United States Environmental Protection Agency
Office of Emergency and Remedial Response
EPA/ROD/R03-91/111
March 1991

EPA

Superfund Record of Decision:

Delta Quarries/Stotler Landfill, PA

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R03-91/111	2.	3. Recipient's Accession No.

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7. Author(s)	8. Performing Organization Rept. No.
9. Performing Orgainization Name and Address	10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	13. Type of Report & Period Covered 800/000 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 137-acre Delta Quarries/Stotler Landfill site includes a 57-acre former landfill, and is located between the City of Altona, Logan Township and the Village of Pinecroft, Antis Township, Pennsylvania. Land use in the area is rural. Several residences are approximately 35 feet east of the landfill boundary, and wetlands areas exist to the southeast and northeast. Residences and businesses in the vicinity of the site rely on private wells adjacent to the landfill for their drinking water supply. Beginning in 1964, two adjacent municipal landfills were operated onsite, and in 1976 these operations were merged into one landfill, known as the Stotler Landfill. Delta Quarries and Disposal, Inc. purchased the landfill and continued to operate the facility until its closure in 1985. Reports from EPA, the State, and previous landfill operators indicate that municipal wastes comprise 98% of the total landfilled wastes; however, the landfill had accepted some industrial wastes including organic solvents, process sludges and metals from electroplating operation, tramp oils and residues from sludge sedimentation basins, which have contaminated onsite soil and ground water in the landfill area. In 1984, the State and Delta Quarries entered into a consent order to develop and implement a closure plan for the landfill. In 1987, the site owners

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Delta Quarries/Stotler Landfill, PA
First Remedial Action - Final
Contaminated Medium: gw
Key Contaminants: VOCs (TCE, PCE), metals (manganese)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 84
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

stract (Continued)

initiated the plan by placing a 4-foot soil cap over the landfill, vegetating the area, and installing sedimentation controls including interceptor berms, channels, and sedimentation basins. All elements of the closure plan were completed except installation of gas venting. This Record of Decision (ROD) addresses onsite ground water contamination. The primary contaminants of concern affecting the ground water are VOCs including PCE, TCE and vinyl chloride; and metals including manganese.

The selected remedial action for this site includes pumping and onsite pretreatment of ground water using precipitation to remove metals, if necessary, followed by onsite treatment using air stripping; discharging the treated water offsite to Little Juniata River; controlling air emissions using activated carbon; monitoring ground water and surface water; maintaining the cap, and installing a gas venting system; conducting periodic site reviews; and implementing institutional controls including deed and land use restrictions, and site access restrictions such as fencing. The estimated present worth cost for this remedial action is $2,344,581, which includes a present worth O&M cost of $1,176,989 over 30 years.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific ground water cleanup standards are based on the more stringent of SDWA MCLs or background levels, and include 1,2-DCA 5 ug/l (MCL); cis-1,2-DCE 70 ug/l (MCL); trans-1,2-DCE 100 ug/l (MCL); chloroform 100 ug/l (MCL); PCE 5 ug/l (MCL); TCE 5 ug/l (MCL); and vinyl chloride 2 ug/l (MCL).

RECORD OF DECISION
DELTA QUARRIES AND DISPOSAL SITE

SITE NAME AND LOCATION

Delta Quarries and Disposal Site
Antis and Logan Townships, Blair County, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action plan for the Delta Quarries and Disposal Superfund Site (the Site) in Blair County, Pennsylvania which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization act of 1986, U.S.C. Section 9601 (CERCLA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based upon and documented in the contents of the Administrative Record. The attached index identifies the items which comprise the Administrative Record.

The Commonwealth of Pennsylvania has reviewed, commented upon, and concurred in this decision.

ASSESSMENT OF THE SITE

Pursuant to duly delegated authority, I hereby determine, pursuant to Section 106 of CERCLA, 42 U.S.C. Section 9606, that actual or threatened releases of hazardous substances from this Site, as specified in Section VI, Summary of Site Risks, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to the public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The remedial action plan in this document is presented as the permanent remedy for controlling the ground water contamination at the Site. This remedy comprises the following components:

1. Extracting and treating the ground water to quickly halt plume migration, with the long-term goal of returning the ground water to its most beneficial use.

2. Provide additional protection by implementing institutional controls to restrict the use of the landfill and the installing of security fencing around the property in conjunction with the existing soil cap, to prevent any possible direct human contact with contaminants at the site, to provide protection to the integrity of the cap by preventing any intrusion which could compromise the cap.

3. Monitoring ground and surface water and implementing a site maintenance program including the installation of methane gas venting.

STATUTORY DETERMINATIONS

Pursuant to duly delegated authority, I hereby determine that the selected remedy is protective of human health and the environment, complies with Federal and State requirements that legally are applicable or relevant and appropriate to the remedial action, and is cost-effective as required under Section 121(d) of CERCLA, 42 U.S.C. Section 9621(d). With respect to a principal threat at the site, the contaminated ground water, the remedy satisfies the statutory preference, as set forth in Section 121(b) of CERCLA, 42 U.S.C. Section 9621(b), for remedial actions in which treatment that reduces toxicity, mobility, or volume is a principal element. Finally, it is determined that this remedy utilizes permanent solutions and alternative technologies to the maximum extent practicable.

Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within five years after the commencement of the remedial action to ensure that human health and the environment continue to be adequately protected by the remedy.

for Edwin B. Erickson
Regional Administrator
Region III

3/29/91
Date

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DECISION SUMMARY

RECORD OF DECISION

DELTA QUARRIES AND DISPOSAL SITE

DECISION SUMMARY

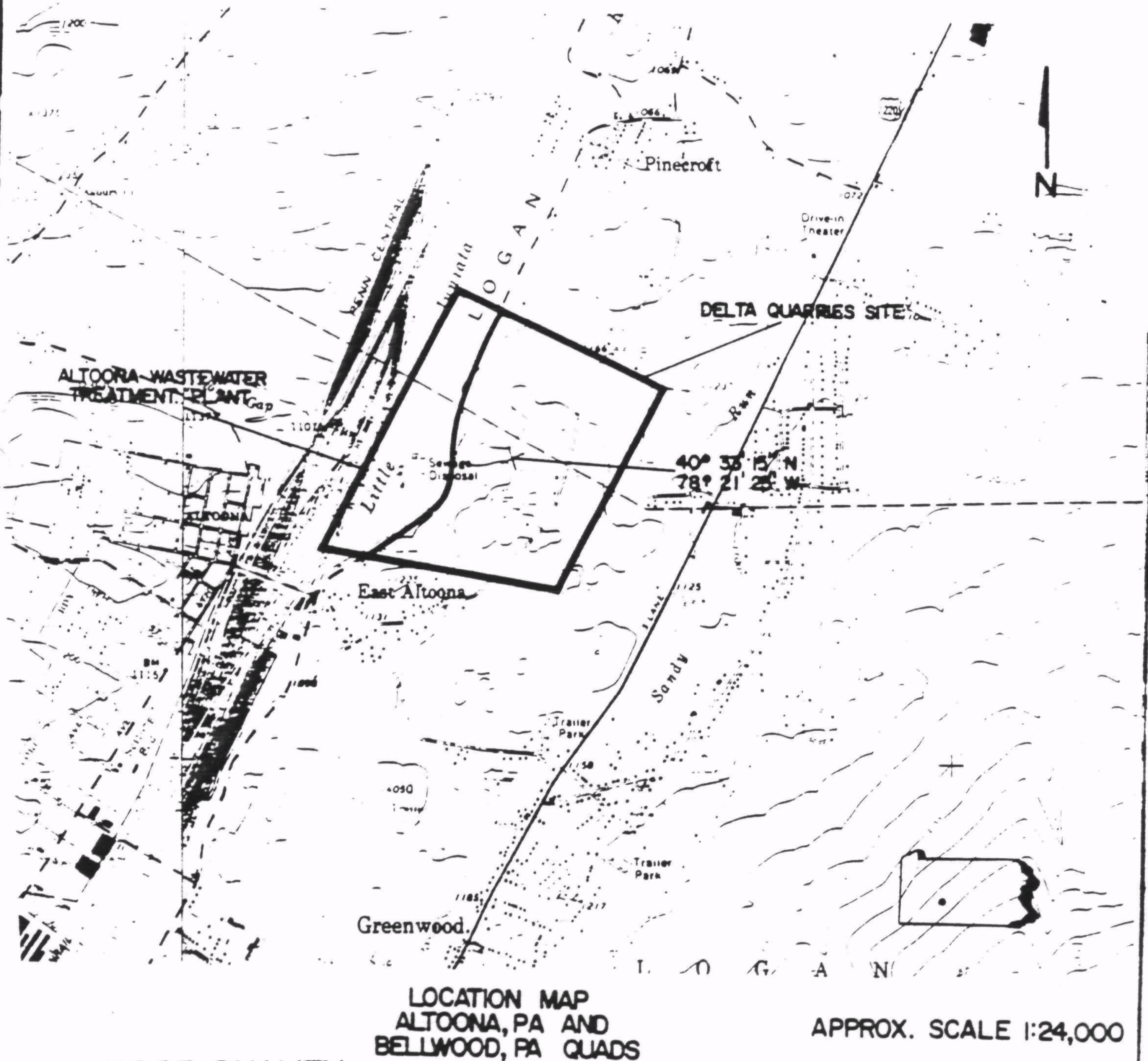
I. SITE NAME, LOCATION AND DESCRIPTION

The Delta Quarries and Disposal Site study area comprises an approximately 137 acre parcel of property located about 2 miles north of the City of Altoona, Logan Township, Pennsylvania and 1 mile south of the Village of Pinecroft, Antis Township, Pennsylvania (Figure 1). A former landfill occupies approximately 57 acres of the property. The landfill is bordered to the west by Sixth Avenue and to the east by Sandy Bank Road (Figure 2). The area is rural in nature with some residential dwellings within 35 feet to the east of the landfill boundary. These residences are trailer homes that are sporadically located in the study area. Other residences are scattered several hundred feet or further from the Site. No parks, recreation areas, wildlife refuges, historic and/or archeological sites, or wild and scenic rivers are located on or adjacent to the Site.

The Little Juniata River, which flows northeasterly, lies approximately one-quarter mile west of the Site. The Little Juniata watershed extends over 343 square miles. The City of Altoona Sewage Treatment Plant and a privately owned solid waste transfer station are located approximately 750 feet west of the southern portion of the Site. Three junkyard operations are also located to the west of the Site.

Sandy Run Creek originates in the northeast corner of the City of Altoona. Sandy Run Creek flows parallel to the Little Juniata River, creating a drainage divide off the northeast edge of the landfill, and joins the Little Juniata River approximately 1 mile downstream of the landfill. Approximately 50 percent of the landfill surface area drains toward Sandy Run. The Sandy Run watershed is 8.64 square miles.

The Delta Quarries and Disposal landfill is situated on a hillside surrounded by areas of relatively high relief. Prior to initiation of landfill activities, the property was characterized as a natural depression. The landfill elevations presently range from a low of 1,175 feet above sea level in the northeast section to a high of 1,290 feet above sea level in the center. To the east, the topography drops off to the Sandy Run before rising rapidly to the Brush Mountain Range with elevations over 2,000 feet above sea level. The topography undergoes a steep transition at



POOR QUALITY
ORIGINAL

FIGURE 1 GENERAL SITE MAP

WELL LOCATIONS
DELTA QUARRIES AND DISPOSAL/
STOTLER LANDFILL
BLAIR COUNTY, PENNSYLVANIA

POOR QUALITY ORIGINAL

LEGEND

LIMITS OF LANDFILL WASTE

MONITORING WELL LOCATION (88 REFERS TO YEAR OF INSTALLATION)

RESIDENTIAL WELL LOCATION

FLOW DIRECTION

PROPOSED MONITORING WELL LOCATION

NOTES

1. THE DELTA QUARRIES AND DISPOSAL INC./STOTLER LANDFILL HAS BEEN CAPPED (4 FOOT MINIMUM SOIL COVER) IN COMPLIANCE WITH THE NOVEMBER 1, 1986 [illegible] CONSENT ORDER AND AGREEMENT

the western edge of the landfill, dropping off to Sixth Avenue before reaching the Little Juniata River floodplain elevation of approximately 1,080 feet. Wetland areas exist to the southwest and northeast of the landfill.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A natural depression originally existed on-site prior to the onset of landfilling operations. In 1964, two adjacent municipal waste landfilling operations, the Stotler and the Parshall/Kruise landfillS commenced. The owner of Stotler Landfill leased the Parshall/Kruise landfill property in 1976 and merged the operations into Stotler Landfill. Delta Quarries and Disposal Inc. (Delta Quarries) purchased the Stotler landfill (and the Parshall/Kruise Landfill incorporated therein) in 1978 and operated the facility until its closure in 1985.

Reports from previous landfill operators and EPA and Pennsylvania Department of Environmental Resources (PADER) file information suggest that the majority of wastes (approximately 99.8 percent) contained in the landfill are municipal wastes. Both the EPA and PADER files indicate that some industrial wastes were accepted at the landfill by the Stotler landfill and by Delta Quarries. The industrial wastes identified included organic solvents, process sludges with heavy metals (including waste water treatment sludges from electroplating operations), tramp oils and residue from sludge sedimentation basin. The sludges from the electroplating operations and the organic solvents included some RCRA listed wastes.

In 1984, PADER and Delta Quarries entered into a Consent Order under Pennsylvania Solid Waste Management Act requiring Delta Quarries to develop and implement a closure plan for the landfill. The Delta Quarries landfill ceased operations on February 28, 1985. In the summer of 1987, a four-foot cap of soil materials borrowed from an area southeast of the Site was placed over the landfill as part of the Site closure activities. The cap was vegetated to provide erosion control. Sedimentation control was provided by utilizing interceptor berms, rock-lined channels, and sedimentation basins. Delta Quarries completed all elements of the closure plan with exception of installation of gas venting, and abatement of ground water pollution.

In 1986, the Site was listed on the National Priorities List (NPL) in accordance with the provisions of CERCLA. On September 18, 1987, Delta Quarries entered into a Consent Order and Agreement with EPA to conduct the Remedial Investigation and Feasibility Study (RI/FS) for the Site. The regulations enacted pursuant to CERCLA generally require that a RI/FS be conducted at each NPL site. The purpose of an RI is to characterize conditions at the site. The subsequent FS then develops, screens, and analyzes remedial alternatives which are applicable to those site conditions and might be implemented at the Site. The study area for the RI for the Site included the landfill and ground water contamination area, the area immediately surrounding the landfill, the adjacent wetlands, Sandy Run Creek, the Little Juniata River, the drainage patterns that make up the surface hydrology and the ground water system below these areas ("study area").

The RI and FS reports were prepared by Delta Quarries in November, 1990 and January 1991 respectively. These reports, after being revised based on EPA and PADER comments, were placed in the information repositories described in Section VI.

Residences and businesses in the Site vicinity, including those immediately adjacent to the landfill, rely on ground water (private wells) for their drinking water supplies. Past and ongoing monitoring of private well water supplies indicates that contamination from the Site has not yet affected area water supplies.

III. SITE CHARACTERISTICS

A. Regional Climate

The regional climate in the vicinity of the Delta Quarries Site is characterized by mild winters, moderate temperature range, and moderate precipitation. The average annual precipitation, including rain and snow, is approximately 36.2 inches, as water. The average annual evaporation rate is approximately 16 inches, as water. The average annual snow fall in Pittsburgh, located 70 miles to the west, is 43.8 inches, as snow. Prevailing winds are from the west southwest during the summer shifting to the northwest during the winter.

B. Surface Water Hydrology

The Site lies entirely in the Little Juniata River watershed which drains ultimately into the Susquehanna River basin. The Little Juniata River headwaters begin in the northwest corner of Altoona and flow in a northeasterly direction along the eastern edge of Conrail railroad tracks to the west of the Site. The

Little Juniata River bends to the southeast along the Blair-Huntingdon County line and eventually joins with the main Juniata River. The mean annual discharge of the Little Juniata River is measured at 372 cubic feet per second (cfs) at the nearest USGS gauging station in Spruce Creek, Pennsylvania. The Little Juniata watershed is approximately 343 square miles.

All Site runoff except that in the northeast section of the Site flows directly toward the Little Juniata River. Runoff from the northeast quadrant of the Site flows northeasterly to Gilbert Pond, which feeds an intermittent unnamed tributary and ultimately to Sandy Run. Sandy Run originates in the northeast area of Altoona and flows northeasterly for 4.6 miles before joining the Little Juniata River at the Borough of Pinecroft. Sandy Run has an estimated mean annual flow of 15 cfs, and a watershed of 8.64 square miles.

There are three surface discharges from ground water in the immediate Site vicinity: FAM Spring, West Flow, and East Flow. FAM Spring is a limestone spring which emerges to the southwest of the landfill near 6th Avenue. FAM Spring flows northwest toward a wetland area adjacent to the Altoona Sewage Treatment Plant. Flows ranging between 0.4 to 70 gpm have been measured with the majority of flows between 10 to 45 gpm.

The West Flow emerges at the toe of the landfill and flows through a culvert under 6th Avenue. The West Flow continues in a westerly direction until it reaches the wetland area adjacent to the Altoona Sewage Treatment Plant. Flows ranging from 0.8 to 24 gpm have been measured with most flows in the range of 1 to 13 gpm.

The East Flow originates in a sedimentation basin at the northeast corner of the landfill, and flows eastward to the wetland area culvert under Sandy Bank Road, feeding a small, unnamed tributary. This tributary drains into Gilbert Pond and eventually flows into Sandy Run. Flows ranging from 0 to 63 gpm have been recorded. Flows are highly dependent on surface water runoff from heavy rains and snow melt. The landfill underwent significant changes in the fall of 1987 when the PADER-approved Site closure plan was implemented. The plan incorporated the regrading and capping of the landfill area with borrow material, as well as a series of diversion ditches, drainage channels, and sedimentation basins. This plan apparently had the most impact on the East Flow, essentially limiting it to high precipitation events only.

C. Geology

The Delta Quarries landfill is situated on the western edge of the Appalachian Mountain Province. Figure 3 shows the relevant geological formations for the area. The Appalachians are a series of thrust-faulted sedimentary wedges originating in the Carboniferous age.

