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File # DE095 B9

FINAL PLAN OF REMEDIAL ACTION

Clayville Dump
Christiana, DE

DNREC Project No. DE-0095

November 2002

Delaware Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Site Investigation & Restoration Branch
391 Lukens Drive
New Castle, Delaware 19720

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1.0 INTRODUCTION AND PURPOSE

The former Clayville Dump site (site) is located on the northern bank of the Christina River in Christiana, Delaware. The site is bordered by wooded uplands on the north and south, the Christina River on the east, and to the west by a large retail outlet, associated parking and storm water drainage basins (Figure 1). The site owner, Mr. Albert Marta, entered into the Voluntary Cleanup Program (VCP) in January 1997, as administered by the Department of Natural Resources and Environmental Control, Site Investigation and Restoration Branch (DNREC) under the provisions of the Delaware Hazardous Substance Cleanup Act (HSCA), 7 Del. C. Chapter 91. Through a VCP Agreement, Mr. Marta agreed to investigate the potential risks posed to the public health, welfare, and the environment at the site. Mr. Marta contracted Environmental Research and Consulting, Inc. (ERC) to perform a remedial investigation (RI) of the site.

Previous investigations by DNREC identified elevated concentrations of various organic compounds and heavy metals in soils at the site. The groundwater investigations conducted did not detect any chemicals of concern. The purpose of the RI was to: 1) further delineate the distribution of these organic compounds and heavy metals in site soils and Christina River sediments; 2) more fully investigate groundwater beneath the site; and 3) evaluate the potential risks of exposure from on-site contaminants to human and ecological receptors.

This document is the DNREC's final plan of remedial action (final plan) for the site. It is based on the results of the previous investigations performed at the site. This final plan is issued under the provisions of the HSCA and the Regulations Governing Hazardous Substance Cleanup (Regulations). It presents DNREC's assessment of the potential health and environmental risks posed by the site.

As described in Section 12 of the Regulations, DNREC provided notice to the public and an opportunity for the public to comment on the proposed plan. No comments were received. Therefore, the proposed plan is adopted as the final plan. All previous investigations of the site, the proposed plan, the comments received from the public, DNREC's responses to those comments, and the final plan constitute the Remedial Decision Record for the site.

Section 2.0 presents a summary of the site description and history. Section 3.0 provides a description of the remedial investigation results. Section 4.0 presents a discussion of the remedial action objectives. Section 5.0 presents the final plan. Section 6.0 presents the Director's declaration.

2.0 SITE DESCRIPTION AND HISTORY

Site Setting

The former Clayville Dump site is located in the north-central region of New Castle County, Delaware approximately ½ mile east/southeast from the intersection of U.S. Interstate 95 and Delaware Route 1 (Figure 1). The site comprises approximately 8.1 acres of an 18-acre parcel of

wooded land adjacent the Christina River. It is bordered to the north by a Conectiv (formerly DP & L) power line right-of-way, the Christina River and associated tidal wetlands to the south and east, and non-tidal wetlands to the west. Surrounding land use consists of a large retail complex opposite the wetlands towards the west, and wooded land and wetlands to the north, south and east (Figure 2).

Site and Project History

The Clayville Dump site was historically operated as a sand and gravel quarry prior to the early 1950s, when the site was operated as an industrial/municipal landfill under a permit from New Castle County. The landfill was in operation reportedly until 1971. There is not any available information as to what types or quantities of waste were disposed at the site. However, during recent investigations, iron and chrome automobile parts, rubber weather stripping, copious amounts of mica insulation, laboratory glassware and numerous 55-gallon drums (some containing liquid and/or solid contents) were identified on the surface and buried in the dump.

In January 1984, DNREC performed a preliminary assessment of the Clayville Dump site that documented the history and prior uses of the property, and recommended ground water sampling in the vicinity of the landfill. A site inspection (SI) was conducted at the site by DNREC in February 1987. This investigation consisted of the installation and sampling of monitoring wells, and the collection and analysis of soil samples and surface water and sediments from the Christina River. Other than low levels of polynuclear aromatic hydrocarbons (PAHs) that were detected in river sediments, there was little other contamination detected. However, a limited number of samples were collected. Only surface soil samples were collected. No drums were found. A hazard ranking of the site, based upon the results of the SI, determined that the site was ineligible for inclusion on the U.S. Environmental Protection Agency's (EPA's) National Priority List. Consequently, the Clayville Dump site was deferred to the State of Delaware.

A facility evaluation (FE) was performed by DNREC in 1994, which consisted of the excavation of numerous test pits, and sampling and analysis of surface and subsurface soils, groundwater, and surface water and sediments from the Christina River. The purpose of the FE was to identify the presence or absence of chemical contamination at the site associated with the former landfilling operations. Elevated concentrations of metals were found in a number of soil samples above the DNREC Uniform Risk-Based Remediation Standards (URS) for protection of human health. Some organic chemical contamination was noted, and several 55-gallon drums were also encountered.

As a result of the findings of the FE, DNREC contacted the property owner, who entered into a VCP agreement to perform a RI of the Clayville Dump site. Prior to the completion of the RI, DNREC requested that an investigation be conducted to further investigate the two areas where the drums had been encountered during the FE. The investigation began in November 1998 and numerous drums containing hazardous substances were found on-site. The investigation and subsequent drum excavation, removal, and disposal were all completed by July 1999.

3.0 REMEDIAL INVESTIGATION RESULTS/FEASIBILITY STUDY

ERC performed a RI at the site in 1997-98. The RI report was completed in July 1999. The RI consisted of the collection of 15 surface soil samples; the collection of one subsurface soil and one groundwater sample from each of eight subsurface boring locations; and the collection of eight sediment samples, five from the Christina River and three from the riparian wetlands between the landfill and the river.

During performance of the RI, a number of 55-gallon drums, some with varying amount of unknown materials, were identified on-site, mostly in the shallow subsurface. In November 1998, ERC began work to excavate and remove the drums that had been identified previously during the FE, as well as those recently discovered during the RI. Excavation and removal of the drums and associated contaminated soil was completed by January 1999, with subsequent waste characterization of the drum contents and disposal at approved facilities occurring in July 1999.

Soil analytical results indicated the presence of elevated concentrations of the metals, particularly lead (up to 6,380 mg/kg), antimony (up to 86.6 mg/kg), mercury (up to 21.8 mg/kg), and iron (223,000 mg/kg) in nearly all surface and subsurface soil samples. Please refer to Appendix I for a complete tabulated list of detected contaminants. One soil sample contained the polychlorinated biphenyl (PCB) Arochlor 1254, at 7.4 mg/kg, a concentration above its restricted use URS of 3 mg/kg. Several PAHs were detected in one or more Christina River sediment samples at concentrations in exceedence of their respective restricted use URS values. PAHs were not detected in the marsh sediments between the landfill and the river. However, the marsh sediments did contain arsenic, beryllium and iron at elevated concentrations in one or more samples.

Groundwater was found at the base of the landfill, perched on top of the underlying dense clay of the Potomac Formation. Groundwater yield was very poor, and is unusable as a potable resource. Intermittent exceedences of dissolved aluminum, beryllium, cobalt, iron, manganese, nickel and zinc were detected in groundwater samples collected from on-site monitoring wells in comparison to their respective URS values. Iron (up to 4,000 μg/l; URS of 300 μg/l), nickel (up to 112 μg/l; URS of 100 μg/l), manganese (up to 7,690 μg/l; URS of 50 μg/l), and zinc (3,700 μg/l; URS of 2,000 μg/l) exceeded their respective URS values of in the filtered samples. The most frequent of the elevated dissolved metals were iron and manganese, whose presence, in combination with a slightly acidic pH, high conductivity and low dissolved oxygen content, were indicative of landfill leachate. Groundwater loading calculations to the Christina River for the detected metals, due to the extremely low discharge rate, did not exceed Delaware Surface Water Quality Standards.

The site-specific human health and ecological risk assessments were performed under the assumption that the site would remain a former landfill, and would be zoned as such. Risks for short-term worker exposure and trespasser were calculated. The risk assessment concluded that no elevated risk existed for human trespassers to the site, or for ecological receptors. However, due to the lack of a risk-based concentration as input into the risk assessment, lead was not included in the risk assessment. Observed lead concentrations from seven surface soil samples were in excess of the restricted use URS of 1,000 mg/kg. As a result of the elevated lead, remedial action was warranted to address elevated concentrations of contaminants in site soils.

A supplemental environmental investigation to the RI was conducted in 1999-2000 at the site to delineate the extent of metal contamination in surface and subsurface soil samples along the edges of the landfill adjacent to the riparian wetlands associated with the Christina River. A total of 15 soil borings were conducted. Soil samples were collected from each boring and screened by the DNREC mobile laboratory. Based upon the results of the screening, a subset of soil samples was submitted for laboratory target analyte list /target compound list (TAL/TCL) analyses.

Concurrently with the supplemental environmental investigation, a geotechnical investigation was conducted across the extent of the landfill, consisting of the installation of 47 soil borings and 46 exploratory test pits. The purpose of the geotechnical investigation was to assess the necessary geotechnical information for use in the remedial design for the site. Soil samples were collected from each of the soil borings, and submitted for geotechnical analyses.

Results of the environmental sampling indicated that soil impacts from the landfilling activities continued up to the edge of the landfill. Elevated concentrations of metals, particularly antimony, arsenic, chromium, iron and lead, were detected at concentrations similar to those observed during the RI exceeding their respective restricted use human health URS in both surface and subsurface soils. During installation of the soil borings and excavation of the test pits, 25 additional 55-gallon drums were found, mostly on the surface and shallow subsurface. Of these, seven were empty and crushed, while the remainder contained varying amounts of unknown materials. All of the drums were excavated, removed and properly disposed off-site at an approved facility.

In the winter of 2002, a geophysical survey was conducted across the entirety of the landfill for purposes of identifying the possible presence of any drums remaining onsite. All magnetic anomalies large enough to represent potential drums were investigated through the excavation of test pits. Numerous drums were encountered, most of which were rusted, holed and crushed. Several contained a resinous product. All drums were excavated, removed and properly disposed at an appropriate off-site disposal facility, following characterization of their contents.

Upon completion of the RI, and after establishing remedial action objectives, DNREC usually requires a Feasibility Study (FS) to evaluate the various options available to remediate a site. However, for some categories of sites with a particular commonality, the U.S. EPA has developed presumptive remedies. Presumptive remedies are based on historical patterns of remedy selection and the preferred technologies typically implemented at sites with similar characteristics.

In the case of landfills, the EPA's Office of Solid Waste and Emergency Response has developed a presumptive remedy policy entitled *EPA's Presumptive Remedy for CERCLA Municipal Landfill Sites*. DNREC has reviewed this policy and concurs with EPA's approach and philosophy of utilizing established remedies for categories of sites with similar characteristics (e.g., landfills). To this end, the Department has previously adopted the EPA's presumptive remedy for municipal landfills, and will also adopt it as the FS for the Clayville Dump site. DNREC has determined that this approach will streamline the remedial process and, at the same time, provide protectiveness to public health, welfare, and the environment.

Therefore, DNREC has placed a copy of *EPA's Presumptive Remedy for CERCLA Municipal Landfill Sites* and a supporting document entitled *Conducting Remedial Investigations/Feasibility Studies for CERCLA Landfill Sites* on file at its Lukens Drive office.

4.0 REMEDIAL ACTION OBJECTIVES

According to Section 8.4 (1) of the Regulations, site-specific remedial action objectives (RAOs) must be established for all plans of remedial action. The Regulations provide that DNREC set objectives for land use, resource use and cleanup levels that are protective of human health and the environment.

