United States Environmental Protection Agency
Office of Emergency and Remedial Response
EPA/ROD/R03-85/016
September 1985

EPA

Superfund Record of Decision:

Douglassville, PA

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

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16. ABSTRACT

The Douglassville Disposal Site occupies approximately 50 acres of land along the southern bank of the Schuylkill River in southeastern Berks County, Union Township, Pennsylvania. Site operations included lubricating oil recycling in 1941 and waste solvents recycling in the 1950's and 1960's. Wastes generated from these operations were stored in several lagoons located in the northern half of the site until 1972. In November 1970, ten days of heavy rain caused the lagoons to overflow and breach safety dikes releasing 2-3 million gallons of wastes. The dikes were repaired and a Federal decree was issued stating that no more waste material was to be stored in t lagoons. Actions were also initiated to dispose of remaining waste materials. Be this action could be carried out, tropical storm Agnes caused the Schuylkill River to overflow its banks and inundate the entire site. An estimated 6 to 8 million gallons of wastes were released and carried downstream by floodwaters for about 15 miles. Oil recycling operations continued until 1979 when corrections mandated by the Pennsylvania Department of Environmental Resources (PADER) became cost-prohibitive. The site operators then turned to refining waste oils for use as fuel in industrial boilers, and oily waste sludge from this new recycling process was landfarmed in the area of the old western lagoon. PADER halted this practice in 1981, and mandated operational corrections to the landfarm configuration.
(see separate sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Douglassville, PA Contaminated Media: gw, sw, sediment, soils Key contaminants: VOCs, inorganics, phenol, arsenic, chromium, PCBs, PAHs, pesticides, acids		

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SUPERFUND RECORD OF DECISION

Douglassville, PA

Abstract - continued

The selected remedial action for this site includes: removal and consolidation in the facility sludge disposal area, of contaminated soils and sediments from the waste water treatment drainage ditch, drainage swale, buried lagoon and drum disposal area to a depth to be determined in the pre-design study; capping of the former sludge lagoon area and the facility sludge disposal area in accordance with RCRA standards; installation of levees and dikes to protect the site from the 100-year flood in compliance with Executive Order 11988; a pre-design study of the contaminated soils to determine the extent of the areas to be capped and the extent of soils to be excavated from the drainage ditch areas. Total capital cost for the selected remedial alternative is estimated to be $5,569,500 with O&M costs approximately $196,000 per year. Ground water pumping and treating and construction of the slurry wall are being deferred until a supplemental RI/FS is completed.

RECORD OF DECISION
REMEDIAL ACTION ALTERNATIVE SELECTION

Site: Douglassville Disposal Site, Berks County, Pennsylvania

Documents Reviewed:

I am basing my decision principally on the following documents describing the analysis of cost-effectiveness and feasibility of remedial alternatives for the Douglassville Disposal Site. Unless otherwise specified, the underlying technical information is included in these reports.

- "Remedial Investigation Report/Feasibility Study of Alternatives", (Draft), Berks Associates, Douglassville Disposal Site, Berks County, Pennsylvania, (NUS Corporation, June, 1985).

- Summary of Remedial Alternative Selection.

- Recommendations by the Pennsylvania Department of Environmental Resources.

- Staff summaries and recommendations, including these attached.

Description of the Selected Remedy:

- Removal and consolidation of contaminated soils and sediments from the waste water treatment drainage ditch, drainage swale, buried lagoon and drum disposal area to a volume to be determined in a pre-design study. The materials will be consolidated in the facility sludge disposal area and will be capped in accordance with the Resource Conservation and Recovery Act (RCRA) standards.

- Installation of an impermeable cap which complies with the requirements of RCRA 40 C.F.R. §264.228(a)(2) on the former sludge lagoon area and the facility sludge disposal area.

- Installation of levees and dikes to protect the site from the 100 year flood event in compliance with Executive Order 11988.

- Pre-Design study of soils at the site to determine the exact extent of the areas to be capped and the extent of soils to be excavated from the drainage ditch areas.

Operation and Maintenance:

Operation and maintenance will be conducted by the State one year subsequent to the completion of the above remedial actions. Operation and Maintenance will be performed on the caps, the dike/levee and the monitoring system (including compliance monitoring) in accordance with RCRA guidance.

Declarations

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the National Contingency Plan (40 C.F.R. Part 300), I have determined that the remedial actions described above together with proper operation and maintenance constitute a cost-effective remedy which mitigates and minimizes damage to public health, welfare, and the environment. The remedial action will be designed to minimize the risk of potential evacuation and temporary inconveniences to the local population during the excavation and consolidation phases.

The State of Pennsylvania has been consulted and agrees with the approved remedy. Following placement and installation of the caps and flood protection structures at the locations identified in the "Summary of Remedial Alternative Selection", operation and maintenance activities will be required to ensure the continued effectiveness and level of protection of the remedy. These activities will be considered part of the approved action and eligible for Trust Fund monies for a period of one (1) year. Land use restrictions may also be necessary to ensure the effectiveness of the remedy.

In addition, excavation of the contaminated soils and sediments from the waste water treatment drainage ditch area and consolidation of this waste in the facility sludge disposal area is necessary to protect public health, welfare, and the environment.

I am deferring selection of remedial response measures that involve active ground water remediation, i.e., pumping and treatment and construction of the slurry wall. Further assessment of the nature of detected contamination and its impact on the Schulkill River needs to be assessed further.

I have determined that the action being taken is appropriate when balanced against the availability of Trust Fund monies for use at other sites.

Sept. 27, 1985
Date

James M. Seif
Regional Administrator
EPA Region III

Summary of Remedial Alternative Selection
Douglassville Disposal Site

Site Location and Description

The Douglassville Disposal Site occupies approximately 50 acres of land in southeastern Berks County, Union Township, Pennsylvania, along the southern bank of the Schuylkill River (Figure 1). State Route 724 borders the southern edge of the site, and a Penn Central/Conrail Railroad right-of-way extends through the site in an east-west direction (Figure 2). The site is located approximately 3 miles northwest of Pottstown and 11 miles southeast of Reading, Pennsylvania. The site is located almost entirely within the 100-year floodplain.

The area around the site can be described as a rural setting consisting of cropland, plowed fields, uncultivated fields, and light residential and industrial development. Within a 1/4-mile radius of the site there are approximately 23 housing units sheltering an estimated 58 residents. A state adult care facility, the Colonial Manor Adult Home, is located across Highway 724 from the site. The city of Pottstown, 2.36 miles downstream from the site on the Schuylkill River, has an estimated population of 35,000. The town of Douglassville lies on the northern bank of the river approximately 1/2-mile northeast of the site and has a population of 2,500 people.

The Schuylkill River borders the site to the north and to the east. This stretch of the river lies within the boundaries designated by the Pennsylvania Scenic Rivers Act of 1972 as a component of the Pennsylvania Scenic Rivers System. The river was so designated for the purposes of "conserving and enhancing its scenic quality and of promoting public recreational enjoyment in conjunction with various present and future uses of the river" (PADER, March, 1979). The Schuylkill River is used extensively for municipal and industrial water supply, recreation, and waste assimilation. In the reach extending downstream of the Douglassville Disposal Site to the confluence with the Delaware River, seven public water supply users withdraw water directly from the Schuylkill River (Figure 3). The distance to the nearest public water supply is 4 miles.

The Douglassville Disposal Site is situated in the Triassic Lowland section of the Piedmont Province. Rock in the general areas of the site is mapped as belonging to the Brunswick Formation which consists of Jurassic-Triassic aged, fine-to-coarse grained sedimentary rocks. The predominant member of the Brunswick Formation consists of red and maroon micaceous, silty mudstones and shales. Structural deformation is not severe. Broad open dips of 25 degrees or less to the north - northwest are prevalent. However, normal faults are common and are located throughout the area. Several fracture traces are located south of the site and it is probable that they project through the site in a 06° NW to 38° NE direction.

Ground water in this formation is controlled by secondary permeability, i.e., water flow takes place along joints, faults, and bedding plans. The Brunswick Formation is generally capable of yielding

