane													
204 29 4	9-methyl-2-methylpropane													
127 00 4	tetradecanoic acid													
101 02 0	9-methyl-2-methylpropane													
50 54 4	9-methyl-2-methylpropane													
101 02 0	9-methyl-2-methylpropane													

* RH quantitation affected by inclusion of unknown compound with the quantitation standard naphthalene-d8.

ARI00791

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TENTATIVELY IDENTIFIED COMPOUNDS
MILLCREEK SITE
CONCENTRATION (µg/l)/PERCENT PURITY (if reported)

METHOD: GROUNDWATER

CAS NO.	COMPOUND	MUS SAMP. NO.	MC-MW-032	MC-MW-078	MC-MW-074	MC-MW-029	MC-MW-030	MC-MW-031	MC-MW-033	MC-MW-000
		LAB SAMP. NO.	C9337	C9333	C9377	C9334	C9335	C9336	C9330	C9318
		SAMPLE LOCATION	MW-25B	MW-22A	MW-21B	MW-220	MW-22C	MW-25A	MW-21A	BLANK
105-60-2	20-azepin-2-one, hexahydrp-									
143-07-7	dodecanoic acid									
15918-07-7	4 nonene-5-methyl-									
1790-71-4	2,6,10-dodecatrien-1-ol, 3,7,11-trimethyl- (Z,Z)									
1678-98-4	Cyclohexane, [2-methylpropyl]-									
5090-4-5	9-oxoheptanal									
57-10-1	hexadecanoic acid									
679-05-0	1-octyne									
7861-64-9	2,6,10,14,18,22-tetracosane,									
	2,6,10,15,19,23-hex									
105-60-2	20-azepin-2-one, hexahydro									
116-02-9	Cyclohexanol, 3,3,5-trimethyl-									
101-02-0	9-oxoheptanamide, (Z)-									
101-02-0	9-oxoheptanamide, (Z)-									
544-63-0	tetradecanoic acid									
143-78-2	9-oxoheptan-1-ol, (Z)-									
10544-50-0	Sulfur, hexa- (S8)									
2091-29-4	9-hexadecanoic acid									
127-18-4	tetrachloroethene									
60-42-7	6-aminohexanoic acid									
98-54-4	4(1,1-dimethyl)phenol									
100-100-1	Toluene									

323 JB 368 JD 373 JB 339 JB 68 J 70 J 440 JB 419 JB

ORIGINAL
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AR100792

TENTATIVELY IDENTIFIED COMPOUNDS
 HILLCREEK SITE
 CONCENTRATION (µg/l)/PERCENT PURITY (if reported)

MEDIUM:	SURFACE WATERS								
CAS NO.	COMPOUND	NUS SAMPLE NO.	MC-SW-001	MC-SW-003	MC-SW-004	MC-SW-005	MC-SW-006	MC-SW-007	MC-SW-010
		LAB-SAMPLE NO.	C9774	C9775	C9776	C9777	C9778	C9779	C9780
		SAMPLE LOCATION							MC-SW-010A
108-88-3	Toluene								
60-12-2	6-Amino, hexanoic acid		352JB	425JB	354JB	334JB	383JB	517JB	381JB
						58			336JB

A-117

ORIGINAL
 (red)

AR100793

A-175

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ORIGINAL
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APPENDIX J

SPECIFIC POSITIVE TOXICITY TESTS
CONDUCTED ON THE CONTAMINANTS OF CONCERN
(ALL DATA FROM RTECS, USDHHS, 1984)

AR100794

TABLE J-1
 VINYL CHLORIDE
 CAS NO. 75-01-4

H-116

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
Mutation in microorganisms (2 cases) Microsomal mutagenicity assay (4 cases) DNA repair Sex chromosome loss and nondisjunction (2 cases) Gene conversion and mitotic recombination (2 cases) Cytogenetic analysis (3 cases) Oncogenetic transformation DNA damage DNA inhibition Host mediated transfer	Reproductive Effects Spermatogenesis (ihl/man) Developmental Effects Fetotoxicity (ihl/rat) Post-implantation mortality (ihl/rat) Fetotoxicity, musculoskeletal system (ihl/rat, mus, rabbit) Urogenital system (ihl/rat)	Carcinogenic, liver tumors (ihl/man) Carcinogenic, GI tumors, liver tumors (ort/rat) Carcinogenic, angiosarcoma, other tumors (ihl/rat) Carcinogenic, transplacental tumorigenesis, endocrine tumors (ihl/rat) Equivocal tumorigenic, other tumors, GI tumors (ipr/rat) Carcinogenic, other tumors (scu/rat) Carcinogenic, vascular tumors, other tumors (ihl/mus) Carcinogenic, lymphoma, other tumors (ihl/ham) Carcinogenic, respiratory tumors, other tumors (ihl/mus) Carcinogenic, respiratory tumors, liver tumors (ihl/rat) Carcinogenic, respiratory tumors, liver tumors (ihl/mus) Carcinogenic, angiosarcoma, kidney tumors (ort/rat) Carcinogenic, respiratory tumors, other tumors (ihl/mus) Carcinogenic, respiratory tumor, other tumors (ihl/rat) Carcinogenic, ear tumors, angiosarcoma (ihl/rat) Carcinogenic, tumors, (ihl/hmn) Carcinogenic, brain tumors, angiosarcoma (ihl/rat) Carcinogenic, other tumors (ihl/rat)

ORIGINAL
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ARI00795

TABLE J-2

TRICHLOROETHYLENE
CAS NO. 79-01-6

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
<p>Mutation in microorganisms Microsomal mutagenicity assay (3 cases) Unscheduled DNA syntheses (3 cases) DNA inhibition Sister chromatid exchange Oncogenic transfer DNA damage (3 cases) Specific locus test Host-mediated assay Sperm morphology Oncogenic transformation</p>	<p>Reproductive Effects Spermatogenesis (ihl/mus) Developmental Effects Musculoskeletal system (ihl/rat) (2 cases) other developmental abnormalities (ihl/rat) Post-implantation mortality, fetotoxicity (ihl/rat) urogenital system (ihl/rat)</p>	<p>Equivocal tumorigenic agent, lymphoma, kidney tumors (ihl/rat) Carcinogenic, liver tumors (ori/mus) Equivocal tumorigenic agent, lymphomas, bronchogenic carcinoma (ihl/mus) Carcinogenic, liver tumors, (ori/mus) Carcinogenic, lymphoma (ihl/mus)</p>