Qualitative objectives describe in general terms what the ultimate result of the remedial action, if necessary, should be. Based on the presumptive remedy policy developed for landfill sites, and in consideration of the proposed commercial land use scenario and the requirements contained within the DNREC *Regulations Governing Solid Waste*, the following qualitative objectives are determined to be appropriate for the site:

1. Prevent human exposure to impacted media.

2. Prevent movement or migration of site contaminants.

3. Prevent environmental impacts, specifically to the Christina River, due to impacted media at the site.

4. Prevent ecological exposure to impacted media and restore ecological habitat.

These objectives are consistent with the current and proposed use of the site as a commercial use in a suburban setting adjacent to high-quality habitats and sensitive ecosystems, New Castle County zoning policies, and State regulations governing water supply.

Based on the qualitative objectives, the quantitative objectives are:

- Prevent human exposure to soils contaminated by VOCs, PAHs, and metals;

- Prevent percolation of precipitation through the landfill waste that could leach soil contaminants into groundwater, or entrain contaminated soil and discharge to surface water bodies via drainage runoff;

- Prevent ecological exposure to soils with concentrations of VOCs, PAHs, and metals;

- Improve riparian and upland habitat by concentrating landfill waste into a smaller area and restoring and revegetating areas that had previously been disturbed by landfilling activities; and

5.0. FINAL PLAN OF REMEDIAL ACTION

In consideration of the presumptive remedy policy adopted for landfill sites, the proposed land use scenario, the *Regulations Governing Solid Waste*, and the interim remedial actions already undertaken, the following remedial actions are proposed to ensure the long-term protectiveness to public health, welfare, and the environment:

1. Concentrate the landfill waste into a smaller area by excavating and moving waste material from the edges towards the center of the landfill. Restore and revegetate the newly exposed riparian and upland habitats that had previously been disturbed or covered by the landfill, with all activities based upon a DNREC-approved workplan and schedule;

2. Construct and install a landfill cap, based upon a DNREC-approved workplan and schedule, over the waste material to prevent both exposure to humans and wildlife by contaminated soils and percolation of precipitation, through the landfill waste that could leach contaminants into groundwater;

3. Construct a drainage system, based upon a DNREC-approved workplan and schedule, to divert surface water away from the landfill, thereby preventing erosion of the landfill cap as well as preventing downward percolation of precipitation through the waste; and

4. Place a deed restriction on the property that: a) restricts use of the property to those uses allowed following landfill post-closure under the *Regulations Governing Solid Waste* and EPA's *Reuse of CERCLA Landfills and Containment Sites Guidance,* b) prohibits digging, excavation or any disturbance of the soil cap, c) prohibits the installation of any water well on, or groundwater use at, the site without the explicit, written approval of DNREC, and d) places the site within a Groundwater Management Zone that will prohibit the installation of water wells at the site.

The Department actively solicited public comments and suggestions on the proposed plan of remedial action. No comments were received. The comment period began on Monday, July 29, 2002, and ended at the close of business (4:30 p.m.) Monday, August 19, 2002.

6.0. DECLARATION

This final plan of remedial action for the Clayville Dump Site is protective of human health, welfare and the environment, and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.

John Blevins
Director, Division of Air and Waste

11/19/02
Date

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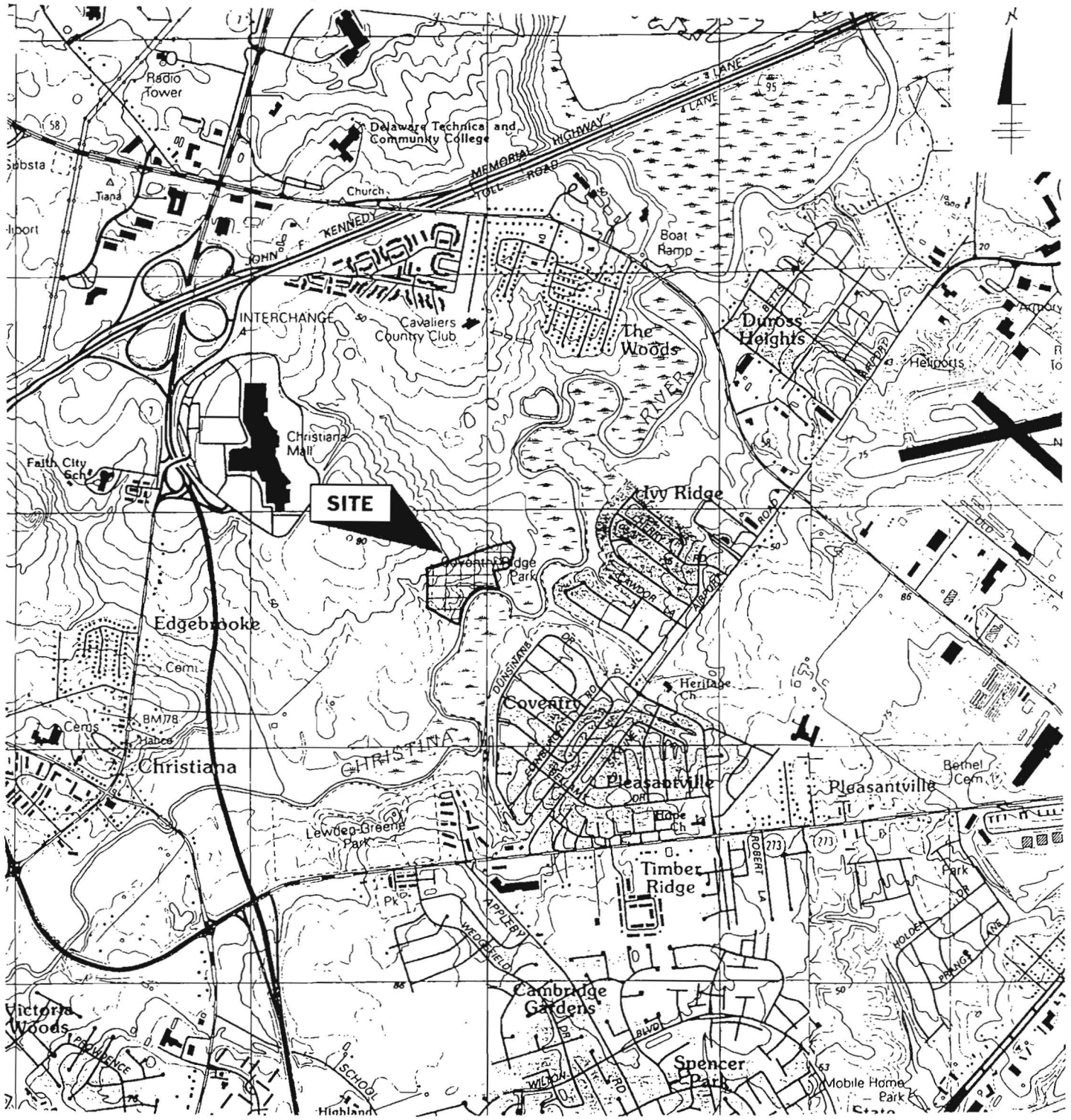
Figures from Remedial Investigation Report and Supplemental Environmental and Geophysical Investigation Report

Figure 1: Site Location/Topographic Map

Figure 2: Remedial Investigation Sampling Locations

Figure 3: Supplemental Environmental Investigation Sampling Locations

Appendix I



CONTOUR INTERVAL = 10 FEET

SOURCE: United States Geological Survey
7.5 Minute Topographic Series
Newark East, Delaware Quadrangle

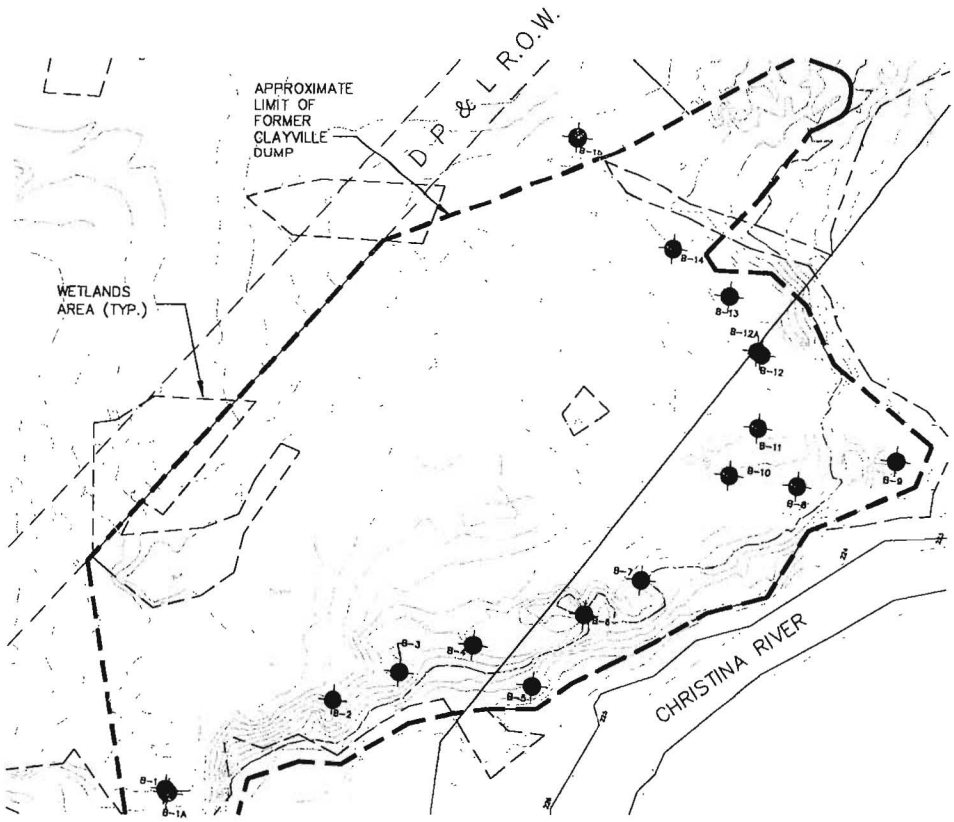
SITE LOCATION MAP

CLAYVILLE DUMP
NEW CASTLE COUNTY, DELAWARE

ENVIRONMENTAL RESEARCH AND CONSULTING, INC.

DATE:	SCALE:	
3/5/97	1" = 2000'	FIGURE 1-1

Figure 2: Remedial Investigation Sampling Locations



NOTES:

1. ALL BORING AND TEST PIT LOCATIONS ARE APPROXIMATE
2. TOPOGRAPHIC INFORMATION WAS COMPILED FROM AERIAL PHOTOGRAPHY COMPLETED BY BET ASSOCIATES FROM 1994 TO 1996.
3. BORINGS B-1 THROUGH B-15 ARE ENVIRONMENTAL BORINGS PERFORMED UNDER THE DIRECTION OF ERC.
4. BOTH TEST PITS AND BORINGS WERE PERFORMED AT LOCATIONS B-5, B-10, B-12, AND B-14.

LEGEND:

BORING/TEST PIT LOCATION

SOURCE: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES: FIGURE 1, PHASE 2, LOCATION PLAN, CHRISTIANA RETAIL CENTER DATED 4 MAY 2001.

SOIL BORING LOCATION MAP
FORMER CLAYVILLE DUMP
NEW CASTLE COUNTY, DELAWARE

ENVIRONMENTAL RESEARCH AND CONSULTING, INC.