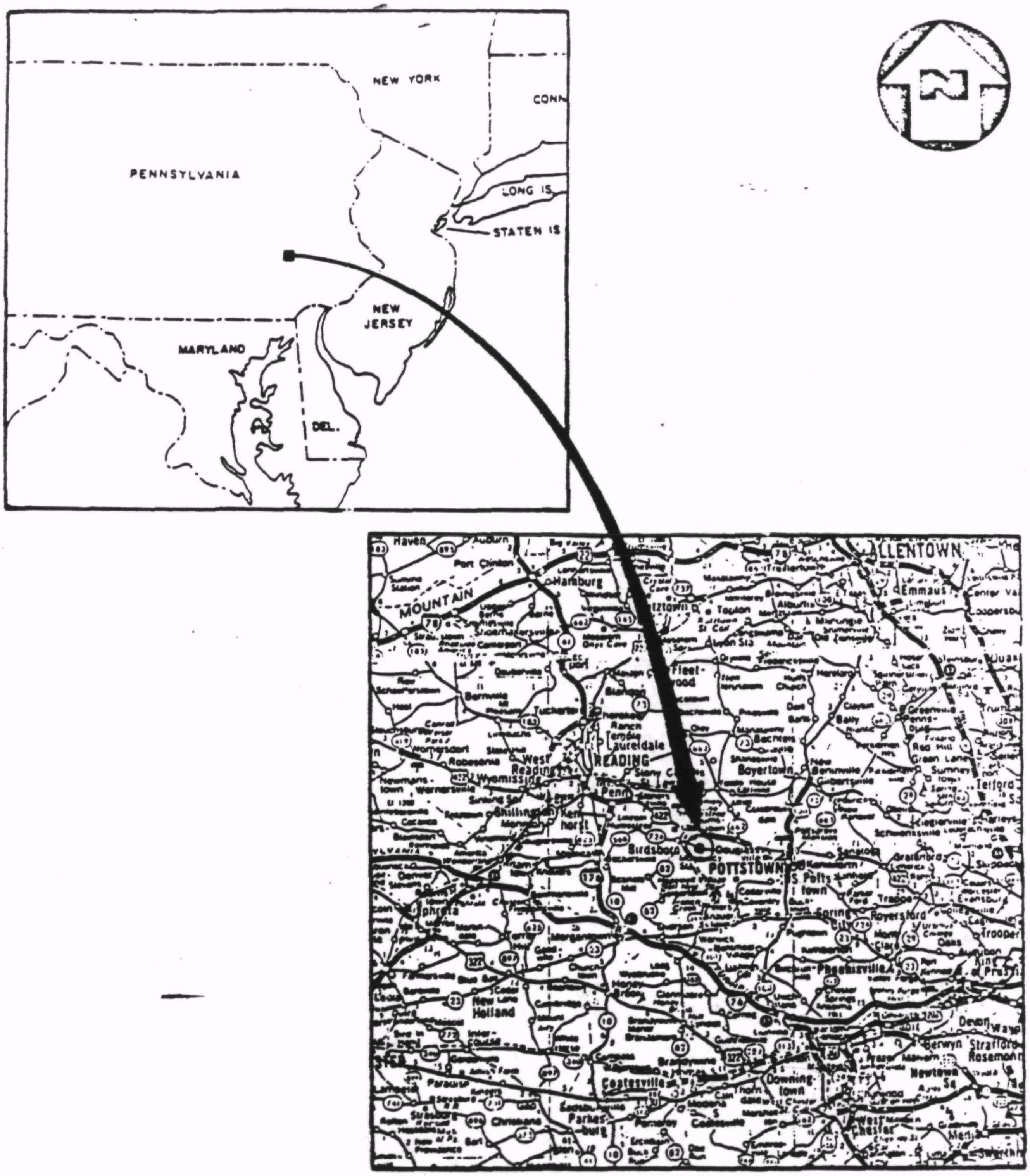

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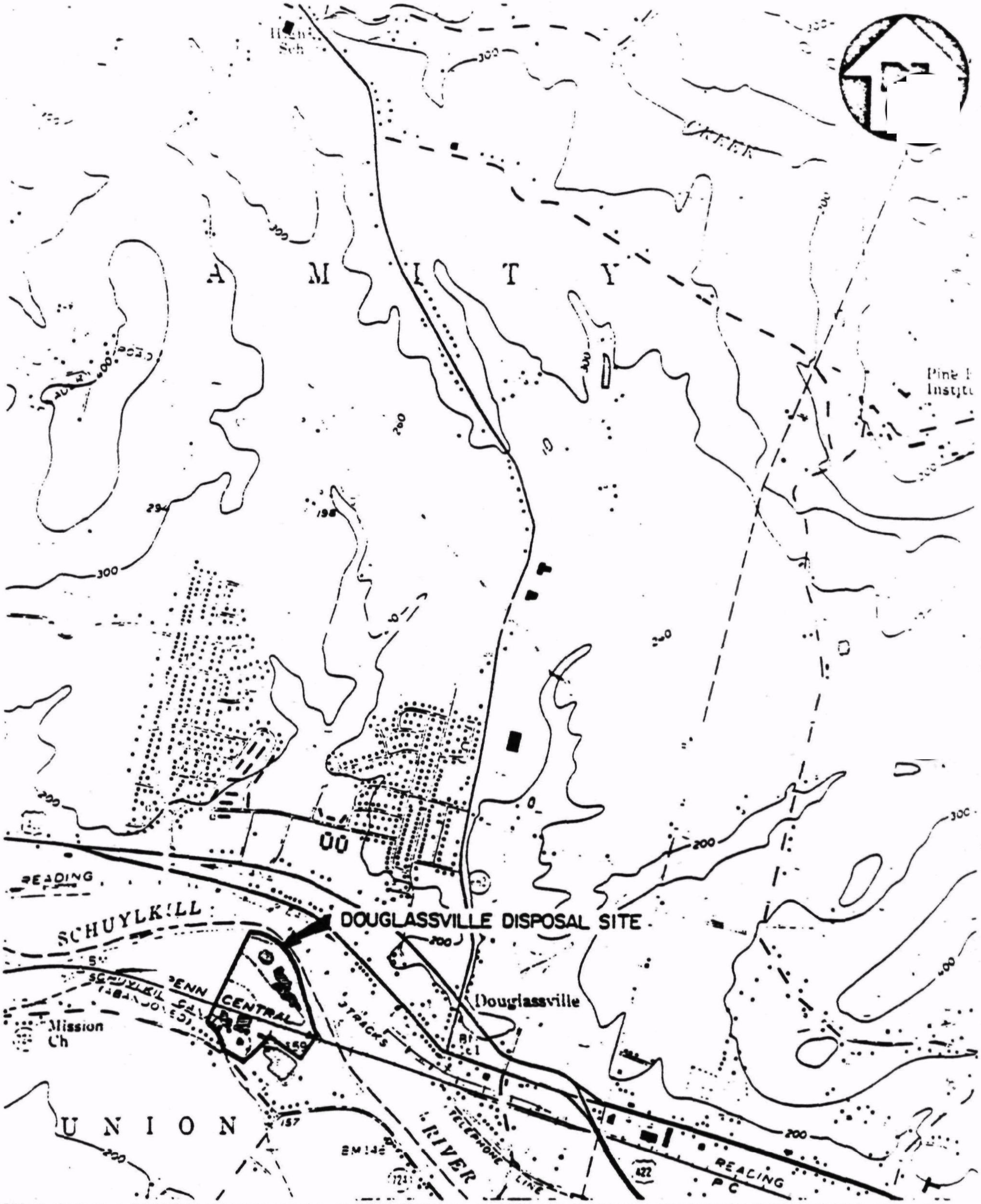
FIGURE 1

GENERAL LOCATION MAP
DOUGLASSVILLE SITE, UNION TWP., PA
NO SCALE



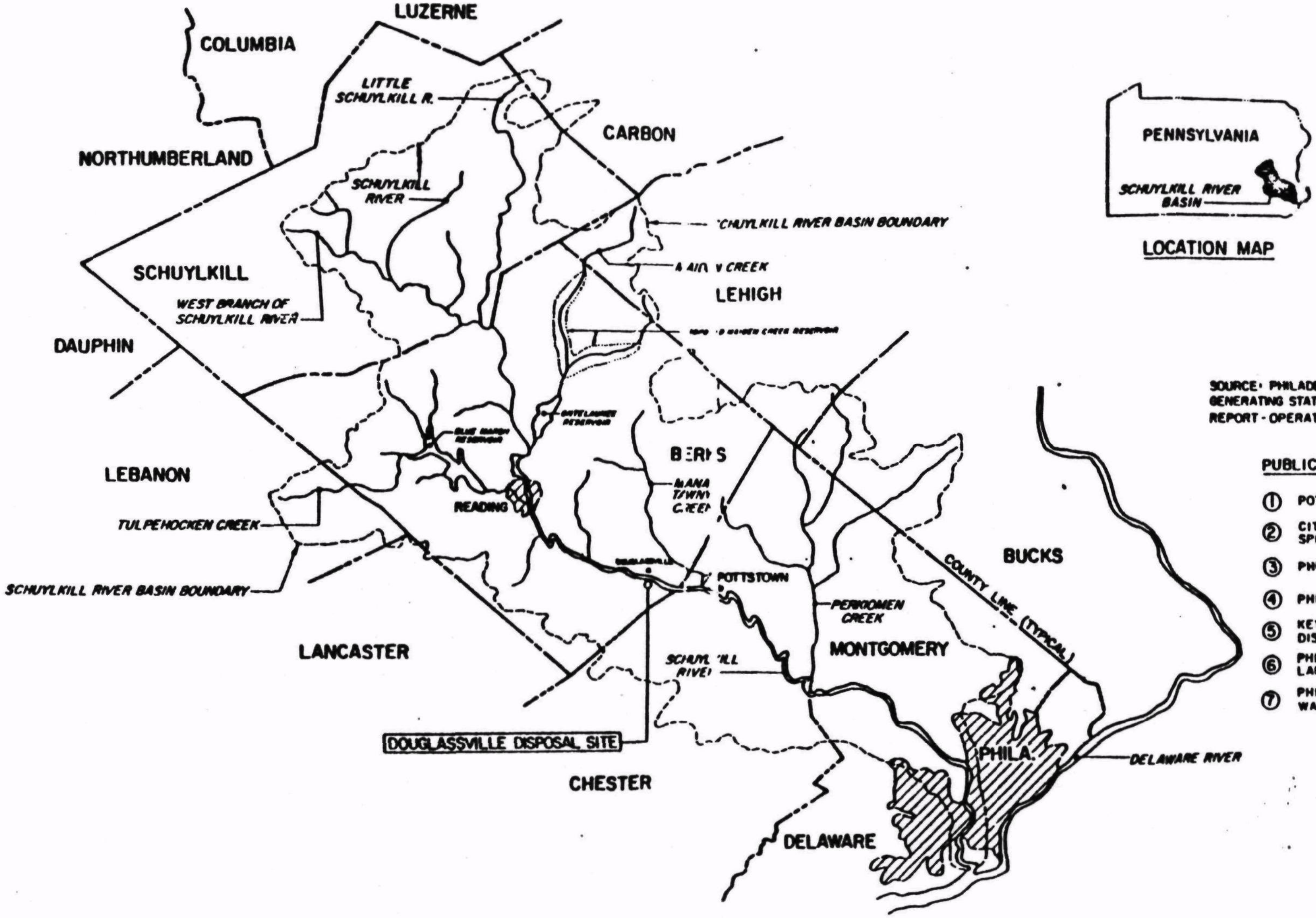
BASE MAP IS A PORTION OF THE U.S.G.S. BOYERTOWN, PA QUADRANGLE (7.5 MINUTE SERIES, 1957, PHOTOREVISED 1973).
CONTOUR INTERVAL 20'.

FIGURE 2

LOCATION MAP

DOUGLASSVILLE DISPOSAL SITE, UNION TWP., PA

SCALE: 1" = 2000'



SOURCE: PHILADELPHIA ELECTRIC COMPANY, LIMERICK GENERATING STATION, UNITS 1 & 2, ENVIRONMENTAL REPORT - OPERATING LICENSE STAGE, VOL. 2, 1982

PUBLIC WATER SUPPLY INTAKES

1. POTTSTOWN BOROUGH AUTHORITY
2. CITIZENS UTILITY HOME WATER CO. OF SPRING CITY-ROYERSFORD
3. PHOENIXVILLE BOROUGH
4. PHILADELPHIA SUBURBAN WATER CO.
5. KEYSTONE WATER CO., NORRISTOWN DISTRICT
6. PHILADELPHIA WATER DEPT., QUEEN LANE WATER TREATMENT PLANT
7. PHILADELPHIA WATER DEPT., BELMONT WATER TREATMENT PLANT

FIGURE 3

0 10 20
SCALE IN MILES

PUBLIC WATER SUPPLY INTAKES DOWNSTREAM OF DOUGLASSVILLE
DOUGLASSVILLE DISPOSAL SITE, UNION TWP, PA

adequate water for household use. Five (5) bedrock residential wells are located within one (1) mile of the site. Ground water from the Brunswick Formation is of the calcium-carbonate type, ranging from moderately hard to very hard within the general regional area. Total dissolved solids are usually about 300 parts per million.

The Douglassville Disposal Site has been the site of operations of Berks Associates, Inc., since its inception in 1941. The Berks Associates, Inc., facility currently consists of a waste oil processing area located in the southern portion of the site. The facility area consists of an office building, garage, active and inactive tanks and other processing equipment and a water treatment system with an oil water separator. A small drainage ditch extends eastward from the oil/water separator in the center of the site and eventually flows into the Schuylkill River. Surface water runoff from the site also feeds into this drainage ditch. A similar drainage swale runs parallel to the ditch and eventually merges with the drainage ditch further east. An old lagoon, identified through historical aerial photographs, lies between the ditch and the swale. The former drum storage area is located just north of the confluence of the ditch and the swale. An adjoining sludge disposal area is located just north of the facility. Various other trenches and impoundments have been noted on site throughout the years. The bed of the abandoned Schuylkill Canal borders the southwestern portion of the site. The waste oil processing equipment consists of approximately 40 tanks and associated refining equipment. The lagoons used for waste disposal have been decommissioned and backfilled. An inactive railroad line extends through the site in an east-west direction (Figure 4).

Site History

In 1941, Berks Associates, Inc., began lubrication oil recycling operations at the site. Site operations also included recycling some waste solvents in the 1950's and 1960's. Wastes generated from the oil recycling and solvent recycling process were stored in several lagoons located in the northern half of the site until 1972. In November of 1970, ten days of heavy rain caused the lagoons to overflow and to breach safety dikes causing a release of 2-3 million gallons of wastes.

The dikes were repaired and a Federal decree was issued that no more waste material was to be stored in the lagoons. Federal and State actions were initiated to dispose of the waste material remaining in the lagoons. Before this action could be carried out, tropical storm Agnes caused the Schuylkill River to overflow its banks and inundate the entire site area in June of 1972. An estimated 6 to 8 million gallons of wastes were released and carried by floodwaters downstream for about 15 miles. During cleanup after the storm, the lagoons were drained and backfilled.