ORIGINAL
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AR100796

TABLE J-3
 1,2-DICHLOROETHANE
 CAS NO. 107-06-2

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
Mutation in microorganisms (2 cases)	Reproductive Effects None reported	Carcinogenic, GI tumors, other tumors (ori/rat)
DNA damage (5 cases)	Developmental Effects Post implantation mortality	Equivocal tumorigenic agent, leukemia, other tumors (ori/rat)
DNA repair		Carcinogenic, respiratory tumors, other tumors (ori/mus)
Sex linked chromosome loss and nondisjunction (2 cases)		Equivocal tumorigenic agent, respiratory tumors, other tumors (ihl/mus)
DNA inhibition		Neoplastic, respiratory tumors, other tumors (skin/mus)
Micronucleus test		*Carcinogenic, bladder tumors, GI tumors (ori/rat)
Body fluid assay		*Carcinogenic, other tumors, uterine tumors (ori/mus)
Oncogenic transformation		*Carcinogenic, bladder tumors, GI tumors (ori/rat)
Mutation in mammalian somatic cells		*Carcinogenic, other tumors, uterine tumors (ori/mus)

* Variable dosage within the same test program

ORIGINAL
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AR100797

ORIGINAL
(red)

TABLE J-4

1,1,1-TRICHLOROETHANE
CAS NO. 71-55-6

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
Mutation in microorganisms Microsomal mutagenicity assay DNA repair Oncogenic transformation (3 cases)	Reproductive Effects None reported Developmental Effects Cardiovascular effects (ori/rat) Musculoskeletal effects (ihl/rat) Urogenital effects, other abnormalities (ihl/rat) Fototoxicity (ihl/rat)	None reported

AR100798

TABLE J-5
1,1-DICHLOROETHENE
CAS NO. 75-35-4

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
Mutation in microorganisms (3 cases) DNA damage (2 cases) Unscheduled DNA synthesis	Reproductive Effects None reported Developmental Effects Fertility effects, fetotoxicity (ori/rat) Miscoskolatal (ihl/rat) Post-implant mortality (ihl/rat)	Equivalent tumorigenic agent, liver tumors, lymphomas (ihl/rat) Carcinogenic, kidney tumors, leukemia, (ihl/mus) Neoplastic, respiratory tumors, other tumors (skin/mus) Equivalent tumorigenic agent, leukemia, other tumors (ihl/rat) Equivalent tumorigenic agent, respiratory tumors, liver tumors (ihl/mus) Equivalent tumorigenic agent, liver tumors (ihl/mus) Equivalent tumorigenic agent, blood tumors (ihl/rat) Equivalent tumorigenic agent, GI tumors, liver tumors (ihl/rat) Equivalent tumorigenic agent, liver tumors, other tumors (ihl/rat) Equivalent tumorigenic agent, liver tumors, other tumors (ihl/rat)

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ORIGINAL
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TABLE J-6
1,2-DICHLOROETHENE
CAS NO. 156-60-5

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
None reported	None reported	None reported

AR100800

TABLE J-7

BIS(2-ETHYLHEXYL)PHOSPHATE
CAS NO. 117-81-7

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
<p>Mutation in microorganisms Cytogenetic analysis (2 cases) Dominant lethal test (2 cases) Oncogenic transformation</p>	<p>Reproductive Effects Ovaries, fallopian tubes (orl/rat) Testes, epididymis, sperm duct (orl/rat) Other effects on male (lpr/rat) Male fertility index (lpr/mus) Female fertility index (lvm/mus) Other measures of fertility (lvm/mus) Testes, epididymis, sperm duct (orl/gpg) Testes, epididymis, sperm duct (orl/man) Developmental Effects Fetotoxicity (orl/rat) Post-implantation mortality (orl/rat) Litter size, fetotoxicity (orl/rat) Post implant mortality, eye-ear, other developmental abnormalities (lpr/rat) Fetotoxicity (lpr/rat) Fetal death, musculoskeletal (orl/mus) Central nervous system, eye, ear, cardiovascular (orl/mus) Preimplant mortality, litter size (lpr/mus) Fetal death (lpr/mus) Preimplant mortality, total death (scu/mus) Litter size (lvm/mus) Fetotoxicity (lvm/mus)</p>	<p>Carcinogenicity, liver tumors, endocrine tumors (orl/rat) Carcinogenicity, liver tumors, (orl/mus) Carcinogenicity, liver tumors, testicular tumors, (orl/rat) Carcinogenicity, liver tumors, (orl/mus)</p>

AR100801

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A-100

TABLE J-8

BENZO(A)PYRENE
CAS NO. 50-32-8

Reported Reproductive and Developmental Effects

Reported Tumorigenic Activity

Mutagenicity Bioassays

- Microsomal mutagenicity assay (8 studies)
- DNA damage (76 studies)
- Mutation in microorganisms (2 studies)
- DNA repair (2 studies)
- Gene conversion and mitotic recombination (2 studies)
- Phage inhibition capacity (3 studies)
- Unscheduled DNA synthesis (18 studies)
- DNA inhibition (7 studies)
- Sex chromosome loss and nondisjunction (6 studies)
- Mutation in mammalian somatic cells (25 studies)
- Oncogenic transformation (21 studies)
- Cytogenetic analysis (29 cases)
- Sister chromatid exchange (26 cases)
- Fluid body assay (3 cases)
- Micronucleus test (3 cases)
- Specific locus test (3 cases)
- Dominant lethal test
- Sperm morphology (5 cases)

Reproductive Effects

- Oogenesis (ori/mus)
- Oogenesis (ipr/mus)
- Spermatogenesis (ipr/mus)
- Spermatogenesis, testes, epididymis, sperm duct (ipr/ham)

Developmental Effects

- Extra embryonic structure, other effects (ori/rat)
- Litter size, female fertility index, male fertility index (ori/mus)
- Immune and reticuloendothelial system (ipr/mus)
- Craniofacial, skin and appendages, musculoskeletal (ipr/mus)

Neonatal Effects

- Stillbirth, growth statistics (ori/rat)
- Live birth index (ori/rat)
- Germ cell effects (ipr/rat)
- Germ cell effects (ori/mus)
- Delayed effects (ori/mus)
- Weaning or lactation effects (ori/mus)
- Growth statistics (ori/mus)
- Stillbirth (ipr/mus)
- Live birth index (scu/mus)