DATE:	SCALE:	
5/11/01	1" = 90'	FIGURE 2

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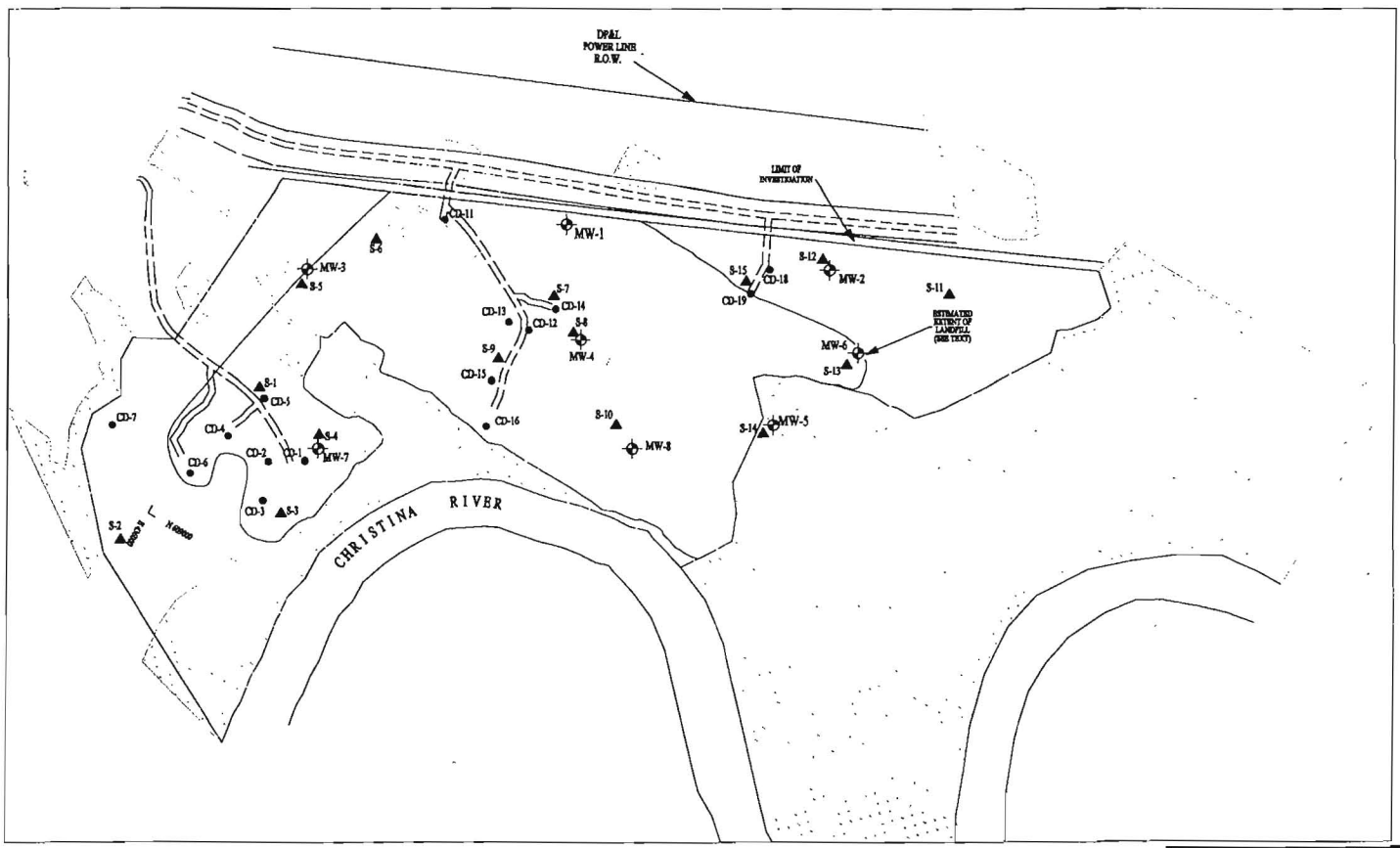
Figure 3: Supplemental Environmental Investigation Sampling Locations



LEGEND

CD-7 ● DIGREC TEST PIT

DIRT ROAD

MONITOR WELL (SUBSURFACE SOIL)

WETLANDS

▲ SURFACE SOIL SAMPLES

SOIL SAMPLING LOCATIONS		
CLAYVILLE DUMP NEW CASTLE COUNTY, DELAWARE		
ENVIRONMENTAL RESEARCH AND CONSULTING, INC.		
DATE 6/17/99	SCALE 1" = 150'	FIGURE 3-1

Appendix I

Appendix I

TABLE 1-1.
CHEMICAL ANALYSIS OF SOIL SAMPLES COLLECTED BY DNREC FROM TEST PITS AT THE FORMER CLAYVILLE DUMP SITE, JULY AND AUGUST 1994.

Test pit	CD-1A	CD-2A	CD-3B	CD-4A	CD-6A	CD-6B	URS - Human Health[1]	
Sample depth (ft)	0-2	0-2	ca. 8	0-2	0-2	ca. 10	Subsurface Soil (2-15 ft.)	Surface Soil (0-2 ft.)
Volatiles (mg/kg)								
Total 1,2-Dichlorethane	NA				NA		63	63
1,1,1-Trichloroethane	NA	0.063	1.3		NA		4,100	4,100
Trichloroethene	NA				NA		520	520
Toluene	NA		0.066J		NA		5,000	5,000
Ethylbenzene	NA		0.26J		NA		5,000	5,000
Styrene	NA		6.3		NA		5,000	5,000
Total xylenes	NA		0.13J		NA		5,000	5,000
Semivolatiles (mg/kg)								
Phenol			46	5			5,000	5,000
2-Methylphenol			5.4				5,000	5,000
4-Methylphenol			1.6J				5,000	5,000
Isophorone							5,000	5,000
2,4-Dimethylphenol							4,100	4,100
Napthalene			12J				5,000	5,000
2-Methylnaphthalene			2J				—	—
Dimethyphthalate			47				5,000	5,000
Acenaphthylene			1.7J				—	—
Dibenzofuran			1.6J				820	820
Fluorene			2.5J				5,000	5,000
Phenanthrene			9J		0.24J		5,000	5,000
Anthracene							5,000	5,000
Carbazole							290	290
Di-n-butylphthalate			1.6J		0.061J		—	—
Fluoranthene			1.2J		0.3J		5,000	5,000
Pyrene					0.19J		5,000	5,000
Butylbenzylphthalate			1.4J				5,000	5,000
Benzo (a) anthracene					0.052J		8	8
Chrysene					0.13J		780	780
Bis(2-ethylhexyl)phthalate			1.9J		0.16J		410	410
Bi-n-octylphthalate							4,100	4,100
Benzo(b)fluoranthene					0.11J		8	8
Benzo(k)fluoranthene					0.11J		78	78
Benzo(a)pyrene					0.08J		0.8	0.8
Indeno(1,2,3-cd)pyrene					0.043J		8	8
Benzo(g,h, I)perylene					0.043J		—	—

TABLE 1-1. CONTINUED.

Test pit Sample depth (ft)	CD-1A 0-2	CD-2A 0-2	CD-3B ca. 8	CD-4A 0-2	CD-6A 0-2	CD-6B ca. 10	URS - Human Health [1] Subsurface Soil (2-15 ft.)	 Surface Soil (0-2 ft.)
Pesticides & PCBs (mg/kg)								
Endosulfan			0.011JP			0.0009JP	1,200	1,200
4,4'-DDE					0.3	0.008	17	17
4,4'-DDD			0.12				24	24
4,4'-DDT			0.12		1.5	0.038	17	17
alpha-Chlordane						0.0014J	16	16
gamma-Chlordane						0.001J	16	16
Arochlor-1248							4	4
Arochlor-1254						0.02J	4	4
Metals (mg/kg)								
Aluminum	8,660	5,040	8,240	NA	8,350	3,090	20,000	20,000
Antimony				NA	24.5		82	82
Arsenic		3.5	7.3	NA	7.6		4/61	4/61
Barium			158	NA	471	92.7	5,000	5,000
Cadmium		1.0	1.4	NA	13.2	2.6	100	100
Calcium			1,680	NA	8,630	2,790	—	—
Chromium	15.1	13.2	28.5	NA		21.4	5,000	5,000
Cobalt				NA			5,000	5,000
Copper	7.6	11.6	50.1	NA		10.5	5,000	5,000
Iron	19,100	15,000	22,400	NA		58,300	23,000	23,000
Lead	16	27.9	40.6	NA		296	1,000	1,000
Magnesium				NA			—	—
Manganese	110	35.5	22.5	NA		326	4,700	4,700
Mercury			0.19	NA			610	610
Nickel			11.0	NA	53.9	17.9	4,100	4,100
Potassium				NA			—	—
Silver				NA			1,000	1,000
Vanadium	28.8	24.4	29.0	NA	24.0	27.7	1,400	1,400
Zinc	19.7	70.0	183	NA	1,260	214	5,000	5,000
Cyanide				NA	1.6		4,100	4,100

TABLE 1-1. CONTINUED.

Test pit Sample depth (ft)	CD-7A 0-2	CD-11A 0-2	CD-12A 0-2	CD-14B ca. 9	CD-15A 0-2	CD-16A 0-2	CD-19B ca. 7	URS - Human Health [1]	
								Subsurface Soil (2-15 ft.)	Surface Soil (0-2 ft.)
Volatiles (mg/kg)									
Total 1,2-Dichlorethane		NA	24J					63	63
1,1,1-Trichloroethane		NA						4,100	4,100
Trichloroethene		NA	12J					520	520
Toluene		NA	240	0.026J	82	0.023J	0.43	5,000	5,000
Ethylbenzene		NA	9.5J		0.91		0.048J	5,000	5,000
Styrene		NA					0.054J	5,000	5,000
Total xylenes		NA	68		7.2		0.38J	5,000	5,000
Semivolatiles (mg/kg)									
Phenol			12	1.8J			1.4J	5,000	5,000
2-Methylphenol			6.9	1.1J			0.26J	5,000	5,000
4-Methylphenol			14	2.4J			1.1J	5,000	5,000
Isophorone				1.2J				5,000	5,000
2,4-Dimethylphenol			14	2.8J			1.7J	4,100	4,100
Napthalene			1.1					5,000	5,000
2-Methylnaphthalene	0.25J		1.8J					—	—
Dimethyphthalate								5,000	5,000
Acenaphthylene								—	—
Dibenzofuran								820	820
Fluorene				0.22J				5,000	5,000
Phenanthrene	0.15J	0.043J		2.3	1.2J			5,000	5,000
Anthracene				0.68J				5,000	5,000
Carbazole				0.41J				290	290
Di-n-butylphthalate	0.31J	0.16J	19		14J		6.1	—	—
Fluoranthene	0.083	0.057J		2.6				5,000	5,000
Pyrene	0.32J	0.047J		1.7J				5,000	5,000
Butylbenzylphthalate								5,000	5,000
Benzo (a) anthracene				0.8J				8	8
Chrysene				0.9J				780	780
Bis(2-ethylhexyl)phthalate		0.53J	10	0.42J	6.5J	0.37J	2	410	410
Bi-n-octylphthalate	0.15J							4,100	4,100
Benzo(b)fluoranthene				0.72J				8	8
Benzo(k)fluoranthene				0.66J				78	78
Benzo(a)pyrene				0.75J				0.8	0.8
Indeno(1,2,3-cd)pyrene				0.3J				8	8
Benzo(g,h,i)perylene								—	—

TABLE 1-1. CONTINUED.