Berks Associates, Inc., continued oil recycling operations until 1979 when the operator, Mr. H. Lester Schurr, determined that the operation corrections mandated by the Pennsylvania Department of

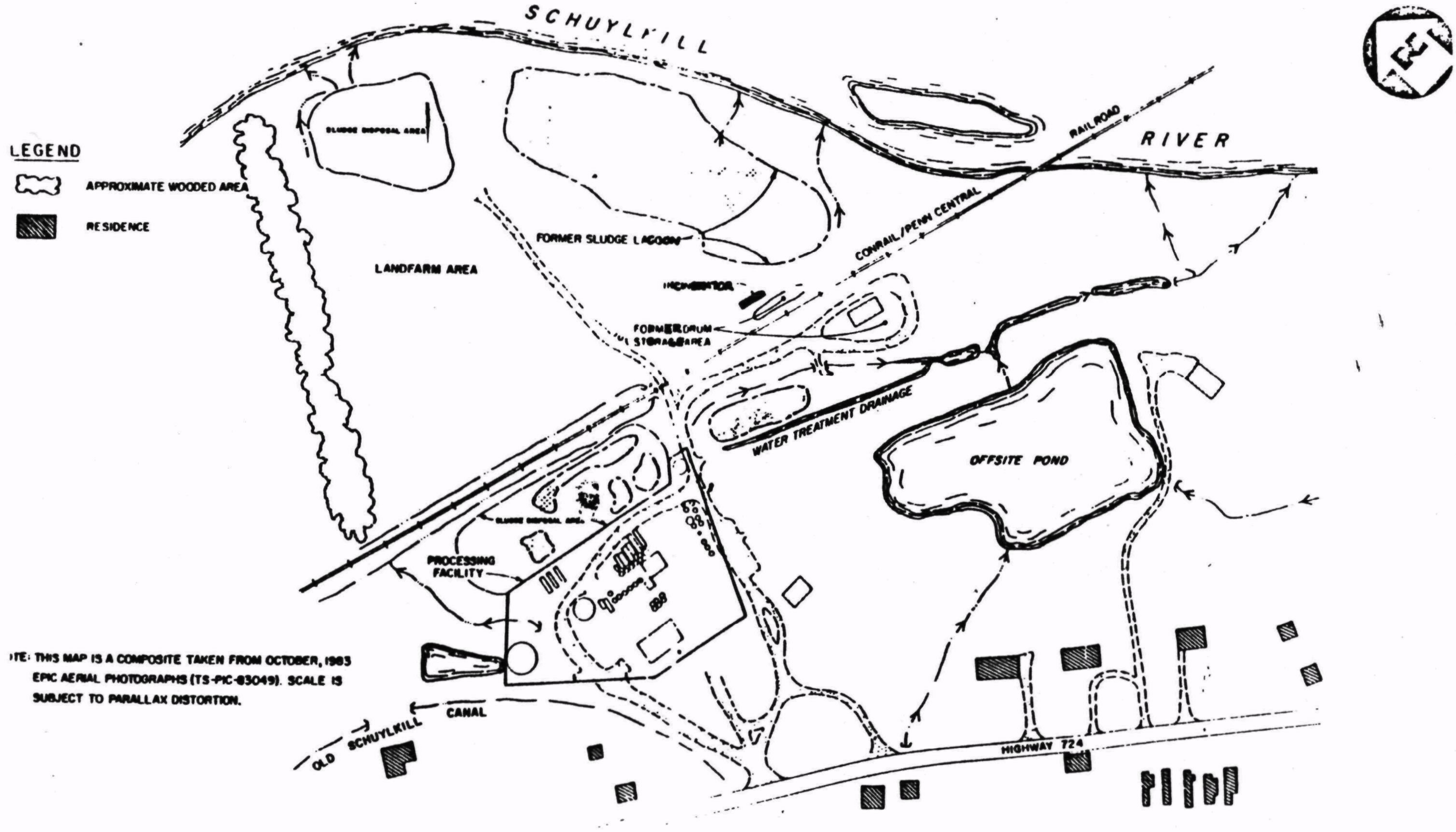


FIGURE 4

GENERAL ARRANGEMENT
DOUGLASSVILLE DISPOSAL SITE, UNION TWP, PA

200 0 200
APPROX. SCALE IN FEET

Environmental Resources (PADER) were cost-prohibitive. Operations then turned to the current practice of refining waste oils for use as fuel in industrial boilers. Beginning in 1979, oily waste sludge from the new recycling process was landfarmed in the area of the old western lagoon. This practice was halted in 1981 when PADER mandated operational corrections to the landfarm configuration.

A 250,000-gallon tank is located in the processing facility area and at one time held an estimated 25,000 gallons of water, mixed solvents, and oil sludge. In the summer of 1983, however, the site operator evaporated liquid from the tank. Thick, petroleum-like liquid and sludge remained in the bottom of this tank at the time of the Remedial Investigation (RI). Several hundred drums were stored on the site from September 1979 to April 1982 in an area at the eastern end of the site.

Results from an EPA Region III Field Investigation Team (FIT) sampling effort in April 1982 showed volatile organic contaminants in the drinking water well which was utilized by workers at the facility. A filter was installed on the facility well in the summer of 1983. The facility workers are currently supplied with bottled water for drinking purposes. During the 1982 sampling effort, the FIT also sampled the Schuylkill River (upstream and downstream of the site), the facility discharge, the drainage swale sediment, and a domestic well (upgradient from the site).

Based on the results of FIT investigations the site received a Hazard Ranking System (HRS) Score of 55.18. The Douglassville Disposal Site appeared on the Proposed National Priorities List in December, 1982. The site appeared on the National Priorities List promulgated by EPA in September, 1983.

Current Site Status

Remedial Investigation activities consisted of investigations of surface and subsurface soil, sediment, surface and ground water, geology, and air quality.

Hydrogeology

Ground water and geological investigations consisted of drilling 25 bore holes at 13 different locations around the perimeter of the waste disposal site. At each of the 13 locations, except at well MW-2, a deep and shallow well were completed so that ground water in both alluvium and bedrock could be observed. Most of the deep wells are approximately 40 feet deep, the shallow wells are generally 20 feet, and several are only 10 feet deep. Seventeen test pits were excavated to obtain additional sub-surface data at the site. Monitoring wells and test pit locations can be found in Figure 5.

The second major stage of the hydrogeologic investigation was the determination of aquifer parameters including localized transmissivities and hydraulic conductivity. These parameters were used to develop estimates on the rates and volumes of ground water moving through the site. The velocity of ground water moving through the site in the alluvium was estimated at .278 feet per day while the movement through bedrock was

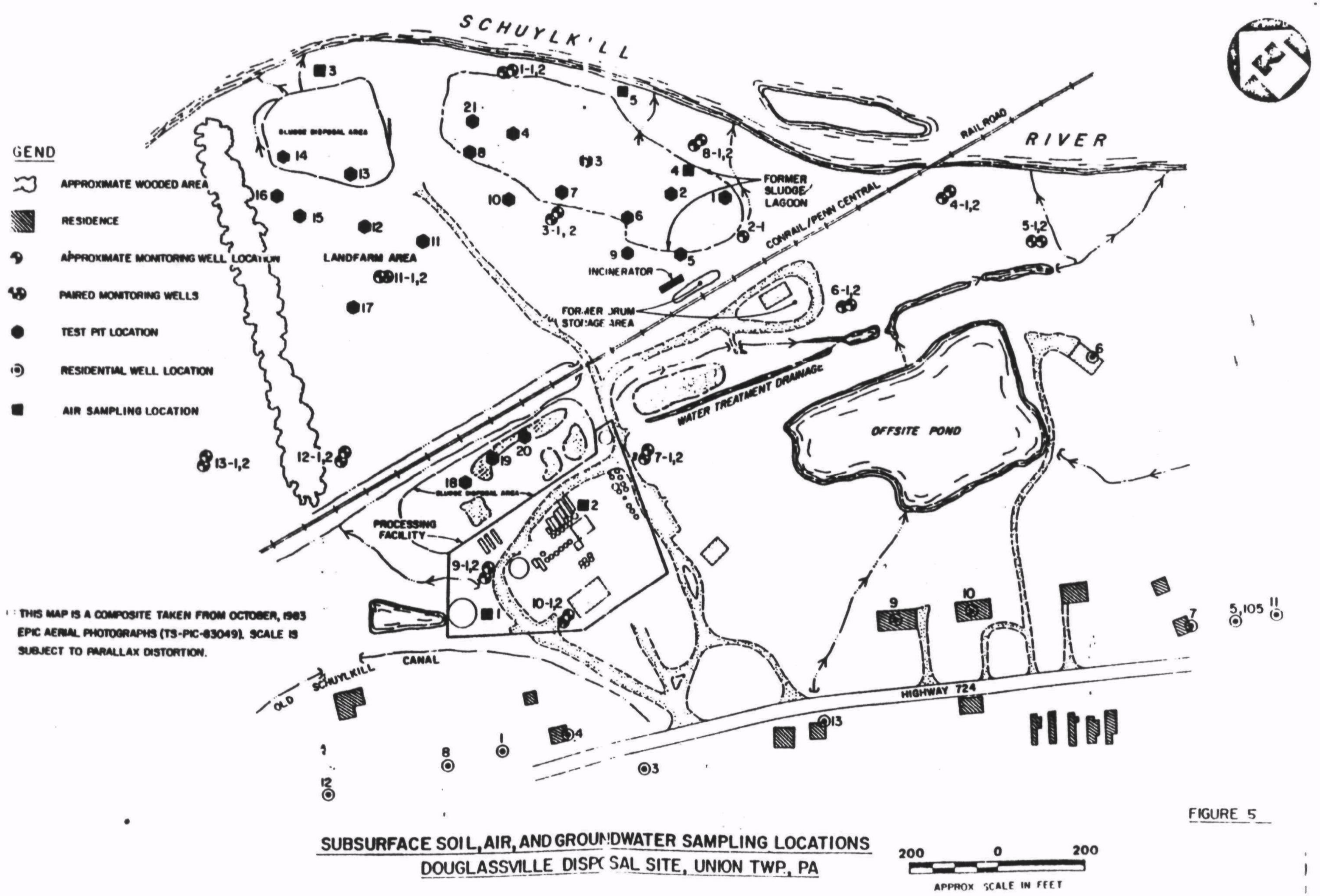


FIGURE 5

SUBSURFACE SOIL, AIR, AND GROUNDWATER SAMPLING LOCATIONS
DOUGLASSVILLE DISPOSAL SITE, UNION TWP, PA

1.39 feet per day. Additional investigative work at the site included searches for seeps and exposure of bedrock and overburden. Offsite activities included a water well inventory and sampling program of nearby residential wells, and examination of bedrock outcrops in the general Berks County area.

Site geology generally consists of 10 to 20 feet of overburden, made up of topsoil, alluvium, waste material, and backfill material in overlying lagoon areas. Underlying bedrock is composed of red shale, siltstone, and some fine sandstones. The bedrock surface dips in a northeasterly direction toward the Schuylkill River. A geologic cross-section of the site is illustrated in Figure 6.

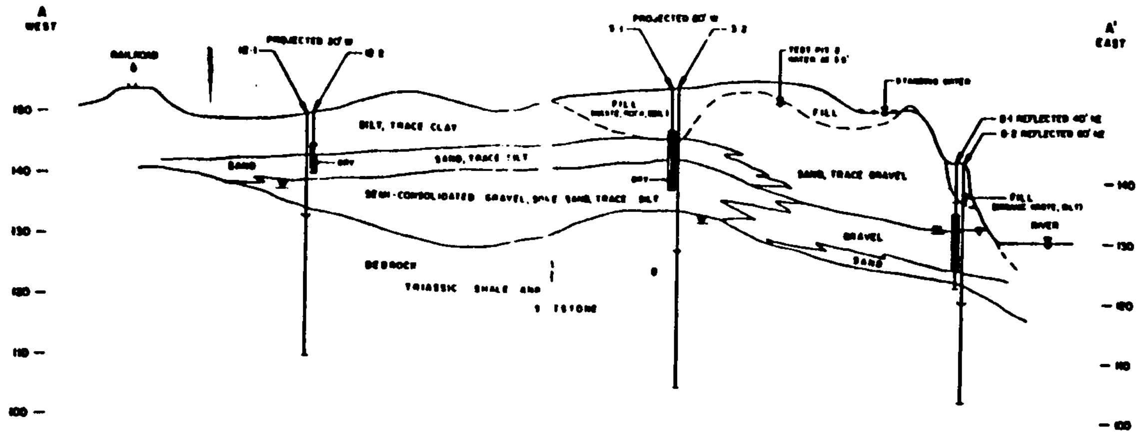
Ground water flows in a north to northeasterly direction toward the Schuylkill River. Overall relief on the water level contour is about 20 feet. The gradient is very low in the flood plain area, but steepens considerably southward, roughly parallel to the topography. Many of the wells placed in the alluvium were dry, which indicates that the top of the saturated zone in most of the monitoring locations was below the top of bedrock at that time.

Water levels and fluctuations observed in paired wells over the course of the RI are indicative of a single open water table regime with general movement north and then northeast toward the Schuylkill River. Based on USGS and site-specific information, seasonal water level fluctuations of 9 feet are expected. The Schuylkill River exerts an increasing influence on ground water levels and movement patterns as distance from the river decreases. The regional ground water will discharge into the river except during flood events.