Reported Tumorigenic Activity

- Carcinogenic, GI tumor, musculoskeletal tumors (ori/rat)
- Equivocal tumorigenic agent, site-of-application tumor (ipr/rat)
- Neoplastic, site-of-application tumor (scu/rat)
- Equivocal tumorigenic agent, skin and appendages (lvt/rat)
- Carcinogenic, site-of-application tumor (i-us/rat)
- Equivocal tumorigenic agent, brain tumors, site-of-application tumors (i-c/rat)
- Carcinogenic, respiratory system tumors, (its/rat)
- Carcinogenic, respiratory system tumors, blood system tumors (ori/mus)
- Equivocal tumorigenic agent, respiratory system tumors (lvt/mus)
- Carcinogenic, transplacental tumorigenesis (skn/mus)
- Carcinogenic, other tumors (skn/mus)
- Carcinogenic, blood system tumors, site-of-application tumors (skn/mus)
- Neoplastic, respiratory system tumors (ipr/mus)
- Carcinogenic, transplacental tumorigenesis, respiratory system tumors (ipr/mus)
- Carcinogenic, site-of-application tumors (scu/mus)
- Carcinogenic, transplacental tumorigenesis, respiratory system tumors (scu/mus)
- Equivocal tumorigenic agent, respiratory system tumors (iir/mus)
- Carcinogenic, site-of-application tumors (imp/mus)
- Equivocal tumorigenic agent, site-of-application tumors (unk/mus)
- Carcinogenic, leukemia, colon tumors (rec/mus)
- Equivocal tumorigenic agent, site-of-application tumors (par/dog)
- Equivocal tumorigenic agent, respiratory system tumors, site-of-application tumors (imp/dog)
- Equivocal tumorigenic agent, respiratory system tumors (scu/mus)

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AR100802

Reported Reproductive and
Developmental Effects

Mutagenicity Bioassays

Reported Tumorigenic Activity

Neoplastic, transplacental tumorigenesis, structural change in nerve or sheath (ivn/rbt) 101
Equivocal tumorigenic agent, bronchogenic carcinoma (itr/rbt)
Equivocal tumorigenic agent, GI tumors, other appendage tumors (ort/ham)
Equivocal tumorigenic agent, nasal tumor, respiratory system cancer (ihl/ham)
Equivocal tumorigenic agent, bronchogenic carcinoma (scu/ham)
Carcinogenic, respiratory system tumors (itr/ham)
Equivocal tumorigenic agent, bladder tumors, kidney tumors (imp/irg)
Carcinogenic, respiratory system tumors, site-of-application tumors (imp/rat)
Neoplastic, respiratory system tumors (skn/mus)
Carcinogenic, respiratory system tumors, liver tumors (itr/rat)
Carcinogenic, other appendage tumors (skn/mus)
Neoplastic, respiratory system tumors, bronchogenic carcinoma (itr/ham)
Neoplastic, bladder tumors, other appendage tumors (imp/mus)
Carcinogenic, respiratory system tumors (itr/ham)
Carcinogenic, site-of-application tumors (imp/rat)
Carcinogenic, other appendage tumors, site-of-application tumors (skn/mus)
Carcinogenic, site-of-application tumors (sku/mus)

ORIGINAL
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AR100803

ORIGINAL
(red)

TABLE J-9
NAPHTHALENE
CAS NO. 91-20-3

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
DNA damage (2 cases, both in vivo)	Musculoskeletal, cardiovascular system (ipr/rat)	Equivalent tumorigenic lymphomas, uterine tumors (scu/rat)

AR100804

ORIGINAL
(red)

TABLE J-10

LEAD
CAS NO. 7439-92-1

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
Cytogenetic analysis (hl/rat)	Reproductive Effects	
Cytogenetic analysis (orl/mky)	None reported	
	Developmental Effects	
	Fetal death, fetotoxicity (orl/rat)	
	Blood and lymphatic system (orl/rat)*	
	Fetotoxicity, blood and lymphatic system (hl/rat)	
	Fetotoxicity, fetal death (orl/mus)	
	Neonatal Effects	
	Behavioral (orl/rat) (2 cases)	
	Growth statistics (orl/rat)*	
	Behavioral (hl/rat)	

*Occurred in same study

AR100805

A-101

ORIGINAL
(red)

TABLE J-11

PCB-1248
CAS NO. 12672-29-6

Mutagenicity Bioassays	Reported Reproductive and Developmental Effects	Reported Tumorigenic Activity
	<p>Reproductive Effects Menstrual cycle disorders (ori/mky) Developmental Effects Post-implantation mortality (ori/mky) Abortion (ori/mky) Immune and reticuloendothelial system (ori/rbt) Neonatal Effect† Behavioral (ori/mky) Growth statistics, behavioral (ori/mky)</p>	

AR100806

TABLE J-12

(red)

TENTATIVELY IDENTIFIED COMPOUNDS
FOR WHICH THE REGISTRY OF TOXIC EFFECTS OF
CHEMICAL SUBSTANCES (RTECS) LISTING PROVIDES EVIDENCE OF TOXIC
BIOLOGICAL EFFECTS IN EXPERIMENTAL TEST SYSTEMS

<u>CAS No.</u>	<u>Compound</u>
<u>Tumorigenicity</u>	
203-64-5	4H-Cyclopenta (d,e,f) phenanthrene
195-19-7	Benzo(c)phenanthrene
2541-69-7	Benz(a)anthracene, 7-methyl-
112-53-8	Dodecyl alcohol
57-11-4	Stearic acid
55556-88-2	Piperazine, 2,5-dimethyl-1,4-dinitroso
79-34-5	Ethane, 1,1,2,2-tetrachloro-
127-18-4	Ethylene, tetrachloro-
79-00-5	Ethane, 1,1,2-trichloro-
10061-02-6	Propene, 1,3-dichloro-
57-10-3	Palmitic acid
1921-70-6	Pentadecane, 2,6,10,14-tetramethyl-
84-74-2	Phthalic acid, dibutyl ester
58-72-0	Ethylene, triphenyl-
<u>Mutagenicity</u>	
195-19-7	Benzo(c)phenanthrene
2541-69-7	Benz(a)anthracene, 7-methyl-
60-29-7	Ethane, 1,1'-oxybis-
59-02-9	2H-1-benzopyran-6-ol, 3,4-dihydro-2,5,7,8-tetramethyl- 2-(4,8,12-trimethyltridecyl)-(2R-(2R*(4R*,8R*)))-
112-80-1	9-octadecenoic acid
55556-88-2	Piperazine, 2,5-dimethyl-1,4-dinitroso
108-67-8	Mesitylene
79-34-5	Ethane, 1,1,2,2-tetrachloro-
127-18-4	Ethylene, tetrachloro-
79-00-5	Ethane, 1,1,2-trichloro-
100-52-7	Benzaldehyde
10061-02-6	Propene, 1,3-dichloro-
2381-21-7	Pyrene, 1-methyl-
82-05-3	7H-Benz(d,e) anthracen-7-one
191-24-2	Benzo (g,h,i) perylene
195-19-7	Benzo(c) phenanthrene
84-74-2	Phthalic acid, dibutyl ester