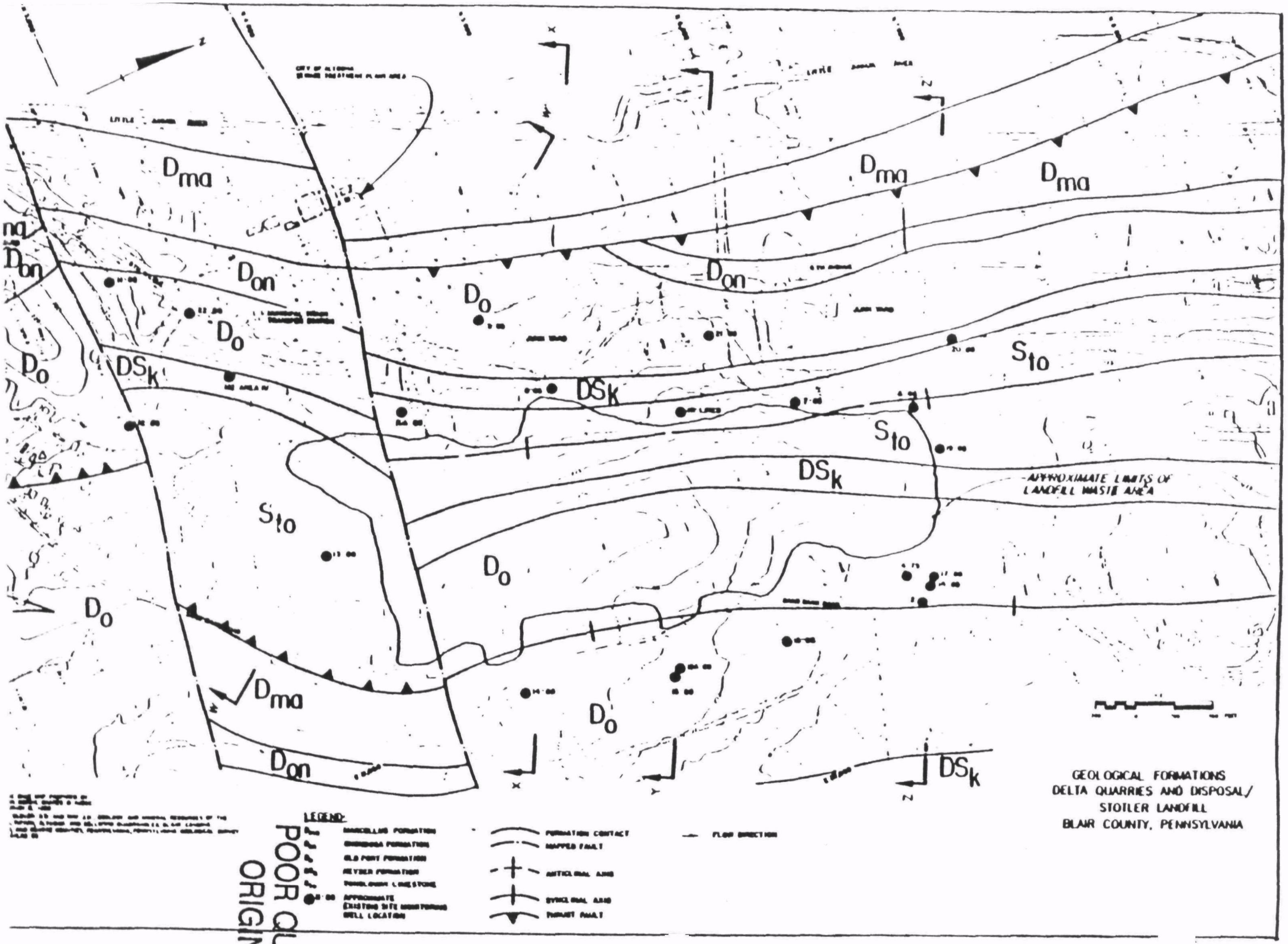


FIGURE 3 GEOLOG . FORMATIONS

TABLE 1

WATER LEVEL ELEVATIONS*
DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL

PRE REMEDIAL INVESTIGATION DATA

Well #	02/80	01/81	07/81	09/81	08/82	12/82	05/83	09/83	03/84	09/84	07/85	09/85	05/86	09/86	03/87	10/87	02/88	04/88
6 - 85												1072.9	1080.0	1071.0	1075.6		1074.3	1074.8
7 - 85											1080.8	1074.6	1087.6	1072.4	1077.2	1073.2	1075.6	
8 - 85												1086.1	1104.5	1088.0	1104.4	1086.5	1090.3	1092.4
9 - 88																		
10A - 88																		
11 - 88																		
12 - 88																		
13 - 88																		
14 - 88																		
15 - 88																		
15A - 88																		
16 - 88																		
17 - 88																		
18 - 88																		
19 - 88																		
20 - 89																		
21 - 88																		
22 - 88																		
W1 Lined	1081.5	1081.8	1092.6	1072.6	1101.9	1093.6	1080.9	1087.6	1093.1	1088.6		1080.4	1094.7	1078.5	1083.6	1079.3	1082.0	1082.4
W2 Area IV	1101.4											1099.8	1109.3	1097.6	1099.1		1100.4	1103.2

REMEDIAL INVESTIGATION DATA

Well #	06/88	10/11/88	11/17/88	08/21/89	08/24/89	09/11/89	1/16/90
6 - 85	1073.5	1071.7	1070.9	1075.9	1070.2	1073.4	1072.0
7 - 85	1074.8	1073.2		1082.7	1075.2		
8 - 85	1087.1	1086.5	1086.7			1086.4	1091.4
9 - 88					1091.6	1091.7	1091.6
10A - 88			1134.5	1136.2	1137.2	1135.6	1134.1
11 - 88		1091.1	1090.1	1089.3	1088.9	1088.4	1087.6
12 - 88		1145.8	1142.5	1155.7	1157.6	1150.7	1144.5
13 - 88		1148.2		1165.7	1165.2	1162.7	<1130
14 - 88		1182.7	1169.4	1180.5	1186.1	1179.3	1191.5
15 - 88				1161.5	1157.6	1143.5	1140.7
15A - 88				1150.8	1155.0	1143.2	1131.3
16 - 88			1156.9	1165.1	1164.3	1159.8	1162.9
17 - 88				1160.0	1150.0	1157.3	1156.6
18 - 88			1149.1	1157.9	1157.2	1157.2	1155.0
19 - 88				1104.5	1102.2	1095.8	1080.1
20 - 89					1075.7	1075.5	1075.4
21 - 88			1079.6	1081.6	1081.1	1082.3	1084.2
22 - 88					1091.6	1083.4	1083.4
W1 Lined	1080.7	1079.4	1078.5	1085.6	1085.7	1083.8	1090.7
W2 Area IV	1100.5	1090.5	1097.6		1102.3	1100.7	1090.6

* All elevations are reported in feet above mean sea level (MSL)

The landfill is situated along a central anticline running north and south. The core of this anticline is comprised of the Tonoloway formation, a Silurian age formation composed of medium gray, thinly bedded to massive limestone. It is believed that the Tonoloway limestone underlies the entire Site to great depths.

The Tonoloway is bounded on either side by synclinal structures composed of limestone. The upper section is interbedded with shale, and the basal section contains nodular and cherty limestone. The Old Port formation is composed of an upper member, Ridgely sandstone, and a lower member, Shriver shale. The Ridgeley sandstone is a fine-grained sandstone with silty siltstone. The Shriver shale is a massive calcareous dark gray shale.

D. Hydrogeology

The Site is located in an area of significant topographical relief, with small isolated ponds and wetland areas. Precipitation is the primary source of ground water recharge in the region and the topography indicates that the landfill could be a major potential ground water recharge area, however the soil cap installed in 1987 limits this recharge. The presence of the wetland area west of the Site is a potential ground water discharge, as is the Little Juniata River.

The Site subsurface is generally composed of a minimum four-foot-thick clay loam over a natural sandy loam to loam material ranging from several feet to 20 feet thick. Beneath the loam lies fractured bed rock including limestone, shale, sandstone, and siltstone. While the bed rock types generally have low porosity, the extensive joints and bedding planes can increase secondary porosities to greater than 20 percent.

The depth to static water level ranges from several feet in the northeast to over 100 feet in the majority of the landfill area. Thus, the ground water flow is predominantly in the bedrock. Piezometric and pump test data indicate that the aquifer behaves as a single unconfined unit.

Historical water level data from 1980 is provided in Table 1. Wells located in topographic highs indicate water level fluctuation on the order of 10 to 20 feet, while those wells in the low-lying western syncline show fluctuations of only a few feet. The larger fluctuations are in areas where the ground water table is approximately 100 feet below the surface. The piezometric surface generally follows the topography sloping northwesterly toward the Little Juniata River. There is a substantial change in the ground water gradient corresponding to the abrupt topographic transition from steep hillsides to a floodplain just west of the site. Using August 26, 1989 data, the gradient changes from an average of 0.057 under the landfill to 0.020 west of the site. This is due to differing geologic materials in these areas.

There is a slight ground water divide located off the northeast section of the landfill, corresponding to a sloping topographical transition to the east. Both surface and shallow ground water flow in this area drain northeast to Sandy Run. While the location of this divide changes with ground water fluctuations, it does not appear that any infiltrations from the landfill would flow eastward. Given that the ground water elevations in this area are near the surface, this ground water movement is considered a local flow phenomena.

E. Nature and Extent of Contamination

Site Characterization

The nature and extent of chemical contamination within the Delta Quarries study area was characterized through extensive sampling of surface soils, ground water monitoring wells, residential drinking water wells, surface water, and sediments. Samples were analyzed for U.S. EPA's Target Compound List (TCL) and Target Analyte List (TAL) constituents. For the organic analyses this also included searches for non-target compounds. The data with required sampling and analysis procedures underwent a rigorous quality assurance review to ensure compliance, validity, and usability of the results.

All analytical data obtained in the course of the remedial investigation were compiled, sorted by environmental medium, evaluated with respect to analytical qualifiers (including sample-specific minimum quantitation limits), analyzed statistically to generate upper 95 percent confidence limits of the average concentrations for each chemical in each medium; and examined in comparison to naturally occurring background levels in accordance with U. S. EPA's guidelines. Environmental media evaluated individually include surface water, sediments, surface soils, and ground water. Ground water represented by downgradient monitoring well samples was evaluated separately from ground water at downgradient residential wells. Air samples were not extensively collected because this medium was not regarded as a significant pathway of exposure at the Site. This conclusion is based on the absence of significant level of volatile organics or other contaminants found in surface soils, and the landfill cover four feet in depth. Soil gas monitoring was done on-site using an organic vapor analyzer. This investigation found concentrations of hydrocarbons, mostly methane, typical for a landfill. The levels of methane found did not pose any explosive threat.

Ground Water Contamination

Tables 2 through 5 present a summary of the sampling and analyses for the groundwater medium. Figure 4 shows the approximate locations of the contaminant ground water and relevant concentrations based on the sampling work.

No point sources or "hot spots" of contamination were identified as a result of the RI and previous sampling surveys. Contamination at levels of potential human health concern appears to be limited to the occurrence of volatile organic chemicals in ground water as reflected by samples collected from monitoring wells situated around the boundary of the former landfill area. The results of the RI survey of all residential wells in proximity to the former landfill indicated that no organic compounds were reliably detected in any residential well samples.

The following compounds which include organic and inorganic compounds were found in the ground water samples at detectable levels: acetone, chlorobenzene, chloroethane, chloroform, 1,1-dichloroethane, 1,2-dichloroethene, 1,2-dichloroethane, trichloroethene ("TCE"),1,1,1, trichloroethane tetrachloroethane, tetrachlorethene ("PCE"), toluene, vinyl chloride, barium, manganese, nickel, and zinc. Of these, the contaminants of primary concern (i.e., those contaminants that may pose a chronic health affect, are vinyl chloride, 1,1-dichloroethane, 1,2-dichloroethene, chloroform) 1,2-dichloroethene, chloroform, 1,2-dichloroethane, TCE, PCE, and manganese.

Surficial Soils Contamination

Soil samples were taken and analyzed within the vicinity of and on the Site. The following compounds were found at detectable levels at the Site. 1,1-dichloroethane, 1,2-dichloroethene, 1,2-dichloroethane, TCE, toluene, barium, cadmium, chromium, copper, lead, mangenese, nickel, and zinc.

Soil sampling points are shown on Figure 5. Sample results are shown on Table 6. In addition to soil samples a soil gas survey was undertaken at the Site. High levels of hydrocarbons were found in sporadic locations up to 1000 ppm, however, when analyzed with a portable gas chromatograph, it was determined that the majority of the gas was methane which is a natural by-product of municipal/and fill degradation and in this case would not be considered to be a hazardous substance. It was also determined that as one moves further away from the landfill the concentrations drop off rapidly.

Surface Water and Sediment Contamination

Surface water and sediment samples from the adjacent wetlands, Sandy Run Creek and the Little Juniata River were taken and analyzed.

TABLE 2

GROUND WATER MONITORING WELL ORGANIC ANALYSIS DATA SUMMARY

DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL

SAMPLED AUGUST SEPTEMBER 1988

	COMPOUND	DETECTION LIMIT	MONITORING WELL LOCATION									FEDERAL MCLs
			M1-Lined	M2-Area IV	6-85	8-85	9-88	9-88 (Dup)	10A-88	14-88	22-88	
VOCs	Vinyl Chloride	10							35			2
	Chloroethane	10							31			
	Acetone	5.0					160	120				
	1,1-Dichloroethane	5.0	36	19	15				47			
	1,2-Dichloroethene (total)	5.0		150		44	58	58	67			70 or 100**
	Chloroform	5.0			30							
	1,2-Dichloroethane	5.0					13					5
	2-Butanone	5.0								100		
	1,1,1-Trichloroethane	5.0	37	86 J			11	9.6				200
	Trichloroethene	5.0		65			47	41	13			5
	Tetrachloroethene	5.0		14			5.8		6.2			5*
	Toluene	5.0		6 J								2000*
	Chlorobenzene	5.0							9.2			
Semi-Volatiles	NONE DETECTED											
Pesticides/PCBs	beta-BHC	0.05			1.5	0.74					0.10	

NOTE:
1. ALL RESULTS REPORTED IN ug/l
2. All Monitoring Well Groundwater samples were analyzed for the full organics TCL. ONLY DETECTS ARE LISTED ABOVE
3. Qualifier "J" indicates that quantitation is only approximate.
4. * MCLs listed for Tetrachloroethene and Toluene are proposed.
5. ** Refers to MCLs listed for 1,2 Dichloroethene (cis) and (trans) molecules respectively.

TABLE 3

GROUND WATER MONITORING WELL INORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL
SAMPLED AUGUST-SEPTEMBER 1988

COMPOUND	DETECTION LIMIT	MONITORING WELL LOCATION													FEDERAL MCLs
		MI Upgd	M2 Area IV	6-88	8-88	9-88	9-88 (Dup)	10A-88	11-88	12-88	13-88	14-88	15-88	15-88 (Dup)	
Aluminum	40		61 B		78 B	40 B	61 B		40 B	47 B	43	33 B	37 R	27 R	
Antimony	0.4														
Arsenic	0.4	8		11 B				4.1							50
Barium	40	424 J	47	140	130	136 B	187 B	481 J	136 B	60 B	12	10	76 B	61 B	1000
Beryllium	0.6														
Cadmium	0.4					2.7 B		2.5 B							10
Calcium	40	100000	103000	216000	164000	88700	71300	186000	60600	27800	86300	71600	56100	64600	
Chromium	2.0									3.5 B					50
Cobalt	4.0	6.3 B		21		11 B	12 B	20	6.8 B			2.1 B			
Copper	3.0									16					
Iron	8.0	6080		8470 J				648	136						
Lead	0.6	0.3 B	0.20 B	0.3 B	0.34 B	0.4 B	0.38 B	0.2 B	0.3 B	0.2 B	0.29 B	0.3 B		0.3 B	50
Magnesium	3.0	18000	15800	29600	18000	2130	2140	16100	7770	5010	33600	2750	3580	3500	
Manganese	3.0	1670		2150	8.1	60	70	4640	61	1.8 B	6.5	1.6			
Mercury	0.08								0.53 R	0.62 R		0.25 R	0.02 R	0.08 R	2
Nickel	8.0			26		23 B	23 B	20 J	15 J			4.8			
Potassium	4.0					2780 B	2700 B	6430 B							
Selenium	0.2							1.5							10
Silver	1.0						8.8 B	14 B	8 B	8.8 B					50
Sodium	100	16300	5410	11600	14100	8420	8060	180000	2160 B	2060 B	1160	2320	2220 B	2030 B	
Thallium	0.1														
Vanadium	0.4			2.4						8.4					
Zinc	3.0	13				21	21	22	24			11 J			
Cyanide	0.5														

NOTE: 1. ALL RESULTS REPORTED IN ug/l

2. All Monitoring Well Groundwater samples were analyzed for the full inorganics TAL. ONLY DETECTS ARE LISTED ABOVE

3. Qualifier "B" indicates qualitatively suspect results, compound detected in field and/or lab blanks at similar level

4. Qualifier "J" indicates quantitation is only approximate

5. Qualifier "R" indicates unreliable results

TABLE 3

GROUND WATER MONITORING WELL INORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL
SAMPLED AUGUST SEPTEMBER 1989
(Continued)

COMPOUND	DETECTION LIMIT	MONITORING WELL LOCATION 16A-89	16-89	17-89	18-89	19-89	20-89	21-89	22-89	Field Blank 12-89	Field Blank 20-89	TRIPBLANK 1	TRIPBLANK 2	FEDERAL MCLs
Aluminum	40	77 B	162 R	687 B	66 B	66 B	40 B	76 B	103 J	61	63 J	34	42 J	
Antimony	0.4													
Arsenic	0.4					8.3	1.8							60
Barium	40	13	126 B	186 B	80 B	83	181 B	71	28	46 J	60 J	42 J	42 J	1000
Beryllium	0.8			2.1 J										
Cadmium	0.4			4.4 B										10
Calcium	40	53800	1620 B	7460	3410	148000	28000	22600	16300	211	442	88	87 B	
Chromium	2.0								7.6 J					50
Cobalt	4.0		8.8 B	14 B	6 B	2.1 B	20	37	6.6 B		2.8			
Copper	2.0			7.3										
Iron	6.0		1160	161	8190	3700 J	229	649 J	71 J					
Lead	0.6	0.2 B	0.8 B	1.4 B	2.4 B	0.62 B	0.4 B	0.3 B	0.3 B	0.3	0.5	0.4	0.5	50
Magnesium	2.0	3070	1300	2020	1260	61200	1780	2710	1610	100	122			
Manganese	2.0		172	180	281	386	78	62	84					
Mercury	0.08		0.53 R	0.61 R	0.32 R					0.47 R		0.61 R		2
Nickel	8.0		38 J	81 J	6.3 J	3.8	42 J	134	12					
Potassium	4.0													
Selenium	0.2						3.6							10
Silver	1.0		8.1 B	13 B	6.9 B					7.7 J				50
Sodium	100	1680	1630 B	13300 J	3310 B	21400	2480 B	1640	1680	1230	1260		1060	
Thallium	0.1													
Vanadium	0.4													
Zinc	2.0		85	184	11	18	88	404 J						
Cyanide	0.5													

NOTE: 1. ALL RESULTS REPORTED IN ug/l
2. All Monitoring Well Groundwater samples were analyzed for the full inorganics TAL. ONLY DETECTS ARE LISTED ABOVE
3. Qualifier "B" indicates qualitatively suspect results, compound detected in field and/or lab blanks at similar level
4. Qualifier "J" indicates quantitation is only approximate
5. Qualifier "R" indicates unreliable results

TABLE 4

RESIDENTIAL WELLS ORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOLLER LANDFILL
SAMPLED AUGUST 1989

	COMPOUND	DETECTION LIMIT	RESIDENTIAL WELL LOCATION				FEDERAL MCLG*
			J. Kling	B. Bickle	Lehman	Hollingshead	
VOCs	Methylene Chloride	5.0	5.4 B	5.8 B	5.1 B	5.1 B	0
Semi-Volatiles	NONE DETECTED						
Pesticides/PCBs	NONE DETECTED						

NOTE:
1. ALL RESULTS REPORTED IN ug/l
2. All Residential Well Groundwater samples were analyzed for the full organics TCL. ONLY DETECTS ARE LISTED ABOVE.
3. Qualifier "B" indicates that quantitatively suspect, compound detected in field and/or lab blank at similar level.
4. * Maximum Contaminant Level Goal.

POOR QUALITY ORIGINAL

TABLE 5

RESIDENTIAL WELLS INORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL
SAMPLED AUGUST 1989
(Continued)

COMPOUND	DETECTION LIMIT	Hollingshead Total	Hollingshead Filter	Hollingshead (Dup) Total	Hollingshead (Dup) Filter	Glenn Stotler Total	Glenn Stotler Filter	Judy Stotler Total	Judy Stotler Filter	R. Ulrich Total	R. Ulrich Filter	R. Ulrich (Dup) Total	R. Ulrich (Dup) Filter	M. Rodkey Total	M. Rodkey Filter	FEDERAL MCLs
Aluminum	40	45 B	50 B		59 B					41.3 B		34.3 B		352		
Antimony	0.4															
Arsenic	0.4													2.7	1.2	50
Barium	40	9	9		10	85.0 J	72.3 J	103 J	85.0 J	116 J	100 J	115 J	107 J	130 J	120 J	1000
Beryllium	0.6															
Cadmium	0.4															10
Calcium	40	1410	1500		2010	83000	81200	90000	80670	5330	5300	5100	5290	35400	34500	
Chromium	2.0													2.6 J		50
Cobalt	4.9									3.1		2.6		14.8	8.2	
Copper	2.0	70	34		92	8 J	5.1 J	16.8 J	10.5 J					6.9 J		
Iron	6.0	2700	171		157	200				5620	5370	5250	5110	16500	4010	
Lead	0.6	4.70 B	0.54 B		5.50	3.1 B	1.9 B	0.8 B	0.9 B	0.9 B	0.9 B	1.3 B	0.8 B	13.6 J	0.6 B	50
Magnesium	2.0	437	495		506	9640	9860	9600	9650	1000	1100	1070	1110	2050	2070	
Manganese	2.0	51	46		29	2.8	2.31	1.6		286	275	273	266	507	300	
Mercury	0.08															2
Nickel	6.0					7.6 J	10.1 J			3.6 J		6.6 J		59.7 J	26.3 J	
Potassium	4.0														2607	
Selenium	0.2															10
Silver	1.0														6.2	50
Sodium	100					5620	5700	5140	4800	2020	1800	1900	1910	3050	3260	
Thallium	0.1															
Vanadium	0.4													3.7		
Zinc	2.0	53	43		45	150	165	263	250	36.2	33.7	40.9	34.5	557	54.6	
Cyanide	0.5															

NOTE: 1. ALL RESULTS REPORTED IN ug/l
2. Cyanide analysis only performed on non-filtered (total) samples.
3. All Residential Well Groundwater samples were analyzed for the full inorganics TAL. ONLY DETECTS ARE LISTED ABOVE
4. Qualifier "B" indicates qualitatively suspect results, compound detected in field and/or lab blanks at similar level.
5. Qualifier "J" indicates quantitation is only approximate.
6. Qualifier "R" indicates unreliable results.