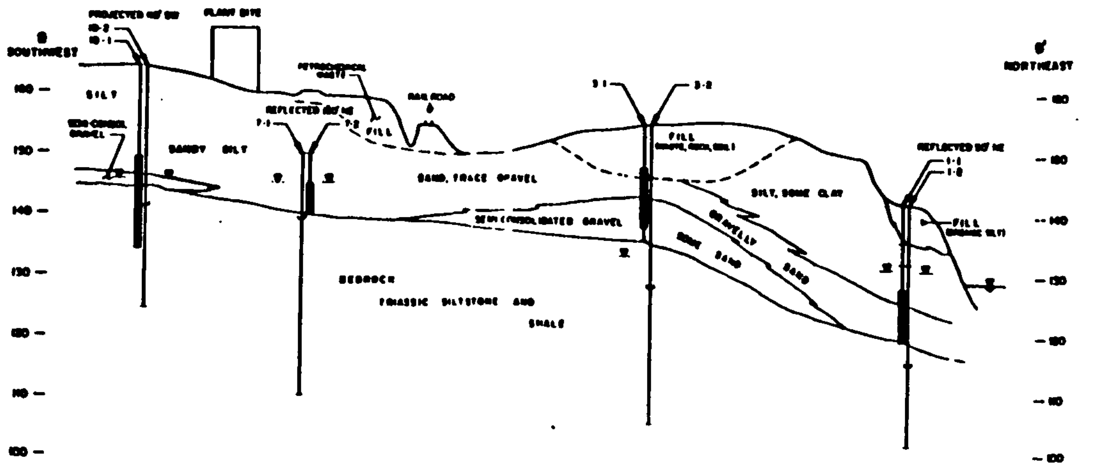
Monitoring wells and residential wells were sampled and analyzed for EPA Contract Laboratory Program Hazardous Substances List (HSL) organics and inorganics in September 1984 and March 1985. No contamination was found in the residential wells during this sampling effort. All residential wells are located upgradient from the site.

Site monitoring well data indicated that ground water was contaminated throughout the site. Volatile organic compounds constitute the majority of site ground water contaminants. Acid, base/neutral, and inorganic ground water contaminants were also detected. The attached table summarizes ground water results; EPA water quality criteria are exceeded in ground water for several organic and inorganic contaminants, including benzene, chlorobenzene, 1.2-dichloroethane, tetrachloroethene, phenol, arsenic and chromium.

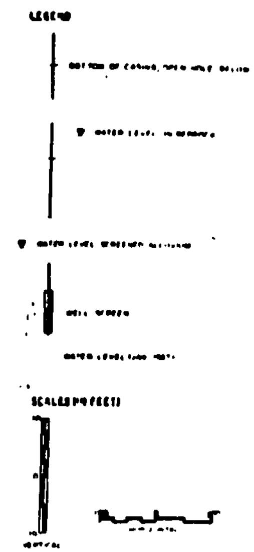
Contaminated plant waste deposited in the sludge disposal area next to the active facility and the abandoned sludge lagoons contained a large number of volatile components. The high water solubility and low soil adsorption partition coefficients of these compounds accounts for their presence in the ground water samples. Infiltration of percolating rainwater is apparently leaching volatiles into the bedrock aquifer from contaminated sludges and soils in this area. The presence of volatile compounds in soil samples taken from test pits in the lagoon area suggests that this is an ongoing process. Seasonal fluctuations



GEOLOGIC CROSS SECTION A-A'



GEOLOGIC CROSS SECTION B-B'



GEOLOGIC CROSS-SECTIONS

DOUGLASSVILLE DISPOSAL SITE __ UNION TOWNSHIP, PA

USEPA

AS SHOWN

Based on theoretical and observed ground water level fluctuations and regional precipitation, calculations were made to estimate the volume of water that passes through the contaminated subsurface which is attributal to infiltation as opposed to the volume directly related to ground water contacting the waste due to water table fluctuations. In the former lagoon area infiltration accounts for 100% of the volume of water passing through the waste area in a normal year, and 99.6% for a wet season. In the facility sludge disposal area infiltration accounts for 80% (normal) and 88% (wet) of the total volume.

Surface Water

Surface water samples were taken in the discharge drainage ditch and the Schuylkill River. Results of sample analyses revealed the presence of several organic and inorganic contaminants in the discharge drainage ditch. Samples from the ditch taken close to the facility exceeded EPA Water Quality Criteria for benzene, tetrachloroethene, 1,1,1 trichloroethane, and lead. Samples taken further from the facility in the discharge drainage ditch did not contain any organic contamination but did contain lead (500 ppb) above the EPA Water Quality Criterion.

Hydrogeological data for the site does indicate that contaminated ground water is entering the Schuylkill River. However, the presence of tetrachloroethene, which was detected in the Schuylkill River sample, may be questionable because upstream and downstream samples showed similar analytical results. Dilution may be the main reason site ground water contaminants are absent in Schuylkill River samples. Further analysis needs to be conducted to determine if site contaminants are affecting the River during low flow periods.

Sediment

Sediment samples were taken from the discharge drainage ditch, the drainage swale west of the processing facility and the Schuylkill River. The facility discharge drainage ditch contains sediments contaminated with several volatile, acid, and base/neutral fraction organics and PCBs as well as a number of inorganic contaminants including lead. The drainage swale west of the processing facility contains similarly contaminated sediments.

Schuylkill River sediment samples were also contaminated with volatiles, acid and base/neutral organics, PCBs, and inorganics. Although sediment contaminants in the Schuylkill River were similar to those found on site, it is difficult to definitively say they are from the Douglassville Disposal Site, since the Schuylkill River is the recipient of numerous other industrial and municipal discharges. Both sediment and surface water sample locations are shown in Figure 7.

Air

Air samples revealed only low levels of contamination. Volatile contaminants were detected at concentrations no greater than 11 ug/m^3. The highest volatile concentrations were detected within the facility boundaries. A number of the compounds detected were also detected in

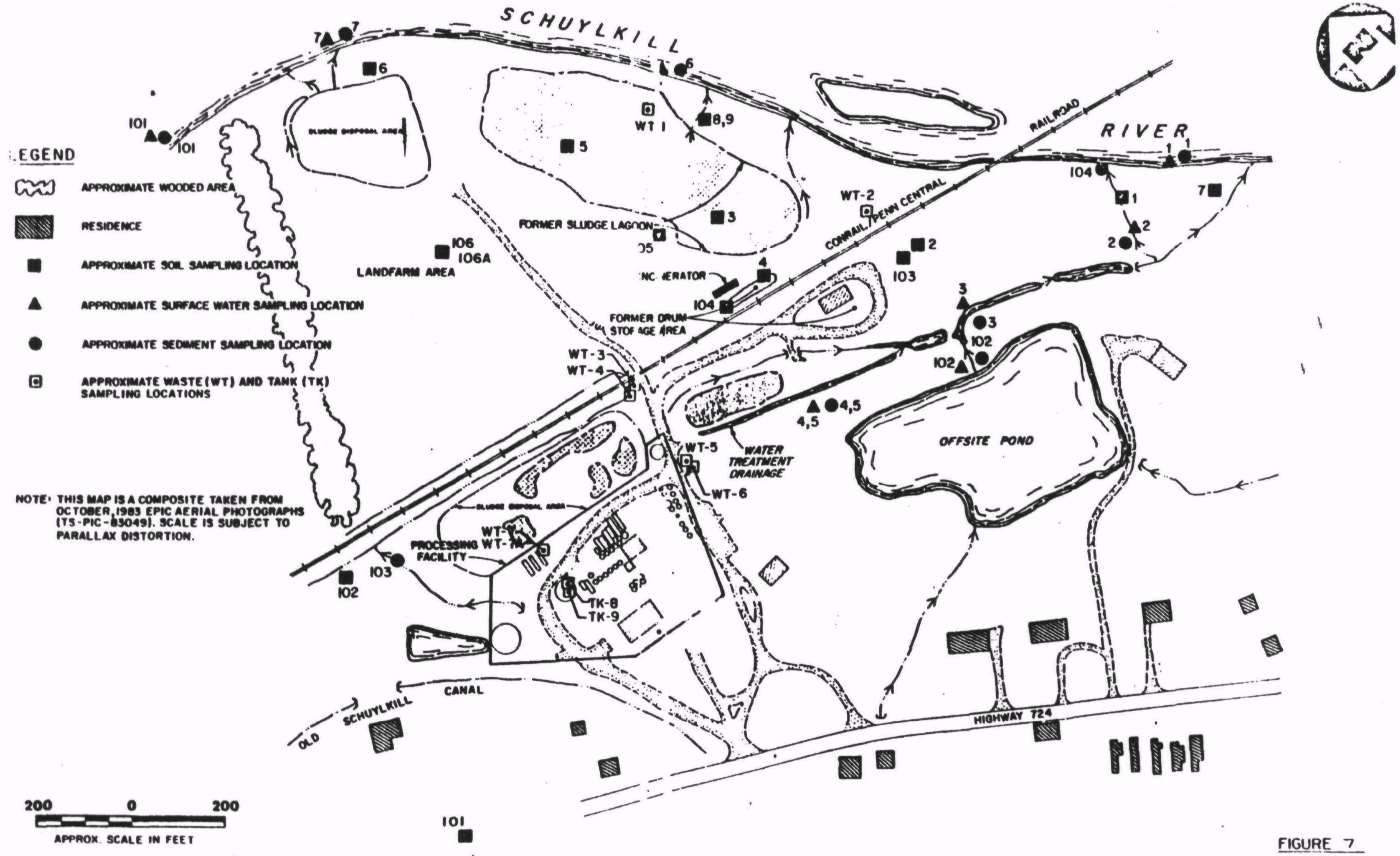


FIGURE 7

SURFACE SOIL, SURFACE WATER, SEDIMENT, WASTE, AND TANK SAMPLING LOCATIONS (JULY '84, MARCH '85)

DOUGLASSVILLE DISPOSAL SITE, UNION TWP., PA the field or laboratory blanks. Levels of most of the contaminants can be considered to be background levels. The presence in the air of several compounds slightly above background levels is most likely due to current processing activities. Air sample locations are found in Figure 5.

Surface Soils

Surficial soils at the Douglassville Disposal Site are contaminated with PCBs, phthalate esters, polynuclear aromatic hydrocarbons (PAHs), pesticides, various volatile organics, and trace elements. Surface soil sample locations are shown in Figure 7.

PCBs were detected in 11 of 16 surface soil samples. Concentrations of PCBs ranged from 39 ug/kg to 24,000 ug/kg. PCB contamination was detected in surface soil samples 1, 3, 4, 5, 6, 7, 102, 103, 105, 106, and 106A.

Various phthalate esters were identified in 9 of 16 surface soil samples. Compounds identified include bis(2-ethylhexyl)phthalate, di-n-butyl phthalate, and di-n-octyl phthalate. Concentrations of these compounds ranged from 170 ug/kg to 9100 ug/kg. Phthalates were found in samples 3, 4, 5, 9, 103, 104, 105, 106, and 106A.

Of the trace elements identified in site soil, arsenic, cadmium, chromium, lead, and mercury are of some concern because of their known toxicity to human and environmental receptors. Concentrations of these elements encountered in site surface soil and results for the background sample (101) and literature background levels are as follows:

Element	Concentration Range (mg/kg)	Backround concentration (mg/kg) Sample 101	Berks Co.	Literature*
Arsenic	ND - 8.98	ND	—	6
Cadmium	ND - 3.2	ND	0.16	0.5
Chromium	9.7 - 227	15	10.4	100
Lead	1.3 - 7,100	49	26.1	10
Mercury	ND - 1.0	0.29	—	0.3

* Literature values are general, not site-specific data based on reports by Allaway, 1968p Ward, 1976; and Lish, 1972.

Lead showed the greatest deviation from background levels and was an order of magnitude higher in samples 3, 4, and 5 than in any other surface soil samples.

Surface soil contamination with polynuclear aromatic hydrocarbons (PAHs) and volatile organics was not as extensive as contamination by the phthlates, metals, and PCBs. Some pesticide contamination was found. This may be attributed to former and current agricultural activites.