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TABLE J-12
 TENTATIVELY IDENTIFIED COMPOUNDS
 FOR WHICH THE REGISTRY OF TOXIC EFFECTS OF
 CHEMICAL SUBSTANCES (RTECS) LISTING PROVIDES EVIDENCE OF TOXIC
 BIOLOGICAL EFFECTS IN EXPERIMENTAL TEST SYSTEMS
 PAGE TWO

<u>CAS No.</u>	<u>Compound</u>
<u>Carcinogenicity</u>	
205-82-3	Benzo(j)fluoranthene
205-99-2	Benz(e)acephenan thrylene
4549-40-0	Vinylarsonic acid, beta-chloro-
79-34-5	Ethane, 1,1,2,2-tetrachloro-
79-00-5	Ethane, 1,1,2-trichloro-
<u>Reproductive Effects</u>	
58-72-0	Ethylene, triphenyl-
127-18-4	Ethylene, tetrachloro-
59-02-9	2H-1-benzopyran-6-ol, 3,4-dihydro-2,5,7,8-tetramethyl- 2-(4,8,12-trimethyltridecyl)-(2R-(2R*(4R*, 8R*)))-
131-18-0	Phthalic acid, diphenyl ester
84-74-2	Phthalic acid, dibutyl ester
84-69-5	Phthalic acid, disobutyl ester

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Park West Two
Cliff Mine Road
Pittsburgh, PA 15275
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REMEDIAL INVESTIGATION/
FEASIBILITY STUDY REPORT

VOLUME IV
APPENDICES

MILLCREEK SITE
ERIE COUNTY, PENNSYLVANIA

EPA WORK ASSIGNMENT
NUMBER 60-3L60
CONTRACT NUMBER 68-01-6699

NUS PROJECT NUMBER S778

AUGUST 1985

SUBMITTED FOR NUS BY:

APPROVED:

CATHERINE D. CHAMBERS
PROJECT MANAGER

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DAVID E. MacINTYRE
REGIONAL MANAGER
REGION III

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APPENDIX K

GROUNDWATER EXTRACTION AND TREATMENT

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APPENDIX K

GROUNDWATER EXTRACTION AND TREATMENT

K.1 Groundwater Extraction and Treatment

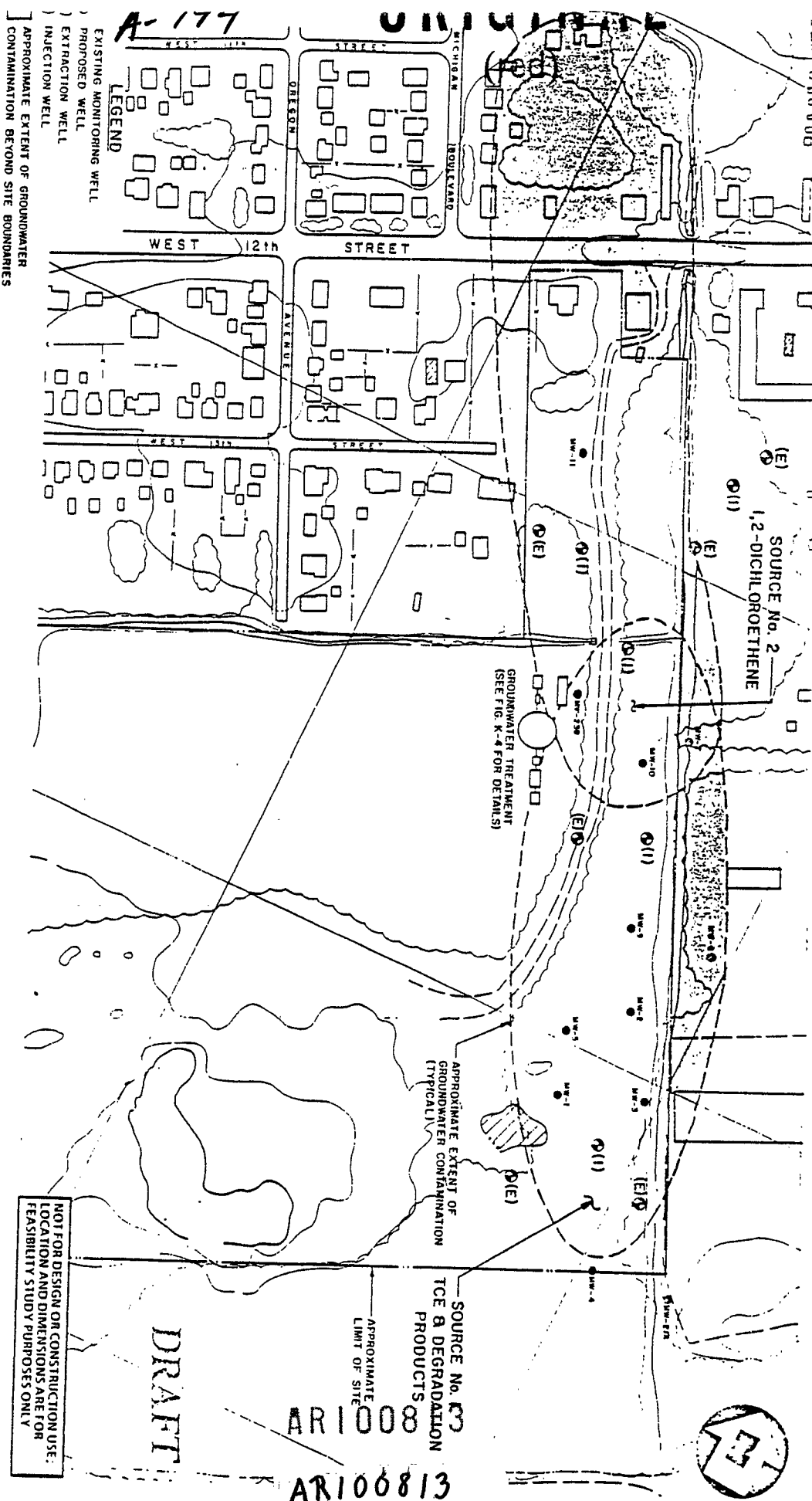
Data gathered during the Remedial Investigation at the Millcreek Site indicate that on and offsite contamination of groundwater has occurred. Control of this contaminated groundwater may be accomplished by pumping the water to the surface and treating the recovered liquids for release or reinjection. Groundwater extraction and treatment will achieve the following objectives:

- Control of flow or influences of plume flow.
- Prevent further contaminant migration off site. (See Figure K-1 for current plume.)
- Control of toxic groundwater contaminants using treatment system specific to the quality desired.
- Protection of nearby surface waters by retarding the rate at which groundwater recharges Marshall's Run.