POOR QUALITY ORIGINAL

TABLE 5

RESIDENTIAL WELLS INORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOLLER LANDFILL
SAMPLED AUGUST 1988
(Continued)

COMPOUND	DETECTION LIMIT	RESIDENTIAL WELL LOCATION: Bertha George Total	Bertha George Filter	C. Caramelo Total	C. Caramelo Filter	J. Cannaro Total	J. Cannaro Filter	J. Lingafelt Total	J. Lingafelt Filter	Brian Jones Total	F.D. at RM 10 Total	F.D. at RM 10 Filter	TRIP BLANK Total	TRIP BLANK Filter	FEDERAL MCL
Aluminum	40			226 B			33.0 B			33 B	32.0 B		46	44 B	
Antimony	0.6														
Arsenic	0.4	3.6	1.3	2.0 B				1.2		2.1	1.1 B				50
Barium	40	[illegible] J	217 J	323 J	193 J	272 J	263 J	79.1 J	78.7 J	79 B	46.2 J	47.2 J			1000
Beryllium	0.6														
Cadmium	0.4														10
Calcium	40	53000	53500	57100	54600	121500	124000	95200	90400	20600	171	256			
Chromium	2.0														50
Cobalt	4.9		3.1	2.0	2.1					5.0 B					
Copper	2.0			60.5 J	13.9 J	10.5 J	7.5 J	5.3 J							
Iron	6.0	7200	7030	7130	5050					3770					
Lead	0.6	0.3 B	0.6 B	16.6 J	1.3 B	0.6 B	1.0 B	0.3 B	0.7 B	0.4 B		0.3 B	0.04	0.21 B	50
Magnesium	2.0	3150	3200		3040	21000	22300	5300	5440	1720		60.7			
Manganese	2.0	242	245	242	171			2.0		88					
Mercury	0.08														2
Nickel	6.0	6.0 J		12 J	5.0 J		3.5	3.5	3.5	13 B	3.5	3.5			
Potassium	4.0	2667	2667	2667	2667	2667	2667	2667	2667		2667	2667			
Selenium	0.2														10
Silver	1.0	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2			50
Sodium	100	2600	2530	3300	3450	2350	2210	5270	5350	2800 B	1220	1200			
Thallium	0.1														
Vanadium	0.4														
Zinc	2.0	95.7	57.7	525	149			15.1	14.8	34					
Cyanide	0.5														

NOTE: 1. ALL RESULTS REPORTED IN ug/l
2. Cyanide analysis only performed on non filtered (total) samples.
3. All Residential Well Groundwater samples were analyzed for the full inorganics TAL. ONLY DETECTS ARE LISTED ABOVE
4. Qualifier "B" indicates qualitatively suspect results, compound detected in field and/or lab blanks at similar level
5. Qualifier "J" indicates quantitation is only approximate.
6. Qualifier "R" indicates unreliable results.

POOR QUALITY ORIGINAL

TABLE 5

RESIDENTIAL WELLS INORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOLLER LANDFILL
SAMPLED AUGUST 1989

COMPOUND	DETECTION LIMIT	RESIDENTIAL WELL LOCATION: Wm. Kling Total	Wm. Kling Filter	J. Kling Total	J. Kling Filter	B. Bickle Total	B. Bickle Filter	Lehman Total	Lehman Filter	G. Hole Total	G. Hole Filter	J. Stiffler Total	J. Stiffler Filter	FEDERAL MCLs
Aluminum	40	45 B	35 B	32 B	30 B	60 B	27 B	32 B	45 B	53 B	49 B		29 B	
Antimony	0.4													
Arsenic	0.4		1.4 J			0.9 J	0.5 J		1.3 J	1.6 J				50
Barium	40	50	51	30	30	511	400	100	106	104	102	23	24	1000
Beryllium	0.6													
Cadmium	0.4									1.7 J				10
Calcium	40	183000	187000	163000	163000	115000	113000	66300	65600	78300	78000	10600	106000	
Chromium	2.0													50
Cobalt	4.9				2.0	12	13		3					
Copper	2.0	36				5						5		
Iron	6.0					2570	2220	12000	11600	5110	4800			
Lead	0.6	1.10 B	0.54 B	1.14 B	0.75 B	2.31 B	0.35 B	1.04 B	0.86 B	1.10 B	0.43 B	1.55 B	1.02 B	50
Magnesium	2.0	122000	12700	10100	10200	12000	12700	4700	4700	5710	5700	4440	4510	
Manganese	2.0	6				1230	1190	371	366	150	150			
Mercury	0.08													2
Nickel	6.0					12	10	12	8					
Potassium	4.0													
Selenium	0.2													10
Silver	1.0													50
Sodium	100	3020	3000	2200	2320	2370	2470	7860	7700	11100	11000	1130	1200	
Thallium	0.1													
Vanadium	0.4													
Zinc	2.0	45	20			21	15	133	117			24	24	
Cyanide	0.5													

NOTE:
1. ALL RESULTS REPORTED IN ug/l
2. Cyanide analysis only performed on non filtered (total) samples.
3. All Residential Well Groundwater samples were analyzed for the full inorganics TAL. ONLY DETECTS ARE LISTED ABOVE.
4. Qualifier "B" indicates qualitatively suspect results, compound detected in field and/or lab blanks at similar level.
5. Qualifier "J" indicates quantitation is only approximate
6. Qualifier "R" indicates unreliable results

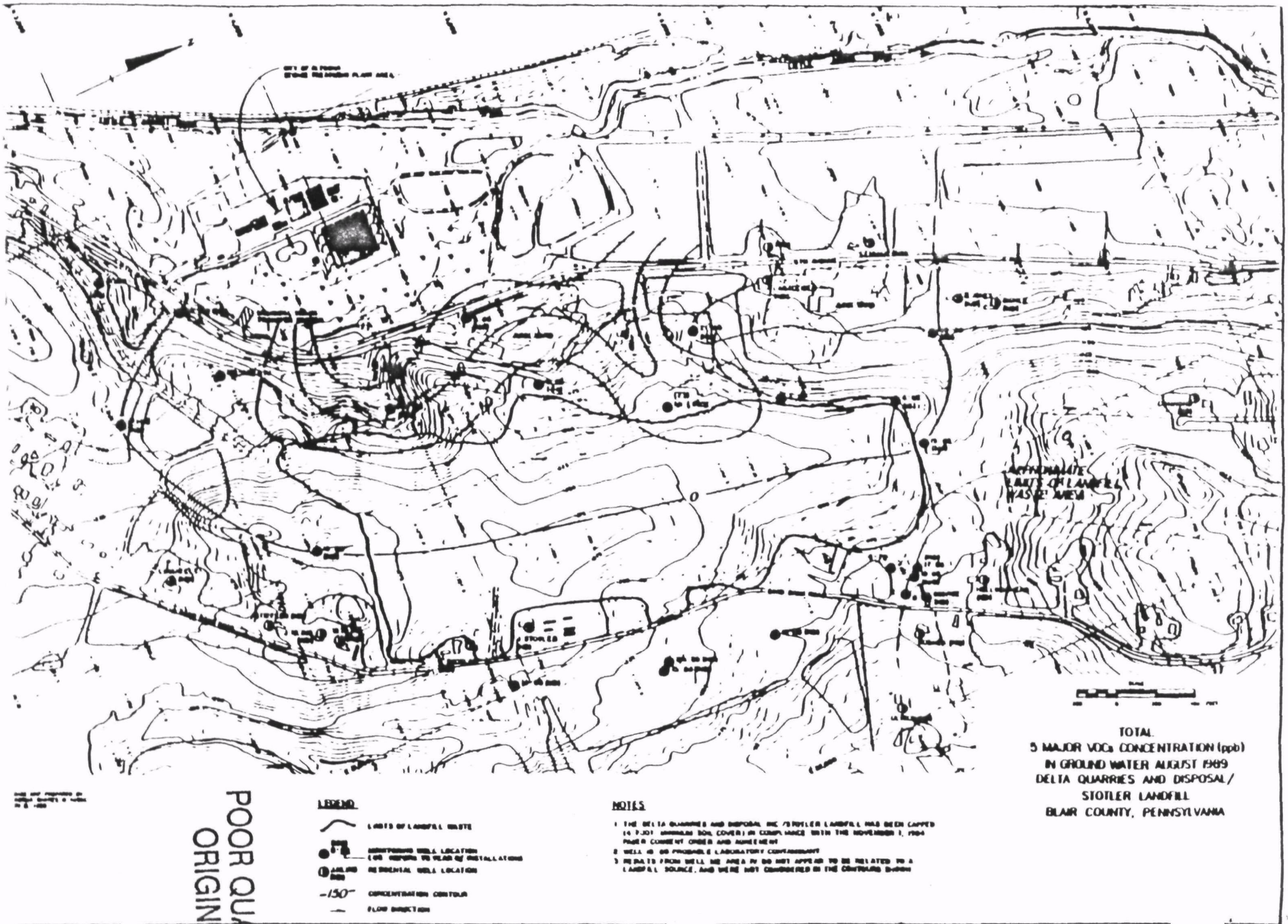


FIGURE 4 GROUND WATER CONT…NATION CONCENTRATIONS

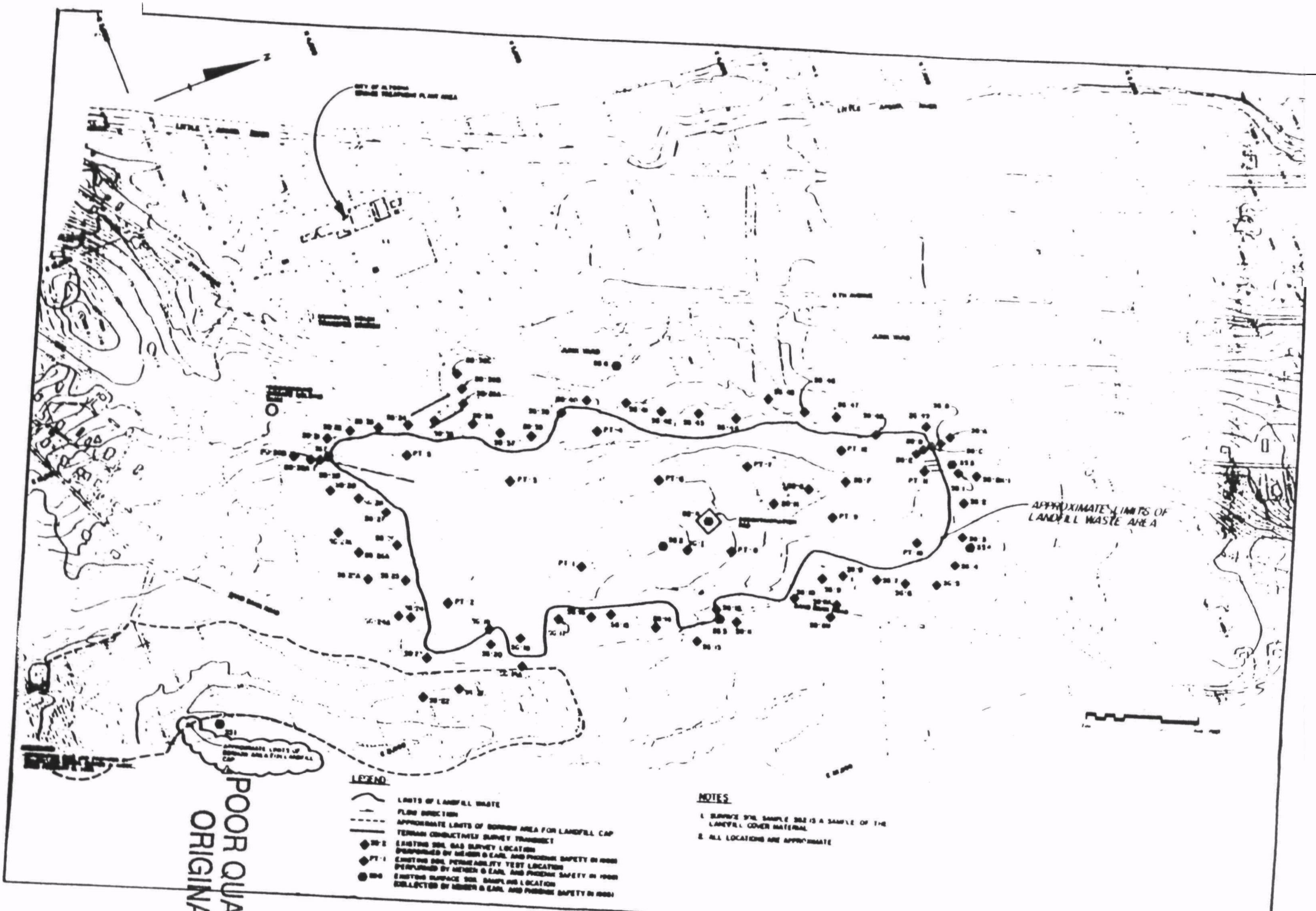


FIGURE 5 SOIL SAMPLING POINTS

TABLE 6

SURFACE SOIL INORGANIC ANALYSIS DATA SUMMARY

DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL

SAMPLED OCTOBER, 1988

COMPOUND	DETECTION LIMIT	SAMPLE LOCATION								TYPICAL RANGE*
		SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	
Aluminum	40	10400	8850	8730	27000	9760	7830	9100	7650	10,000-300,000
Antimony	0.4		1.4	0.98		0.76		0.60	2.0 B	0.2-150
Arsenic	0.4	9.5	2.6	4.9	8	7.8	4.8	5.2	10.7	0.1-194
Barium	40	[illegible]	152	120	250	71.5	165	140	110	100-3000
Beryllium	0.6	0.[illegible]	1.4	0.84	0.95	0.77	1	0.90	1.2	0.01-40
Cadmium	0.4		1.7							0.01-0.7
Calcium	40	248	701	2210	535	402	1030	19200	8000	
Chromium	2.0	8.2 J	6.8 J	12.0 J	16.5 J	12.8 J	11.4 J	17.4 J	14.4	5-3000
Cobalt	4.0	12.8	20.1	17.9	6.8	14.6	10.5	6.2	13.6	0.05-65
Copper	2.0	21.5	161	34.8	19.2	13.8	40	30	15.9	2-250
Iron	4.0	20300	32000	26000	19700	21500	34100	30100	29400	100-550,000
Lead	0.4	9.7 J	8.2 J	30.1 J	23.0 J	34.4 J	17.0 J	31.0 J	14.0	2-800
Magnesium	2.0	765	701	821	1440	1040	982	1050	4940	
Manganese	2.0	251 J	80.2 J	356 J	237 J	836 J	304 J	140 J	143	20-10,300
Mercury	0.08								0.04	0.01-4.6
Nickel	4.0	67.7	218	77.7	10	61.2	400	39.7	33.0	0.1-1530
Potassium	4.0	952	1230	843	1040	767	1120	1520	1940	
Selenium	0.2	0.3	0.66	0.30	0.97	0.20				0.1-38
Silver	1.0			1.2 J					2.3	0.1-5
Sodium	100		135	167	203			174	70.4 B	
Thallium	0.1	0.14 J	0.36 J	0.12 J	0.70 J	0.23 J	0.06 J	0.14 J		0.1-0.8
Vanadium	0.4	15.0 J	12.3 J	11.7 J	43.1 J	29.3 J	11.6 J	15.9 J	20.8	3-500
Zinc	8.0	54.0 J	107 J	105 J	110 J	51.0 J	104 J	52.1 J	72.8	1-2000

POOR QUALITY ORIGINAL

NOTE 1 ALL RESULTS REPORTED IN MG/KG

2 * Refers to typical concentration range of inorganics in soils. Reference: [illegible], "Median Elemental Composition of Soils" 1984

3 All surface soil samples were analyzed for the full inorganics TAL. ONLY DETECTS ARE LISTED ABOVE

4 Qualifier "J" indicates quantitation is only approximate

TABLE 6

SURFACE SOIL ORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL
SAMPLED OCTOBER 1988

	COMPOUND	DETECTION LIMIT	SAMPLE LOCATION SS-1	SS-2	SS-3	SS3 RE	SS-4	SS-5	SS-5DU	SS-6	SS-7	TRIPBLANK
VOCs	Methylene Chloride	5.0	4 B	20 B	14 B	22 B	36 B	11 B	27 B	13 B	8 B	5 J
	Acetone	10.0	10 B	40 B	21 B	24 B	52 B	960 B	590 B	11 B	24 B	20
	1,1 Dichloroethane	5.0									45	
	1,2 Dichloroethene (total)	5.0			4 J	3 J					42	
	Chloroform	5.0	10 B									
	1,2 Dichloroethane	5.0									30	
	Trichloroethene	5.0			7	6						
	Toluene	5.0		2 J			3 J				5 J	
	Total Xylenes	5.0									3 J	
Semi Volatiles	Fluoranthene	330			150 J							
	Pyrene	330			130 J							
	Chrysene	330			94 J							
	Benzo(b)fluoranthene	330			200 J							
	Benzo(k)fluoranthene	330			200 J							
	Benzo(a)pyrene	330			75 J							
	Indeno(1,2,3 cd)pyrene	330			66 J							
Pesticides/PCBs	NONE DETECTED											

NOTE:
1. ALL RESULTS REPORTED IN UG/KG
2. All surface soil samples were analyzed for the full organics TCL. ONLY DETECTS ARE LISTED ABOVE
3. Qualifier "B" indicates result is qualitatively suspect, compound detected in field and/or lab blank at similar level
4. Qualifier "J" indicates quantitation is only approximate
5. Qualifier "R" indicates unreliable results
6. Total Benzo(b) and Benzo(k)fluoranthene are reported

TABLE 7

SURFACE WATER INORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL
SAMPLED NOVEMBER 1990

COMPOUND	DETECTION LIMIT	SW 1 Filter	SW 1 Total	SW 2 Filter	SW 2 Total	SW 3 Filter	SW 3 Total	SW 4 Filter	SW 4 Total	SW 5 Filter	SW 5 Total	SW 6 Filter	SW 6 Total	SW 7 Filter	SW 7 Total	FEDERAL MCLs
Aluminum	200	200			300									200		
Antimony	6.0															
Arsenic	3.0															50
Barium	200															1000
Beryllium	4.0															
Cadmium	4.0															10
Calcium	200	31000	31000	31000	31000	60000	60000	106000	101000	115000	113000	127000	132000	80000	80000	
Chromium	10															50
Cobalt	60															
Copper	10				10 J		10 J				10.0 J					
Iron	30	320 J	660 J	330 J	200 J	170 J	480 J	330 J	320 J	410 J	340 J	190 J	290 J	240 J	130 J	
Lead	2.0	3.4 J	3.4 J	3.7 J	3.6 J					2.4 J	0.7 J					50
Magnesium	10	9600	9500	9300	9600	8900	9300	12000	12300	11300	11300	13100	13300	10100	10100	
Manganese	10	100 J	100 J	60.0 J	60.0 J	60.0 J	60.0 J	190 J	190 J	200 J	210 J	30.0 J	30.0 J			
Mercury	0.2															2
Nickel	30															
Potassium	20	7520	7600	8070	8020	1750	1600	4410	3000	3110	2900	3270	3300	780	750	
Selenium	2.0										2.0 W					10
Silver	10											10.0 J				50
Sodium	1000	36000	37000	38000	39000	13000	13000	23000	23000	20000	20000	47000	47000	6400	6400	
Thallium	2.0															
Vanadium	2.0							3.2 B				3.4 B		3.0 B		
Zinc	10	30.0 J	140 J	70.0 J	90.0 J	30.0 J	30.0 J	20.0 J	20.0 J	10.0 J	60.0 J	50.0 J	40.0 J	20.0 J	60.0 J	
Cyanide	10															

NOTE 1. ALL RESULTS REPORTED IN ug/l
2. All surface water samples were analyzed for the full inorganics TAL [illegible] listed above
3. Qualifier "B" indicates result is qualitatively suspect result, compound detected in field and/or lab blanks at similar level
4. Qualifier "J" indicates quantitation is only approximate
5. Cyanide analysis only performed on non filtered (total) samples

TABLE 7

SURFACE WATER ORGANIC ANALYSIS DATA SUMMARY

DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL

SAMPLED NOVEMBER 1988

	COMPOUND	DETECTION LIMIT	SAMPLE LOCATION													FEDERAL MCLs
			SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	SW-12	SW-15	SW-16	TRIP BLANK 1	TRIP BLANK 2	
VOCs	Methylene Chloride	5.0			3 B			4 B			4 B		8 B	2 J	3 J	
	Acetone	10.0	1 B		130 B	15 B	36 B			6 B	5 B	10 B	2 B	14 J	13	
	1,1 Dichloroethene	5.0						6								7
	1,1 Dichloroethane	5.0					19	51	33							
	1,2 Dichloroethene (total)	5.0					61	100	100							
	1,1,1 Trichloroethane	5.0					24	60	50							200
	Trichloroethene	5.0					25	73	34							5
	Tetrachloroethene	5.0			10		7	20	9			3 J				5*
Semi Volatiles	NONE DETECTED															
Pesticides/PCBs	NONE DETECTED															