Test pit Sample depth (ft)	CD-7A 0-2	CD-11A 0-2	CD-12A 0-2	CD-14B ca. 9	CD-15A 0-2	CD-16A 0-2	CD-19B ca. 7	URS - Human Health [1] Subsurface Soil (2-15 ft.)	 Surface Soil (0-2 ft.)
Pesticides & PCBs (mg/kg)									
Endosulfan									
4,4'-DDE		0.011J	0.12JP	0.01J	0.063JP	0.01P	0.028JP	1,200	1,200
4,4'-DDD		0.02P		0.032P				17	17
4,4'-DDT		0.055J			0.27JP		0.059J	24	24
alpha-Chlordane								17	17
gamma-Chlordane		0.0032P				0.0019JP	0.0061JP	16	16
Arochlor-1248							0.5J	16	16
Arochlor-1254							0.66J	4	4
								4	4
Metals (mg/kg)									
Aluminum	6,320	18,500	10,100	8,610	8,050	19,900	8,270	20,000	20,000
Antimony		86.6	73.2	28.2	52.9	48.2	21.9	82	82
Arsenic	2.7	15.5	13.8	3.4	3.8	11.7	4.8	4/61	4/61
Barium	60.5	491	353	312	466	1,340	212	5,000	5,000
Cadmium	3.5	30.2	26.9	13.9	136	29.3	7.9	100	100
Calcium		41,400	7,800	13,900	15,900	29,200	4,030	—	—
Chromium	51.1	73.7	76.8	40.2	500	128	37.2	5,000	5,000
Cobalt		24.6	20.6	12.7		21.1	11.0	5,000	5,000
Copper	43.1	674	245	204	1,570	812	25.5	5,000	5,000
Iron	35,400	19,500	218,000	119,000	68,400	130,000	78,800	23,000	23,000
Lead	275	2,750	2,460	481	522	3,390	595	1,000	1,000
Magnesium		3,360			1,920	4,930	1,050	—	—
Manganese	202	1,590	894	642	829	1,180	696	4,700	4,700
Mercury		0.69	0.76	0.21	21.8	1.6	0.27	610	610
Nickel	18.4	10.5	72.1	35.8	84.8	96.5	121	4,100	4,100
Potassium		1,950				1,370		—	—
Silver		3.7				3.0		1,000	1,000
Vanadium	23.8	47.0	24.3	29.2	45.8	33.6	24.5	1,400	1,400
Zinc	128	2,870	1,270	1,240	2,950	3,910	1,290	5,000	5,000
Cyanide					1,130			4,100	4,100

NOTES
No concentration is entered for compounds which were not detected.
NA = not analyzed
* Values listed are for "Total PCBs"

Qualifier Codes: J - Analyte present. Reported value may not be accurate or precise.
P - Concentration outside laboratory quality control limits.

[1] DNREC, 1998 (non-critical water resource area, restricted use)

Source: ERC, Inc.

TABLE 1-2.
CHEMICAL ANALYSIS OF SEDIMENT SAMPLES COLLECTED BY DNREC FROM THE CHRISTINA RIVER IN THE VICINITY OF THE FORMER CLAYVILLE DUMP SITE, AUGUST 1994.

Station Location Sample depth (in)	SED-5 Downstream 0-6	SED-6 Downstream 6-7	SED-2 Mid-site 6-36	SED-4 Upstream 6-12	URS – Environment[1]
Volatiles (mg/kg)	NA				
Semivolatiles (mg/kg)					
Phenanthrene	0.09J	0.061J	0.31J		0.9
Di-n-butylphthalate	0.21J				---
Fluoranthene	0.18J	0.16J	0.72J		3
Pyrene	0.26J	0.15J	0.94J		---
Butylbenzylphthalate		0.1J			11
Benzo (a) anthracene	0.11J	0.092J	0.84J		0.1
Chrysene	0.15J	0.11J	0.95J		—
bis (2-Ethylhexyl) phthalate	0.16J				1000
Benzo (b) fluoranthene	0.11J	0.1J	0.57J		---
Benzo (k) fluoranthene	0.085J	0.078J	0.55J		—
Benzo (a) pyrene	0.11J	0.084J	0.91J		0.1
Indeno (1,2,3-cd) pyrene			0.31J		—
Pesticides and PCBs (mg/kg)					
Endosulfan			0.00094JP		0.005
4,4'-DDE	0.021	0.012P			---
4,4'-DDD	0.03P				0.06
4,4'-DDT	0.012P				0.002
gamma-Chlordane	0.002JP				0.4
Arochlor-1254	0.09P	0.13P			0.002*
Arochlor-1260	0.089P				0.002*

TABLE 1-2. CONTINUED.

Station	SED-5	SED-6	SED-2	SED-4	URS – Environment[1]
Metals (mg/kg)					
Aluminum	9,720	14,900	6,290	47.6	---
Arsenic	12.7	9.6	31.8		8
Barium	175	147			20
Cadmium	4.3		8.3		1
Calcium	3,980	3,280			---
Chromium	30.7	45.6	11.5		81
Cobalt	26.0	21.1			---
Copper	154	116	40.5		34
Iron	69,600	42,500	13,000	324	---
Lead	333	51.9	554	1.9	47
Magnesium		3,200			---
Manganese	1,010	645	428	9.2	---
Mercury	0.36	0.29	0.54		0.2
Nickel		16.3			21
Vanadium	29.9	40.7	29.4		---
Zinc	752	589	1,830		150

Notes
No concentration is entered for compounds which were not detected.
NA = not analyzed
Qualifier Codes: J - Analyte present. Reported value may not be accurate or precise.
P - Concentration outside laboratory quality control limits.
[1] – DNREC, 1998
* URS is for total PCBs

TABLE 3-1.
ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES COLLECTED AT THE FORMER CLAYVILLE DUMP SITE, NOVEMBER 4, 1997

Location	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12	S-13	S-14	S-15	URS - HH
Lab Sample Number	29713	29714	29715	29716	29719	29720	29721	29722	29723	29724	29725	29726	29727	29728	29729	Surf. Soil[1]
VOLATILE COMPOUNDS (mg/kg)																
Methylene chloride	0.14 JB	0.8 U	0.7 U	0.7 U	1.15 U	0.9 U	0.8 U	0.8 U	0.9 U	0.17 B	0.12 B	0.22 B	0.21 B	0.31 B	0.17 B	760
Acetone	0.75 U	0.8 U	0.7 U	0.7 U	1.15 U	0.9 U	0.8 U	0.8 U	0.9 U	0.75 U	0.6 U	0.91 J	0.8 U	1.7	0.52 J	5,000
Toluene	0.75 U	0.8 U	0.7 U	0.7 U	1.15 U	0.9 U	0.8 U	0.8 U	0.58 J	0.75 U	0.6 U	0.7 U	0.8 U	0.8 U	0.7 U	5,000
Ethylbenzene	0.75 U	0.8 U	0.7 U	0.7 U	1.15 U	0.9 U	0.8 U	0.8 U	0.098 J	0.75 U	0.6 U	0.7 U	0.8 U	0.8 U	0.7 U	5,000
SEMIVOLATILE COMPOUNDS (mg/kg)																
Phenol	0.04 J	0.02 J	0.2 U	0.39 U	0.15 J	0.034 J	0.69	0.12 J	18	0.027 J	0.007 J	0.205 U	0.48	0.096 J	0.04 J	5,000
2-Methylphenol	0.22 U	0.22 U	0.2 U	0.39 U	0.06 J	0.5 U	0.13 J	0.023 J	4.7 J	0.006 J	0.205 U	0.205 U	0.24 J	0.023 J	0.008 J	5,000
4-Methylphenol	0.006 J	0.007 J	0.2 U	0.39 U	0.17 J	0.019 J	0.56	0.086 J	14	0.02 J	0.205 U	0.205 U	1.1	0.089 J	0.02 J	5,000
Isophorone	0.22 U	0.22 U	0.2 U	0.39 U	0.06 J	0.5 U	0.23 U	0.25 U	0.88 J	0.235 U	0.205 U	0.205 U	0.23 U	0.225 UL	0.41 U	5,000
2,4-Dimethylphenol	0.22 U	0.22 U	0.2 U	0.39 U	0.36 J	0.025 J	0.61	0.073 J	0.264 U	0.019 J	0.205 U	0.205 U	0.94	0.11 J	0.41 U	4,100
Naphthalene	0.22 U	0.22 U	0.2 U	0.39 U	0.034 J	0.01 J	0.009 J	0.007 J	0.264 U	0.054 J	0.205 U	0.205 U	0.07 J	0.011 J	0.41 U	5,000
2-Methylnaphthalene	0.22 U	0.22 U	0.2 U	0.39 U	0.294 U	0.5 U	0.008 J	0.006 J	0.294 U	0.035 J	0.205 U	0.205 U	0.033 J	0.013 J	0.41 U	---
Acenaphthylene	0.22 U	0.015 J	0.2 U	0.39 U	0.291 U	0.5 U	0.23 U	0.008 J	0.291 U	0.16 J	0.004 J	0.205 U	0.11 J	0.044 J	0.24 J	---
Acenaphthene	0.22 U	0.22 U	0.2 U	0.39 U	0.251 U	0.011 J	0.23 U	0.25 U	0.251 U	0.235 U	0.205 U	0.205 U	0.23 U	0.225 UL	0.41 U	5,000
Dibenzofuran	0.22 U	0.22 U	0.2 U	0.39 U	0.274 U	0.5 U	0.005 J	0.25 U	0.274 U	0.048 J	0.205 U	0.205 U	0.044 J	0.008 J	0.028 J	820
Fluorene	0.22 U	0.22 U	0.2 U	0.39 U	0.291 U	0.01 J	0.006 J	0.25 U	0.291 U	0.045 J	0.205 U	0.205 U	0.018 J	0.01 J	0.016 J	5,000
N-nitrosodiphenylamine	0.22 U	0.22 U	0.2 U	0.39 U	0.274 U	0.5 U	0.019 J	0.25 U	0.72 J	0.235 U	0.205 U	0.205 U	0.23 U	0.225 UL	0.41 U	1,200
Hexachlorobenzene	0.22 U	0.22 U	0.2 U	0.39 U	0.252 U	0.014 J	0.23 U	0.25 U	0.252 U	0.235 U	0.205 U	0.205 U	0.23 U	0.225 UL	0.41 U	4
Pentachlorophenol	0.22 U	0.22 U	0.235 U	0.95 U	0.052 J	1.2 U	0.55 U	0.8 U	0.5 U	0.55 U	0.495 U	0.5 U	0.009 J	0.55 U	1 U	48
Phenanthrene	0.018 J	0.039 J	0.2 U	0.39 U	0.15 J	0.11 J	0.054 J	0.026 J	0.38 J	1.1	0.022 J	0.01 J	0.67	0.17 J	0.03 J	---
Anthracene	0.22 U	0.011 J	0.2 U	0.39 U	0.244 U	0.03 J	0.012 J	0.008 J	0.244 U	0.13 J	0.205 U	0.205 U	0.098 J	0.035 J	0.42 J	5,000
Carbazole	0.22 U	0.006 J	0.2 U	0.39 U	0.244 U	0.015 J	0.009 J	0.006 J	0.244 U	0.1 J	0.205 U	0.205 U	0.078 J	0.03 J	0.079 J	290
Di-n-butylphthalate	0.22 U	0.22 U	0.2 U	0.2 J	1.2 J	0.14 J	2.8	0.36 J	74	0.235 U	0.205 U	0.205 U	0.13 J	0.42 J	0.41 U	5,000
Fluoranthene	0.034 J	0.099 J	0.006 J	0.008 J	0.15 J	0.22 J	0.077 J	0.054 J	0.18 J	1.4	0.039 J	0.025 J	0.79	0.49	0.58 J	5,000
Pyrene	0.027 J	0.093 J	0.004 J	0.39 U	0.12 J	0.17 J	0.08 J	0.047 J	0.28 J	1.2	0.032 J	0.02 J	0.62	0.38 J	1.3	5,000
Butylbenzylphthalate	0.22 U	0.22 U	0.2 U	0.39 U	0.282 U	0.5 U	0.081 J	0.059 J	0.282 U	0.235 U	0.205 U	0.205 U	0.23 U	0.13 J	0.41 U	5,000
Benzo(a)anthracene	0.014 J	0.05 J	0.2 U	0.009 J	0.076 J	0.14 J	0.055 J	0.034 J	0.84 J	0.47	0.016 J	0.013 J	0.26 J	0.2 J	0.77 J	8
Chrysene	0.025 J	0.074 J	0.2 U	0.39 U	0.11 J	0.16 J	0.062 J	0.049 J	0.295 U	0.63	0.023 J	0.017 J	0.41 J	0.25 J	0.72 J	780
bis(2-Ethylhexyl)phthalate	0.048 B	0.061 B	0.2 U	0.39 U	3.8 B	0.15 B	1.8 B	0.36 B	1.9 B	0.12 B	0.205 U	0.205 U	0.069 B	0.091 J	0.41 U	410
Di-n-octylphthalate	0.22 U	0.22 U	0.2 U	0.39 U	0.274 U	0.5 U	0.92	0.25 U	0.274 U	0.235 U	0.205 U	0.205 U	0.23 U	0.225 UL	0.41 U	4,100
Benzo(b)fluoranthene	0.027 J	0.084 J	0.2 U	0.39 U	0.295 U	0.2 J	0.11 J	0.077 J	0.17 J	0.84	0.028 J	0.02 J	0.55	0.33 J	2.1	8
Benzo(k)fluoranthene	0.009 J	0.03 J	0.2 U	0.39 U	0.295 U	0.077 J	0.033 J	0.029 J	0.295 U	0.3 J	0.011 J	0.009 J	0.22 J	0.12 J	0.88	78
Benzo(a)pyrene	0.015 J	0.046 J	0.2 U	0.39 U	0.295 U	0.13 J	0.063 J	0.042 J	0.295 U	0.55	0.017 J	0.012 J	0.25 J	0.19 J	0.67 J	0.8
Indeno(1,2,3-cd)pyrene	0.009 J	0.023 J	0.2 U	0.39 U	0.265 U	0.049 J	0.036 J	0.03 J	0.265 U	0.25 J	0.009 J	0.205 U	0.12 J	0.095 J	0.38 J	8
Dibenz(a,h)anthracene	0.22 U	0.22 U	0.2 U	0.39 U	0.271 U	0.5 U	0.012 J	0.006 J	0.271 U	0.061 J	0.205 U	0.205 U	0.032 J	0.225 UL	0.13 J	0.8
Benzo(g,h,i)perylene	0.01 J	0.022 J	0.2 U	0.39 U	0.265 U	0.048 J	0.04 J	0.038 J	0.265 U	0.22 J	0.009 J	0.205 U	0.097 J	0.079 J	0.24 J	---
PESTICIDES & PCBs (mg/kg)																
Heptachlor epoxide	0.0012 U	0.0011 U	0.0011 U	0.001 U	0.0165 U	0.0115 U	0.0012 UL	0.0013 U	0.007 U	0.0012 U	0.001 U	0.001 U	0.004	0.001 U	0.001 UL	0.6
gamma-Chlordane	0.0012 U	0.0011 U	0.0011 U	0.001 U	0.0165 U	0.0115 U	0.0052 L	0.0013 U	0.007 U	0.0012 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 UL	16
alpha-Chlordane	0.0012 U	0.0011 U	0.0011 U	0.001 U	0.0165 U	0.0115 U	0.0064 J	0.0013 U	0.007 U	0.0012 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 UL	16
4,4'-DDE	0.0061 NJ	0.0062 NJ	0.002 U	0.002 U	0.032 U	0.011 NJ	0.0023 UL	0.0025 U	0.013 U	0.027 NJ	0.002 U	0.005 NJ	0.007 NJ	0.022 NJ	0.002 UL	17
4,4'-DDD	0.0022 U	0.0022 U	0.002 U	0.002 U	0.11 NJ	0.0084 NJ	0.0023 UL	0.0025 U	0.013 U	0.026 NJ	0.002 U	0.002 U	0.008 NJ	0.002 U	0.002 UL	24
4,4'-DDT	0.0022 R	0.016 L	0.002 U	0.002 U	0.032 R	0.028 L	0.0082 J	0.0082 J	0.071 J	0.039 L	0.002 U	0.002 U	0.014 L	0.015 L	0.002 UL	17
Endrin ketone	0.0022 U	0.0022 U	0.002 U	0.002 U	0.014 NJ	0.0025 U	0.012 NJ	0.0025 U	0.013 U	0.0024 U	0.002 U	0.002 R	0.002 U	0.002 U	0.002 UL	---
Aroclor-1248	0.022 U	0.022 U	0.02 U	0.0195 U	0.32 U	0.025 U	0.023 UL	0.025 U	3 J	0.0235 U	0.021 U	0.021 U	0.023 U	0.023 U	0.021 UL	4
Aroclor-1254	0.022 U	0.022 U	0.02 U	0.0195 U	7.4 J	0.025 U	0.023 UL	0.025 U	0.13 U	0.0235 U	0.021 U	0.021 U	0.023 U	0.023 U	0.021 UL	4
Aroclor-1260	0.022 U	0.022 U	0.02 U	0.0195 U	0.32 U	0.07	0.023 UL	0.09	0.19 L	0.28	0.021 U	0.021 U	0.075	0.023 U	0.021 UL	13