A series of extraction and injection wells can be used to lift groundwater to the surface, where it can be treated using physical, chemical, or biological methods. Treated effluent may either be released to an offsite POTW for further treatment, released to Marshall's Run, or injected into the aquifer from which it was pumped.

Careful monitoring of pumped groundwater is necessary to assure that the plume is extracted to the surface in an effective manner. In particular, the impact of reinjection must be determined early to make certain that the plume is not diverted away from the recovery wells. The groundwater collection and treatment system designed for Millcreek will be described in detail in the following sections.

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(red)**K2 Groundwater Recovery System****K2.1 General**

The groundwater extraction system was designed to recover the contaminated groundwater from the sand, silt, and gravel aquifer beneath the Millcreek Site. Aquifer characteristics were reported in the RI Report prepared by NUS Corporation.

The groundwater extraction system was designed with the assistance of BESTWELLS, a computer optimization model designed by In-Situ, Inc. The model determines the optimum number and location of wells to achieve a targeted drawdown. Injection wells purge the low-flow velocity regions between wells so that stagnant contamination could be removed.

BESTWELLS is a steady-state, analytical model with the following built-in assumptions:

- The aquifer is of uniform thickness.
- The aquifer is infinite in extent.
- The properties of the aquifer are homogeneous and constant.
- All wells are fully screened and 100 percent efficient.
- The pumping rate of the well remains constant during the lifetime of the project; i.e., the pumping rate of the well represents the average pumping rate for the given pumping period.
- The groundwater head is constant at the boundary of the project area.

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Since site conditions at Millcreek can be characterized by the model assumption, BESTWELLS is a useful tool in estimating the location and production rate of the proposed groundwater extraction system.

K2.2 System Operation

The groundwater extraction system was designed based on the following input data obtained during the Remedial Investigation:

- Well diameter - 4 inches
- Maximum available drawdown - 15 feet
- Pumping duration - 6 months
- Aquifer type - unconfined
- Existing water table elevation - 708.1 feet above MSL
- Hydraulic conductivity - 17.8 gpd/ft²
- Specific yield - 0.15
- Target drawdown - 15 feet
- Physical boundary of well field - see Figure K-1
- Location of contaminated plume - see Figure K-1
- Thickness of contaminated plume - 15 feet
- Plume volume - 1.7 x 10⁶ cubic feet.

The purpose of applying BESTWELLS is to determine the optimum number and location of wells to recover the contaminant plume. In other words, the model is used to design a well field to lower the water table 15 feet below current elevation. Twelve existing wells were used in the well field design to lower construction costs. Additionally, the sand, silt, and gravel media in the aquifer must be flushed at least once during the pumping period.