NOTE: 1 All results reported in ug/l

2 All surface water samples were analyzed for the full organics TCL. Only detects are listed above

3 Qualifier "B" indicates result is qualitatively suspect, compound detected in field and/or lab blank at similar level

4 Qualifier "J" indicates quantitation is only approximate

5 * MCL listed for tetrachloroethene is proposed

6 Sample SW 16 was obtained at the same location as SW 15 as a control measure

POOR QUALITY ORIGINAL

TABLE 7

SURFACE WATER INORGANIC ANALYSIS DATA SUMMARY

DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL

SAMPLED NOVEMBER 1988

(Continued)

COMPOUND	DETECTION LIMIT	SW 8 Filter	SW 8 Total	SW 12 Filter	SW 12 Total	SW 13 Filter	SW 13 Total	SW 14 Filter	SW 14 Total	SW 15 Filter	SW 15 Total	SW 16 Filter	SW 16 Total	FEDERAL MCLs
Aluminum	200				2230									
Antimony	6.0								5.6 B		4.3 B			
Arsenic	2.0													
Barium	200	600	450					200						1000
Beryllium	6.0				6.0 J									
Cadmium	6.0						11.0 J							10
Calcium	200	267000	185000	27300	25200	31700	28700	23400	23300	50000	45400		500	
Chromium	10		10		10		10							50
Cobalt	40	40					40							
Copper	10		23.0 J		13.0 J		12.0 J				10.0 J			
Iron	30	1310 J	1010 J	300 J	2470 J	90.0 J	110 J	140 J		100 J	200 J	110 J	300 J	
Lead	2.0		3.0 J	2.0 J	5.1 J			2.3 J		7.1 J			6.9 J	50
Magnesium	10	46700	44400	2900	3300	5700	5030	4300	4340	14200	470		30	
Manganese	10	3400 J	3330 J	190 J	243 J	10.0 J	19.0 J	10.0 J						
Mercury	0.2										0.8			2
Nickel	30	70.0 J	200 J		110 J		190 J		40.0 J					
Potassium	20	61400	65300	2070	3320	910	920	920	890	11300	14000			
Selenium	2.0												40	10
Silver	10	40.0 J												50
Sodium	1000	110000	109000	3000	4000	3000	4000	4000	4000	44000	397000			
Thallium	2.0													
Vanadium	2.0	2.9 B	6.1		3.5	3.0 B		3.1 B						
Zinc	10	30.0 J	50.0 J	20	40.0 J	10.0 J	40.0 J	20.0 J	30.0 J	70.0 J	30.0 J	70.0 J	40.0 J	
Cyanide	10													

NOTE 1 ALL RESULTS REPORTED IN ug/l

2 All surface water samples were analyzed for the full inorganics TAL. ONLY DETECTS ARE LISTED ABOVE

3 Qualifier "B" indicates result is qualitatively suspect result, compound detected in field and/or lab blanks at similar level

4 Qualifier "J" indicates quantitation is only approximate

5 Cyanide analysis only performed on non-filtered (total) samples.

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TABLE 7

SEDIMENT INORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL
SAMPLED NOVEMBER 1988

COMPOUND	DETECTION LIMIT	SAMPLE LOCATION															TYPICAL RANGE*
		SED 1	SED 2	SED 3	SED 4	SED 5	SED 6	SED 7	SED 8	SED 9	SED 10	SED 11	SED 12	SED 13	SED 14	SED 15	
Aluminum	40	9230	7700	7000	10000	10000	11300	12400	7000	12000	4460	10000	9900	3630	3430	3060	(1 30)e+5
Antimony	0.4	1.4 B	0.62 B	1.1 B			0.88 B	0.53 B		1.7 B							0.2 150
Arsenic	0.4	7.4	3.3	3.6	15.2	9.3	3.8	8.9	3.8	9.3	0.61	8.8	3.2	2.8	3.3	4.0	0.1 194
Barium	40	90.8 J	60.7 J	65.6 J	300 J	254 J	167 J	107 J	319 J	174 J	86.7 J	220 J	120 J	60.6 J	105 J	64.6 J	100 3000
Beryllium	0.4	0.82 J	0.4[illegible] J	0.77 J			1.5 J		1.0 J	2.0 J	1.5 J	2.4 J		2.1 J		0.65 J	1 7
Cadmium	0.4				4.5	3.4			3.6			2.6					0.1 10
Calcium	40	3600	4600	3060	28000	14700	17500	14100	31100	804	1520	1800	800	870	670	2530	100 1.6e+5
Chromium	2.0	50.3 J	12.6 J	18.6 J	40.5 J	30.1 J	12.5 J	17.3 J	96.2 J	16.2 J	7.6 J	11.9 J	8.7 J	11.0 J	6.2 J	6.5 J	1 100
Cobalt	4.0	23.1 J	12.6 J	15.3 J		33.9 J	10.6 J	14.6 J	15.0 J	20.6 J	7.6 J		20.0 J	10.0 J	23.0 J	9.7 J	
Copper	2.0	62.6 J	33.0 J	40.5 J	130 J	153 J	20.2 J	34.6 J	31.0 J	37.0 J	20.0 J	40.0 J	9.3 J	8.2 J	11.1 J	26.2 J	1 150
Iron	4.0	52700	33000	67000	85100	30000	30300	39500	33600	45900	15500	13200	16700	29500	20400	22500	100 1.0e+5
Lead	0.4	295 J	203 J	260 J	150 J	106 J	25.4 J	46.1 J	37.0 J	33.2 J	5.3 J	80.0 J	17.7 J	10.0 J	13.2 J	34.6 J	7 300
Magnesium	2.0	2540 J	3660 J	3220 J	3920 J	2120 J	2720 J	6300 J	2350 J	1100 J	500 J	1150 J	800 J	640 J	620 J	1760 J	50 50,000
Manganese	2.0	636	634	616	1020	607	300	373	1100	660	160	80.0	270	340	1200	210	2 7000
Mercury	0.08				0.5	0.7											0.010 3.4
Nickel	4.0	31.3 J	24.7 J	31.7 J	40.5 J	50.8 J	64.8 J	25.1 J	62.1 J	75.9 J	11.0 J	42.8 J	10.1 J	20.7 J	16.2 J	12.9 J	1 700
Potassium	4.0	642	547	600	2140	1600	1330	720	1500	960	600	1060	700	340	370	375	
Selenium	0.2		0.41 J		0.93 J												0.1 1.4
Silver	1.0				4.1 J				2.1 J								
Sodium	100	165	137	160	405				210	135			140			142	2 7000
Thallium	0.1		0.14		0.05 J	0.60	0.31	0.16	0.32	0.60	0.15	0.64	0.14				
Vanadium	0.4	10.3 J	14.0 J	10.1 J	36.1 J	16.1 J	16.3 J	14.6 J	13.2 J	31.2 J	5.3 J	31.9 J	16.0 J	5.6 J	8.8 J	8.8 J	5 300
Zinc	2.0	190 J	151 J	164 J	446 J	500 J	203 J	128 J	2100 J	83.7 J	50.0 J	200 J	54.0 J	100 J	170 J	95.3 J	5 400
Cyanide	0.5	1.6															

NOTE: 1. ALL RESULTS REPORTED IN MG/KG
2. * Refers to Typical Concentration Range of Inorganics in Soils in Eastern U.S., Reference: McClanahan, "Median Elemental Composition of Soils", 1984
3. All sediment samples were analyzed for the full inorganics TAL. ONLY DETECTS ARE LISTED ABOVE
4. Qualifier "B" indicates qualitatively suspect result, compound detected in field and/or lab blanks at similar level
5. Qualifier "J" indicates quantitation is only approximate

TABLE 7

SEDIMENT ORGANIC ANALYSIS DATA SUMMARY
DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL
SAMPLED NOVEMBER 1988

	COMPOUND	DETECTION LIMIT	SED 1	SED 2	SED 3	SED 4	SED 5	SED 6	SED 7	SED 8	SED 9	SED 10	SED 11	SED 12	SED 13	SED 14	SED 15
VOCs	Chloroethane	10						5 J									
	Methylene Chloride	5.0	6 B	7 B	6 B	10 B	14 B	7 B	6 B	10 B	12 B	4 B	7 B	6 B	8 B	11 B	4 B
	Acetone	10 B	50 B	8 B	7 B	200 B	62 B	17 B	40 B	20 B	8 B	4 B	12 B	9 B	11 B	11 B	43 B
	1,1 Dichloroethane	5.0					33	30	12								
	1,2 Dichloroethene (total)	5.0					17	30	40								
	Trichloroethene	5.0						12	14								
	Tetrachloroethene	5.0		13	5 J		21 [illegible]	6 J									
	Toluene	5.0	3 B	4 B	2 B	15 B	14 B	3 B	1 B	2 B	3 B	1 B			2 B	2 B	3 B
Semi-Volatiles	Acenaphthene	330		94 J													
	Dibenzofuran	330		50 J													
	Fluorene	330		130 J													
	Phenanthrene	330		620	41 J				110 J								450 J
	Anthracene	330		170 J													110 J
	Di-n-butylphthalate	330										61 J	170 J	49 J	45 J	42 J	
	Fluoranthene	330	110 J	700	95 J	240 J			350 J						33 J	72 J	880
	Pyrene	330	180 J	500	90 J	250 J			330 J	5700 J					52 J	73 J	670
	Benzo(a)anthracene	330		310 J	50 J				190 J								300 J
	Chrysene	330		340 J		180 J			170 J								380 J
	Bis(2-ethylhexyl)phthalate	330	140 J	88 J		160 J	160 J			73000 B							140 J
	Benzo(b)fluoranthene	330	110 J	430 J	88 J	300 J			290 J								310 J
	Benzo(k)fluoranthene	330	110 J	410 J	68 J	300 J			290 J								310 J
	Benzo(a)pyrene	330		190 J		160 J			130 J								260 J
	Indeno(1,2,3-cd)pyrene	330		160 J					83 J								210 J
	Benzo(g,h,i)perylene	330		130 J					80 J								190 J
Pesticides/PCBs	4,4'-DDE	16											17 J				
	4,4'-DDD	16											26 J				

1. All results reported in ug/kg
2. All sediment samples were analyzed for the full organics list. Only detects are listed above.
3. Qualifier "B" indicates that result is qualitatively suspect; compound detected in field and/or lab blank at similar level.
4. Qualifier "J" indicates that quantitation is only approximate.

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Some organic compounds were detected in surface water samples and sediment samples from the western wetlands at low concentrations (6 ppb to 190 ppb in water, 12 ppb to 48 ppb in sediment). Organic compounds were not detected at the outlet of the western wetlands where the western wetlands flow into the Little Juniata River in either water or sediment samples.

Six organic compounds were detected in surface water samples from the western wetlands (1,1-dichloroethene, 1,1 dichloroethane, 1,2-dichloroethene, 1,1,1-trichloroethane, trichloroethene, and tetrachloroethene). All concentrations were more than 10 times lower than the Fresh Water Acute Water Quality Criteria for aquatic life (25 Pa. Code §16.51. Table 1) of the six compounds detected, only tetrachloroethene has a chronic limit established (840 ppb). The concentrations of tetrachloroethene measured (range 7 ppb to 20 ppb) are well below the chronic limit for tetrachloroethene. Sample results are shown in Table 7.

IV. Summary of Site Risks

A. Human Health Effects of Site Contamination

A Baseline Public Health Evaluation and a risk assessment were conducted to estimate the human health and environmental problems that could result if no further response action is taken at the Site. Contaminants of concern were selected and associated risks calculated for the different media and potential exposure routes at the Site.

The following compounds were selected as contaminants of concern because of their presence in the contaminated media at the Site and because of their potential chronic health affects: vinyl chloride, 1,1-dichloroethane, 1,2-dichloroethene, chloroform, 1,2-dichloroethane, TCE, tetrachloroethene and manganese.

Although not identified as a contaminant of concern as part of the evaluation, nickel was found in the ground water at levels above the proposed health-based maximum concentration level (MCL) of 100 ppb.

Exposure Analysis

Exposure pathways considered for the purpose of evaluating site risks include: (1) incidental ingestion and dermal absorption from direct contact with contaminated surface soils, surface waters, and sediments; (2) future consumption of contaminated ground water which may be utilized as a potable supply; and (3) future inhalation of vapor phase chemicals from daily showering with potentially contaminated household water. Other potential pathways of exposure such as inhalation of dusts and uptake of contaminants into garden vegetables were judged to be insignificant relative to exposures resulting from direct contact with contaminated soils.

The next step in the exposure analysis process involved quantification of the magnitude, frequency, and duration for the populations and exposure pathways selected for evaluation. Generally, exposure point concentrations of chemicals were based not upon the arithmetic average concentrations of chemicals in a particular medium, but rather upon the 95 percent upper confidence limit of the average, so as to produce an estimate of the reasonable maximum exposure. Intake factors (e.g., amount of soil ingestion, rate of dermal contact, exposure frequency, and duration) were selected in accordance with EPA risk assessment guidance so that the combination of all variables conservatively results in the maximum exposure that can reasonably be expected to occur at a site. The assumptions used to estimate the projected human intake factors are set forth in Table 8.

Toxicity and Risk Characterization

Projected intakes for each risk scenario and each chemical were then compared to acceptable intake levels for carcinogenic and noncarcinogenic effects. With respect to projected intake levels for noncarcinogenic compounds, a comparison was made to risk reference doses (RfDs). RfDs have been developed by EPA for chronic (e.g. lifetime) and/or subchronic (less than lifetime exposure) to chemicals based on an estimate that is likely to be without an appreciable risk of deleterious effects. The chronic RfD for a chemical is an estimate of a lifetime daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects. The potential for non-cancer health effects is evaluated by comparing an exposure level over a specified time period with the RfD derived by the EPA for a similar exposure period. This ratio of exposure to toxicity is called the hazard quotient.

The non-cancer hazard quotient assumes that there is a threshold level of exposure (i.e., RfD) below which it is unlikely for even the most sensitive populations to experience adverse health effects. If the exposure level exceeds the threshold (i.e., the hazard quotient exceeds a value greater than 1.0) there may be concern for potential non-cancer effects. The more the value of the hazard quotient or hazard index exceeds one, the greater the level of concern for potential health impacts.

To assess the overall potential for non-cancer effects posed by multiple chemicals, a hazard index (HI) is derived by summing the individual hazard quotients. This approach assumes additivity of critical effects of multiple chemicals. This is appropriate only for compounds that induce the same effect by the same mechanism of action. EPA considers any Hazard Index exceeding one to be an unacceptable risk to human health.

For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential human carcinogen. The EPA's Carcinogen Assessment Group has developed carcinogen potency factors (CPFs) for suspected and known human carcinogens which are used to convert daily intakes averaged over a lifetime of exposure directly to incremental risk. The CPF is generally expressed in units of risk per milligram chemical per kilogram body weight per day of exposure (i.e., risk units per mg/kg/day). The CPF or slope factor is the upper 95th percentile upper confidence limit of the extrapolation (slope) from high-dosed animal data to very much lower doses in humans. The use of the upper limit produces a risk estimate that has a 95 percent probability of exceeding the actual risk, which may actually be zero. For exposures to multiple carcinogens the upper limits of cancer risk are summed to derive a total cancer risk. Cancer risks beyond the generally acceptable risk range of 1×10^{-4} to 1×10^{-6} are considered an unacceptable risk to human health.

Ground Water Risks

Tables 9 and 10 present a summary of the hazard indices and upper-bound lifetime cancer risks resulting from exposure to the chemicals of potential concern in ground water via ingestion and inhalation, respectively. As these tables indicate, the potential risk associated with exposure to ground water (through ingestion and inhalation of vapor phase chemicals during showering) is 0.8 based on the hazard index and therefore is acceptable. As described below, the carginogenic risk which is driven by the potential future use of ground water drawn from the aquifer is beyond 1.0×10^{-4} and therefore unacceptable.

The cancer risk to persons currently living in the vicinity of the site is within the acceptable risk range. As noted earlier, no existing residential wells have evidenced any indication of Site-related contamination. Indeed, all but a few of the home wells situated around the site are upgradient of the entire former fill area. Estimates of the current risk to nearby residents based upon analysis of home well samples are less than 1×10^{-6}.

Alternately, transport modeling was used to predict contaminant concentrations downgradient of specific monitoring wells within the study area which revealed the greatest contamination. This analysis predicts the exposure that existing residents may face as the contaminated ground water migrates to their wells.

TABLE 9

SUMMARY OF HAZARD INDICES AND CANCER RISK ESTIMATES FOR THE INHALATION OF VAPOR PHA[SE] CHEMICALS VIA DAILY SHOWERING FOR FUTURE RESIDENTS AT THE DELTA QUARRIES AND DISPOSAL STOTLER LANDFILL IN ALTOONA, PA

Chemical of Concern	Upper 95 Percent Confidence Limit of the Mean Concentration in Downgradient Monitoring Wells (mg/L)	Reasonable Maximum Daily Inhalation Dose via Showering (mg/kg/day)	Chronic Inhalation RfD (mg/kg/day)	Hazard Index	Upper-Bound Inhalation CPF (mg/kg/day)⁻¹	Reasonable Maximum Average Lifetime Daily Dose (mg/kg/day)	Upper-Bound Cancer Ri[sk] for 30-Year Exposure
Vinyl Chloride	0.010	3.6×10^{-4}	5×10^{-3} [b]	7.2×10^{-2}	2.95×10^{-1}	1.5×10^{-4}	$4.4 \times 10^{[illegible]}$
1,1-Dichloroethane	0.022	7.6×10^{-4}	1.0×10^{-1} (i)	7.6×10^{-3}	ND		
1,2-Dichloroethene	0.065	1.1×10^{-3}	2.0×10^{-2} (o)	5.5×10^{-2}	NA		NA
Chloroform	0.012	2.1×10^{-4}	1.0×10^{-2} (o)	2.1×10^{-2}	8.1×10^{-2} (i)	1.8×10^{-4}	$1.5 \times 10^{[illegible]}$
1,2-Dichloroethane	0.005	9.1×10^{-5}	0.19 (o)[c]	4.8×10^{-4}	9.1×10^{-2} (i)	7.8×10^{-5}	$7.1 \times 10^{[illegible]}$
Trichloroethene	0.031	5.4×10^{-4}	7.4×10^{-3} (o)[d]	7.3×10^{-2}	1.7×10^{-2} (i)[e]	4.6×10^{-4}	$7.8 \times 10^{[illegible]}$
Tetrachloroethene	0.006	1.1×10^{-4}	1.0×10^{-2} (o)	1.1×10^{-2}	1.8×10^{-3} (i)	8.7×10^{-5}	$1.6 \times 10^{[illegible]}$
Manganese	1.767[f]	0	NA	0	NA		
				Total 2×10^{-1}			7×10^{-5}

[a] Where the chronic inhalation RfD or inhalation CPF was based on oral administration (gavage) in animals, an absorption fa[ctor of] 0.5 was utilized to adjust the daily doses. This is indicated next to the RfD or CPF value by an "(i)" to indicate that the [...] value was based on inhalation studies (i.e., an absorption factor of 1.0 with no adjustment necessary), or "(o)" to indicate t[he] inhalation CPF or RfD was based on oral data, and an adjustment of the daily dose (AF = 0.5) was performed. This assum[es] the absorption from oral administration (e.g., in drinking water) is 100 percent. While this is inappropriate for most inorgani[c] semivolatile compounds, the gastro-intestinal absorption of volatile organics is essentially complete.

[b] An RfD for vinyl chloride is not listed in EPA's IRIS or HEAST. A provisional value of 5×10^{-3} mg/kg/day as an acceptabl[e] intake is listed here based on a provisional AADI developed by EPA for noncarcinogenic effects of vinyl chloride in drinking (see U.S. EPA, 1984). The provisional value is included for completeness.

[c] An RfD for 1,2-dichloroethane is not listed in EPA's IRIS or HEAST. A provisional value of 0.19 mg/kg/day is utilized (see [...] Lifetime Health Advisory and U.S. EPA, 1984).

[d] An RfD for trichloroethene is not listed in EPA's IRIS or HEAST. A provisional value of 0.0074 mg/kg/day is utiliz[ed for] completeness based on EPA's Drinking Water Equivalent Level (DWEL) and provisional AADI (U.S. EPA, 1984).

[e] The inhalation cancer potency factor (CPF) for trichloroethene has been withdrawn from IRIS pending re-evaluation [of] pharmacokinetic parameters (the value may decrease somewhat). The CPF utilized is from the most recent EPA listing.