Source: ERC, Inc.

TABLE 3-1. CONTINUED.

Location Lab Sample Number	S-1 29713	S-2 29714	S-3 29715	S-4 29716	S-5 29719	S-6 29720	S-7 29721	S-8 29722	S-9 29723	S-10 29724	S-11 29725	S-12 29726	S-13 29727	S-14 29728	S-15 29729	URS - HH Surf. Soil[1]
METALS (mg/kg)																
Aluminum	5250	610	8730	3270	4840	17700	9960	16500	25000	10200	2830	6350	8930	6280	5100	20,000
Antimony	1.3 B	1.8 B	0.85 B	0.74 UL	19 B	7 L	16.6 L	14.8 L	26.9 L	8.6 L	0.77 UL	0.76 UL	1.6 B	2.5 B	0.84 B	82
Arsenic	1.9 J	2.1 J	1.9 J	4	5.4 L	32.2	17.4	19.6	19.5	16.3	2.9	2.8	6.7	7.3	3.2	4/61
Barium	88	68.7	40.3 J	11.2 J	275	384	545	862	439	680	39.8 J	42.9 J	90.8	107	26.4 J	5,000
Beryllium	0.33 J	0.28 J	0.25 J	0.15 J	0.15 U	0.14 J	0.11 U	0.18 J	0.35 J	0.49 J	0.35 J	0.37 J	0.34 J	0.47 J	0.33 J	1
Cadmium	0.18 U	0.18 U	0.16 U	0.16 J	16.7	21.1	0.77 U	5.3 J	2.6	2.9 J	0.17 U	0.17 U	0.72 J	0.19 U	0.17 U	100
Calcium	1710	1140 J	385 J	287 J	14800	7050	8410	9340	30000	5670	311 J	978 J	9850	672 J	309 J	—
Chromium	9.2	13.2	11.2	15.3	23.1	135	62.7	114	55.6	58.4	7.1	12.1	14.8	15.3	10.2	5,000
Cobalt	4.8 J	2.9 J	7.1 J	2.6 J	5.6 J	15.6	13.9	25.4	9.9 J	12.4 J	4.6 J	5.5 J	5.1 J	7.1 J	3.1 J	5,000
Copper	27.2	25.4	6.4	18.4	311	484	323	606	1420	304	6 J	8.2	46.8	21.7	6.2	5,000
Iron	8660	8480	13900	17000	35700	194000	162000	223000	54600	98200	6070	10500	11500	13700	8380	23,000
Lead	56	120	9.7	7.5	350	1330	2390	6380	557	1400	24.3	17.9	70.6	105	23.5	1,000
Magnesium	446 J	333 J	454 J	131 J	1230 J	1270 J	2280	1790	3510	860 J	245 J	787 J	880 J	715 J	521 J	—
Manganese	434	145	259	40	483	1340	1070	1480	956	721	185	188	342	190	87.9	4700
Mercury	0.19	0.32	0.06 J	0.06 U	11.3	1.2	0.52	0.83	1.8	1.1	0.08 J	0.06 J	0.18	0.35	0.09 J	610
Nickel	6.6 J	7.7 J	5.1 J	2.1 J	25.7	162	64.2	89.5	69	47.7	3.2 J	6.5 J	9.9 J	9.3 J	5.6 J	4100
Potassium	262 J	222 J	253 J	191 J	444 J	535 J	456 J	767 J	3680	640 J	95.6 J	381 J	665 J	374 J	190 J	—
Selenium	1.3 U	1.3 U	1.2 U	1.2 U	1.9 U	6 U	5.5 U	7.5 U	1.6 U	6.6	1.2 U	1.2 U	1.4 U	1.4 U	1.2 U	1,000
Silver	0.43 J	0.34 U	0.3 U	0.3 U	1.3 J	2.8 J	2.5 J	5.7	2.6 J	2.5 J	0.31 U	0.31 U	0.36 U	0.35 U	0.31 U	1000
Sodium	73.5 U	73.3 U	104 J	65 U	107 U	325 J	280 J	349 J	2770	130 J	67.8 U	67.2 U	107 J	76.6 U	72.4 J	—
Vanadium	23.3	19.2	21	33.6	22.2	23.7 J	18.9 J	42.6 J	209	26.3 J	16.5	20.2	16	44	20.7	1400
Zinc	63.5 J	269 J	17.3 J	27.7 J	814 J	1520 J	1610 J	2900 J	1180 J	2040	20	32.6	400	79.9	22.7	5,000
Cyanide	0.67 U	0.66 U	0.61 U	0.59 U	1.7	0.76 U	1.1	0.77 U	0.8 U	0.93	0.62 U	0.63 U	0.7 U	0.69 U	0.62 U	4100

Notes

Only compounds detected in one or more samples are listed. See laboratory reports for a complete list of analytes and quantitation limits.

Qualifiers

U - Analyte not detected. Value is one-half the limit of quantitation (LOQ) for all samples except S-5 and S-9 semivolatiles. For S-5 and S-9 semivolatiles, value is one-half the mean LOQ for remaining non-detects.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

L - The analyte is present. The reported values may be biased low. The actual value is expected to be higher than reported.

NJ - Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.

UL - The analyte was not detected, and the quantitation limit is probably higher than that reported by the laboratory.

R - Unusable result. Analyte may or may not be present in sample.

[1] DNREC, 1998 (non-critical water resource area, restricted use)

Source: ERC, Inc.

TABLE 3-2.
ANALYTICAL RESULTS FOR SUBSURFACE SOIL SAMPLES COLLECTED AT THE FORMER CLAYVILLE DUMP SITE, NOVEMBER 5-7, 1997