Subsurface Soil

Subsurface soil samples were obtained from a number of the test pits excavated at the site (see Figure 5). Subsurface soil contamination generally reflects the contamination detected in surface soil samples, although higher concentrations of volatile contaminants were identified. Subsurface soil samples taken from test pits located in the former northeastern lagoon area, the northwestern area, and the northeast corner of the production facility were contaminated with lead, PCBs, and phthalate esters. Samples obtained in these areas were also contaminated with chlorinated aliphatics, monocyclic aromatic hydrocarbons, and polynuclear aromatic hydrocarbons. These compounds are generally associated with industrial solvents, petroleum production byproducts, and coal tar.

Summary of Conditions

Based on the results of sampling, there are the four (4) distinct areas of concern for the Douglassville Disposal Site. These include:

- the former sludge lagoon area, including the landfarming area in the northeastern quandrant of the site along the bank of Schuylkill River;
- the sludge disposal area, located between the facility processing area and the Penn Central/Conrail Railroad tracks; this includes a drainage swale to the west of this area;
- the facility processing area;
- the area which includes the drainage ditch flowing from the facility processing area to the Schuylkill River along with the land directly adjacent to this ditch. This land contained a small lagoon at one time and was also used as a drum storage area.

Surface and subsurface soils in the former sludge lagoon and sludge disposal areas are contaminated with a number of HSL compounds. Volatile organic contaminants of concern include benzene, 1.2 - dichloroethane, 1,1,1 - trichloroethene, ethyl benzene, tetrachloroethene, toluene, trichloroethene, and xylene. Also, the presence of PCBs and lead is of primary concern. These compounds were detected at maximum concentrations of 500,000 ug/kg and 56,300 mg/kg, respectively. These concentrations indicate the need for control, destruction and/or secure disposal of the wastes in accordance with federal regulations. The greatest concentration of PCBs was identified in the sludge disposal area adjacent to the processing facility grounds. The greatest degree of lead contamination was found in the drainage swale west of the processing facility. Lead was also found at significant concentrations (up to 23,400 mg/kg) in the former lagoon and landfarming areas in the northeastern corner of the site. PCBs and lead were also found along the riverfront in surface and subsurface soils, and in sedmient samples from the facility discharge. A listing of the site's critical contaminants with their range of concentrations is found in Table 1.

TABLE 1

CRITICAL CONTAMINANTS
DOUGLASSVILLE DISPOSAL SITE

Contaminant	Media	Range	No. of Samples In Which Detected
Benzene CAS No. 71-43-2	Ambient Air	2.6 - 3.3 µg/m^3	4
	Subsurface Soil	6.6 - 9,200 µg/kg	6
	Surface Water	7.4 - 11.0 µg/l	3
	Monitoring Wells	7.6 - 100 µg/l	9
1,2-Dichloroethane CAS No. 107-06-2	Subsurface Soil	5.2 - 45 µg/kg	3
	Monitoring Wells	45 - 330 µg/l	6
1,1,1-Trichloroethane CAS No. 71-55-6	Ambient Air	2.7 µg/m^3	1
	Subsurface Soil	8.2 - 34 µg/kg	5
	Surface Water	40 - 47 µg/l	3
	Sediment	34 - 120 µg/kg	2
	Monitoring Wells	2 - 30 µg/l	9
Ethylbenzene CAS No. 100-41-4	Ambient Air	2.6 - 3.4 µg/m^3	3
	Subsurface Soil	7.4 - 36,000 µg/kg	10
	Surface Water	6.5 - 8 µg/l	3
	Sediment	2,200 - 16,000 µg/kg	2
	Monitoring Wells	2.4 - 160 µg/l	7
Tetrachloroethene CAS No. 127-18-4	Ambient Air	2.6 - 8.0 µg/m^3	5
	Surface Soil	18 µg/kg	1
	Subsurface Soil	6.4 - 17,000 µg/kg	7
	Surface Water	13 µg/l	2
	Sediment	820 µg/kg	1
	Monitoring Wells	2.1 - 29 µg/l	13
Toluene CAS No. 107-88-3	Ambient Air	2.6 - 28 µg/m^3	5
	Surface Soil	33 - 257 µg/kg	7
	Subsurface Soil	17 - 79,000 µg/kg	12
	Surface Water	2.5 - 70 µg/l	4
	Sediment	43 - 36,000 µg/kg	3
	Monitoring Wells	3.6 - 91 µg/l	7

TABLE 1
CRITICAL CONTAMINANTS
DOUGLASSVILLE DISPOSAL SITE
PAGE TWO

Contaminant	Media	Range	No. of Samples In Which Detected
Trichloroethene CAS No. 79-01-6	Ambient Air	2.6 µg/m³	1
	Subsurface Soil	14 - 59,000 µg/kg	9
	Surface Water	19 - 367 µg/l	3
	Sediment	30 - 460 µg/kg	2
	Monitoring Wells	3.3 - 68 µg/l	11
Xylene CAS No. 95-47-6	Ambient Air	2.6 - 16 µg/m³	5
	Surface Soil	42 - 120 µg/kg	4
	Subsurface Soil	6.6 - 85,000 µg/kg	14
	Surface Water	20 µg/l	2
	Sediment	400 - 32,000 µg/kg	3
	Monitoring Wells	2.3 - 820 µg/l	7
PCB-1254 CAS No. 17097-69-7	Surface Soils	38 - 1,700 µg/kg	6
	Subsurface Soil	290 - 12,000 µg/kg	7
	Sediment	86 µg/kg	1
	Monitoring Wells	1.7 µg/l	1
PCB-1248 CAS No. 12672-29-6	Surface Soil	1,200 µg/kg	1
	Subsurface Soil	1,800 - 25,000 µg/kg	2
	Sediment	130 - 30,000 µg/kg	3
PCB-1260 CAS No. 11046-82-5	Surface Soil	70 - 24,000 µg/kg	10
	Subsurface Soil	57 - 500,000 µg/kg	16
	Sediment	62 - 48,000 µg/kg	6
Bis (2-ethylhexyl) phthalate CAS No. 117-81-7	Surface Soil	182 - 9,100 µg/kg	7
	Subsurface Soil	2,800 - 20,000 µg/kg	2
	Surface Water	26 - 85 µg/l	2
	Sediment	470 - 91,000 µg/kg	4
	Monitoring Wells	24 µg/l	1
Lead CAS No. 7439-92-1	Surface Soil	1.3 - 7,100 mg/kg	16
	Subsurface Soil	52 - 23,400 mg/kg	23
	Surface Water	5.2 - 973 µg/l	5
	Sediment	22.2 - 56,300 mg/kg	10
	Monitoring Wells	5.1 - 9.3 µg/l	8
	Residential Wells	5.1 - 6.5 µg/l	2

Migration of soil and sediment contaminants is occurring by the following mechanisms:

- erosion of contaminated particulates during storm events, or because of flooding. The presence of PCBs in the upstream sediment sample (SD-007) indicates that this may have occurred during the 1972 flood, or as a result of upstream conditions.

- airborne migration of contaminated particulates;

- infiltration of precipitation through contaminated soils and sediments, causing various organic compounds to be leached into ground water;

- seasonal fluctuations in ground water elevations, causing subsurface organic soil contaminants to be leached into the ground water when the water table rises sufficiently to contact contaminated soil zones;

- flow from the contaminated drainage ditch that is transporting sediments and soils in the ditch.

Health and Environmental Impacts

Potential environmental and health impacts associated with the site are summarized below.

- Receptors using ground water for drinking purposes were located only upgradient of the site at the time of sampling, and would not be exposed to the site contaminants as long as ground water migration patterns remained unchanged. However, changes in future ground water use (e.g., by pumping, increased usage, or river-induced changes in ground water gradient) could alter the migration of contaminants. There would then be a potential for chronic and carcinogenic health effects if the contaminants were ingested over a long period of time at the concentrations observed currently in ground water.

- The primary site specific hazard attributable to the Douglassville Disposal Site is through dermal exposure to site contaminants ~~in~~ soils, onsite surface waters, and offsite surface waters if the contaminants migrate.

- Ingestion of any of the volatile organic contaminants in the food chain is not considered to be an immediate hazard. The possibility of high flow or flooding conditions in the Schuylkill River could transport relatively immobile contaminants (PCBs, lead). These contaminants have a potential for bioaccumulation, therefore increasing the potential for health impacts from this route of exposure.

- Toxic effects on aquatic biota may be expected if high flow or flooding of the Schuylkill River occurs, or contaminants migrate via ground water into the Schuylkill River at significant concentrations.

Alternatives Evaluation

The major objectives for remedial action to be taken at the Douglassville Disposal Site are to mitigate or eliminate public health effects and environmental contamination through direct contact and migration of contaminated soils, sediments, and surface waters and to prevent infiltration of surface water through contaminated soil zones. The decision whether further remedial action is necessary for ground water contamination and for the slurry wall installation will be deferred pending further investigation.

Any remedial alternative proposed onsite must take into consideration the location of the site which is almost entirely within the 100-year floodplain.

The NCP specifies that remedial alternatives should be classified either as source control (40 CFR 300.68(e)(2)) or offsite (management of migration) remedial actions (40 CFR 300.68(e)(3)). Source control remedial actions address situations in which hazardous substances remain at or near the areas in which they were originally located and are not adequately contained to prevent migration into the environment. Offsite remedial actions address situations in which the hazardous substances have migrated from their original locations. Alternatives developed may fall solely in either classification or may involve a combination of source control and management of migration measures, as problems at the site dictate.

In an effort to determine remedial alternatives for the subject site, feasible technologies were identified for consideration in each response action category (source control and management of migration). Available technologies were then screened to eliminate all but the most feasible and implementable alternatives. This screening included: technical (site conditions or waste characteristics), environmental and public health, institutional, performance and cost criteria. A list of the remedial technologies that were screened for this site can be found in Table 2.

Those technologies that passed the technology screening process were used to form remedial alternatives. Remedial alternatives were developed using best engineering judgement to select a technology or groups of technologies that best address the problems existing at the site.

In order to study a range of responses, remedial alternatives that fall into one of five different categories were developed. These categories are described below.

- No action (no-action alternatives could include monitoring activities).

- Alternatives which do not attain applicable or relevant public health or environmental standards but will reduce the likelihood of present or future threat from the hazardous substances. This must include an alternative which closely approaches the level of protection provided by the applicable or relevant standards

TABLE 2

POTENTIAL REMEDIAL ACTION TECHNOLOGIES
DOUGLASSVILLE DISPOSAL SITE

Technology	Retained for Further Evaluation
No Action (with monitoring)	Yes
Surface Capping (Clay and Synthetic)	Yes
Groundwater Barriers (Slurry Wall and Grout Curtain)	Yes
Groundwater Pumping	Yes
Subsurface Collection Drains	No
Surface Water Diversion	Yes
Soil/Sediment Excavation	Yes
In Situ Treatment:	
Permeable Treatment Beds	No
Solvent Flushing	No
Bioaugmentation	No
Onsite Wastewater Treatment:	
Flow Equalization	No
Activated Carbon	Yes
Biological Treatment	No
Precipitation	No
Solidification/Fixation	No
Oil-Water Separation	Yes
Air Stripping	Yes
Dissolved Air Floatation	Yes
Sludge Treatment (Thickening and Dewatering)	Yes
Offsite Wastewater Treatment	No
Incineration (Onsite and Offsite)	Yes
Onsite RCRA Approved Landfill	Yes
Offsite RCRA Approved Landfill	Yes
Onsite Storage	No

and meets CERCLA's objective of adequately protecting public health, welfare and environment.

- Alternatives which attain applicable and relevant federal public health or environmental standards.

- Alternatives which exceed applicable and relevant public health or environmental standards.

- Alternatives for treatment or disposal at an offsite facility approved by EPA.

The evaluation criteria selected were: technical feasibility, public health, environment, institutional evaluation, and cost-effectiveness. Particular emphasis within each of the criteria is listed below:

- Technical Feasibility
  - Performance
  - Operation and Maintenance
  - Implementability
  - Reliability
  - Safety

- Public Health Evaluation
  - During and after implementation

- Environmental Evaluation
  - Reduction of environmental impacts
  - Protection of natural resources

- Institutional Evaluation
  - Impact of applicable standards
  - Community impacts

- Cost-Effectiveness
  - Capital costs
  - Operation and maintenance costs
  - Present worth values
  - Sensitivity analyses

The remaining alternatives after screening are shown in Table 3. This matrix summarizes technical, environmental, public health and other concerns associated with each alternative and gives cost ranges for both capital and present worth costs. A more detailed project cost breakdown can be found in Table 4.