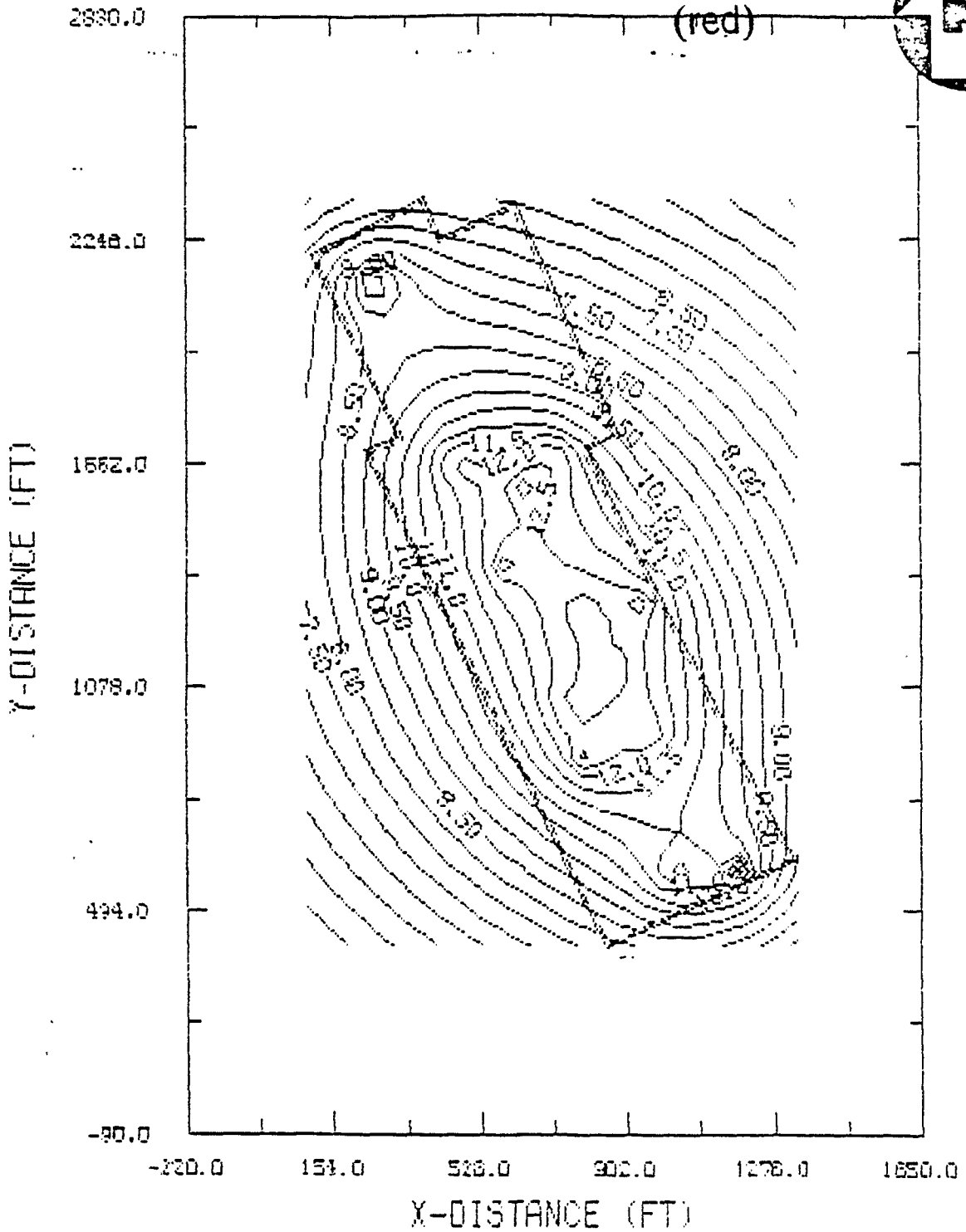
K2.3 Model Output

The model indicates that using 12 existing and 6 new wells, at an associated pumping rate of 500 gpm, will lower the water table by 12 feet (see Figure K-2).

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FIGURE K-2

PUMPING DRAWDOWN CONTOURS
MILLCREEK SITE, MILLCREEK TWP, PA

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However, to achieve complete recovery of groundwater contaminants, five recharge wells were added. These wells are located where the drawdown gradient was relatively flat. The injection rate for each recharge well is designed at 30 gpm. This injection rate is based on the average pumping rate of the 18 extraction wells. The total pumping rate of 18 extraction wells and five recharge wells is 585 gpm. Approximately 150 gpm will be treated and injected into the aquifer. The net discharge rate will be 435 gpm or 1 cfs.

The drawdown contours from the combined pumping and recharge system indicated the average drawdown is approximately identical to the 18 extraction well system (see Figure K-3). However, the stagnant areas between the extraction wells are significantly reduced by the mixing that is obtained through injection. Based on the production rate of 585 gpm obtained by the pumping and recharge system, the amount of water pumped during the 6-month period is $2.0 \times 10^{-7} \text{ ft}^3$, or 12 pore volumes.

During design of the groundwater recovery system, consideration was given to the Yoder Wells, located about 2,000 feet south of the site. The drawdown contours indicate that the cone of depression may extend to the Yoder Wells. The maximum induced drawdown is approximately 1 foot, attained at the end of the 6-month pumping period. This effect will be reduced by the natural recovery that occurs when pumping operations at the site cease. During normal rainfall times, the induced drawdown is not expected to have an effect on the Yoder Wells' capacity. However, there is a possibility that during dry conditions there may be some effect.

K.3 Water Treatment

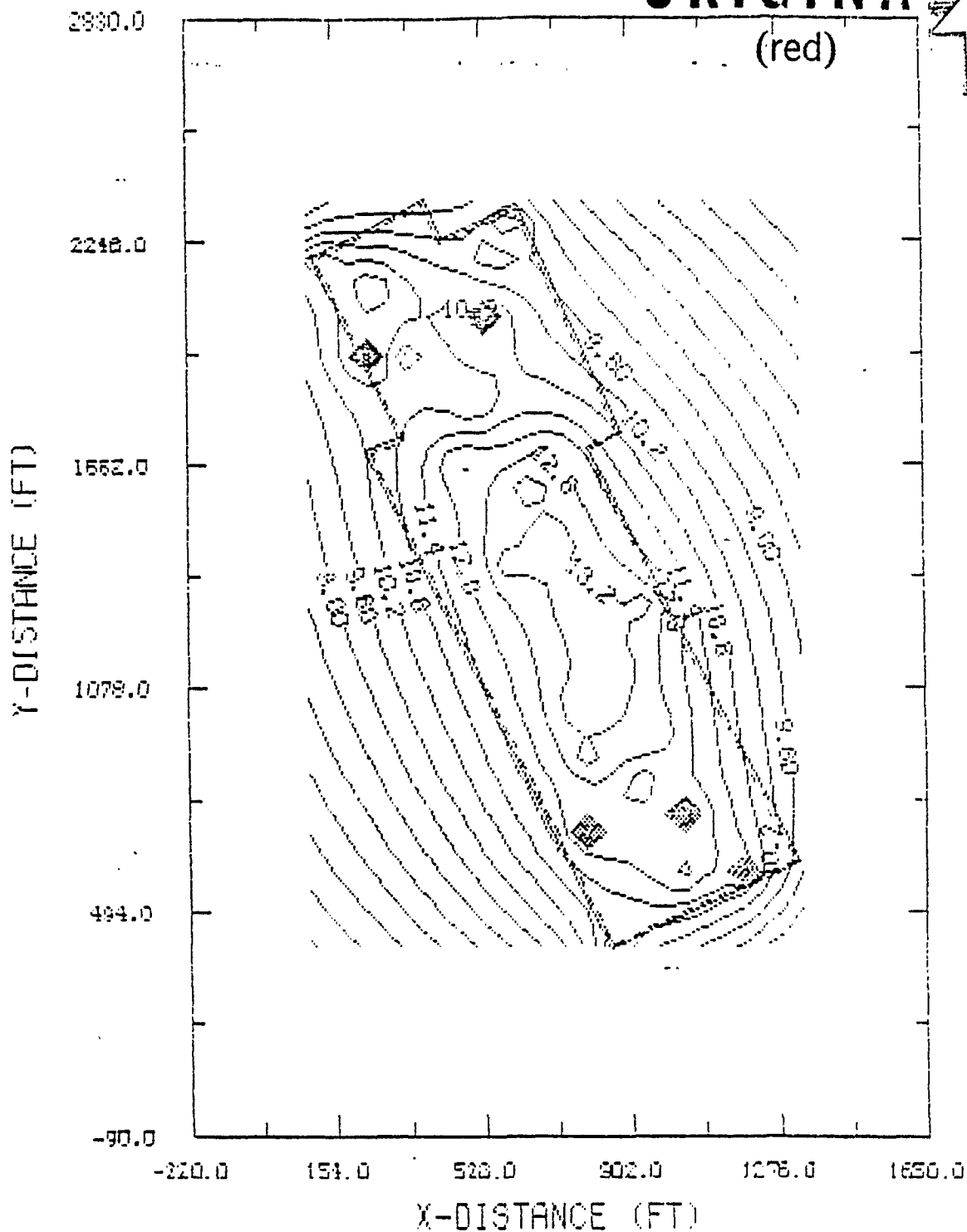
K.3.1 General

Retaining groundwater collection as a control technology leads automatically to considering appropriate methods of treatment and disposal. Because groundwater at the Millcreek Site contains volatile and nonvolatile organics and certain metals,

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PUMPING WITH INJECTION
DRAWDOWN CONTOURS
MILLCREEK SITE, MILLCREEK TWP., PA

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FIGURE K-3



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several different unit processes may have to be combined to effectively treat the water. Three basic categories of treatment for potential application are biological, chemical, and physical.