[f] Filtered results only.

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TABLE 10 **SUMMARY OF HAZARD INDICES AND CANCER RISK ESTIMATES**

FOR THE INGESTION OF COMPOUNDS OF CONCERN IN DOWNGRADIENT MONITORING WELLS

FOR FUTURE RESIDENTS AT THE DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL IN ALTOONA, PA

Chemical of Concern	Upper 95 Percent Concentration in Downgradient Monitoring Wells (mg/l)	Reasonable Maximum Chronic Daily Intake (mg/kg/day)	Chronic Oral RfD (mg/kg/day)	Hazard Quotient	Upper-Bound Oral CPF (mg/kg/day)[1]	Reasonable Maximum Average Lifetime Daily Intake (mg/kg/day)	Upper-Bound Cancer Risk Adjusted for 30 Year Exposure
Vinyl Chloride	0.010	2.2×10^{-4}	1.3×10^{3}	0.169	1.9	9.5×10^{5}	1.8×10^{4}
1,1-Dichloroethane	0.022	4.7×10^{-4}	1×10^{1}	0.005	ND		
1,2-Dichloroethene	0.065	1.4×10^{3}	2.0×10^{2}	0.07	NA		NA
Chloroform	0.012	2.6×10^{-4}	1.0×10^{2}	0.026	6.1×10^{3}	1.1×10^{-4}	6.7×10^{7}
1,2-Dichloroethane	0.005	1.1×10^{-4}	0.19	0.001	9.1×10^{-2}	4.9×10^{5}	4.5×10^{-6}
Trichloroethene	0.031	6.7×10^{4}	7.4×10^{3}	0.091	1.1×10^{2}	2.9×10^{-4}	3.2×10^{4}
Tetrachloroethen	0.006	1.3×10^{-4}	$1.0 \times {}^{-2}$	0.013	5.1×10^{-2}	5.4×10^{5}	2.8×10^{6}
Manganese	1.767*	3.8×10^{-2}	0.1×10^{-1}	0.38	NA		NA
			Total	0.8			2×10^{4}

* Based on filtered results only.

b Group C carcinogen: only limited and equivocal evidence of carcinogenicity in animals and no evidence in humans.

Based on the ground water gradient and transport model, the only wells that could potentially exhibit elevated concentrations of VOCs in ground water are the existing ones downgradient of Monitoring Well 6-85, which revealed 1,1-dichloroethene at 15 micrograms per liter (ppb) and chloroform at 39 ppb. The total upper-bound cancer risk for household use of this water is estimated to be about 1×10^{-5}, assuming concentrations of these suspected human carcinogens remain constant in water used as a household supply over several decades. However, according to the EPA guidelines, even though no vinyl chloride was detected in this monitoring well sample, at least one-half the sample method detection limit of 1.3 ppb must be assumed as present. Under an assumption of steady-state conditions (i.e., the concentration remains constant over time and the center plume eventually migrates to the receptor point), and further assuming a concentration of 10.4 ppb of vinyl chloride was present in household water, the theoretical upper limit of risk would correspond to an upper limit of about 2.0×10^{-5} risk of cancer.

The estimates of potential future risk are based on the assumption that future residents may someday be located directly downgradient of the fill area at the site boundary. Exposure point concentrations were determined, in accordance with EPA's recent Human Health Evaluation guideline (EPA, 1989), by calculating the 95th percentile confidence limit on the current average concentrations in monitoring wells and conservatively assuming steady-state conditions. The 95 percentile upper confidence limit represents a 95 percent probability that the average concentrations are less than the upper limit calculated. Where chemicals detected at least once in ground water were not detected in other samples, a concentration equivalent to one-half the method detection limit was assumed for the chemical in that sample, in accordance with the EPA Human Health Evaluation guidelines (EPA, 1989). Calculations of those exposure concentratons include monitoring Well 10A-88 which is the only well sampled during the Remedial Investigation which revealed detectable levels of vinyl chloride. This well was subsequently resampled. No vinyl chloride was detected during the additional sampling. However, concentrations of TCE and PCE which are precursors to vinyl chloride formation were found at levels exeeding their respective MCLs. In addition, vinyl chloride was found previously twice in another well prior to the Remedial Investigation. Therefore the vinyl chloride was still considered in the risk analysis.

For potential future conditions, Table 11 presents a summary of the combined upper bound cancer risks and hazard indices utilizing the upper 95 percentile confidence limits of the mean concentrations in all downgradient wells of the compounds of concern to future residents downgradient of the former landfill. As shown in the table, the combined cancer risk for future residents at the Site is 3.0×10^{-4} which exceeds the CERCLA acceptable range of 1.0×10^{-6} to 1.0×10^{-4}. (This risk value

TABLE 11

SUMMARY OF COMBINED CANCER RISKS AND HAZARD INDICES FOR FUTURE RESIDENTS AT THE DELTA QUARRIES AND DISPOSAL/STOTLER LANDFILL IN ALTOONA, PA

Chemical of Concern	Upper 95 Percent Confidence Limit of the Mean Concentration in Downgradient Monitoring Wells (ug/L)	Applicable Drinking Water Criteria Public Water Supplies (ug/L)	ARAR	Combined Upper Limit of Cancer Risk	Total Hazard Index
Vinyl Chloride	10.38	2	MCL	2.2 × 10^{-4} (A)	0.241
1,1-Dichloroethane	22.07	—	—		0.013
1,2-Dichloroethene	65.24	70-100	Proposed MCL	NA	0.125
Chloroform	12.21	(100)	NIPDWR[a]	1.6 × 10^{-5} (B2)	0.047
1,2-Dichloroethane	5.31	5	MCL	1.2 × 10^{-6} (B2)	0.001
Trichloroethene	31.31	5	MCL	1.1 × 10^{-5} (pending)	0.164
Tetrachloroethene	5.89	5	Proposed MCL	3 × 10^{-6} (pending)	0.024
Manganese	1767.36[b]			NA	0.38
			Total	3 × 10^{-4}	0.995

[a] National Interim Primary Drinking Water Regulations. This may not qualify as an ARAR for chloroform present in raw groundwaters.

[b] Filtered results only.

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shown represents a change from the risk value previously listed in the proposed plan. This change occurred as the result of recalculation of the risk based on revised EPA risk assessment guidance.) Also included in this table are some of the preliminarily identified Applicable or Relevant and Appropriate Requirements (ARARs), where available, for these compounds of concern in ground water. MCLs are enforceable standards promulgated under the Safe Drinking Water Act and are designed for the protection of public health. MCLs represent chemical-specific ARARs and provide the basis for defining preliminary remediation goals. The 95th percentile upper confidence limits of some of the compounds of concern exceed the MCL.

Surface Water and Sediment Risks

Based on the results of the sampling and analysis of the surface water and sediment, there is no apparent current risk to the human health or the environment, caused by any contaminant migrating from the Site into the adjacent wetlands, Sandy Run Creek or the Little Juniata River.

Surficial Soil Risks

Due to the existing 4 foot soil cap placed over the landfill, no risk to human health or the environment is currently present nor should any future risk occur as long as the cap integrity is maintained.

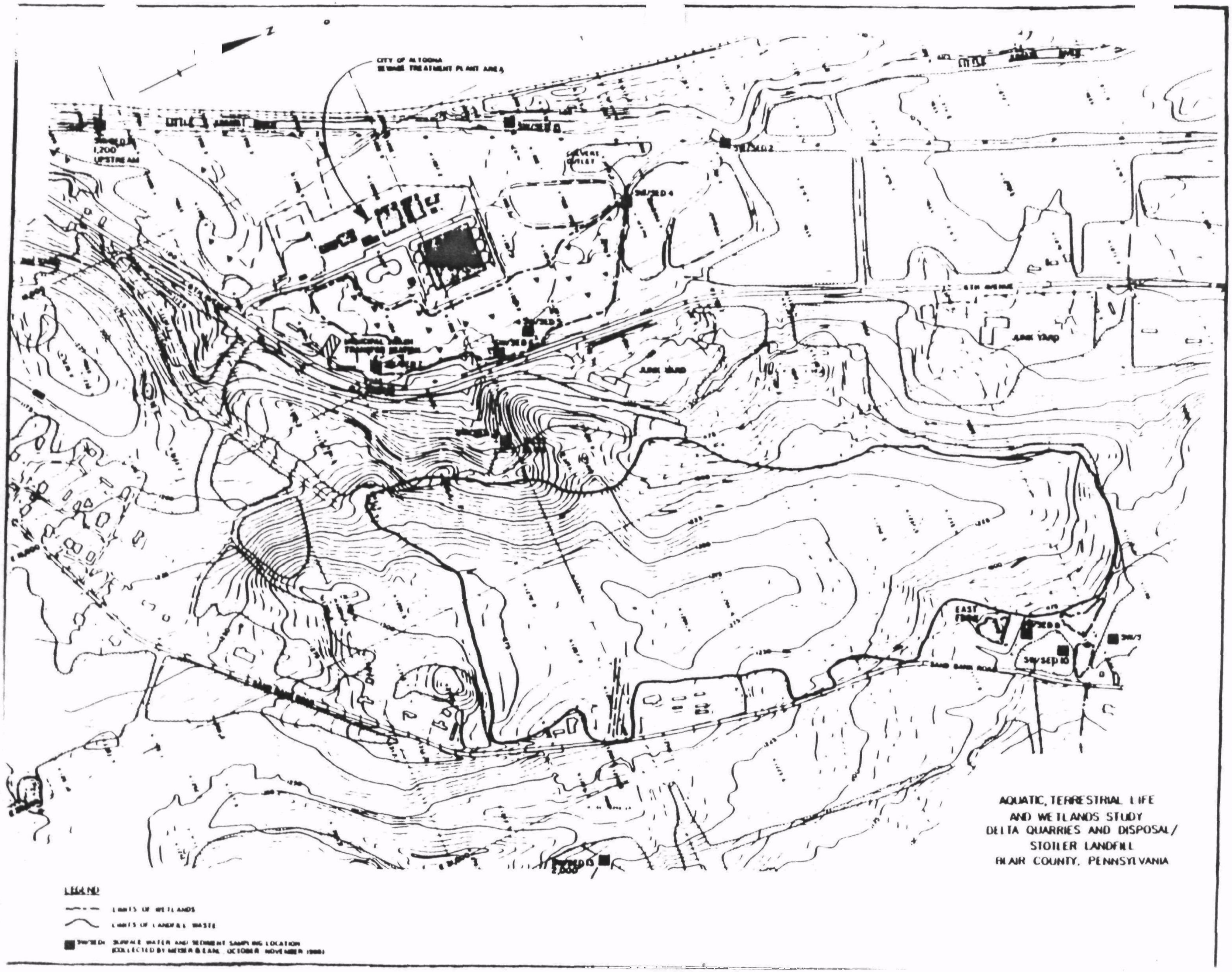
Accordingly, the potentially carcinogenic chemicals found in ground water represent the compounds of major potential concern, and the future use of the affected ground water poses the only unacceptable risk of interest at the Site.

B. Environmental Impact of Site Contamination

The ecological investigation of the Site consisted of a wetlands delineation and an aquatic and terrestrial life study. A summary of the investigation results are presented below. The complete investigation reports for both the wetlands delineation and the aquatic and terrestrial life study were submitted as a separate report in March 1990.

Wetlands Investigation

Two wetland areas adjacent to the Site were delineated as shown in Figure 6. The wetlands surveyed encompassed a total of 8.7 acres of which 8 acres is situated on the southwestern edge of the landfill and .7 acre is situated on the northeastern edge of the landfill. The survey included a determination of the transition lines between wetland and upland vegetation with



POOR QUALITY ORIGINAL

emphasis on that portion of the wetlands vegetation dominated by emergent aquatic vegetation.

Surface Water and Sediment Impacts

The surface water and sediment data review concluded that there was no observable negative impact from the western wetland outflow on the surface water quality of the Little Juniata River. There was no indication that Sandy Run has been affected by any chemical compounds emanating from the landfill via the East Flow.

The findings of the ecological study also indicate that there may be other potential sources of contamination upgradient from the City of Altoona Wastewater Treatment Plant, as several VOCs were detected in an upstream control point sample above the influence of the landfill drainage and the treatment plant.

There are no special or endangered species at the Site or in the area of the Little Juniata or Sandy Run Creek drainage basin. There is no evidence of impacts to biota in either tributary from activities at the landfill.

C. Conclusion

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in the Record of Decision, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

V. SCOPE AND ROLE OF THIS REMEDIAL ACTION

The scope and role of this remedial action is to address the principal threat at the landfill which is the contaminated ground water. The source materials within the existing landfill are considered to be a low-level threat due to the existing soil cap which provides protection from direct contact or ingestion and also minimizes infiltration of rainwater into the landfill which in turn minimizes leachate generation which could further contaminate the ground water. The installation of gas venting along with continued cap maintenance will ensure that the cap will continue to function as intended. The purpose of the groundwater remediation is to return the groundwater to its full beneficial use.

VI. COMMUNITY RELATIONS SUMMARY

In accordance with Sections 113 and 117 of CERCLA, 42 U.S.C. Sections 9613 and 9617, EPA, in conjunction with the PADER, issued a Proposed Plan to present the preferred remedial alternative. The Proposed Plan and the RI/FS reports were made available to the public in the copies of the administrative record maintained at the EPA Region III offices and at the information repository listed below:

Altoona Public Library
1600 5th Avenue
Altoona, Pennsylvania 16602

EPA instituted a public comment period from February 15, 1991 to March 17, 1991 for the purpose of soliciting public participation in the decision process. As part of the public comment period, a public meeting was held on March 4, 1991 to present information and to accept oral and written comments and to answer questions from the public regarding the Site and remedial alternatives. A transcript of the meeting was maintained in accordance with Section 117(a)(2) of CERCLA, 42 U.S.C. Section 9617(a)(2). Responses to the oral and written comments received during the public comment period are included in the attached Responsiveness Summary.

An announcement of the public meeting, the comment period, and the availability of the RI/FS reports was published in the Altoona Mirror, on February 15, 1991.

All documents considered or relied upon in reaching the remedy selection decisions contained in this Record of Decision are included in the Administrative Record for this Site and can be reviewed at the information repositories.

VII. DOCUMENTATION OF SIGNIFICANT CHANGES FROM PROPOSED PLAN

The Proposed Plan for the Site was released for comment in February 1991. The Proposed Plan described the alternatives studied in detail in the Feasibility Study and identified Alternative E as the Preferred Alternative. EPA reviewed all written and verbal comments submitted during the comment period and at the public meeting. Upon review of these comments, it was determined that no significant changes to the remedy presented in the Proposed Plan were necessary.

VIII. DESCRIPTION OF ALTERNATIVES

The objective of the Feasibility Study performed at this Site was to identify alternatives to address contaminant source control and contaminated ground water remediation. Contaminant source control is expected to maintain the reduction in the rate of release of contaminants into the aquifer achieved upon closure of the landfill. Contaminated ground water remediation will minimize potential exposure of ground water contaminants to the public and the environment and make future well water supplies available.

CERCLA requires that the remedial alternative for a site be protective of human health and the environment, cost effective, and in accordance with statutory requirements.

Permanent solutions to contamination are to be achieved whenever possible. In addition, emphasis is placed on treating wastes on-site, wherever possible, to reduce the toxicity, mobility, or volume of Site related contaminants, and on applying alternative or innovative treatment technologies.

Potential technologies for implementation of these objectives were evaluated to determine whether the technologies could meet health-based and other environmental standards including applicable or relevant and appropriate requirements of Federal and State law. These technologies were also evaluated against operational, institutional, cost and other factors affecting implementation. The technologies evaluated in the Feasibility Study were combined into remedial alternatives to address the Site.

The alternatives evaluated in the FS Report are summarized below. The estimated costs reported for implementing each alternative represent both the preliminary estimates of initial capital outlay and the estimates of continuing operation and maintenance. Costs are reported as present worth figure calculated with a discount rate of 10%. Costs of the alternatives are compared in Table 12.

ALTERNATIVE A: NO ACTION

This alternative is included in the FS Report for comparison with the other alternatives under investigation. It would only be selected if the Site posed little or no risk to the public health or the environment. Under this alternative, no additional measures would be undertaken to remedy contaminant sources or their migration pathways, and risks from the Site would remain and could potentially increase with time. Because hazardous substances would remain on the Site, five year effectiveness reviews would be conducted.

Except for the costs involved with the five year review, no capital or operation and maintenance (O&M) costs would be incurred for this alternative, and no time expended beyond the costs and time presently expended to maintain the existing landfill cap and ground water monitoring. The estimated cost for this alternative is $109,672.

ALTERNATIVE B: DEED AND ACCESS RESTRICTIONS, MONITORING AND CAP MAINTENANCE

As part of this measure the current owners of the land comprising the Site would be restricted from any future actions which would disturb the landfill surface and wastes, including construction of roads, underground utilities, or wells. Deed restrictions recorded by the owners would provide notice to any future property owners of potential hazards and likewise restrict the use of the relevant property.

Access restrictions would offer a physical barrier for inhibiting direct contact of humans and wildlife with the landfill wastes. A six-foot high, high tensile-strength fence would be installed around the perimeter of the landfill. The fence would have locking gates to control entrance of construction vehicles used for Site maintenance. If necessary, barbed wire along the top of the fence would also be installed.

Long-term ground water and surface monitoring would incorporate periodic sampling and analysis at pre-determined locations which would adequately track migration of impacted contaminated ground water and sediments and surface water within the adjacent wetlands. The sampling parameters will be determined during the Remedial Design.

Gas vents would be installed to ensure the integrity of the existing cap to complete the approved landfill closure plan requirements. The existing soil cap would be repaired where necessary. This would include minor re-regrading and backfilling of areas where substantial soil erosion has occurred and reseeding of bare areas. The existing drainage and erosion control measures would be repaired and upgraded. They include the existing benches, diversion ditches, and riprapped downchutes. In addition, a new diversion ditch along the western edge of the flat central area would minimize the erosion over the steeper western slopes.

Assuming no unexpected sampling results are obtained during the sampling and analysis program, the following wells would be sampled at the following frequency, with the sampling parameters determined during the Remedial Design.

- From the upgradient side of the landfill, wells (4-88 and 18-88) would be sampled semi-annually for years 1 through 3, annually for years 4 through 30;

- Downgradient wells (6-85, 8-85, 10A-88, 20-88, new well 23-88, and M1-Lined), cross-gradient well M2-Area IV, and the outfall from the western wetland would be sampled semi-annually for years 1 through 3, then annually for years 4 through 30.

- Surface water and sediment samples would be taken from FAM spring and several points within the western wetland.

Semi-annual sampling would be performed at different seasons from year to year in order to assess seasonal fluctuations in water quality. After five years, the sampling frequency, location, and parameters would be reviewed and, if appropriate, modified. For cost-estimating purposes, it is assumed that the monitoring frequency described above would be followed for 30 years.

Long-term monitoring of Site ground water would effectively mitigate the only unacceptable risk associated with the site: future ingestion of Site ground water (risk value of 3.0×10^{-4}) by allowing protective action to be taken if organic chemicals are detected in monitoring wells upgradient of residential wells. Because hazardous substances would remain on Site, five year effectiveness reviews would be conducted. The estimated cost for this alternative is $750,134. This alternative could be implemented within 6 months.

ALTERNATIVE C: HOOK-UP DOWNGRADIENT RESIDENCES TO PUBLIC WATER SUPPLY SYSTEM, DOWNGRADIENT WELL CLOSURE, DEED AND ACCESS RESTRICTIONS, LIMITED MONITORING AND CAP MAINTENANCE.

This alternative is identical to Alternative B except that an alternate water supply source to downgradient residents would be provided by a connection to the public water supply system. This alternative would provide the total water supply (drinking, cooking, and washing) to downgradient receptors, and would provide for closure of the downgradient residential wells. Monitoring would be done but less extensively due to the public water supply. Deed and access restrictions, periodic Site reviews, and cap maintenance will be provided as described in Alternative B.

Hook-up of the five downgradient residents to the nearest public water supply main would require the installation of approximately 5,400 linear feet (LF) of a water main along Sixth Avenue. Installation of an additional 100 LF of 2-inch water main along Sixth Avenue, and installation of an additional 100 LF of 2-inch header pipe would be required to connect each resident to the new water main.

Well closure is the abandonment of currently existing wells. Each of the five downgradient residential wells would be pressure grouted with cement until the entire well casing is filled. The estimated cost of this alternative is $1,085,403. This alternative could be implemented within 12 months.