Description of Remedial Alternatives

A. No-Action with Monitoring

Alternative No. 1 - No-Action with Monitoring

Under the no-action alternative, no steps would be taken to control the source or mitigate migration of site contaminants. The contaminants would continue to migrate into the river by surface and ground water flow, and by erosion from storm water runoff. Direct contact with contaminated soils would continue to be a threat to human health and the environment. Contaminated ground water would continue to be generated as a result of infiltration of precipitation through contaminated soil zones and also by contact of contaminated soils with ground water, which will rise due to seasonal fluctuations.

A long-term monitoring program would be established and implemented to observe and provide early warning of contaminants migrating from the site. In addition, a fence would be installed around the perimeter of the site to reduce the potential for direct contact by human and animal receptors.

Due to the presence of contaminants in onsite soils, surface water, and ground water, a comprehensive sampling and analysis program would be developed to include surface water, sediment and ground water sampling.

Sample locations would be identified to provide the most beneficial data. Surface water and sediment samples would be taken in the discharge drainage ditch and at several locations upstream, downstream, and along the Schuylkill River.

Monitoring wells would be located so that contaminant loadings into the Schuylkill, upgradient and downgradient ground water quality, and ground water flow directions could be monitored.

Due to water table fluctuations and seasonal precipitation fluctuations, sampling and analyses should be conducted twice a year, once during high ground water flows in the late spring and once during periods of low ground water levels in late fall.

B. Alternatives that Meet the Objectives of CERCLA

Alternative No. 2 - Transfer Contaminated Soils and Sediments From Drainage Ditch to Facility Sludge Disposal Area, Install Surface Caps in the Facility Sludge Disposal Area and the Former Sludge Lagoon Area.

Implementation of this alternative would involve excavation or dredging the sediments from the drainage ditch that flows from the active facility eastward toward the river. The ditch is approximately 1,600 feet long and the sediments contain organic and inorganic contaminants such as PCBs, lead, naphthalene, and trichloroethene. Surface soils in the former drum storage area as well as a small former lagoon area adjacent to the drainage ditch may also require excavation and consolidation in the facility sludge disposal area. Sampling to be done in a pre-design study will help determine the extent of vertical contamination in these areas and will tighten the estimate on how much contaminated material needs to consolidated. The current estimated volume of material from those two areas is 32,500 cubic yards.

Following consolidation of excavated or dredged materials, the facility sludge disposal area and the former sludge lagoon area would be capped to prevent erosion of contaminated surface soils and significantly reduce leachate generated by infiltration of precipitation through contaminated subsurface soils. The cap would consist of 1.5 feet of compacted clay, 12 inches of borrowed fill, and 6 inches of topsoil. A gas collection and venting system would be installed to prevent damage to the cap from volatile organic gases which may be generated by the contaminated soils.

A French drain and dike would be installed around the facility to direct surface runoff away from the contaminated facility. A similar French drain and dike would also be installed between the cap on the former sludge lagoon area and the Schuylkill River to protect the cap against high river flows.

Alternative No. 3 - Transfer Sediments from Drainage Ditch to Facility Sludge Disposal Area and Install Cap; Install Cap in Former Sludge Lagoon Area; Pump and Treat Ground Water in Sludge Disposal and Former Sludge Lagoons Areas.

This alternative includes all of the items of Alternative No. 2 with the addition of pumping and treatment of ground water beneath the site. The items which are common to the previous alternatives will not be described in this discussion.

Ground water would be pumped and treated in order to control contaminant migration to the Schuylkill River. A well point dewatering system would be used, consisting of intermittently spaced wells pumped by submersible pumps, and connected by a header pipe. In addition to removing ground water for treatment, the well points can also be utilized to lower the water table to prevent rising ground water from contacting contaminated soils.

Modeling of the hydrogeologic system at the site indicates that optimum ground water discharge would be achieved by using eight wells with a total pumping rate of 182 gpm in the facility sludge disposal area, and nine wells with a total pumping rate of 72 gpm in the former sludge lagoon area.

Contaminated ground water could be treated to comply with any discharge standard developed using dissolved air flotation, air stripping, and activated carbon. Flow equalization could also be utilized. Sludges and waste carbon generated by the treatment process would be disposed offsite at an EPA-approved facility.

C. Alternatives that Attain all Applicable or Relevant Public Health or Environment Standards, Guidance, or Advisories

Alternative No. 4 - Transfer Sediments from Drainage Ditch to Facility Sludge Disposal Area; Install a RCRA Cap in the Facility Sludge Disposal Area and the Former Sludge Lagoon Area; Install a Levee Around the Former Sludge Lagoon Area; Install a Slurry Wall Between the Former Sludge Lagoon Area and the Schuylkill River; Pump and Treat Ground Water; Provided Monitoring and Post-Closure Care.

This alternative incorporates all the elements of Alternative 3 in addition to the following elements:

- Upgrade the cap in Alternative No.3 to a RCRA cap.
- Install a levee to provide protection against the 100-year flood event.
- Install a slurry wall between the Schuylkill River and former sludge lagoon area to provide protection against localized reversal of ground water flow patterns due to high water elevations in the Schuylkill River.
- Implement a monitoring program and post-closure care program as required under RCRA regulations.

A surface cap meeting the performance standards of the Resource Conservation, Recovery Act (RCRA), 40 CFR 264, will be constructed. The cap proposed in this alternative is designed to virtually eliminate infiltration, whereas the cap proposed in Alternative 3 would only reduce infiltration.

The levee would be installed around the perimeter of the surface cap in the former sludge lagoon area to provide protection against the 100-year flood event. The levee would have two feet of freeboard and be designed to insure stability and prevent erosion. This would provide a greater degree of protection against flooding than the dike/French Drain system proposed in the previous alternative.

Alternative No. 5 - Transfer All Sediments and Soils to Former Sludge Lagoon Area; Install a RCRA Cap with Levees; Install Slurry Wall; Pump and Treat Ground Water; Provide Monitoring and Post-Closure Care.

This alternative is the same as Alternative 4, except that all contaminated sediments and soils would be transferred to the former sludge lagoon area where they would be capped as described in Alternative 4. Approximately 100,000 cubic yards of material would have to be transferred from the facility sludge disposal area.

Soils would be excavated until the levels of contaminants found in unexcavated material are such that no significant impact to ground water quality would be expected. The 100,000 cubic yard estimate is based on excavation to a depth of 15 feet. Verification of estimates on the extent of the contamination would be done in a pre-design study.

D. Alternatives that Exceed All Applicables or Relevant Public Health and Environmental Standards Guidances, and Advisories.

Alternative No. 6 - Transfer All Sediments to an Onsite RCRA Approved Landfill with Levees; Pump and Treat Ground Water; Provide Monitoring and Post-Closure Care.

This alternative differs from Alternative 5 in that a landfill would be constructed onsite to receive all contaminated soils. The landfill would incorporate a double liner leachate collection system and have a design life of 30 years consistent with the requirements of RCRA. The levee would be constructed around 3 sides of the landfill to protect against washout during flood events.

Alternative No. 7 - Incinerate All Contaminated Soil and Sediment Onsite and Disposal of Residues in Former Sludge Lagoon Area and Facility Sludge Disposal Area Under RCRA-Approved Cap; Pump and Treat Ground Water; Provide Monitoring and Post-Closure Care.

This alternative incorporates all of the elements of Alternative 5 with the addition of incineration.

Mobile incinerators would be brought onsite to incinerate an estimated 347,000 cubic yards of contaminated soils and sediments to remove organic contaminants. The residue, which would still be contaminated with metals, would be backfilled in the facility sludge disposal area and former sludge lagoon area where it would be capped to prevent infiltration of precipitation. Levees and dikes would be provided to protect the caps against storm events.

E. Alternatives that Specify Offsite Disposal

Alternative No. 8 - Remove All Contaminated Soils and Sediments and Dispose in Offsite RCRA-Approved Landill; Pump and Treat Ground Water.

Under this alternative approximately 347,000 cubic yards of material would be removed to a RCRA approved landfill. The site would be backfilled to grade and revegetated. Ground water would be pumped and treated as described in Alternative No. 3.

Alternative No. 9 - Remove All Contaminated Soil and Transfer to Offsite Incinerator; Pump and Treat Ground Water

Under this alternative all the actions described in Alternative No. 6 would be implemented. Prior to disposal of the contaminated soil in an offsite RCRA landfill the soils would be incinerated to remove organic contamination.

F. Recommended Alternative

Section 300.68(j) of the National Contingency Plan (NCP) [47FR 31180; July 16, 1982] states that the appropriate extent of remedy shall be determined by the lead agency's selection of a remedial alternative which the agency determines is cost-effective (i.e., the lowest cost alternative that is technically feasible and reliable) and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, and the environment. In selecting a remedial alternative EPA considers all environmental laws that are applicable and relevant. Based on the evaluation of the cost-effectiveness of each of the proposed alternatives, the comments received from the public, information from the Feasibility Study and information from the Pennsylvania Department of Environmental Resources (PA DER), we recommend Alternative No. 4 be implemented

TABLE 3

REMEDIAL ACTION ALTERNATIVE TRADE-OFF MATRIX
DOUGLASSVILLE DISPOSAL SITE

Remedial Action Alternative	Cost Range ($1,000s) Capital	Cost Range ($1,000s) Present Worth	Technical Concerns	Public Health Concerns	Environmental Concerns	Institutional Concerns	Others
1. No action with monitoring and fence	$210-218	$1,398-1,443	Will not mitigate contaminant sources.	Possible exposure risks through ingestion, inhalation, and dermal contact remain.	No protection from migration to river or groundwater.	No environmental regulations satisfied	-
2. Non-RCRA approved caps in facility and lagoon areas with French drains, dike, gas venting, and monitoring	1,794-2,340	3,159-[illegible]	Reduces infiltration through contaminated soils, reduces surface runoff.	Possible exposure risks reduced through source containment.	Migration and further contamination reduced. Groundwater contamination remains.	Non-compliance with RCRA due to continued groundwater contamination and utilization of sub-RCRA caps	Effectiveness of sub-RCRA caps may be reduced by repeated flooding
3. Non-RCRA approved caps in facility and lagoon areas with gas venting, ground water treatment, and monitoring	3,176-4,902	6,003-7,227	Reduces infiltration and leachate production; effectiveness of groundwater pumping from fractured rock difficult to determine.	Potential exposure risks reduced through source containment and groundwater treatment.	Migration and further contamination reduced. Groundwater contamination mitigated.	Non-compliance with RCRA due to utilization of sub-RCRA caps. Must meet State or Federal water quality requirements	Effectiveness of sub-RCRA caps may be reduced by repeated flooding

at the Douglassville Disposal Site with the exception of ground water pumping and treatment and the slurry wall. Installation of an impermeable cap will significantly reduce the amount of contaminated ground water being generated by the site.

This selected remedy will mitigate all surface contamination problems at the site which were identified in the Remedial Investigation. In addition, the proposed remedial action will significantly reduce generation of contaminated ground water by eliminating infiltration of precipitation through the contaminated soil zones.

Excavation of sediments and contaminated soils from the discharge drainage ditch and from adjacent areas will eliminate direct contact and contaminated sediment deposition. In addition, these soils and sediments currently are located in a depressional area onsite and the water table frequently contacts the waste. Consolidation of these materials at a higher contour level, such as in the facility sludge disposal area, will eliminate this source of ground water contamination. Since the facility sludge disposal area is contaminated with the same type of contaminants as in the drainage ditch area, the consolidation of these wastes is in compliance with RCRA. The facility sludge disposal area will be capped to eliminate contaminant transport by infiltration of precipitation. Pre-design samples (borings) will be taken at locations along the drainage ditch, in the former drum storage area and in the old lagoon area near the drainage to determine the vertical extent of the contamination. This will either verify or revise the 32,500 cubic yard estimate of contaminated material needed to be excavated and consolidated. If the core borings indicate that contamination is much deeper than estimated and that consolidation of the entire contaminated zone is technically impractable or not cost effective, this portion of the selected alternative will be revised. Possible solutions may include capping the area, lining the ditch or limited excavation and consolidation of wastes. In any event, before work starts in this area the current discharge from the active facility must be diverted so not to interfere with construction and not to disrupt active processing at the facility.