Based upon review of the available treatment alternatives in Section 11.0, and upon consideration of the groundwater characteristics at the Millcreek Site, the most effective treatment sequence would include a process to reduce dissolved metals concentration (e.g., precipitation); a process to reduce volatile organics loadings (e.g., air stripping); and a process to reduce nonvolatile organics loadings (e.g., carbon absorption or biological treatment). Other treatment components (e.g., filtration, equalization, flocculation/sedimentation) may be required to achieve differing levels of effluent quality, but the basic components will be common to most treatment alternatives.

At most sites, treatment can be accomplished either on site, in specially constructed facilities tailored to specific site requirements, or off site, in an existing Publicly Owned Treatment Works (POTW). Even when offsite treatment is selected, a need for some degree of onsite pretreatment usually exists prior to release to the POTW.

K3.2 System Design

The groundwater at the Millcreek Site must be treated for removal of volatile organics, dissolved metals, and nonvolatile organics. To ensure a thorough purging of low-flow velocity regions between existing wells, 6 additional wells will be installed to pump water to the surface, and 5 injection wells will be strategically located to inject treated water.

The use of injection wells ensures that the stagnant areas of the contaminated plume can be moved into positions where the groundwater can be lifted to the surface for treatment. The groundwater pumping and treatment system is based on pumping 585 gpm, treating this entire flow, injecting 150 gpm via the 5 injection wells, and releasing 435 gpm to Marshall's Run. During discussions with local

engineers regarding the capacity of Millcreek Township's sanitary sewer system, NUS learned that the proposed 400-450 gpm flow cannot be discharged to any nearby sewer. This 576,000 to 648,000 gpd flow rate is greater than the total system capacity that the Millcreek Township serves. The nearest sewers with sufficient total capacity are more than 2 miles away, in the city of Erie. Even here, existing sewer flows leave insufficient room for the Millcreek Site's discharge flows. The option to pretreat groundwaters for additional treatment off site in the POTW is not applicable.

The major contaminants identified in groundwater samples were volatile organics, especially 1,2-dichloroethene, and two dissolved metals, iron, and manganese. The relative absence of dissolved toxic metals indicates that they remain in subsurface soils and are not currently migrating into the groundwater. Low levels of other organics, such as phthalates and isophorone, were reported for single monitoring wells only. The groundwater treatment will be used to control of volatile organics. Iron and manganese, even though nontoxic and found at appreciable levels in background samples, will have to be reduced in concentrations before the groundwater can be released or injected into the aquifer. Their presence also would have adverse effects on the treatment components used to remove organics.

The sequence of treatment technologies to be used to remediate the Millcreek Site groundwater is as follows:

- Equalization to eliminate surges in raw groundwater quality.
- Precipitation of dissolved iron and manganese using lime or sodium hydroxide at a pH between 8.0 and 10.0.
- Flocculation/sedimentation of suspended matter in a sedimentation basin or tank. Polymer additions may be used to enhance settling.
- Air stripping of volatile organics, using pack-tower air strippers and counter-current flow.

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- Adsorption of trace metals, residual volatile organics, and other organics, using granular activated carbon columns.
- Separating the treated effluents into two discharge flows -- 150 gpm to aquifer recharge via 5 injection wells, and 435 gpm -- to direct discharge via Marshall's Run.

Variations on the basic treatment sequence proposed above are possible. For example, filtration could be substituted for the flocculation/sedimentation step prior to air stripping. Biological treatment processes could be considered instead of air stripping for removal of organics. However, in this latter case, air stripping has definite advantages over the three retained biological treatment processes (activated sludge, trickling filters, and rotating biological contactors). The biological processes are all more effective in controlling a wide range of organic contaminants, but the Millcreek Site groundwaters contain volatiles only. For this reason, air stripping, which only treat volatiles, is the more efficient unit process for organics control.

A simplified groundwater treatment system for use at Millcreek Site consists of an oxidation/volatilization basin, wherein dissolved iron and manganese may be oxidized by brisk mechanical agitation or air sparging. At the same time, volatile organic compounds will be driven off to the atmosphere. By using theoretical oxygen consumption rates, with dissolved oxygen in water as the primary oxidant, and theoretical half-life data for volatile organics under mixing conditions, it is possible to size the oxidation/volatilization with reasonable retention and mixing times. Aerated groundwaters would overflow to another onsite basin designed to provide enough retention time to settle out the ferric and manganic oxide flocs. Final effluents to Marshall's Run would still contain measurable, but safe, concentrations of the groundwater contaminants

This treatment sequence requires no chemical addition and less complicated treatment components than the air strippers and carbon adsorption systems proposed earlier. Similar systems are widely used to aerate and oxidize ferrous and

manganous compounds found in coal mine drainage. However, these latter systems usually include chemical addition to neutralize acids in the mine drainage, thus greatly accelerating the rate at which dissolved iron and manganese will precipitate.

Even though the simplified treatment approach appears to have advantages, there are a number of reasons why it should not be considered as an acceptable remedial alternative. First, and most serious, there is no provision for controlling the quantity of volatile organics that will be transferred from groundwater to the ambient atmosphere not only on site, but also in the residential areas immediately adjacent to the site in the prevailing downwind direction. On an average basis, the 3,540 to 4,715 µg/l of one volatile compound -- 1,2-dichloroethene -- represents a potential release of 26.4 to 35.1 pounds per day. The remaining volatile organics will contribute smaller shares to an average total volatile release rate of 28.3 to 36.0 pounds per day. Moreover, depending on which groundwater wells are being pumped at any given time, a potential maximum release of up to 216 pounds per day is possible. The proximity of residential housing to these releases ensures an immediate negative response to this practice, even though groundwater effluents would be of acceptable quality.