Location Lab Sample Number Sampling Date	MW-1 30481 11/06/97	MW-2 30478 11/05/97	MW-3 30482 11/07/97	MW-4 30480 11/06/97	MW-5 30477 11/05/97	MW-6 30476 11/05/97	MW-7 30483 11/07/97	MW-8 30479 11/06/97	URS - Human Health [1] Subsurface Soil
VOLATILE COMPOUNDS (mg/kg)									
Methylene chloride	0.12 B	0.6 U	0.14 B	0.13 B	0.6 U	0.074 B	0.15 B	0.6 U	760
1,1,1-Trichloroethane	0.085 J	0.6 U	0.65 U	0.65 U	0.6 U	0.47 U	0.7 U	0.6 U	4,100
SEMIVOLATILE COMPOUNDS (mg/kg)									
Phenol	0.200 U	0.01 J	0.2 U	0.22 U	0.175 U	0.018 J	0.205 U	0.004 J	5,000
2-Methylphenol	0.196 U	0.18 U	0.2 U	0.22 U	0.175 U	0.004 J	0.205 U	0.195 U	5,000
4-Methylphenol	0.199 U	0.006 J	0.2 U	0.22 U	0.175 U	0.013 J	0.205 U	0.195 U	5,000
2,4-Dimethylphenol	0.196 U	0.18 U	0.2 U	0.22 U	0.175 U	0.011 J	0.205 U	0.195 U	4,100
Naphthalene	0.099 J	0.18 U	0.2 U	0.22 U	0.175 U	0.19 U	0.205 U	0.195 U	5,000
Acenaphthylene	0.196 U	0.008 J	0.2 U	0.22 U	0.175 U	0.19 U	0.205 U	0.195 U	—
Acenaphthene	0.196 U	0.007 J	0.2 U	0.22 U	0.175 U	0.19 U	0.205 U	0.195 U	5,000
2,4-Dinitrophenol	23 R	0.44 U	0.96 R	1.1 R	0.86 R	0.92 R	1 R	0.95 R	410
Fluorene	0.196 U	0.007 J	0.2 U	0.22 U	0.175 U	0.19 U	0.205 U	0.195 U	5,000
Pentachlorophenol	0.48 U	0.44 U	0.48 U	0.55 U	0.43 U	0.007 J	0.5 U	0.004 J	48
Phenanthrene	0.57 J	0.12 J	0.2 U	0.22 U	0.175 U	0.013 J	0.205 U	0.195 U	5,000
Anthracene	0.199 U	0.032 J	0.2 U	0.22 U	0.175 U	0.031 J	0.205 U	0.195 U	5,000
Carbazole	0.199 U	0.016 J	0.2 U	0.22 U	0.175 U	0.005 J	0.205 U	0.195 U	290
Fluoranthene	0.2 J	0.32 J	0.2 U	0.22 U	0.175 U	0.14 J	0.205 U	0.195 U	5,000
Pyrene	0.37 J	0.29 J	0.2 U	0.22 U	0.175 U	0.24 J	0.205 U	0.195 U	5,000
Butylbenzylphthalate	0.196 U	0.18 U	0.2 U	0.22 U	0.175 U	0.055 J	0.205 U	0.195 U	5,000
Benzo(a)anthracene	0.16 J	0.15 J	0.2 U	0.22 U	0.175 U	0.11 J	0.205 U	0.195 U	8
Chrysene	0.199 U	0.18 J	0.2 U	0.22 U	0.175 U	0.14 J	0.205 U	0.195 U	780
bis(2-Ethylhexyl)phthalate	0.202 U	0.04 J	0.2 U	0.22 U	0.037 J	0.19 U	0.205 U	0.195 U	410
Benzo(b)fluoranthene	0.11 J	0.22 J	0.2 U	0.22 U	0.175 U	0.11 J	0.205 U	0.195 U	8
Benzo(k)fluoranthene	0.199 U	0.084 J	0.2 U	0.22 U	0.175 U	0.051 J	0.205 U	0.195 U	78
Benzo(a)pyrene	0.199 U	0.15 J	0.2 U	0.22 U	0.175 U	0.038 J	0.205 U	0.195 U	0.8
Indeno(1,2,3-cd)pyrene	0.199 U	0.077 J	0.2 U	0.22 U	0.175 U	0.007 J	0.205 U	0.195 U	8
Dibenz(a,h)anthracene	0.198 U	0.022 J	0.2 U	0.22 U	0.175 U	0.19 U	0.205 U	0.195 U	0.8
Benzo(g,h,i)perylene	0.199 U	0.062 J	0.2 U	0.22 U	0.175 U	0.008 J	0.205 U	0.195 U	—
PESTICIDES/PCBs (mg/kg)									
gamma-Chlordane	0.00095 U	0.0029	0.001 U	0.00115 U	0.0009 U	0.0058	0.00105 U	0.001 U	16
alpha-Chlordane	0.00095 U	0.004 J	0.001 U	0.00115 U	0.0009 U	0.0085 J	0.00105 U	0.001 U	16
4,4'-DDE	0.0019 U	0.029	0.002 U	0.0022 U	0.00175 U	0.14	0.00205 U	0.00195 U	17
4,4'-DDD	0.0019 U	0.0062 J	0.002 U	0.0022 U	0.00175 U	0.019 J	0.00205 U	0.00195 U	24
4,4'-DDT	0.0019 U	0.057	0.006 J	0.0022 U	0.00175 U	0.32 J	0.00205 U	0.00195 U	17
Aroclor-1248	0.019 U	0.018 U	0.21	0.022 U	0.0175 U	0.019 U	0.68 J	0.0195 U	4
Aroclor-1254	0.019 U	0.018 U	0.091	0.022 U	0.0175 U	0.019 U	0.28 J	0.0195 U	4

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Source: ERC, Inc.

TABLE 3-2. CONTINUED.

Location Lab Sample Number Sampling Date	MW-1 30481 11/06/97	MW-2 30478 11/05/97	MW-3 30482 11/07/97	MW-4 30480 11/06/97	MW-5 30477 11/05/97	MW-6 30476 11/05/97	MW-7 30483 11/07/97	MW-8 30479 11/06/97	URS - Human Health [1] Subsurface Soil
METALS (mg/kg)									
Aluminum	2900	3620	3080	6850	7900	3370	2040	1530	20,000
Arsenic	3.5	3	4.8	3.3	2.8	2.6	2.6	1.8 U	4/61
Barium	23.3 J	28.3 J	50.3	26 J	34.4 J	36.3 J	44 J	15.7 J	5,000
Beryllium	0.22 J	0.3 J	1.4 J	0.72 J	0.35 J	0.42 J	4.7 J	0.94 J	1
Cadmium	0.2 K	0.15 U	0.33 U	0.18 U	0.15 U	0.26 K	0.17 U	0.33 U	100
Calcium	537 J	3720	954 J	802 J	466 J	1300	683 J	235 J	—
Chromium	9.9	9.2	37.4	17.9	20.9	7.9	18.6	13.1	5,000
Cobalt	2 J	7.8 J	6.5 J	3.5 J	6 J	5.5 J	12.2 J	2.5 J	5,000
Copper	7.5 J	6 J	10.9 J	10.5 J	10 J	5.6 J	59.1 J	14.8 J	5,000
Iron	10100	9240	83900	19500	7730	6490	42600	58200	23,000
Lead	10.7 J	17.9 J	15.7 J	7.6 J	5.6 J	19.8 J	8.4 J	7.6 J	1,000
Magnesium	242 J	1670	329 J	722 J	953 J	405 J	396 J	118 J	—
Manganese	48.2	165	472	68.5	102	293	53.7	163	4,700
Mercury	0.06 U	0.06 U	0.11 J	0.07 U	0.05 U	0.06 U	0.06 U	0.06 U	610
Nickel	4 J	5.4 J	8.7 J	5.4 J	8.5 J	4.6 J	29	5 J	4,100
Potassium	41.4 U	186 B	374 B	866 J	652 B	42.2 U	108 B	336 B	—
Silver	0.31 L	0.28 UL	0.35 L	0.33 UL	0.28 UL	0.29 UL	0.32 UL	0.31 UL	1,000
Sodium	65.5 J	61.2 U	113 J	261 J	60 U	143 J	381 J	111 J	—
Vanadium	16.8 L	14.2 L	66.4 L	33.7 L	25.7 L	11.9 L	50.7 L	24.6 L	1,400
Zinc	22.7 J	89	13.4 J	29.1 J	24.4 J	140 J	48.9 J	27.7 J	5,000

Notes

Only compounds detected in one or more samples are listed. See laboratory reports for a complete list of analytes and quantitation limits.

Qualifiers

- Analyte not detected. Value is one-half the limit of quantitation (LOQ) for all samples except MW-1 semivolatiles. For MW-1, value is mean LOQ for remaining non-detects.

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

K - Analyte present - reported value may be biased high. Actual value is expected to be lower.

L - The analyte is present. The reported values may be biased low. The actual value is expected to be higher than reported.

UL - The analyte was not detected, and the quantitation limit is probably higher than that reported by the laboratory.

R - Unusable result. Analyte may or may not be present in sample.

[1] DNREC, 1998 (non-critical water resource area, restricted use)

Source: ERC, Inc.

TABLE 3-5.
ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES (UNFILTERED) COLLECTED AT THE FORMER CLAYVILLE DUMP SITE, NOVEMBER 25-26, 1997

Location	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	URS
Lab Sample Number	33661	33656	33663	33659	33658	33657	33664	33662	Human Health [1]
Sampling Date	11/26/97	11/25/97	11/26/97	11/25/97	11/25/97	11/25/97	11/26/97	11/26/97	Groundwater
VOLATILE COMPOUNDS (ug/l)									
Methylene chloride	1 B	2 B	2 B	1 B	0.4 B	2 B	2 B	2 B	5/4
Acetone	5 U	5 U	11	9 J	5 U	9 J	5 U	7 J	370
Benzene	5 U	5 U	0.5 J	5 U	5 U	5 U	5 U	5 U	5/0.4
Toluene	5 U	5 U	0.7 J	5 U	5 U	5 U	5 U	5 U	1000/750
SEMIVOLATILE COMPOUNDS - none detected									
PESTICIDES/PCBs - none detected									
TOTAL METALS (ug/l)									
Aluminum	1470	40100	7680	18100	5070	11200	17600	3700	200
Antimony	3.2 UL	3.2 UL	3.5 L	3.2 UL	3.2 UL	3.2 UL	3.2 UL	7.7 L	6
Arsenic	3.9 U	47.9	10.3	22.2	5.2 J	8.7 J	7.4 J	4.4 J	50/1
Barium	63.2 J	245	324	180 J	176 J	92.2 J	159 J	134 J	2,000
Beryllium	0.4 U	5.8	2.1 J	19.4	1.6 J	1.6 J	25.7	1.1 J	4/0.02
Cadmium	0.7 U	0.7 U	5.4	2.2 J	0.7 U	0.7 U	0.96 J	0.7 U	5
Calcium	26500	5710	48000	32100	3660 J	6530	114000	16400	—
Chromium	7.3 J	140	122	49.1	27.9	34.6	70.3	15.9	100*/18**
Cobalt	60	115	50.5	492	19.6 J	120	888	66.2	220
Copper	7.2 J	80	113	90.7	31.1	24.1 J	98.5	32.7	1000
Iron	3950	127000	38600	56000	17900	29200	37800	8650	300
Lead	6.5	39.3	89.2	76.1	12.5	14.9	20.4	23.1	15
Magnesium	17000	5860	7380	20600	1170 J	2560 J	55300	8380	—
Manganese	3920	1150	1080	2310	166	766	3900	664	50
Mercury	0.1 U	0.12 J	3.2	0.11 J	0.1 U	0.1 U	0.1 U	0.1 U	2
Nickel	140	49.5	80.1	671	27.3 J	23.7 J	1680	87	100
Potassium	2730 J	3310 J	10300	2770 J	2280 J	2480 J	5420	39900	—
Silver	1.3 U	1.3 U	1.4 B	1.5 B	1.3 U	1.3 U	1.3 U	1.3 U	100
Sodium	81400	2410 B	27700	77400	5320	3200 J	183000	58800	—
Vanadium	6.2 J	239	70.8	86.7	45.5 J	47.4 J	124	21.4 J	28
Zinc	72	199	578	1240	57.5	152	1700	158	2000

Notes
Only compounds detected in one or more samples are listed. See laboratory reports for a complete list of analytes and quantitation limits.

Qualifiers
- U- Analyte not detected. Value is one-half the limit of quantitation (LOQ).
- J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
- B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental
- L - The analyte is present. The reported values may be biased low. The actual value is expected to be higher than reported.
- UL - The analyte was not detected, and the quantitation limit is probably higher than that reported by the laboratory.

[1] DNREC, 1998

Source: ERC, Inc.