Installation of an impermeable cap will eliminate direct contact with and erosion of surface soils and contaminated sediments as well as infiltration of precipitation through contaminated soil zones. As mentioned previously in this document, it was calculated that infiltration of precipitation accounts for 80%-100% of the total volume of water passing through the contaminated subsurface zones. Since a RCRA cap will virtually eliminate infiltration, this source of contamination to the ground water will be significantly reduced or eliminated. The cap will be installed over the former sludge lagoon, the sludge disposal area and the facility sludge disposal area. The cap will meet the recommended standards as specified in 40 CFR 264 of RCRA.

Capping of these specified areas will include installation of a gas ventilation system. French drains will be laid out on a 200 foot horizontal grid with a vertical PVC vent at the intersection of each drain (Figure 8). Based on this configuration approximately 3000 feet of French drains will be required. These drains should slope slightly to the collection points along the center drain. Monitoring should be performed periodically to determine that any gaseous emmissions do not exceed acceptable levels.

Since the site is located almost entirely within the 100-year flood plain, a levee/dike system will be utilized to protect the cap from the 100-year event and to divert surface runoff from the capped areas. The levee will be constructed around the perimeter of the surface cap and will provide a freeboard of at least two feet. This means the top of levee elevation will range from 3-15 feet high depending on the contours of the land. The levee must be constructed with fairly impermeable material to prevent seepage and must be well compacted to insure stability and prevent erosion. Tile drains equipped with one way valves will be installed within the embankment to provide drainage of rainwater which falls within the levee.

Once the cap has been installed, a detection monitoring program as specified under RCRA will be implemented. This will include installing monitoring wells (where current wells don't exist) downgradient from each capped area to determine the extent of contamination that may be emanating from these closed areas. One upgradient well will be needed at each area to determine the water quality before it passes through the closed lagoons or sludge disposal areas. At this time it appears that approximately 6-8 wells would be needed for the monitoring program. The operator must monitor semi-annually at all compliance points for volatile organics, inorganics, PCBs, oil and grease.

Ground water pumping and treating and construction of the slurry wall are being deferred until more data can be generated concerning what toxic effects, if any the contamination is having on the target stream (Schuylkill River). A decision on what corrective ground water action is necessary to address fluctuating ground water elevations contacting contaminated soil zones is also being deferred pending further analysis. The additional data needed to make these decisions will be collected through a supplemental remedial investigation and feasibility study. Potential impacts on the ground water from the active facility will also be investigated.

Upon completion of the recommended remedial actions, future land use activities should be restricted so as not to permit damage to or removal of the soil cover, gas vents, and other structures necessary to ensure long-term integrity and effectiveness of the remedial response.

Operation and Maintenance

Monitoring and post-closure maintenance activities are required to verify the site cleanup, effectively maintain permanent onsite actions, and monitor potential contaminant migration. Sampling of surface water and sediment in Schuylkill River should be conducted quarterly for at least the first two years after remediation is completed and semi-annually thereafter to assess the effectiveness of remedial actions. Ground water should also be sampled at the same frequency as surface waters and sediments. Ground water sampling is necessary to monitor pollutant levels and movement patterns. Surface water and sediment sampling

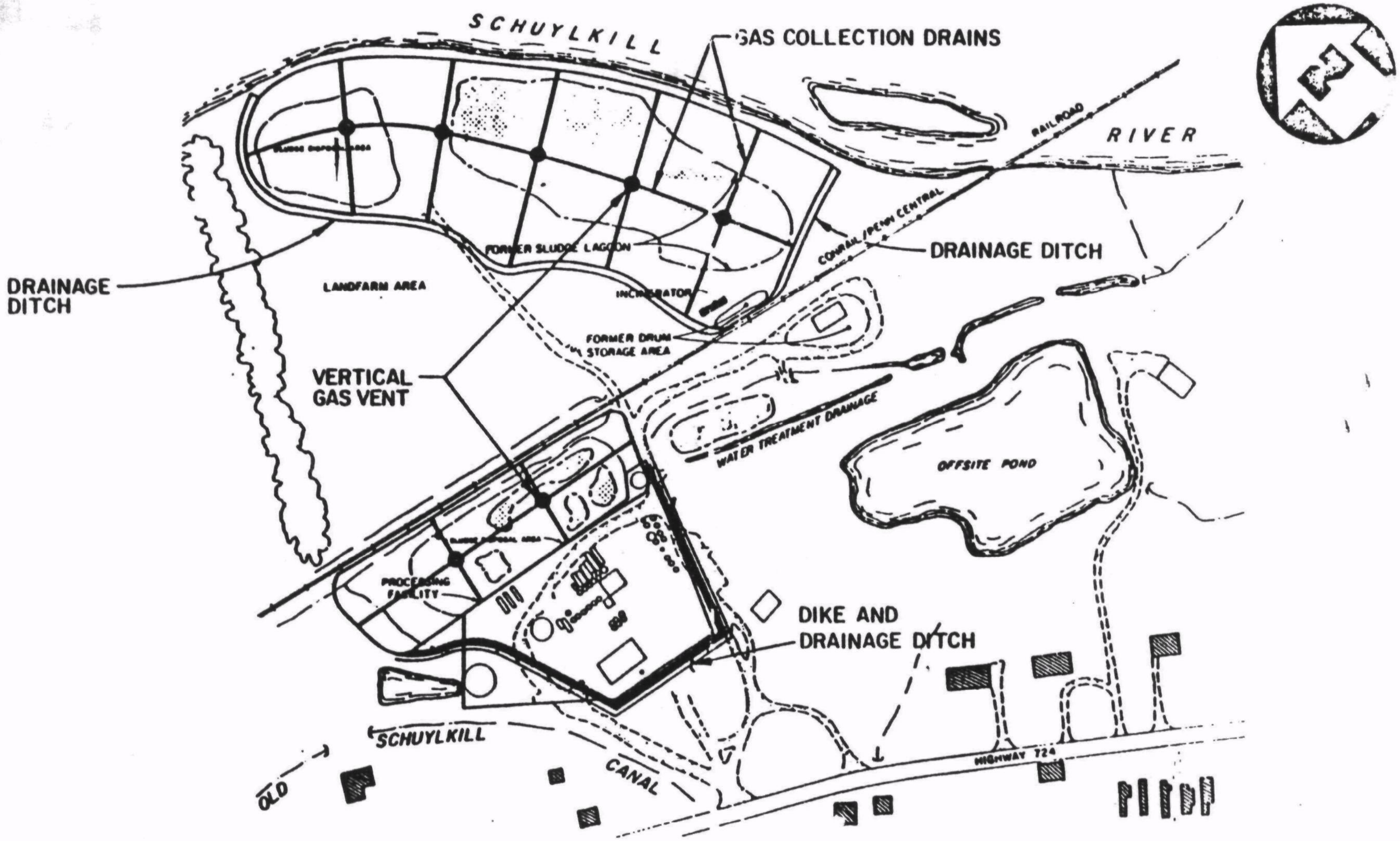


FIGURE 8

CONFIGURATION OF GAS COLLECTION SYSTEM FOR CAPPED AREAS

DOUGLASSVILLE DISPOSAL SITE, UNION TWP., PA

SCALE 1" = 300'

will be needed to monitor the impacts of ground water entering surface waters and accumulating in sediments.

The soil cap should be effective as long as it is not disturbed. Post-closure inspection and maintenance are required to restore and rehabilitate the cap to insure its integrity. Regrading and reseeding would also be required to ensure the effectiveness of the caps.

Routine inspection and maintenance of the levee and dike structures will also be required to ensure their effectiveness in protection against the 100-year flood event.

All operation and maintenance requirements will be the responsibility of the State of Pennsylvania one year subsequent to completion of construction. Annual cost for operation and maintenence is estimated to be $196,000.

Evaluation of Alternatives Not Selected

The No-Action with Monitoring alternative was not selected since this option would not mitigate contaminant sources. Potential direct contact threat would remain as well as possible risks through ingestion and inhalation. No environmental regulatory standards would be met under this alternative.

Alternative 2 involves surface caps in the facility and lagoon areas with French Drains, dikes, gas venting and monitoring. Although this alternative may reduce risk exposure through reduced infiltration and reduced direct contact probability, it does not eliminate these threats completely. The caps would still allow an amount of infiltration that could carry contaminants to the ground water system.

Alternative 3 upgrades Alternative 2 to include ground water pumping and treating. Effectiveness of the surface caps in Alternatives 2 and 3 may be reduced by repeated flooding. Infiltration through caps will continually carry contaminants to the ground water.

Alternative 5 would consolidate all site waste into the sludge disposal area. This was not preferred since it would cause an unnecessary amount of environmental disturbance during transferal of large amounts of waste. It would also require an extensive amount of backfilling which is not as cost-effective or more environmentally sound than capping.

Alternative 6 would create a RCRA landfill in the lagoon area with a levee and ground water treatment and monitoring. This was not selected due to staging problems that would occur when attempting to construct the landfill. All sludges from the lagoon areas would need to be excavated and staged somewhere until construction of the landfill was completed. The large quantity of material excavated and transported would pose a high risk of exposure from volatilization of organics. A large quantity of waste may be lost downstream if exposed during a heavy flood event.

Alternative 7 provides for incineration of the waste. Since toxic metals are not eliminated by this process this option was not chosen. In addition, soil volumes would not be substantially reduced, emissions from incinerator stacks may increase air pollution in the area and portable incinerators are not currently available. Another reason for rejection is the length of time for complete cleanup (6 years). In addition this alternative appears to be cost prohibitive at $67-$147 million.

Alternative 8 (offsite disposal of all wastes) was rejected due to the high transportation and disposal costs (an order of magnitude higher than the selected alternative). In addition, complete excavation would expose volatile organics to the atmosphere and increase the potential for direct contact exposure.

Alternative 9 evaluates offsite incineration of all waste. This option was eliminated due to the magnitude of cost ($417 million) relative to the other alternatives. In addition, the capacity of a sole incineration facility may be exceeded.

Consistency with Other Environmental Laws

EPA is currently proposing a regulation requiring the agency to select a remedial Superfund remedy which "attains or exceeds applicable or relevant Federal public health or environmental standards". See proposed 40 C.F.R. §300.68(f).

Environmental laws which may be applicable or relevant to remedial activity are:

- National Environmental Policy Act (NEPA)
- Clean Air Act (CAA)
- Clean Water Act (CWA)
- Safe Drinking Water Act (SDWA)
- Resource Conservation and Recovery Act (RCRA)
- Pennsylvania Clean Streams Act
- Toxic Substances Control Act (TSCA)
- Executive Orders 11988 and 11990 on Floodplains and Wetlands

The alternative chosen meets the NEPA functional equivalency exception because the necessary and appropriate investigation and analysis of environmental factors as they specifically relate to the Douglassville Disposal Site and the recommended alternative were considered and evaluated in the Remedial Investigation/Feasibility Study. In addition, a meaningful opportunity for public comment on environmental issues was provided before the final selection of the remedial alternative was made.

Compliance with all applicable substantive requirements of the CWA and CAA as well as the Pennsylvania Clean Streams Act will be incorporated into the design of the remedial alternatives. Any discharge into the atmosphere of gas from excavation of the drainage ditch will be monitored and treated as necessary. All state permits for discharge of treated surface water will be acquired and complied with as necessary.

The caps placed over the facility sludge disposal area, former sludge lagoon area, and sludge disposal area shall be designed to meet EPA's engineering specifications for constructing a RCRA cover required by 40 C.F.R §264.228. Ground water monitoring shall be developed during design to satisfy the requirements of 40 C.F.R. Part 264 Subpart F. Excavation of contaminated materials and sediments in the drainage ditch area will be removed and consolidated if estimated volumes are verified in the pre-design study. The area will then undergo "clean closure" as per RCRA regulations.