The amounts of iron and manganese to be treated are low enough that the projected conversion to ferric and manganic oxides is supportable, especially since mechanical aeration or air sparging will replace the dissolved oxygen consumed during this reaction. Reaction rates will vary with season, but the need for long control times to volatilize high concentrations of 1,2-dichloroethene, estimated to be 3 hours and 20 minutes, should permit oxidation of metals to proceed to completion. However, this long mixing time for a large volume of groundwater will require heavy-duty mechanical mixers or aerators, with an accompanying high energy cost. To allow at least 3 hours, 20 minutes of contact time, the basin volume has to be at least 124,000 gallons. This entire volume must be continuously agitated to provide adequate oxidation and volatilization. Much of the money saved in eliminating air-stripping and chemical addition will have to be spent in operating and maintaining the aeration system, typically a high maintenance item.

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For the above reasons, the simplified system will not be included in the list of remedial alternatives under consideration. The uncontrolled release of volatiles to the atmosphere, while remediating the groundwater, will have adverse impacts on the atmosphere and create unfavorable public reaction to EPA's efforts. The treatment system illustrated in Figure K-4 addresses this problem by controlling volatile emissions by means of a confined air stripper with an activated carbon trap on the exhaust line.

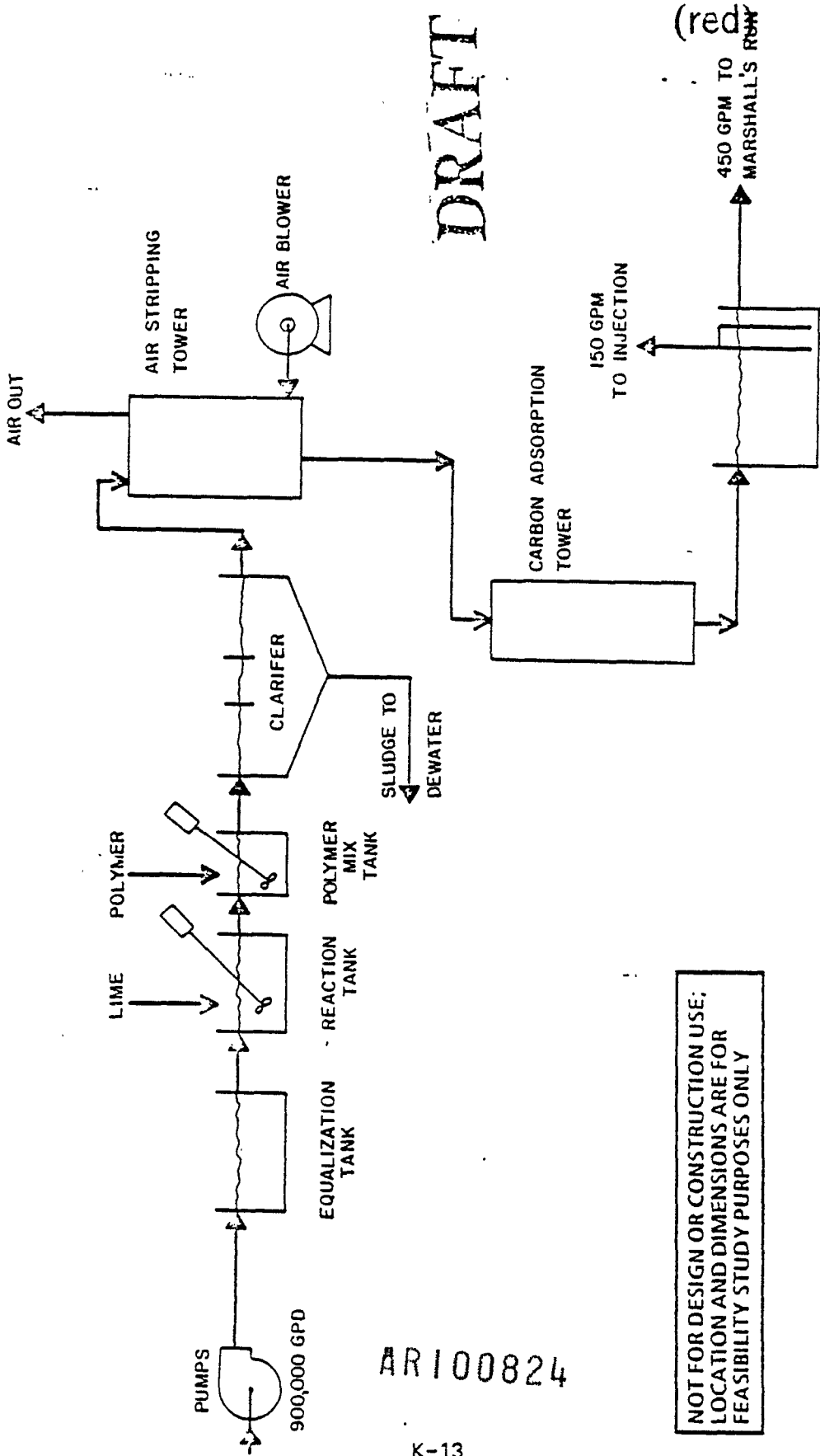
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The groundwater treatment system will be designated to accommodate a flow rate of 620 gpm. This allows for some excess capacity to account for minor variations in expected pumping rates, and to permit treatment of the existing pond waters and drainage from sludges and sediments in the same treatment plant. When these waters are brought into the system during the early days of remediation activities, other pumping rates may have to be adjusted to keep from grossly exceeding treatment plant capacity. To prevent overloading, Marshall's Run effluent release rates from the treatment plant should not exceed about 1 cfs (450 gpm). Since the 5 injection wells will each handle 30 gpm, 150 gpm of treatment plant effluent can be injected and 450 gpm discharged, giving a maximum total flow through treatment of 600 gpm. Refer to Figure K-4 for a diagram of the groundwater treatment system, and to Appendix M for details on costs.

Treatment duration is difficult to estimate at this time. Dewatering model studies indicate that groundwater volumes pumped over a 6-month period will provide sufficient flushing to replace the original plume volume 10 to 12 times. However, because of model limitations, costs are based on a more conservative pumping duration of 24 months.

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NOT FOR DESIGN OR CONSTRUCTION USE;
 LOCATION AND DIMENSIONS ARE FOR
 FEASIBILITY STUDY PURPOSES ONLY

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FIGURE K-4

GROUNDWATER TREATMENT SYSTEM FOR DIRECT DISCHARGE & INJECTION

MILLCREEK SITE, MILLCREEK TWP., PA

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APPENDIX L
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE

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