ALTERNATIVE D: MULTILAYER CAP, DEED AND ACCESS RESTRICTIONS, MONITORING AND CAP MAINTENANCE

Alternative D includes a full containment alternative consisting of a multilayer cap over the entire landfill area. Deed and access restrictions, ground water and surface water monitoring, cap maintenance and periodic site reviews are also provided as described in Alternative B. The multilayer cap is intended to isolate the waste from rainwater infiltration. The specific components of this alternative include the following:

- o Stripping of the existing cap material and regrading to provide a smooth subgrade to install a multilayer cap and to achieve a surface grade adequate for surface water drainage;

- o Installation of a multilayer cap (meeting the current performance standards of PADER solid waste regulations) over approximately 57 acres to cover the entire waste disposal area;

- o Placement of a soil cover which will be vegetated with grass;

- o Implementation of surface water control features such as diversion ditches and benches along steep slopes.

The multilayer cap would further minimize the infiltration of precipitation through the landfill. The vegetated surface and benched slope would effectively control soil erosion. This alternative would not directly address the only unacceptable risk associated with the Site: future ingestion of already contaminated ground water. The estimated cost of this alternative is $6,766,864. This alternative could be implemented in 18 months.

ALTERNATIVE E: GROUND WATER EXTRACTION AND TREATMENT VIA AIR STRIPPING, DEED AND ACCESS RESTRICTIONS, MONITORING & MAINTENANCE OF CAP

Alternative E consists of ground water extraction and treatment via air stripping, with effluent discharge to the Little Juniata River. Ground water and surface water monitoring, deed and access restrictions, cap maintenance including gas venting, and periodic Site reviews as described in Alternative B also would be implemented as part of this alternative.

Ground water would be pumped at a rate of approximately 80 gallons per minute (gpm) from 8 downgradient wells. Ground water would then be treated via stripping in an on-site facility.

Expected influent concentrations were estimated from the average measured concentrations from wells M1-Lined, 10A-88, 6-

85, and 8-85. The measured concentrations from well M2-Area IV were not included in the averaging process since this well is nc downgradient from the landfill and does not reflect potentia contamination from the landfill. The expected average concentrations in the extracted ground water are as follows:

Vinyl Chloride	7.0 parts per billion (ppb)
Chloroethane	6.2 ppb
Acetone	32.0 ppb
1,1-Dichloroethane	19.6 ppb
1,2-Dichloroethene(total)	33.8 ppb
1,1,1-Trichloroethane	9.6 ppb
Trichloroethene	12.0 ppb
Tetrachloroethene	12.0 ppb
Chlorobenzene	1.8 ppb

It is also expected that other contaminants identified in the ground water will be present in the extracted ground water. As of the date of this Record of Decision, the expected concentrations of the other contaminants in the extracted ground water has not been calculated.

Eighty gpm was calculated to be the required pumping rate to intercept all ground water flowing across the western edge of the landfill in the top 50 feet of ground water. The precise pumping rate will be determined as a part of the remedial design. The resulting drawdown at the proposed extraction wells would be approximately 6.4 feet. The resulting drawdown at downgradient residential wells would be approximately 3.7 feet. Ground water would still flow in the general area toward the Little Juniata River. At 80 gpm, the total mass of VOCs extracted from the ground water would be approximately 0.14 pounds per day (0.33 pounds per day if the highest concentration well alone were used). Air from the stripping tower would pass through activated carbon canisters to minimize the release of VOCs to the atmosphere. For purposes of the air emissions controls design, the maximum concentration from downgradient monitor wells of 340 ppb of total VOCs was used. During the remedial design, fugitive emissions disperson modeling will be done to determine the extent and assess the risks created by any fugitive emissions from the air stripping operation. The treatment effluent stream would meet the PADER National Pollutant Discharge Elimination System Requirements (NPDES).

Based upon the average concentrations of iron and manganese measured in the ground water, pretreatment equipment for the removal of iron, manganese, and suspended solids was considered to be unnecessary. Precipitation of iron and manganese in the air stripping tower could be handled by routine maintenance of the treatment equipment. Such maintenance has been considered in the cost estimate associated with this alternative. Treatability tests would be conducted to confirm this assumption. Pretreatment equipment would be added if treatability tests indicated that such equipment would make the treatment equipment operate more efficiently and economically. The spent carbon from the airstripping operation will either be destroyed or regenerated at a RCRA approved facility. The sludges produced during operation will be managed in accordance with State hazardous waste requirements and Federal land disposal restrictions.

Based on current estimates, it is anticipated that the ground water extraction and air stripping operation will take approximately 4 1/2 years to effectively clean up the contaminated ground water to the cleanup levels set forth in Section X below. Operation and maintenance of the cap, and monitoring of the ground and surface water will occur for a minimum of 30 years. As waste will be left on site, 5 years reviews of the site will take place. The estimated cost for this alternative is $2,333,549. However, this treatment period will be reevaluated as it progresses and the remediation period may be adjusted based on the field results. This alternative could be implemented within 12 months.

ALTERNATIVE F: EXCAVATION OF LANDFILL SOURCE MATERIAL SOLIDIFICATION AND DISPOSAL OF INCINERATOR ASH ONSITE , MULTILAYER CAP, DEED AND ACCESS RESTRICTIONS, MONITORING AND MAINTENANCE OF CAP

This alternative involves the excavation and thermal destruction of all landfill materials constituting sources of site contamination. Based on the estimated 6,700 cubic yards of industrial wastes reportedly placed in the landfill, it is assumed that 10 times this volume (i.e., other wastes and soils impacted by the source areas) would require incineration. Materials which are excavated and do not require incineration will be stockpiled separately for use as backfill on-site. Ground water and surface water monitoring, deed and access restrictions, cap maintenance, periodic site inspections and five-year reviews as described in Alternative B also would be implemented as part of this alternative.

This alternative would consist of the following remedial actions:

- o Site preparation for installation of a mobile incinerator;
- o Excavation of all landfill waste (approximately 2,700,000 cy) and segregation of approximately 67,000 cy of wastes requiring incineration;
- o Incineration of segregated wastes;
- o Stabilization and proper disposal of incinerator residuals on site.

A mobile rotary kiln incinerator, rated at eight tons per hour, would be used at the Site. The incinerator may require a secondary combustion unit (afterburner) operated at temperatures adequate to completely oxidize any products of incomplete combustion (PICs) heaving the primary combustion unit. A test burn would be required to determine the optimum incinerator operating conditions, and to identify any specific emission control requirements. Pollution control devices (i.e., scrubbers) would be required to capture fly ash and acid gases prior to discharge from the stack.

For purposes of cost estimation, it is assumed the incinerator ash and other facility residuals (e.g. scrubber sludges) will be hazardous waste under the Resource Conservation and Recovery Act (RCRA). The cost estimates assume that the ash must be disposed of and treated in accordance with PADER hazardous waste regulations.

A final cover meeting the current state solid waste standards would be placed over the stabilized materials and the entire landfill area. The cover area would be vegetated to prevent erosion of the topsoil. Post-closure maintenance and monitoring would also be performed. The cost estimate for this alternative is $72,603,897. This alternative would take 48 months to implement and 120 months of operation.

IX. COMPARATIVE ANALYSIS OF ALTERNATIVES

Each of the six remedial alternatives has been evaluated with respect to the nine evaluation criteria set forth in the NCP, 40 C.F.R. Section 300.430(e)(9). These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria.

Threshold Criteria

1. Overall Protection of Human Health and the Environment
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Primary Balancing Criteria

3. Reduction of Toxicity, Mobility, or Volume through Treatment
4. Implementability
5. Short-term Effectiveness
6. Long-term Effectiveness
7. Cost

Modifying Criteria

8. Community Acceptance

9. State Acceptance

These evaluation criteria relate directly to requirements in Section 121 of CERCLA, 42 U.S.C. Section 9621, which measure the overall feasibility and acceptability of the alternatives. Threshold criteria must be satisfied in order for an alternative to be eligible for selection. Primary balancing criteria are used to evaluate the performance of each of the alternatives relative to the others. State and community acceptance are the modifying criteria formally taken into account after public comment is received on the Proposed Plan. The evaluations are as follows:

1. Overall Protection of Human Health and the Environment

A primary requirement of CERCLA is that the selected remedial alternative be protective of human health and the environment. A remedy is protective if it reduces current and potential risks to acceptable levels under the established risk range posed by each exposure pathway at the Site.

Environmental risks were not evaluated for the alternatives as no unacceptable risk to any environmental receptor was identifed during the RI. However, implementation of any of the alternatives would provide protection to the environment by their implementation.

Alternative A does not reduce risk to human health from future use of ground water, because it does not address the risk posed through exposure to the contaminated ground water; therefore Alternative A will not be evaluated any further.

Alternatives B through F provide protection of human health in the sense that the monitoring of existing wells between the possible receptors' wells and the known contaminated ground water would likely warn possible receptors of potential exposure to contaminants in the ground water prior to actual exposure. The deed and access restrictions in Alternatives B through F would protect any receptors from any possible direct contact with any contaminants still in the landfill. Alternative C would provide additional overall protection to human health by providing alternate water supply. Alternative D would be protective of human health by further marginally reducing any new contaminants from entering the ground water from the landfill. Alternative E would be further protective of human health by extracting and treating the ground water to the clean up levels listed in Section X. Alternative F would be protective of human health by removing the source of contamination, although it would not directly reduce the threat of exposure to already contaminated ground water.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Under Section 121(d) of CERCLA, 42 U.S.C. Section 9621(d), and EPA guidance, remedial actions at CERCLA sites must attain legally applicable or relevant and appropriate Federal and promulgated State environmental standards, requirements, criteria and limitations which are collectively referred to as "ARARs", unless such ARARs may be waived under CERCLA Section 121(d)(4), 42 U.S.C. Section 9621(d)(4). Applicable requirements are those substantive environmental standards, requirements, criteria, or limitations promulgated under Federal or State law that are legally applicable to the remedial action to be implemented at the Site. Relevant and appropriate requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law which, while not being directly applicable to the remedial action, do address problems or situations sufficiently similar to those encountered at the Site such that their use is well suited to the Site. ARARs may relate to the substances addressed by the remedial action (chemical-specific), to the location of the Site (location-specific), or to the manner in which the remedial action is implemented (action-specific). There are no location-specific ARARs for this site.

Alternatives B, C, and D do not include ground water remediation as a component of the remedies; therefore no chemical-specific ARARs for ground water clean up exist for these remedies. Accordingly these alternatives would not meet the chemical specific ARARs relating to ground water remediation and treatment. The alternatives would meet all action-specific ARARs relating to the actions required under the respective remedies.

Alternative E, which includes ground water remediation, would meet the chemical-specific ARARs (as set forth in Section XI of this ROD) relating to ground water remediation and treatment. In addition, Alternative E would meet all action-specific ARARs relating to activities performed as part of the remedy, including RCRA treatment, storage and disposal requirements, NPDES discharge and design requirements, and Federal and State emissions requirements.

Alternative F, which does not include ground water remediation and treatment, would meet all action-specific ARARs relating to the remedy, including RCRA requirements regarding construction, operation and closure of hazardous waste incinerators, disposal requirements, and air emissions requirements.

3. Reduction of Toxicity, Mobility, or Volume through Treatment

This evaluation criterion addresses the degree to which a technology or remedial alternative reduces toxicity, mobility, or volume of hazardous substances at the Site. Section 121(b) of CERCLA, 42 U.S.C. Section 9621(b), establishes a preference for remedial actions which include treatment that permanently and significantly reduces the toxicity, mobility, or volume as a principal element over remedial actions which do not.

Alternatives B, C and D do not employ a treatment process and therefore do not satisfy the CERCLA statutory preference for treatment.

Alternatives E and F will result in the reduction of toxicity, mobility and volume of Site contaminants through various means of treatment. In Alternative E, the ground water treatment technology, air stripping, provides reduction of ground water toxicity and the reduction of the mass or volume of ground water constituents, but does not directly reduce the source of contamination. The compounds extracted during the air stripping phase of Alternative E, are expected to be absorbed onto carbon and later incinerated at an off-Site facility during regeneration of the carbon or treated in a biodegradation process. Alternative F will reduce the volume and toxicity of contaminated materials in the landfill through incineration, but will not address the primary risk at the site, the existing contaminated ground water.

4. Implementability

This evaluation criterion addresses the difficulties and unknowns associated with implementing technologies, the ability and time necessary to obtain required permits and approvals, the availability of services and materials, and the reliability and effectiveness of monitoring.

For all of the remedial alternatives, the ability to monitor effectiveness of each remedy exists. Over 21 ground water monitoring wells are currently installed at the Site and nearby. For Alternatives E and F, ground water monitoring and the use of the early warning wells will give notice of failure of the action before significant risk of exposure for downgradient ground water users can occur. For Alternative E, periodic sampling and analysis of ground water treatment system discharges would allow monitoring of ARAR compliance. For Alternatives E and F, continuous and automated sampling and monitoring of stack emissions would give the ability to monitor ARAR compliance for air emissions.

For Alternative B, the monitoring wells and fencing would be easily built. The waterline in Alternative C can be built using existing lines and would require minimal O&M. The new cap in Alternative D would be more difficult to build but would require little maintenance. The groundwater recovery and treatment facilities for Alternative E would be relatively easy to construct and operate. The ground water treatment system requires some operator attention. In Alternative F, the construction of the hazardous waste incinerator is considered to be moderately difficult and excavation of the landfill is considered to be difficult.

In terms of the availability of services and capacities Alternative B requires few services and its implementation will not affect any commercially available capacities. For Alternatives C and D, services and capacities needed for implementation are readily available. In addition to those services needed for implementation of Alternative B, Alternative E has the need for air stripper construction and ground water extraction facilities and Site operating services, which are available. For Alternative F, most of the services relating to excavating and incineration are readily available but will take time to procure.

For all of the alternatives, equipment, specialists and materials are readily available. The specified technologies needed are available for all of the remaining alternatives. Alternative E requires ground water treatment pilot testing and Alternative F requires incineration treatability studies.

5. <u>Short-Term Effectiveness</u>

Short-term effectiveness addresses the period of time needed to achieve protection of human health and the environment and any adverse impacts that may be posed during the construction and operation period of the remedial alternative until cleanup levels are achieved.

Alternative B does not present any short-term risk to the community; potential releases of contaminants to the air from the installation and operation of methane vents can easily be controlled. The alternative however, could present a long-term cancer risk by exposure to and ingestion of ground water, if the monitoring fails to detect the movement of the contamination. Alternative C does not pose any short-term risks to the community and would provide no risks to receptors using the alternate water supply. Alternative D does not present any substantial risk to the community as the new cap would be installed in small increments-thus reducing any possible short-term exposure to any wastes below the existing cap. In addition, protective measures would be implemented during construction to ensure that no new infiltration would occurs during the recapping. Alternative E does not present short term risks to the community because potential releases of contaminants to the air from the installation and operation of the air stripper and methane vents can easily be controlled.

Excavation of the landfill and operation of an on-Site incinerator in Alternative F will present a short-term risk to the community of releases to the air and surface water runoff during the operating period.

There would be no significant short term risk to workers resulting from the implementation of Alternatives B, C or D. For Alternative E, there would be minor risks to workers with respect to activities involving extraction well installation, construction of the ground water treatment facility, and other related construction. There would be significantly increased risks for workers at the Site in Alternative F resulting from excavation of the landfill. A substantially increased risk of worker exposure to methane gas releases, as well as the risk of explosions associated from possible methane gas pockets within the landfill with this activity would be expected.

For Alternatives B, C, D and E there are no significant detrimental environmental impacts. All air emissions, surface water discharge and disposal of residuals would be conducted in compliance with ARARs. For Alternative F there would be increased local pollutant loadings to the atmosphere from the on-Site incinerator but will be controlled to the greatest extent possible.

In Alternatives B at least 75 years is the estimate for natural attenuation and dissemination of ground water contamination to reach background levels. For Alternative C, design and construction of the alternate water supply could be implemented within 12 months, however it would still take 75 years for the ground water to be cleaned through natural attenuation.

For Alternative D, design and construction would take approximately 18 months to implement. The ground water ground water would then be cleansed faster as any current migration of contaminants from the landfill to the ground water would be further reduced from what the existing cap now allows, however, this rate would be only marginally faster then with the existing cap. Alternative E could be implemented within 12 months, however, the actual extraction and operation is estimated to take approximately 4 1/2 years to reduce the concentration of VOCs to cleanup levels set forth in Section X. Alternative F would take 4 years to construct and approximately 10 years of operation to incinerate all waste within the landfill. Even so,natural attenuation and dissemination of ground water contaminants would require 75 years.

6. <u>Long-Term Effectiveness and Permanence</u>

Long-term effectiveness and permanence address the long-term protection of human health and the environment provided after the remedial action goals have been achieved. This comparison focuses on the residual risk that will remain after completion of the remedial action and the adequacy and reliability of controls used to manage the untreated waste and treatment residuals.

There is virtually no residual risk associated with direct contact with soil or soil ingestion for any of the alternatives as long as the landfill cap is maintained and, in the case of Alternatives B, C, D, E, and F, the site remains fenced. Fencing the site along with deed restrictions will substantially eliminate potential future exposure from unauthorized access or any development on or within the landfill.

Alternative B would warn downgradient users prior to the contamination of the drinking water supply; however, an additional action would then subsequently be needed to alleviate the threat. Alternative C would protect future users as long as they are connected to the public water supply. Alternatives D and F reduce the risk posed by any leachate generated within the landfill through further containment and through the source reduction in Alterative F, thus reducing the marginal risk of continuing release of the ground water. Alternative E substantially eliminates any risk posed by the ingestion of the ground water by extracting and treating the ground water prior to migration to any receptor.

Due to the existing landfill cap and vegetative soil cover, the adequacy and reliability of all the described alternatives is sufficient to minimize leachate generation and prevent direct exposure to soils. Controls for ground water recovery and treatment under Alternative E are adequate and extremely reliable. Additionally, early warning monitoring wells which will be part of the ground water extraction and treatment system under Alternative E provide backup performance monitoring. The source control technology of Alternative F, incineration, has been demonstrated as being effective in removing VOCs from soils. Field scale test would be conducted to verify the effectiveness of incineration on the landfill materials. The controls and monitoring technology for incineration are well established and reliable. While removal of the landfill and contaminated materials and treatment by incineration does provide a good long-term solution for Site remediation, the short-term implications of excavation of the landfill are significant as described in paragraph 5 (Short-Term Effectiveness) below.

For all of the remedial action alternatives, other than Alternative F, a periodic review is needed to assure long-term effectiveness and permanence, as well as the protection of human health.

7. <u>Costs</u>

CERCLA requires selection of a cost-effective remedy that protects human health and the environment and meets the other requirements of the Statute. The capital and the annual operation and maintenance (O&M) costs for these alternatives, as calculated on a present worth basis, vary significantly. Cost estimates have been developed for direct and indirect capital costs and O&M costs. The present worth of each alternative has been calculated for comparative purposes. Direct Capital costs include the following:

- o Remedial action construction
- o Equipment
- o Building and services
- o Waste disposal costs

Indirect capital costs include:

- o Engineering expenses
- o Environmental permit acquisition
- o Startup and shakedown
- o Contingency allowances

Annual O&M costs include the following:

- o Operating and maintenance labor and material costs
- o Maintenance materials and labor costs
- o Chemicals, energy, and fuel
- o Administrative costs and purchased services
- o Monitoring costs
- o Costs for periodic site review (every five years)
- o Insurance, taxes, and license costs

The remedial action alternative cost estimates have an accuracy of +50 percent to -30 percent. For the purpose of the present worth calculations, all Alternatives have a performance period of 30 years.

Alternative A involves no capital costs and no O&M. The only cost for Alternative A is the cost of $109,672 associated with the five year effectiveness reviews, which are necessary in all of the alternatives except Alternative F.

Alternative B has a present worth capital cost of $242,905 and a present worth operation and maintenance (O&M) cost of $529,596 with a total $772,501 project cost. Alternative C has a present worth capital cost of $831,155 and a present worth O&M cost of $254,247 with a total of $1,085,402, project cost.

Alternative D has a present worth capitol cost of $6,237,368 and a present worth O&M cost of $529,596 with a total of $6,766,964, project cost.

Alternative E has a present worth capital cost of $1,167,592 and a present worth O&M cost of $905,376 with a total project cost of $2,344,581. Alternative F has a present worth capital cost of $72,096,668 and a present worth O&M cost of $529,596 with a total of $72,626,264 project cost. Alternative F is almost twelve times greater in cost than any of the other considered alternatives. Alternatives B, C, and E are all in the same order of cost range with Alternative D being three times the cost of Alternative E. A summary of all costs are shown on Table 12.

8. State Acceptance

The Commonwealth of Pennsylvania has concurred with the selection of Remedial Alternative E for implementation at the Site.

9. Community Acceptance

A public meeting on the Proposed Plan was held on March 4, 1991 in Altoona, Pennsylvania. Comments received at that meeting and during the comment period are discussed in the Responsiveness Summary attached to this Record of Decision.