TABLE 3-6.
ANALYTICAL RESULTS FOR GROUNDWATER (UNFILTERED AND FILTERED) SAMPLES COLLECTED AT THE FORMER CLAYVILLE DUMP SITE, APRIL 30, 1998

Location	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	URS
Lab Sample Number	58424	58425	58426	58427	58428	58429	58430	58431	Human Health [1]
Sampling Date	4/30/98	4/30/98	4/30/98	4/30/98	4/30/98	4/30/98	4/30/98	4/30/98	Groundwater
TOTAL METALS (ug/l)									
Aluminum	947	5570	1560	5010	2880	1440	12900	753	
Arsenic	3 J	7 J	6.5 J	9.4 J	5.1 J	2.8 U	11.3	2.8 U	
Barium	51.3 J	36.3 J	106 J	102 J	88.6 J	22.9 J	161 J	77.7 J	
Beryllium	0.2 U	0.47 J	0.2 U	2.1 J	0.56 J	0.24 J	44.6	0.2 U	
Cadmium	0.63 J	0.4 U	0.7 J	0.4 U	0.4 U	0.4 U	4.3 J	0.4	
Calcium	27600	5480	281000	48100	3880 J	7820	171000	98100	
Chromium	4.9 J	12.4	18.7	15.3	13.9	3 J	28.1	3.8 J	
Cobalt	35.5 J	6 J	39.8 J	82.8	14.6 J	5.1 J	1790	16.7 J	
Copper	23.3 J	7.2 J	14.9 J	23.4 J	11.6 J	3.9 J	197	8.1 J	
Iron	4080	9020	13800	30200	14400	2430	16900	2060	
Lead	19.4	3.2	10	23.7	4.7	2 U	11	3.2	
Magnesium	17100	2040 J	16800	23400	1500 J	2540 J	101000	13400	
Manganese	1770	86.1	4990	2140	155	53.1	7280	473	
Mercury	0.1 U	0.1 U	0.22	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Nickel	105	5.8 J	42.2	99.4	22.2 J	2.9 J	3360	22.4 J	
Potassium	1580 J	1060 J	13100	33900	1470 J	989 J	4250 J	20300	
Sodium	73000	1480 J	8730	67100	6220	1720 J	297000	22100	
Vanadium	4.3 J	19.2 J	9.1 J	26.3 J	17.6 J	3.6 J	37 J	3.5 J	
Zinc	117	21.6	131	155	38.8	14.1 J	3450	118	
DISSOLVED METALS (ug/l)									
Aluminum	84.1 U	110 J	84.1 U	84.1 U	223	84.1 U	7710	84.1 U	200
Arsenic	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	3 J	2.8 U	50/1
Barium	24.6 J	7.6 J	35.3 J	33.7 J	49.7 J	11.4 J	10.5 J	42.5 J	2,000
Beryllium	0.2 U	0.2 U	0.2 U	0.38 J	0.2 U	0.23 J	45.6	0.2 U	4/0.02
Cadmium	0.67 J	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	4.9 J	0.4 U	5
Calcium	30200	5560	285000	50800	3520 J	8270	182000	90100	—
Chromium	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2 J	1.1 U	100*/18**
Cobalt	37.2 J	1.3 U	47.6 J	90.2	12.2 J	1.3 U	1900	21.6 J	220
Copper	8.2 J	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	180	2.9 U	1000
Iron	1520	47.5 U	8880	14000	3460	47.5 U	405	47.5 U	300
Lead	2 U	2 U	2 U	2 U	2 U	2 U	3.6	2 U	15
Magnesium	18600	1820 J	19800	25100	1300 J	2580 J	107000	15000	—
Manganese	1900	4.1 J	5560	2280	143	4.7 J	7690	671	50
Nickel	112	2.1 U	44.7	103	17.1 J	2.1 U	3570	28.8 J	100
Potassium	1600 J	589 J	13700	34900	1120 J	933 J	3840 J	27500	—
Sodium	77100	1500 J	10300	72700	6630	1780 J	313000	31800	—
Zinc	108	6.1 J	50.5	122	27	8.2 J	3700	103	2000

Notes
Only compounds detected in one or more samples are listed. See laboratory reports for a complete list of analytes and quantitation limits.

Qualifiers
U - Analyte not detected. Value listed is one-half the limit of quantitation (LOQ).
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
* Chromium 3+
** Chromium 6+

[1] DNREC, 1998

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Source: ERC, Inc.

TABLE 3-7.
ANALYTICAL RESULTS FOR SAMPLES COLLECTED AT GROUNDWATER SEEPS (UNFILTERED) AT THE FORMER CLAYVILLE DUMP SITE, NOVEMBER 25, 1997

Location Lab Sample Number Sampling Date	Seep-SW-A 33665 11/25/97	Seep-SW-2 33668 11/25/97
VOLATILE COMPOUNDS (ug/l)		
Methylene chloride	1 B	1 B
Acetone	18	9 J
SEMIVOLATILE COMPOUNDS (ug/l)		
Phenol	2 J	5 U
4-Methylphenol	0.4 J	5 U
PESTICIDES/PCBs - none detected		
METALS (ug/l)		
Aluminum	12200	81.2 U
Antimony	6.1 L	10.0 L
Arsenic	12.2	3.9 U
Barium	105 J	218
Beryllium	2.1 J	0.4 U
Cadmium	3.1 J	0.7 U
Calcium	18300	159000
Chromium	35.0	1.6 U
Cobalt	70.9	11.1 J
Copper	85.4	3.7 J
Iron	50600	1270
Lead	75.4	2.5 U
Magnesium	5660	18700
Manganese	594	568
Mercury	0.14 J	0.1 U
Nickel	108	5.6 J
Potassium	8510	43800
Selenium	5.1 L	5 UL
Sodium	19000	16100
Vanadium	93.5	4.4 J
Zinc	394	31.2

Notes
Only compounds detected in one or more samples are listed. See laboratory reports for a complete list of analytes and quantitation limits.

Qualifiers
- U - Analyte not detected. Value is one-half the limit of quantitation (LOQ).
- J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
- B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
- L - The analyte is present. The reported values may be biased low. The actual value is expected to be higher than reported.
- UL - The analyte was not detected, and the quantitation limit is probably higher than that reported by the laboratory.

Source: ERC, Inc.

TABLE 3-6.
ANALYTICAL RESULTS FOR SEDIMENT SAMPLES COLLECTED IN THE CHRISTINA RIVER UPSTREAM OF, ADJACENT TO, AND DOWNSTREAM OF THE FORMER CLAYVILLE DUMP SITE, SEPTEMBER 30, 1997

Location	SED-1 U/S Dump Zone	SED-2 Mid Dump Zone	SED-3 D/S Dump Zone	SED-4 U/S Reference	SED-5 D/S Reference	URS Environment[1]	URS Human Health[2]
Lab Sample Number	24550	24551	24552	24553	24554		
Sampling Date	09/30/97	09/30/97	09/30/97	09/30/97	09/30/97	Sediment	
VOLATILE COMPOUNDS (mg/kg)							
Methylene chloride	0.4 B	0.88 B	0.83 B	0.5 B	0.4 B	0.4	780
Tetrachloroethene	0.93 J	0.84 J	0.39 B	0.22 B	0.17 B	1	110
SEMIVOLATILE COMPOUNDS (mg/kg)							
Phenol	0.01 J	0.024 J	0.022 J	0.006 J	0.006 J	0.4	5,000
4-Methylphenol	0.009 J	0.02 J	0.02 J	0.225 U	0.012 J	—	5,000
Naphthalene	0.22 U	0.045 J	0.014 J	0.225 U	0.21 U	0.4	5,000
2-Methylnaphthalene	0.22 U	0.021 J	0.335 U	0.225 U	0.21 U	—	—
Acenaphthylene	0.22 U	0.033 J	0.017 J	0.225 U	0.21 U	—	—
Acenaphthene	0.22 U	0.01 J	0.007 J	0.225 U	0.21 U	0.6	5,000
Dibenzofuran	0.22 U	0.015 J	0.007 J	0.225 U	0.21 U	2	820
Fluorene	0.007 J	0.027 J	0.011 J	0.225 U	0.21 U	0.5	5,000
Phenanthrene	0.098 J	0.15 J	0.099 J	0.008 J	0.01 J	0.9	5,000
Anthracene	0.025 J	0.074 J	0.03 J	0.225 U	0.21 U	0.0003	5,000
Carbazole	0.013 J	0.335 U	0.014 J	0.225 U	0.21 U	—	290
Fluoranthene	0.24 J	0.36 J	0.28 J	0.018 J	0.025 J	3	5,000
Pyrene	0.22 J	0.49 J	0.31 J	0.021 J	0.03 J	—	5,000
Benzo(a)anthracene	0.1 J	0.27 J	0.17 J	0.008 J	0.013 J	0.1	8
Chrysene	0.1 J	0.23 J	0.23 J	0.01 J	0.023 J	—	780
bis(2-Ethylhexyl)phthalate	0.22 U	0.335 U	0.19 J	0.225 U	0.21 U	1000	410
Benzo(b)fluoranthene	0.18 J	0.32 J	0.3 J	0.018 J	0.027 J	—	8
Benzo(k)fluoranthene	0.057 J	0.12 J	0.1 J	0.005 J	0.01 J	—	78
Benzo(a)pyrene	0.1 J	0.28 J	0.17 J	0.007 J	0.015 J	0.1	0.8
Indeno(1,2,3-cd)pyrene	0.042 J	0.082 J	0.077 J	0.225 U	0.013 J	—	8
Dibenz(a,h)anthracene	0.01 J	0.027 J	0.02 J	0.225 U	0.21 U	—	0.8
Benzo(g,h,i)perylene	0.034 J	0.072 J	0.064 J	0.225 U	0.012 J	—	—
PESTICIDES/PCBs - NONE DETECTED							
METALS (mg/kg)							
Aluminum	1780	10900	6640	990	2430	—	20,000
Antimony	0.78 R	1.2 R	1.2 R	0.6 R	0.73 R	—	82
Arsenic	2.4 J	10.1	4.8	3.2	4.3	8	4/61
Barium	21.4 J	124	84.9	13.7 J	26.2 J	20	5,000
Beryllium	0.24 J	1.0 J	0.55 J	0.31 J	0.34 J	—	1
Cadmium	0.6 U	0.08 U	1.3 J	0.06 U	0.05 U	1	100
Calcium	542 J	1920 J	872 J	199 J	287 J	—	—
Chromium	7.6	68.6	25.5	22.4	11.8	81	5,000
Cobalt	2.6 J	11.7 J	7.3 J	3.2 J	3.3 J	—	5,000
Copper	4.1 J	25.8	19.0	5.9 J	4.7 J	34	5,000
Iron	6710	22400	14200	8920	13700	—	23,000
Lead	8.9	35.9	43.1	10.7	7.2	47	1,000
Magnesium	546 J	3190	1290 J	114 J	411 J	—	—
Manganese	101 K	982 K	364 K	121 K	148 K	—	4,700
Mercury	0.07 U	0.24	0.11 J	0.07 U	0.08 U	0.2	610
Nickel	3.9 J	18.4	11.3 J	3.4 J	3.8 J	21	4,100
Potassium	117 J	1180 J	508 J	35.8 U	167 J	—	—
Sodium	88.1 B	171 B	134 B	80.7 B	75.4 B	—	—
Vanadium	9.3 J	33.3	22.1	9.0 B	14.2	—	1,400
Zinc	51.1	96.5	461	67.1	77.2	150	5,000
TOTAL ORGANIC CARBON (mg/kg)	2080	21700	13800	1940	1880	—	—

Notes
Only compounds detected in one or more samples are listed. See laboratory reports for a complete list of analytes and quantitation limits

Qualifiers
U - Analyte not detected. Value is one-half the limit of quantitation (LOQ).
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample
K - Analyte present - reported value may be biased high. Actual value is expected to be lower.
R - Unusable result. Analyte may or may not be present in sample.