Further investigation of ground water was elected to satisfy the requirements of RCRA 40 C.F.R. Part 264 Subpart F. Organic contamination was detected in onsite ground water. RCRA 40 C.F.R. Part 264 Supbpart F would require further investigation as to the nature, source, and extent of this contamination. Additional study work will be conducted to establish an Alternate Concentration Limit, if necessary, and to assess the need for corrective action as defined in 40 C.F.R. Subpart F.

Proposed Action

We request your approval of the recommended remedial alternative as described above. We also request that you approve the deferrment of ground water pumping and treatment and construction of the slurry wall until further investigations can be performed. The estimated cost of the approved portion of this project for design and construction is $5,569,500. This includes the Corps of Engineers supervisory cost.

TABLE 4

PROJECT COST SUMMARY ($1,000s)

Remedial Action Alternative	Capital Cost Estimates		Operation & Maintenance Cost Estimates				Present Worth Analyses (30 Yrs)	
	Low	High	Yrs 1-2	Yrs 3-30	Yrs 1-2	Yrs 3-30	Low	High
1. No action with monitoring	$ 210	$ 218	$ 126	$ 126	$ 130	$130	$ 1,398	$ 1,443
2. Non-RCRA approved caps in facility and lagoon areas with monitoring	1,794	2,340	148	148	152	152	3,189	3,773
3. Non-RCRA approved caps in facility and lagoon areas with groundwater treatment and monitoring	3,176	4,902	388	150	675	150	5,003	7,227
4. RCRA-approved caps in facility and lagoon areas with groundwater treatment and monitoring	5,763	8,535	452	193	739	193	8,032	11,302
5. Transfer of all soils to lagoon area, RCRA-approved cap in lagoon area, with groundwater treatment and monitoring	7,054	11,936	421	172	708	172	9,108	14,488
6. RCRA-approved landfill in lagoon area with groundwater treatment and monitoring	18,146	30,202	464	208	751	208	20,551	33,105

TABLE 4
PROJECT COST SUMMARY ($1,000s)
PAGE TWO

Remedial Action Alternative	Capital Cost Estimates Low	Capital Cost Estimates High	Operation & Maintenance Cost Estimates Yrs 1-2	Yrs 3-30	Yrs 1-2	Yrs 3-30	Present Worth Analyses (30 Yrs) Low	Present Worth Analyses (30 Yrs) High
7. Onsite incineration, RCRA-approved caps in facility and lagoon areas with groundwater treatment and monitoring	$ 67,349	$147,373	$ 452	$ 193	$ 739	$193	$69,618	$150,140
8. Offsite disposal in RCRA-approved landfill with groundwater treatment and monitoring	105,932	197,383	373	135	660	135	107,618	199,567
9. Offsite incineration and disposal with groundwater treatment and monitoring	417,903	678,892	1,405	135*	2,252	135*	422,155	685,035

* Cost given actually represents annual O&M cost for years 4-30 only. Costs for year 3 are $1,167,000 (Low) and $1,727,000 (High), representing the third year of O&M costs incurred for the drum packaging plant.

TABLE 3
REMEDIAL ACTION ALTERNATIVE TRADE-OFF MATRIX
DOUGLASSVILLE DISPOSAL SITE
PAGE FOUR

Remedial Action Alternative	Cost Range ($1,000s) Capital	Cost Range ($1,000s) Present Worth	Technical Concerns	Public Health Concerns	Environmental Concerns	Institutional Concerns	Others
7. Onsite incineration, RCRA-approved caps in facility and lagoon areas with levee, groundwater treatment and monitoring	$67,349-147,373	$69,618-150,140	Organic contamination sources effectively eliminated. Toxic metals not destroyed by incineration. Soils volumes not substantially reduced. Effectiveness of groundwater pumping from fractured rock difficult to determine.	Stack emissions monitored and controlled to minimize risks of inhalation exposure. RCRA-approved cap, highly impermeable, reducing dermal exposure to a minimum. Groundwater treatment eliminates ingestion risk	Stack emissions monitored and treated. Migration to surface and groundwater reduced. Leachate generation reduced. Groundwater contamination mitigated.	Stack emissions must meet NAAQS Incinerator and caps must meet RCRA requirements. Subject to flood-plain regulations Must meet State or Federal water quality requirements.	Portable incinerator currently unavailable Erosion due to flooding reduced by levee
8. Offsite disposal in RCRA-approved landfill with groundwater treatment and monitoring	105,932-197,383	107,618-199,567	Contamination sources eliminated from site. Removal of source proven technology. Effectiveness of groundwater pumping from fractured rock difficult to determine.	Inhalation and dermal exposure risks during transport. Source removal and groundwater treatment eliminate long term exposure risks.	Potential environmental exposure during transport. Source removal eliminates environmental concern in site vicinity. Groundwater contamination mitigated.	Requires PADER transportation licenses, RCRA transport and disposal manifests Must conform to DOT regulations Must meet State or Federal water quality requirements.	High transportation and disposal costs Offsite disposal facility must be in compliance with all applicable environmental regulations

TABLE 3
REMEDIAL ACTION ALTERNATIVE TRADE-OFF MATRIX
DOUGLASSVILLE DISPOSAL SITE
PAGE FIVE

Remedial Action Alternative	Cost Range ($1,000s) Capital	Present Worth	Technical Concerns	Public Health Concerns	Environmental Concerns	Institutional Concerns	Others
9. Offsite incineration and disposal with groundwater treatment and monitoring	$417,903-678,892	$422,155-685,035	Contamination sources eliminated from site. Capacity of sole incineration facility may be exceeded. Immediate access to rail transportation unavailable. Effectiveness of groundwater pumping from fractured rock difficult to determine.	Source removal and groundwater treatment eliminate long term exposure risks.	Source removal eliminates environmental concern in site vicinity. Groundwater contamination mitigated.	Requires PADER transportation licenses, RCRA transport and disposal manifests. Must conform to DOT regulations. Must meet State or Federal water quality requirements	High transportation and incineration/disposal costs. Incineration facility must be in compliance with all applicable environmental regulations. Incineration residues will require disposal in a secure, permitted facility.

TABLE 3
REMEDIAL ACTION ALTERNATIVE TRADE-OFF MATRIX
DOUGLASSVILLE DISPOSAL SITE
PAGE TWO

Remedial Action Alternative	Cost Range ($1,000s) Capital	Present Worth	Technical Concerns	Public Health Concerns	Environmental Concerns	Institutional Concerns	Others
4. RCRA-approved caps in facility and lagoon areas with levee, slurry wall, gas venting, groundwater treatment and monitoring	$5,783-8,535	$8,032-11,302	Infiltration and leachate production minimized, effectiveness of groundwater pumping from fractured rock difficult to determine. Groundwater migration under slurry wall due to fractures.	RCRA-approved caps highly impermeable, reducing risk of exposure to a minimum. Groundwater treatment eliminates future ingestion risk.	Migration to surface and groundwater reduced. Leachate generation reduced. Groundwater contamination mitigated.	Meets RCRA requirements. Subject to flood plain regulations. Must meet State or Federal water quality requirements	Erosion due to flooding reduced by levee
5 Transfer of all soils to lagoon area, RCRA-approved cap in lagoon area with levee, slurry wall, gas venting, groundwater treatment and monitoring	7,054-11,936	9,108-14,488	Contamination sources reduced to one. Infiltration and leachate production minimized. Effectiveness of groundwater pumping from fractured rock difficult to determine. Groundwater may migrate under slurry wall due fractures.	Public exposure risks reduced due to consolidation of all wastes farther from residences. RCRA-approved cap highly impermeable, reducing exposure to a minimum. Groundwater treatment eliminates future ingestion risk.	Migration to surface and groundwater reduced. Leachate generation reduced. Groundwater contamination mitigated.	Meets RCRA requirements Subject to flood plain regulations Must meet Federal or State water quality requirements.	Erosion due to flooding reduced by levee

TABLE 3
REMEDIAL ACTION ALTERNATIVE TRADE-OFF MATRIX
DOUGLASSVILLE DISPOSAL SITE
PAGE THREE

Remedial Action Alternative	Cost Range ($1,000s) Capital	Present Worth	Technical Concerns	Public Health Concerns	Environmental Concerns	Institutional Concerns	Others
6. RCRA-approved landfill in lagoon area with levee, groundwater treatment and monitoring	$18,146-30,202	$20,551-33,105	Contaminant sources effectively contained. However, long-term reliability of landfills not yet established. Effectiveness of groundwater pumping from fractured rock difficult to determine.	Public exposure risks reduced due to consolidation of all wastes further from residences. RCRA-approved landfill provides high degree of containment, greatly reducing exposure risks of offsite receptors. Groundwater treatment eliminates future ingestion risk.	Large quantity of material excavated and transported poses high risk of environmental effects, especially volatilization of organics, during construction. Contaminant migration to surface and groundwater is reduced after construction is completed. Leachate generation reduced and collected. Groundwater contamination mitigated.	Meets RCRA requirements. Subject to flood plain regulations. Must meet State or Federal water quality requirements.	Erosion of contaminated soil reduced by temporary dikes and sedimentation ponds, and by levee

Douglassville Responsiveness Summary

The Douglassville Superfund Site consists of approximately 50 acres just west of Douglassville, Berks County, Pennsylvania, on the southern bank of the Schuylkill River. A waste oil processing facility is located on site, along with a series of backfilled lagoons. The facility includes office buildings, a garage, a water treatment system, a former drum storage area, and an oil/water separator. In September, 1983, the site was placed on the National Priorities List. EPA received no comments from the nearby community regarding placement of the site on the NPL. EPA held a public meeting in March, 1984, to discuss the site Remedial Investigation and Feasibility Study workplan. Eight interested members of the nearby community attended the meeting. Most of their questions centered on two main issues: the timeframe of the work, and the extent of contamination. EPA explained that the Remedial Investigation would address the extent of contamination, and it would take approximately 7 months to complete. EPA also said the Feasibility Study is expected to take about four months to complete, after the Remedial Investigation is finished.

In August, 1984, questionnaires requesting information on private water wells were sent to residents living near the site. A door-to-door survey to discuss well sampling was conducted by EPA. Residents were not highly concerned with the site, but, several of them asked to have their wells tested. Also, some residents, when asked, commented that the site operations were "quiet" and that the trucks entering and leaving the site were "cautious and careful." Children often play on and near the site.

Two residents said they didn't feel work was necessary at the site because they would prefer to see the money used to correct a road drainage problem. Only two residents expressed some concern over the potential for contamination of private water supplies and possible health effects of contaminants found on site. Both of those residents requested that EPA sample their water wells. Several times, the 1972 storm known as Hurricane Agnes was referred to by the residents. They told EPA that after the flooding of the Schuylkill River, (which was caused by Hurricane Agnes) several houses on Highway 724 were coated with oil. News accounts following the flooding of 1972, and backfilling of the lagoons, however, brought no response from local residents. Questions from the two residents regarding the possibility of private well contamination were answered when they received the sample results, which showed contaminants below levels of concern.

As the Remedial Investigation of the site progressed, residents and the press did not display a high level of interest in EPA's work at the site. The RI/FS was completed and placed in the repository at the Union Township Building in June, 1985. Notice of a public meeting was made through a press release to area media. The meeting was held Wednesday, July 10, 1985 at the Union Township Building. About 20 people attended the meeting. The comments centered on a specific lagoon area which is contaminated with PCBs. Several residents asked if their ground water would eventually be affected by PCBs from the site. Those people were told the threat only existed from direct contact, and after the sampling in September, 1984, PCBs were not detected in the residents' private water wells. The only written comments that EPA received were from a resident who lived a few houses away from the site. The resident noted that the onsite well with the highest level of contamination is closest to the residential area. This resident has suggested that, in the place of new onsite monitoring wells, EPA should regularly test privately-owned wells as part of the implementation of the design stage of the project. This suggestion was also mentioned at the public meeting. In response, EPA explained that a hydrogeologic study was conducted at the site, and the ground water gradient is in the direction away from the residential water wells. If contamination increases in the onsite monitoring wells, then there is the possibility that private wells will be tested again.

EPA will hold a public meeting when the design stage is complete to discuss the work that will be done during the site cleanup.