X. SELECTED REMEDIAL ALTERNATIVE

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives and public comments, the remedial alternative selected for implementation ("Selected Remedy") at the Site is Alternative E, **Groundwater Extraction, and Treatment of Ground water via an Air Stripper, Deed and Access Restrictions, Monitoring and Maintenance of Cap.**

Clean up Levels

The clean up levels for the aquifer contaminants are, for each contaminant, the lower of (1) the MCL listed below and (2) the background level of that contaminant:

Contaminant	Clean up level (ug/l)	Basis
1,2 Dichloroethane	5	MCL
cis 1,2 Dichloroethene	70	MCL
trans 1,2 Dichloroethene	100	MCL
Chloroform (total trihalomethanes)	100	MCL
Tetrachloroethane	5	MCL
Trichloroethene	5	MCL
Vinyl Chloride	2	MCL

TABLE 12

COST ESTIMATES

Alternative	Present Worth Capital Cost	Present Worth O&M Cost	Total Project Cost
A	$ 9,312	$ 100,360	$ 109,672
B	$ 242,905	$ 529,596	$ 772,501
C	$ 831,155	$ 254,247	$ 1,085,403
D	$ 6,237,368	$ 529,596	$ 6,766,964
E	$ 1,167,592	$ 1,176,989	$ 2,344,581
F	$72,096,668	$ 529,596	$72,626,264

Promulgated or relevant and appropriate health-based levels for manganese do not exist. Because of the low hazard index for manganese identified at this site, a site-specific health based cleanup level is not necessary. Likewise, a promulgated or relevant health-based level for 1,1 Dichloroethane (another contaminant giving rise to relatively low risk at the site) does not exist; and therefore a site-specific health-based clean-up level is not listed.

Background concentrations for the above contaminants will be determined by complying with the procedures for ground water monitoring as outlined in 25 PA Code §264.97. In the event that a contaminant is not detected in samples taken for background calculations, the detection limit for the method of analysis utilized with respect to that contaminant shall constitute the "background" concentration of the contaminant. As of the date of this Record of Decision, the appropriate methods and their detection limits are as follows:

Contaminant	Method	Detection Limit (ug/l)
Chloroform (total trihalomethanes)	601/602[1]	.05
1,2 Dichloroethane	601/602	.03
cis 1,2 Dichloroethane	524.2[2]	.12
trans 1,2 Dichlorethene	601/602	.10
Tetrachloroethane	601/602	.03
Trichloroethene	601/602	.03
Vinyl Chloride	601/602	.18

[1] 40 C.F.R. Part 136
[2] 40 C.F.R. Part 141

The discharge levels for contaminants in the treated ground water effluent will be determined by EPA in consultation with PADER as part of remedial design in accordance with the substantive requirements of Pennsylvania's NPDES program.

If implementation of the selected remedy demonstrates, in corroboration with hydrogeological and chemical evidence, that it will be technically impracticable to achieve and maintain the clean-up levels throughout the area of attainment (which will be the edge of the landfill area where contamination is furthest detected). EPA, in consultation with the Commonwealth of Pennsylvania, intends to amend the ROD or issue an Explanation of Significant Differences to inform the public of the selection of alternative ground water clean up levels as appropriate.

XI. STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at CERCLA sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. One such requirement is that when complete, the Selected Remedy implemented at the Site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The Selected Remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment as a principal element to permanently and significantly reduce the volume, toxicity, or mobility of hazardous waste. The following sections discuss how the Selected Remedy meets these statutory requirements.

Protection of Human Health and the Environment

The Selected Remedial Alternative protects human health and the environment in the long term by using ground water extraction and treatment to halt the migration of the existing contamination and to reduce the contamination in the groundwater to acceptable levels. The current excess cancer risks associated with exposure to contaminated ground water are 3.0×10^{-4}. Implementation of the Selected Remedial Alternative is expected to reduce this risk to within the generally acceptable cancer risk range of 1.0×10^{-4} to 1.0×10^{-6} .

The existing cap with installation of the gas vents along with long term maintenance will continue to reduce the infiltration of water into the landfill, which in turn reduces the migration of any source contaminants into the ground water.

There are no short-term risks associated with the Selected Remedy that cannot be readily controlled. In addition no adverse cross media impacts are expected to result from implementation of the Selected Remedy. The Selected Remedy will also provide protection from exposure of contamination left on the site by the installation of security fencing.

Compliance with Applicable or Relevant and Appropriate Requirement.

The Selected Remedy of ground water extraction and treatment will comply with all applicable or relevant and appropriate chemical-, location-, and action-specific ARARs. Those ARARs are as follows:

1. Chemical-Specific ARARs

a. Relevant and appropriate Maximum Contaminant Levels (MCLs) promulgated under the Safe Drinking Water Act, 42 U.S.C. § 300f to 300j-26, and set forth at 40 C.F.R. §141.61(a) and 55 Fed. Reg. 30370 (July 25, 1990) are:

Contaminant	Concentration (ug/liter)
1,2 Dichloroethane	5
cis-1,2 Dichloroethene	70
trans-1,2 Dichloroethene	100
Chloroform (Total Trihalomethanes)	100
Tetrachloroethane	5
Trichloroethene	5
Vinyl Chloride	2
Nickel (proposed)	100

b. The Pennsylvania ARAR for ground water for hazardous substances is that all ground water must be remediated to "background" quality as specified by 25 Pa. Code Sections 264.90 - .100. The Commonwealth of Pennsylvania also maintains that the requirement to remediate to background is also found in other legal authorities. The method by which background levels will be determined is set forth in Section X of this ROD (Selected Remedial Alternative). Such background levels shall be attained as part of the Selected Remedy, unless it is demonstrated that attaining such levels is infeasible, or otherwise waivable under CERCLA Section 121(d), 42 U.S.C. Section 9621(d).

c. The National Emissions Standards for Hazardous Air Pollutants (NESHAPs) set forth at 40 C.F.R. §61.64(b) and promulgated under the Clean Air Act, 42 U.S.C. § 7401, contain an emission standard for air stripping vinyl chloride manufacturing plants which is relevant and appropriate to the air stripping. The vinyl chloride emission standard is 10 ppm (average for 3-hour period).

2. Location-Specific ARARs

No location specific ARARs with respect to this Site, have been identified.

3. <u>Action-Specific ARARs</u>

a. 25 Pa. Code Sections 123.1 and 123.2 are applicable to the Selected Remedy, and require that dusts generated by earthmoving activities be controlled with water or other appropriate dust suppressants.

b. To the extent that new point source air emissions result from the implementation of the remedial alternative, 25 Pa. Code Section 127.12(a)(5) will apply, requiring that emissions be reduced to the minimum obtainable levels through the use of best available technology (BAT), as defined in 25 Pa. Code Section 121.1.

c. Treatment and discharge of contaminated ground water to The Little Juniata River will cause the requirements of Pennsylvania's NPDES program to apply. Those requirements, as set forth in 25 Pa. Code Sections 93.1 through 93.9, include design, discharge, and monitoring requirements which will be met in implementing the Selected Remedy.

d. 25 Pa. Code Sections 102.1 through 102.24 contain relevant and appropriate standards requiring the development, implementation, and maintenance of erosion and sedimentation control measures and facilities which effectively minimize accelerated erosion and sedimentation.

e. 25 Pa. Code Sections 105.291 through 105.314, promulgated in part under the Pennsylvania Dam Safety and Encroachments Act of 1978, set forth applicable design requirements relating to the ground water treatment discharge pipe/headwall construction.

f. 25 Pa. Code Sections 264.111, 264.117, and 264.310(b), (i), (iv) and (v) contain relevant and appropriate requirements with respect to maintenance of the existing cap. These requirements preclude any breaches of integrity of the existing landfill cap except under certain circumstances, which circumstances will be met by the Selected Remedy. These provisions also will require adequate repair of the landfill cap.

g. Portions of the Pennsylvania Municipal Waste Regulations, 25 PA Code Article VIII, set forth relevant and appropriate substantive requirements regarding the maintenance of the landfill cap required under the Selected Remedy. Those portions include are: 25 Pa. Code §§271.212 (relating to access restrictions), 273.235 and 273.236 (relating to revegetation of landfill cover), 273.241 (relating to prevention of water pollution), 273.242 (relating to sedimentation and erosion control), and 273.292 (relating to gas venting).

h. The ground water extraction and treatment operations at the Site will constitute treatment of hazardous waste (i.e., the ground water containing hazardous waste), and will result in the generation of hazardous wastes derived from the treatment of the contaminated ground water (i.e., spent carbon filters from the air stripping operation). The remedy will be implemented consistently with the requirements of 25 Pa. Code Part 262 Subparts A (relating to hazardous waste determination and identification numbers), B (relating to manifesting requirements for off-site shipments of spent carbon or other hazardous wastes), and C (relating to pretransport requirments; 25 Pa. Code Part 263 (relating to transporters of hazardous wastes); and with respect to the operations at the site generally, with the substantive requirements of 25 Pa. Code Part 264 Subparts B-E, F (in the event hazardous waste generated as part of the Selected Remedy is managed in a surface impoundment), G, I(in the event that hazardous waste generated as part of the Selected Remedy is managed in containers), J (in the event hazardous waste generated as part of the Selected Remedy is treated or stored in tanks), and K (in the event hazardous waste generated as part of the Selected Remedy is treated or stored in surface impoundments).

i. The land disposal restrictions set forth at 40 C.F.R. Part 268 are applicable to the management of hazardous wastes (including spent carbon filters from the air stripping operation) generated as part of the Selected Remedy.

j. 29 C.F.R. §1910.170 sets forth applicable requirements regarding worker safety in the handling of hazardous substances.

k. 49 C.F.R. §171.1-171.16 sets forth applicable requirements regarding off-site transportation of hazardous wastes.

l. The requirements of Subpart AA (Air Emission Standards for Process Vents) and BB (Air Emission Standards for Equipment Leaks) of the federal RCRA regulations, 40 C.F.R. Sections 1030 and 1050, are relevant and appropriate (and, depending upon the levels of organics in the extracted ground water and treatment residuals) may be applicable to the air stripping operations under the Selected Remedy. These regulations require that total organic emissions from the air stripping process vents must be less than 1.4 kg/hr (3 lb /hr) and 2.8 mg/yr (3.1 tons/yr.).

m. Revised Procedures for Planning and Implementing Off-Site Response Actions (OSWER No. 9834.11 November 13, 1987), although not an ARAR, is a guidance developed by EPA which is to be considered in implementing the remedy.

Cost effectiveness

Alternative E is cost effective in remediating the site, when compared to all other Alternatives. A detailed cost breakdown for all components of the Alternative is shown below in Table 13

Table 13
Cost Estimate

Item	Item Cost
Regrading	$ 22,800
Fence	21,750
Well Construction and Development	184,549
PTA Treatment System	201,419
Plant Building	28,000
Indirect Construction Costs	114,630
Construction Total	$ 573,148
Permits & Legal	$ 120,000
Design Costs	205,000
Total Construction	$ 898,148
Contingency	269,444

Total Capital Costs	$ 1,167,592
Present Worth O&M Costs	1,176,989
Total Project Costs	$ 2,344,581

Preference for Treatment as a Principal Element

The selected remedy satisfies the statutory preference for remedies that employ treatment as a principal element to permanently reduce the toxicity, mobility, or volume of hazardous substances. The Selected Remedy addresses the risks posed by the ground water associated with the Site through use of treatment technologies.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized while providing the best balance amonung the other evaluation criteria. Of the alternatives that are protective of human health and the environment, the selected remedy provides the best balance in terms of long-term and short-term effectiveness and permanence; cost; implementability; reduction in toxicity, mobility, or volume of hazardous substances through treatment; state and community acceptance; and the statutory preference for treatment as a principal element.

The selected remedy utilizes the technology of ground water extraction and treatment technology to reduce the volume and toxicity of hazardous substances in the ground water. In the short-term, the risks posed by direct contact with contaminated materials present during remedial activates and afterwards and the potential ingestion of ground water will be avoided through the installation of security fencing and deed restrictions. For the long-term, the ground water extraction and treatment will return the ground water to levels that meet federal and state criteria. The treatment component of the selected remedy is easily implemented. Removal of the source material within the landfill is not practicable due to volume and nature of the landfill and the excessive cost associated with the treatment method. Moreover, existing containment measures, as maintained under the Selected Remedy, significantly minimize the impact of the source material on the ground water.

RESPONSIVENESS SUMMARY

This community relations responsiveness summary is divided into the following sections:

Section I — **Overview.** A Discussion of EPA's Preferred Alternative and the public's response to this Alternative.

Section II — **Background of Community Involvement and Concerns.** A discussion of the history of community interest and concerns raised during remedial planning activities at the Delta Quarries Superfund Site.

Section III — **Summary of Major Comments Received During the Public Comment Period and Agency Responses.** A summary of comments and responses categorized by topic.

I. OVERVIEW

EPA's Preferred Alternative, Alternative E, outlined in the Proposed Plan, involves access and deed restrictions on the landfill portion of the site, long term maintenance of the existing soil cap, installation of gas vents, monitoring of ground and surface water, and the extraction of contaminated ground water through a series of extraction wells with the ground water being run through an on-Site ground water treatment system and then discharged to the Little Juniata River.

During the public comment period, the community in general supported the clean up of the Site, however, they questioned the extent of the contamination and how the proposed plan will guarantee the total remediation of the Site. Several residents voiced their desire that EPA implement the proposed plan with the addition of water supply lines to serve the community. Also of concern to the community was a bacteria problem which they had experienced in the drinking water supply during the previous few years. Some residents believed these problems to be related to the Site.

II. BACKGROUND OF COMMUNITY INVOLVEMENT AND CONCERNS

Community interest in the Delta Quarries and Disposal Site dates to 1979 when well water samples were taken from the homes of four property owners living in the vicinity of the landfill. Since that time general community interest has been minimal.

EPA and PADER met with the Antis Township Action Committee at the committee's request in May 1989. At the meeting EPA discussed the ongoing RI/FS Investigation and the direction it would be taking. The Antis Township Action Committee expressed their concerns about their drinking water supply and requested that a public water line be provided to bring water to the Village of Pinecroft.

III. SUMMARY OF MAJOR COMMENTS DURING THE COMMENT PERIOD AND AGENCY RESPONSES

Comments raised during the Delta Quarries and Disposal Site public comment period on the proposed plan are summarized below. The comment period was held from February 15, 1991 to March 17, 1991.

1. PADER supports EPA's choice of the preferred alternative for the Delta Quarries and Disposal Site.

EPA RESPONSE: No response required.

2. One Resident asked, what is the vertical extent of the ground water traveling from the landfill and what are the flow paths and discharge zones for this groundwater regime?

EPA RESPONSE: To determine ground water flow directions, the water levels of the monitoring wells at the Site were measured. After the water level elevations were determined in each well and plotted on a Site map, ground water contour lines were drawn. These lines are similar to the contour lines of a topographic map in that the lines indicate the elevation of a surface (here the surface is the water table).

Realizing that water flows downhill, we can therefore predict that ground water at the Site flows from areas of high ground water table elevations to low ground water table elevations. The ground water table at the Site is highest in the eastern half and lowest in the western half near the Little Juniata River, indicating that the ground water at the Site flows from the landfill to the west northwest toward the river.

In the northeast quadrant of the Site near monitoring well #2, water table elevations indicated that ground water in this location has the potential to flow north-northeast. However, since ground water immediately west of this area flows toward the west, and this area is east of the landfill, it is inferred that contaminants from the Site will not be transported with the north-northeast flow path. This is what is known as a ground water divide.

Ground water at the Site is found in the pore spaces and in the fracture zones of the bedrock. Since the pore spaces in the

Site's bedrock are small, higher hydraulic conductivities are found in the fractures.

The ground water that travels from the landfill discharges to the Little Juniata River and will not travel under the river to be carried to the opposite side from the landfill. Since water table surfaces generally mirror the topographic surface of an area, as observed at the landfill, the ground water table elevations on the west side of the river would be lowest (nearest the surface) at the river in the valley and the ground water would tend to flow east toward the Little Juniata.

Therefore, ground water is flowing to the Little Juniata River on both sides of the water body. Where the mirrored flow gradients meet at the valley floor, there is an occurrence of an upward rising of ground water flow and the ground water is discharged into the river.

3. Residents questioned where the extraction wells would be placed if the ground water contamination plume has not been well defined.

EPA RESPONSE: The proposed plan contemplates the use of eight extraction wells based on current information. During the remedial design, additional ground water samples will be taken from all downgradient wells to better define the ground water contamination plume prior to the final selection of the number and location of the extraction wells.

4. Residents questioned who was going to be financially responsible for implementing the proposed plan.

EPA RESPONSE: EPA has done an investigation as to who, under the Superfund Law, can be held liable for the costs of cleaning up the Site. At some time after issuance of this Record of Decision, EPA may issue special notice letters to those potentially responsible parties (PRPs) whom EPA believes are responsible for the performance of or payment for the clean up. These letters will request that those PRPs enter into negotiations with EPA to undertake the cleanup. If no party wishes to negotiate or if negotiations are unsuccessful, then EPA may either order the PRPs to undertake the cleanup or use Superfund monies to undertake the cleanup. In the event EPA performs the clean up, it is authorized to seek recovery of costs incurred in the clean up from the PRPs.

5. One resident, who lives adjacent to the Site, questioned why her children became ill after consuming their well water and yet well tests done during the previous few years have not shown any contamination.

EPA RESPONSE: EPA has reviewed the well sampling data from the last several sampling rounds and finds that her well is no longer showing any of those compounds which EPA looked for during a remedial investigation. It may be possible that the prior contamination has degraded and no longer exists within her well source. EPA, however, cannot explain why her children became ill after consuming it. Based on the results of the recent and previous well tests, there were no contaminants in the water supply which was tested which could have caused an illness to occur so rapidly after consumption.

6. Residents asked that since the source of contamination will be left on the site, what assurances are there that the problem will not reoccur after the ground water treatment process is completed?

EPA RESPONSE: Under Superfund, if sources of contamination are left on a site (as would occur under the proposed plan), EPA is required to perform periodic reviews of the site at least every five years after the remedial action is initiated. If during any of these reviews or if during the normal ground water monitoring which may take place as a part of the proposed alternative, evidence demonstrates that conditions exist which pose a threat to human health or the environment, EPA is required to take appropiate action to address such conditions.

7. One resident questioned whether general trash haulers could be held liable for clean up costs.

EPA RESPONSE: If a hauler disposed of only general municipal trash not containing hazardous substances at the Site, the hauler would not be considered liable under Superfund. If the hauler disposed of hazardous substances at the Site and the hauler was responsible for selecting Delta Quarries as the disposal site, then the hauler may be a potentially responsible party.

8. Several residents questioned the selection of Alternative E only and recommended that Alternative E along with Alternative C, a new public water supply be also implemented.

EPA RESPONSE: EPA evaluated Alternative C under the same criteria as all alternatives, and while Alternative C would be protective of human health, it does not address the cleanup of the contaminated ground water. Although it is possible to implement Alternative C concurrently with Alternative E, the provision of alternate water supply is not appropriate given the Site conditions and the protection provided under Alternative E. No residential wells recently tested have shown any signs of contamination associated with the Site, so at this time there is no need to bring in an outside water supply to those residents utilizing the ground water as their water supply. When

Alternative E is implemented, the ground water extraction will be designed to prevent any currently contaminated ground water from migrating off-site to any drinking water supply well or any other potential receptor. Furthermore, the continuous ground water and surface water monitoring will ensure that no residential wells are ever threatened during or after implementation of the ground water extraction and treatment process.

9. Several residents from the Pinecroft area expressed concern about their water supply in their area. Of particular concern was high levels of bacteria which began appearing a few years ago in their wells, which bacteria they feel may be coming from the Delta Site.

EPA RESPONSE: During the Remedial Investigation, there was no indication that any type of contamination from the Site could have migrated to their residential area. Bacteria is generally not considered a hazardous substance and therefore, EPA would not sample for it during a Remedial Investigation nor attempt to address it during a clean up. Nonetheless, given the fact that no known Site contaminants have been detected in the wells in question, it is unlikely that bacteria, even if it originated at the Site, would have reached those wells.

Hydrogeological analysis demonstrates that contaminants have not migrated to those wells. When a contaminant encounters the water table at the Site, the horizontal hydraulic gradient dictates the migration of that contaminant. This means contaminants that are in the ground water are not as likely to be transported downward as easily as they will be transported horizontally. Therefore, the horizontal extent of the contaminants is of much greater concern than the vertical extent. However, the vertical extent is still important. A ground water model was used to aid in extrapolating or determining the vertical extent of the contamination which would be consistent with the hydraulic properties and contaminant concentrations observed during the investigation. Based on these analyses, it appears that none of the Site contaminants have reached the wells in question because ground water flow is not in the general direction of these wells.