[1] DNREC, 1998
[2] non-critical water resource area, restricted use

TABLE 3-10.
ANALYTICAL RESULTS FOR SEDIMENT SAMPLES COLLECTED IN WETLANDS ADJACENT TO THE FORMER CLAYVILLE DUMP SITE, SEPTEMBER 30, 1997

Location Lab Sample Number	SED-6 Upper Dump Site 24555	SED-7 Mid Dump Site 24556	SED-8 Lower Dump Site 24557	URS - Human Health [1] Surface Soil
VOLATILE COMPOUNDS (mg/kg)				
Methylene chloride	0.78 JB	0.7 JB	0.72 JB	760
Tetrachloroethene	0.22 B	0.21 B	1.5 U	110
SEMIVOLATILE COMPOUNDS (mg/kg)				
Phenol	0.029 J	0.02 J	0.057 J	5,000
1,2-Dichlorobenzene	0.345 U	0.006 J	0.255 U	5,000
2-Methylphenol	0.059 J	0.255 U	0.15 J	5,000
4-Methylphenol	0.009 J	0.01 J	0.068 J	5,000
Isophorone	0.345 U	0.008 J	0.255 U	5,000
2,4-Dimethylphenol	0.345 U	0.007 J	0.255 U	4,100
Acenaphthylene	0.012 J	0.255 U	0.255 U	—
Phenanthrene	0.058 J	0.016 J	0.255 U	5,000
Anthracene	0.016 J	0.255 U	0.255 U	5,000
Carbazole	0.012 J	0.255 U	0.255 U	290
Fluoranthene	0.19 J	0.022 J	0.24 J	5,000
Pyrene	0.17 J	0.024 J	0.3 J	5,000
Benzo(a)anthracene	0.073 J	0.014 J	0.11 J	8
Chrysene	0.099 J	0.012 J	0.17 J	780
Benzo(b)fluoranthene	0.19 J	0.018 J	0.28 J	8
Benzo(k)fluoranthene	0.058 J	0.007 J	0.092 J	78
Benzo(a)pyrene	0.096 J	0.012 J	0.14 J	0.8
Indeno(1,2,3-cd)pyrene	0.062 J	0.255 U	0.255 U	8
Dibenz(a,h)anthracene	0.015 J	0.255 U	0.255 U	0.8
Benzo(g,h,i)perylene	0.057 J	0.255 U	0.255 U	—
PESTICIDES/PCBs (mg/kg)				
Aroclor-1254	0.0345 U	0.2	0.05 U	4
METALS (mg/kg)				
Aluminum	16300	1640	18300	20,000
Antimony	1.2 R	0.9 R	1.8 R	82
Arsenic	9.3	3.4	5.9 J	4/81
Barium	203	101	220	5,000
Beryllium	1.4 J	0.39 U	1.3 J	1
Cadmium	0.08 U	0.55 J	0.12 U	100
Calcium	2560	5020	2080 J	—
Chromium	40.4	11.1	45.0	5,000
Cobalt	18.3 J	4.8 J	12.6 J	5,000
Copper	28.3	18.2	43.4	5,000
Iron	32800	23300	32600	23,000
Lead	65.3	27.0	73.4	1,000
Magnesium	2700	262 J	2400 J	—
Manganese	2190 K	306 K	629 K	4,700
Mercury	0.14 J	0.21	0.25 J	610
Nickel	27.5	6.6 J	27.9	4,100
Potassium	651 J	239 J	812 J	—
Selenium	2.0 J	1.2 U	2.3 U	1,000
Sodium	223 J	71.4 B	240 J	—
Vanadium	53.1	22.9	54.8	1,400
Zinc	298	148	518	5,000
TOTAL ORGANIC CARBON (mg/kg)	53800	37900	101000	—

Notes
Only compounds detected in one or more samples are listed. See laboratory reports for a complete list of analytes and quantitation limits.

Qualifiers
- U - Analyte not detected. Value is one-half the limit of quantitation (LOQ).
- J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
- B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
- K - Analyte present - reported value may be biased high. Actual value is expected to be lower.
- R - Data is unstable. Analyte may or may not be present in sample.

[1]DNREC, 1998 (non-critical water resource area, restricted use)

Source: ERC, Inc.

TABLE 4-1.
SUMMARY STATISTICS FOR SURFACE SOIL SAMPLES COLLECTED AT THE FORMER CLAYVILLE DUMP SITE
BY ERC (NOVEMBER 1997) AND DNREC (JULY-AUGUST 1994)

	No. Samp.	No. Det.	Mean	STDEV	Coeff. Var.	Median	Std. Error	t value (95% CL)	95% UCL	URS - HH[1] Surf. Soil
VOLATILE COMPOUNDS (mg/Kg)										
Acetone	21	3	0.610	0.455	0.746	0.750	0.099	1.761	0.785	5,000
1,1-Dichloroethane	21	1	1.704	5.121	3.006	0.750	1.117	1.725	3.631	5,000
1,1,1-Trichloroethane	21	2	0.625	0.381	0.609	0.750	0.083	1.725	0.769	4,100
Trichloroethene	21	1	1.132	2.515	2.223	0.750	0.549	1.725	2.078	520
Toluene	21	4	15.884	54.330	3.420	0.750	11.856	1.725	36.335	5,000
Ethylbenzene	21	3	1.022	1.974	1.931	0.750	0.431	1.725	1.765	5,000
Total xylenes	21	2	4.141	14.706	3.551	0.750	3.209	1.725	9.677	5,000
SEMIVOLATILE COMPOUNDS (mg/Kg)										
Phenol	24	14	1.611	4.334	2.691	0.165	0.885	1.714	3.127	5,000
2-Methylphenol	24	9	0.640	1.626	2.542	0.165	0.332	1.714	1.208	5,000
4-Methylphenol	24	12	1.350	3.903	2.891	0.165	0.797	1.714	2.715	5,000
Isophorone	24	2	0.248	0.164	0.660	0.205	0.033	1.714	0.305	5,000
2,4-Dimethylphenol	24	8	0.815	2.815	3.452	0.183	0.575	1.714	1.800	4,100
Naphthalene	24	8	0.197	0.220	1.118	0.165	0.045	1.714	0.274	5,000
2-Methylnaphthalene	24	7	0.260	0.351	1.352	0.183	0.072	1.714	0.383	—
Acenaphthylene	24	7	0.183	0.113	0.617	0.165	0.023	1.714	0.223	—
Acenaphthene	24	1	0.209	0.077	0.369	0.205	0.016	1.714	0.236	5,000
Dibenzofuran	24	5	0.182	0.113	0.624	0.165	0.023	1.714	0.221	820
Fluorene	24	6	0.161	0.100	0.623	0.165	0.020	1.714	0.196	5,000
N-nitrosodiphenylamine	24	2	0.241	0.141	0.583	0.205	0.029	1.714	0.290	1,200
Hexachlorobenzene	24	1	0.209	0.077	0.368	0.205	0.016	1.714	0.236	4
Pentachlorophenol	24	2	0.468	0.271	0.580	0.400	0.055	1.714	0.563	48
Phenanthrene	24	16	0.243	0.317	1.306	0.165	0.065	1.714	0.354	5,000
Anthracene	24	8	0.164	0.104	0.633	0.165	0.021	1.714	0.200	5,000
Carbazole	24	8	0.147	0.093	0.632	0.165	0.019	1.714	0.179	290
Di-n-butylphthalate	24	13	4.797	15.451	3.221	0.213	3.154	1.714	10.203	—
Fluoranthene	24	18	0.233	0.313	1.345	0.165	0.064	1.714	0.342	5,000
Pyrene	24	17	0.263	0.336	1.278	0.165	0.069	1.714	0.380	5,000
Butylbenzylphthalate	24	3	0.214	0.100	0.469	0.183	0.020	1.714	0.249	5,000
Benzo(a)anthracene	24	15	0.188	0.216	1.145	0.165	0.044	1.714	0.264	8
Chrysene	24	13	0.203	0.177	0.876	0.165	0.036	1.714	0.265	780
bis(2-Ethylhexyl)phthalate	24	10	1.168	2.396	2.051	0.203	0.489	1.714	2.006	410
Di-n-octylphthalate	24	1	0.260	0.166	0.639	0.213	0.034	1.714	0.318	4,100
Benzo(b)fluoranthene	24	13	0.285	0.426	1.493	0.165	0.087	1.714	0.435	8
Benzo(k)fluoranthene	24	12	0.180	0.181	1.003	0.165	0.037	1.714	0.244	78
Benzo(a)pyrene	24	11	0.190	0.161	0.847	0.165	0.033	1.714	0.247	0.8
Indeno(1,2,3-cd)pyrene	24	11	0.170	0.118	0.695	0.165	0.024	1.714	0.211	8
Dibenz(a,h)anthracene	24	6	0.185	0.108	0.585	0.165	0.022	1.714	0.223	0.8
Benzo(g,h,i)perylene	24	11	0.162	0.110	0.681	0.165	0.022	1.714	0.200	—

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Source: ERC, Inc.

TABLE 4-1. CONTINUED.

	No. Samp.	No. Det.	Mean	STDEV	Coeff. Var.	Median	Std. Error	t value (95% CL)	95% UCL	URS - HH[1] Surf. Soil
PESTICIDES & PCBs (mg/Kg)										
Heptachlor epoxide	24	1	0.00245	0.00387	1.57888	0.00105	0.00079	1.714	0.00381	0.6
gamma-Chlordane	24	3	0.00265	0.00387	1.46267	0.00108	0.00079	1.714	0.00400	16
alpha-Chlordane	24	1	0.00256	0.00395	1.54332	0.00105	0.00081	1.714	0.00394	16
4,4'-DDE	24	12	0.02719	0.06378	2.34575	0.00615	0.01302	1.714	0.04950	17
4,4'-DDD	24	6	0.00917	0.02239	2.44072	0.00205	0.00457	1.714	0.01701	24
4,4'-DDT	24	13	0.08661	0.30611	3.53437	0.00520	0.06248	1.714	0.19371	17
Endrin ketone	24	3	0.00334	0.00375	1.12183	0.00205	0.00077	1.714	0.00466	—
Aroclor-1248	24	1	0.15648	0.60876	3.89036	0.02050	0.12426	1.714	0.36947	4
Aroclor-1254	24	1	0.33190	1.50567	4.53658	0.02050	0.30734	1.714	0.85868	4
Aroclor-1260	24	5	0.04713	0.07152	1.51748	0.02050	0.01460	1.714	0.07215	13
METALS (mg/Kg)										
Aluminum	23	23	9324.78	6138.92	0.66	8050.00	1280.05	1.717	11522.64	20,000
Antimony	23	12	17.71	24.49	1.38	6.00	5.11	1.717	26.47	82
Arsenic	23	22	8.82	8.04	0.91	5.40	1.68	1.717	11.70	4/61
Barium	23	21	300.94	335.62	1.12	107.00	69.98	1.717	421.10	5,000
Beryllium	23	13	0.36	0.14	0.39	0.35	0.03	1.717	0.41	1
Cadmium	23	14	12.70	28.79	2.27	1.00	6.00	1.717	23.01	100
Calcium	23	15	8493.13	11197.29	1.32	5670.00	2334.80	1.717	12501.98	—
Chromium	23	22	61.57	103.82	1.69	15.30	21.65	1.717	98.73	5,000
Cobalt	23	18	9.43	7.21	0.77	5.50	1.50	1.717	12.01	5,000
Copper	23	22	303.48	449.15	1.48	43.10	93.65	1.717	464.29	5,000
Iron	23	22	59613.04	73318.92	1.23	19100.00	15288.05	1.717	85862.63	23,000
Lead	23	22	968.81	1573.66	1.62	120.00	328.13	1.717	1532.21	1,000
Magnesium	23	18	1224.43	1232.25	1.01	715.00	256.94	1.717	1665.61	—
Manganese	23	22	554.91	508.35	0.92	342.00	106.00	1.717	736.91	4,700
Mercury	23	18	1.89	4.92	2.61	0.32	1.03	1.717	3.65	610
Nickel	23	21	37.32	42.39	1.14	10.50	8.84	1.717	52.49	4,100
Potassium	23	17	672.85	768.38	1.14	500.00	160.22	1.717	947.95	—
Selenium	23	1	1.93	2.16	1.12	1.20	0.45	1.717	2.71	1,000
Silver	23	9	1.44	1.40	0.97	1.00	0.29	1.717	1.94	1,000
Sodium	23	8	376.86	555.88	1.48	280.00	115.91	1.717	575.88	—
Vanadium	23	23	35.17	39.04	1.11	24.00	8.14	1.717	49.15	1,400
Zinc	23	23	1020.60	1192.15	1.17	400.00	248.58	1.717	1447.42	5,000
Cyanide	23	5	49.98	235.44	4.71	0.80	49.09	1.717	134.27	4,100

[1] DNREC, 1998 (non-critical water resource area, restricted use)

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Source: ERC, Inc.