10. It was questioned that even if vinyl chloride was not detected in some wells, could it be possible that the compound was in fact near the well sampled, but not obtained during the sample collection from that well.

EPA RESPONSE: If vinyl chloride was in the ground water, near a well during sampling, it should have been detected during sampling of that well. When a well is sampled three to five volumes of water are purged or removed from the well prior to sampling. This purging ensures that stagnant water is removed from the well and that a representative sample of ground water is drawn into the well to be sampled. If vinyl chloride is in the ground water near the well, it would be drawn into that well and sampled. Vinyl chloride may be detected in a well in one sample, but not in later samples because 1) the contaminant plume has migrated or moved away from the well location to such a distance from the well that the vinyl chloride can no longer be detected in samples taken from that well, or 2) the concentration of vinyl chloride has been diluted or the vinyl chloride has started to degrade. When several consecutive sampling rounds indicate no vinyl chloride at one well, there is some certainty that the contaminant has moved or degraded and is no longer present near that well.

11. One resident raised the question that if the wastes were removed from the site would the contamination or potential for contamination be completely eliminated?

EPA RESPONSE: By eliminating the source, the potential for future soil and ground water contamination from the site will be eliminated. However, the soil and ground water that is already contaminated by the landfill would still need to be addressed. In addition, EPA policy is to not move sources of contamination from one geographical location to another, but EPA prefers to treat a source at a site and remove the source through its treatment or extraction. Based on the factors set forth in the decision summary, it was determined that removal of the landfill materials would not be appropriate in this case.

12. The question was raised on why is there such a large cost difference between Alternative E and Alternative F.

EPA RESPONSE: The difference in cost between Alternative E and Alternative F involves the level of work required.

Alternative E is a remedy which would involve pumping and treating the ground water to remove contaminants. This remedy would require some study to determine pumping rates and construction of the actual pumping and treatment systems but is expected to ultimately reach the remedial goal of cleaning or restoring the aquifer.

Alternative F would involve a much larger scope of work, specifically a very large construction/excavation project. This project would involve the following components:

- o A study to determine exactly where the buried wastes are located.

- o Excavation of all landfill wastes (approximately 2,700,000 cubic yards) and separation of approximately 67,000 cubic yards of waste for incineration.

- Site preparation and installation of a mobile incinerator.
- Incineration of some of the waste.
- Stabilization of incinerator residuals (i.e., treatment of incinerator ash prior to disposal.
- Construction of a new landfill on-site with liner and multi-layer cap to hold incinerator ash.
- Monitoring and cap maintenance after the project is complete.

13. It was questioned that if no records were maintained describing or indicating what types of waste were being disposed at the site, then what methods are used to determine the types of buried waste.

EPA RESPONSE: Several methods are used to determine the types of waste buried at the Site. Specifically this information is determined by two methods: 1) using historical information from landfill operators, waste haulers, and waste generating companies, and 2) looking at substances actually detected in environmental samples collected at the Site and determining the types of wastes from which these substances would have come. Even if the landfill owner or operator didn't keep records, waste generators and haulers do so; therefore, through investigation information can be tracked down concerning waste dumped at the site. When no records are available, the knowledge of chemicals found at the site gives a reasonably accurate idea of what was disposed of at the site.

14. Residents asked what percentage of the contaminants from the Site in the ground water can be removed by air stripping?

EPA RESPONSE: EPA is proposing that the air stripping device be designed to remove 99.9 percent of the concentrations of volatile compounds that are in the ground water extracted from the aquifer.

The extraction well or wells placed at the site will intersect or be installed in zones of high hydraulic conductivities (i.e., fractures) so that a pump placed in the wells could effectively remove the calculated ground water that is contaminated from the aquifer (see response to question 2). Packed towers (air stripper type) can achieve up to 99.9 percent of some volatile compounds from ground water [EPA 540/2-86/003(f), 1986]. Since vinyl chloride, the main contaminant of concern, is highly volatile, it is expected that this compound will effectively be removed.

Post-treatment groundwater sampling will be part of the alternative remedy to analyze the effectiveness of the air-stripping program.

15. One resident asked why wells in Pinecroft, reported by residents to be 230 and 240 feet deep, weren't included in the sampling program for the RI?

EPA RESPONSE: The reason why wells in Pinecroft were not sampled in twofold. The well nearest to Pinecroft which was sampled was a residential well, approximately 1,400 feet north of the Site. The analysis of this sample revealed no contaminants associated with the Site. This indicates that contaminants have not traveled in this direction. Also, due to the site hydraulic characteristics, contaminants from the site should not be transported by ground water to wells in Pinecroft. (See response to question 9).

The EPA concluded that wells in Pinecroft have not and should not be affected by contaminants from the Site, therefore the wells were not sampled.

16. One resident suggested that wells be sampled on the opposite side of the Little Juniata River from the landfill, and some in Pinecroft.

EPA RESPONSE: EPA feels that based on the existing data the ground water on the opposite side of the Little Juniata River from the landfill and in Pinecroft will not be affected by contaminants moving from the landfill. Therefore, these wells were not included in the sampling program. This is based on our review of all hydrogeological data available, based on water level elevations observed in the monitoring and residential wells sampled. Ground water on both sides of the Little Juniata River are flowing towards the River. Therefore, EPA does not expect contaminants to move to the other side of the river or towards the village of Pinecroft.

17. One commenter stated that the ARAR requiring ground water to be remediated to background quality is not a promulgated, legally enforceable requirement under Pennsylvania law. The commenter also asserted that Pennsylvania has not consistently applied, or demonstrated the intention to consistently apply such a requirement at other remedial actions within the Commonwealth.

EPA RESPONSE: In accordance with Section 121 of CERCLA, 42 U.S.C. §9621, and the NCP, Pennsylvania submitted to EPA a list of state ARARs relating to the Site. As described in the Decision Summary, the "background" ARAR is based upon promulgated and legally enforceable provisions of Pennsylvania's hazardous waste management regulations, namely 25 PA Code §264.90 - 264.100. These provisions require ground water monitoring at hazardous waste management facilities, and, in the event that hazardous waste, hazardous constituents or decomposition by-products are detected at levels above background, require implementation of actions to abate the contamination. Abatement under these provisions as interpreted by Pennsylvania requires remediation of the ground water to background levels. Therefore, the background ARAR is based upon a legally enforceable, promulgated state environmental standard.

EPA is unaware of any action or pattern of activity by Pennsylvania which would indicate that Pennsylvania has not consistently applied (or demonstrated the intention to consistently apply) the background ARAR at other remedial actions in the Commonwealth. Since Pennsylvania first identified the relevant provisions as constituting an ARAR, it has consistently asserted those provisions as ARARs at sites involving remediation of contaminated ground water in the Commonwealth. Therefore, based on the current facts known to EPA, it would not be appropriate to invoke the waiver set forth in Section 121(d)(4)(E) of CERCLA with respect to this ARAR.

18. The owner of the Site has commented on the proposed plan and has indicated it does not agree with the EPA's selection of Alternative E. The owner recommends selection of Alternative B based on the fact that there are no current receptors which are threatened by the contaminated ground water, and that under Alternative B, the ground water monitoring plan would alert any potential receptors of possible contamination prior to it reaching their water supply wells. In addition, the owner disagrees with the risk analysis. It bases its disagreement on the results of its resampling of well 10A-88, in January 1991. This resampling did not show any vinyl chloride where as it had been found previously once during the RI.

EPA RESPONSE: EPA does not agree with the commenter's recommendation that Alternative B be implemented in lieu of Alternative E for the following reasons: (1) Alternative B does not address the EPA goal of returning the aquifer to its full beneficial use; (2) Alternative B will not prevent the potential migration of a contamination from the Site to current or future potential receptors; and (3) Alternative E will provide the best overall protection of human health and the environment.

EPA believes that the risk is not overstated. While well 10A-88 did not show any vinyl chloride during the resampling, in January 1991, the resampling detected trichloroethene and tetrachloroethene in the new sample. This is of concern to EPA because both of these compounds are precusors to vinyl chloride formation through the natural degradation of both these compounds. In addition, vinyl chloride has been detected twice before on the site in well 8-85 prior to the RI. In addition to the vinyl chloride, there have been several instances where various other volatile organic compounds have exceeded their respective MCLs for safe drinking water standards and therefore also represent potential risk. EPA's risk calculations are based on reasonable maximum exposure assumptions and are not considered overly conservative, therefore EPA believes that the risk value of 3×10^{-4} is a reasonable expectation of risk for this Site.

DELTA QUARRIES SITE
ADMINISTRATIVE RECORD FILE *
INDEX OF DOCUMENTS

I. SITE IDENTIFICATION

1. Report: Preliminary Assessment, Delta Quarries and Disposal Inc. Landfill, 2/20/85. P. 100001-100047.

* Administrative Record File available 1/3/91, updated 2/15/91, updated 3/18/91.

II. REMEDIAL ENFORCEMENT PLANNING

1. Consent Order and Agreement In the Matter of: Delta Excavating and Trucking Company, Inc., et al. v. Pennsylvania Department of Environmental Resources (PADER), Docket #81-080-M, signed by Mr. John P. Niebauer, Jr., Delta Quarries and Disposal Inc., and Mr. Edward Simmons and Mr. Donald Lazarchik, PADER, 10/17/84. P. 200001-200036.

2. Report: Delta Altoona Landfill, "Old Stotler Site", Hydrogeologic Investigation, Antis and Logan Townships, Blair County, prepared by Meiser & Earl, Inc., 2/86. P. 200037-200242.

3. Report: Delta Stotler Landfill, Closure Plan and Soil Erosion and Sedimentation Plan, prepared by Martin and Martin, Incorporated, 6/86. P. 200243-200333. A transmittal letter is attached.

4. Administrative Order by Consent In the Matter of: Delta Quarries and Disposal/Stotler Landfill, Docket #III-88-01-DC, signed by Mr. John P. Niebauer, Jr., Delta Quarries and Disposal Inc., and Mr. James M. Seif, U.S EPA, 10/9/87. P. 200334-200349.

* 5. Attachment I (Part 1): Delta Quarries and Disposal, Inc., Site-related Records, (undated). P. 200350-200532.

* 6. Attachment I (Part 2): Delta Quarries and Dispoal, Inc., Site-related Records, (undated). P. 200533-200662.

* 7. Attachment II (Part 1): Delta Quarries and Disposal, Inc., Title Documents, (undated). P. 200663-200836.

* 8. Attachment II (Part 2): Delta Quarries and Disposal, Inc., Title Documents, (undated). P. 200837-201035.

* Documents previously appearing at pages AR200350 through AR201035 have been removed. These documents were not relied upon or considered in selecting remedial alternatives for the site and therefore placement of them in the administrative record file was erroneous. These documents remain in EPA Region III files and are subject to review under the Freedom of Information Act, 5 U.S.C. Section 552.

III. REMEDIAL RESPONSE PLANNING

1. Report: Work Plan, Remedial Investigation/Feasibility Study (RI/FS), Delta Quarries and Disposal/Stotler Landfill, Antis and Logan Townships, Blair County, Pennsylvania, prepared by Meiser & Earl, Inc., 5/6/88. P. 300001-300125.

2. Letter to Ms. Donna McCartney, U.S. EPA, from Ms. Noreen Chamberlain, Bureau of Waste Management, re: Concerns over investigation, 8/9/88. P. 300126-300127.

3. Report: Health and Safety Plan for the Delta Quarries and Disposal/Stotler Landfill, Antis and Logan Townships, Blair County, Pennsylvania, prepared by Meiser & Earl, Inc., 8/29/88. P. 300128-300241.

4. Report: Quality Assurance Project Plan, Delta Quarries and Disposal, Inc./Stotler Landfill, RI/FS, prepared by Meiser & Earl, Inc., 8/29/88. P. 300242-300303.

5. Report: Quality Assurance Project Plan (Appendices), Delta Quarries and Disposal, Inc./Stotler Landfill, RI/FS, prepared by Meiser & Earl, Inc., 8/29/88. P. 300304-300749.

6. Report: Remedial Investigation, Site Operations Plan, Delta Quarries and Disposal/Stotler Landfill, Antis and Logan Townships, Blair County, Pennsylvania, prepared by Meiser & Earl, Inc., 8/29/88. P. 300750-300940.

7. Health Assessment for Delta Quarries/Stotler Landfill, Antis/Logan Township, Blair County, Pennsylvania, prepared by the Agency for Toxic Substances and Disease Registry (ATSDR), 11/15/88. P. 300941-300944.

8. Organic Data Validation (Case 10702), prepared by Weston, 1/18/89. P. 300945-301044. A transmittal memorandum is attached.

9. Inorganic Data Validation (Case 10702), prepared by Weston, 1/19/89. P. 301045-301068. A transmittal memorandum is attached.

10. Inorganic Data Validation (Case 10588), prepared by Weston, 1/24/89. P. 301069-301087. A transmittal memorandum is attached.

11. Organic Data Validation (Case 10588), prepared by Weston, 3/31/89. P. 301088-301150. A transmittal memorandum is attached.

12. Report: Statement of Qualifications, Delta Quarri Remedial Investigation/Feasibility Study, prepared Canonie Environmental Services Corp., 5/19/89. P. 301151-301206.

13. Report: Quality Assurance Review, the Delta Quarry Project, prepared by Environmental Standards, Inc., 9/20/89. P. 301207-301404.

14. Report: Quality Assurance Review, the Delta Quarry Project, prepared by Environmental Standards, Inc., 9/27/89. P. 301405-301950.

15. Report: Quality Assurance Review, the Delta Quarry Project, prepared by Environmental Standards, Inc., 10/31/89. P. 301951-302296.

16. Inorganic Data Validation (Case 12544), prepared by Weston, 11/10/89. P. 302297-302324. A transmittal memorandum is attached.

17. Report: Quality Assurance Review, the Delta Quarry Project, prepared by Environmental Standards, Inc., 11/17/89. P. 302325-302704.

18. Letter to Ms. Donna McCartney, U.S. EPA, from Mr. Bruce Pluta, CDM, re: Suspicion of test validity, 11/20/89. P. 302705-302729. Information on dye tracers is attached.

19. Report: Trip Report, Delta Quarries, RI/FS Oversight, prepared by CDM, 11/22/89. P. 302730-302819. The transmittal letter is attached.

20. Letter to Ms. Donna McCartney, U.S. EPA, from Mr. Arthur Pyron, re: Notification of geologic report and comments on the Remedial Investigation, 11/25/89. P. 302820-302823.

21. Inorganic Data Validation (Case 12735), prepared by Weston, 11/30/89. P. 302824-302837. A transmittal memorandum is attached.

22. Organic Data Validation (Case 12735), prepared by Weston, 12/4/89. P. 302838-302915. A transmittal memorandum is attached.

23. Organic Data Validation (Case 12544), prepared by Weston, 12/7/89. P. 302916-303049. A transmittal memorandum is attached.

24. RI/FS Data Summary Tables transmittal letter to Ms. Donna McCartney, U.S. EPA, from Mr. Joseph E. Mihm, Canonie Environmental Services Corp., re: Completion of RI/FS Data Summary Tables, 1/4/90. P. 303050-303090. The tables are attached.

25. Report: Data Comparison Report, Delta Quarries Site, prepared by CDM, 4/3/90. P. 303091-303108. A transmittal letter is attached.

26. Report: Summary of the Geology of the Delta Quarry Superfund Site, and its Influence upon Site Hydrogeology, Logan and Antis Townships, Blair County, Pennsylvania, prepared by Arthur J. Pyron, (undated). P. 303109-303214.

27. Report: Wetlands Investigation and Phase II Surface Water and Sediment Sampling Data Review, prepared by Canonie Environmental, 3/90. P. 303215-303281.

28. Report: Draft Human Health Evaluation of the Delta Quarries and Disposal/Stotler Landfill in Altoona, Pennsylvania, prepared by Canonie Environmental, 4/24/90. P. 303282-303392.

29. Report: Final Draft Report, Remedial Investigation, prepared by Canonie Environmental, 11/14/90. P. 303393-303978.

30. Report: Feasibility Study, prepared by Canonie Environmental, 1/91. P. 303989-304170.

31. Memorandum to Mr. Martin Kotsch, U.S. EPA, from Ms. Nancy Rios, U.S. EPA, re: Report of analytical result for MW 10A-88, 1/14/91. P. 304171-304172.

32. Letter to Mr. Martin Koch [sic], U.S. EPA, from Mr. Mike Morris, Brockway Analytical, Inc., re: Transmittal of analytical data for monitoring well 10A-88, 1/17/91. P. 304173-304188.

33. Proposed Remedial Action Plan, Delta Quarries and Disposal Site, prepared by U.S. EPA, 2/15/91. P. 304189-304203.

V. COMMUNITY INVOLVEMENT/CONGRESSIONAL CORRESPONDENCE/ IMAGERY

1. Topographic map with directions, Delta Quarry Site and surrounding area, U.S. Geological Survey, 1962. P. 500001-500002.

2. Topographic map, Delta Quarry Site and surrounding area, U.S. Geological Survey, 1962. P. 500003-500004. A legend indicating water line locations and number of houses and people within two miles of the site is attached.

3. General plan, Altoona City Authority water system and reservoirs, Dobson & Foreman, Inc., 5/6/82. P. 500005-500005.

4. Photographs from a site visit, Delta Quarries and Disposal, 10/31/84. P. 500006-500010.

5. Contour map, Delta Quarries and Disposal, Inc., Altoona Disposal Sites, Meiser & Earl, Inc., 2/26/85. P. 500011-500011.

6. Contour map (enlargement), Delta Quarries and Disposal, Inc., Altoona Disposal Sites, Meiser & Earl, Inc., 2/26/85. P. 500012-500012.

7. Contour map (enlargement) with handwritten additions to the legend, Delta Quarries and Disposal, Inc., Altoona Disposal Sites, Meiser & Earl, Inc., 2/26/85. P. 500013-500013.

8. Contour map (full-size) with handwritten notations, Delta Quarries and Disposal, Inc., Altoona Disposal Sites, Meiser & Earl, Inc., 2/26/85. P. 500014-500014.

9. Topographic map (Plate 1), Delta Quarries and Disposal/Stotler Landfill, Antis and Logan Townships, Blair County, PA, Meiser & Earl, Inc., 1/88. P. 500015-500015.

10. Photographs from two site visits, Delta Quarries, 6/22/88 and 9/15/88. P. 500016-500032.

11. Draft Report, Delta Quarries Site, Community Relations Plan, prepared by Booz, Allen & Hamilton Inc., 8/4/88. P. 500033-500052.

12. Photographs from a site visit, including drilling operations and testing procedures, 10/88. P. 500053-500062.

13. Location map (Figure 1), Delta Quarries and Disposal, (undated). P. 500063-500063.

14. Assessment map (Figure 4), Delta Quarries Site, TechLaw, Inc., (undated). P. 500064-500064.

15. Water system map, Altoona area, (undated). P. 500065-500065.

16. Location map, Parshall Landfill, (undated). P. 500066-500067. A topographic map showing the Parshall Sanitary Landfill proposed site plan is attached.

17. Transcript of Public Meeting, Delta Quarries, 3/4/91. P. 500068-500158.

SITE SPECIFIC GUIDANCE DOCUMENTS

1. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, prepared by OSWER/CERR, 10/1/88.

2. Superfund Federal-Lead Remedial Project Management Handbook, prepared by OERR, 6/1/86.

3. Land Disposal Restrictions, prepared by H.L. Longest, CERR and G. Lucero, CWPE, 8/1/87. The following are attached:

    a) Summary of Major LDR Provisions & California List Prohibitions;
    b) Other attachements cited are available in the Federal Register.

4. CERCLA Compliance with Other Environmental Statutes, prepared by J.W. Porter, OSWER, 10/2/85.

5. CERCLA Compliance with Other Laws Manual Draft Guidance, prepared by OERR, 8/8/88.

6. ATSDR Health Assessments on NPL Sites, prepared by Department of Health and Human Services/ATSDR, 6/16/8.

7. Guidelines for Carcinogen Risk Assessment (Federal Register, September 24, 1986, P. 33992), prepared by EPA, 9/24/86.

8. Guidelines for Exposure Assessment (Federal Register, September 24, 1986, P. 34042), prepared by EPA, 9/24/86.

9. Health Assessment Documents (58 Chemical Profiles), Volume 28-30, prepared by ORD/OHEA/ECAO and OSWER/OERR, 9/1/84.

10. Superfund Exposure Assessment Manual, prepared by OERR and OSWER, 4/1/88.

11. Superfund Public Health Evaluation Manual, prepared by OERR and OSWER, 10/1/86.

12. Community Relations in Superfund: A Handbook (Interim Version), prepared by OERR, 6/1/88.

13. Endangerment Assessment Guidance, prepared by J.W. Porter, OSWER, 11/22/85.