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Environmental Protection
Agency

Office of
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EPA/ROD/R07-90/044
September 1990

EPA

Superfund Record of Decision:

Wheeling Disposal Service, MO

50272-101

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Wheeling Disposal Service, MO
First Remedial Action - Final

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Washington, D.C. 20460

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800/000

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 200-acre Wheeling Disposal Service site is an inactive industrial and sanitary landfill in Amazonia, Missouri. Onsite disposal features include nine solid waste trenches, five liquid waste trenches, two evaporation ponds, a farm chemical area, three tannery waste areas, and a rinsed- container area. Surrounding land use is mixed residential and agricultural. From 1964 until the landfill was closed in 1986, municipal and industrial wastes, including tanning sludges, pesticides, asbestos, laboratory wastes, construction debris, paint sludges, battery and cyanide waste, and crushed drums were disposed of in the various onsite disposal units. EPA and the State conducted onsite and offsite investigations from 1980 to 1987 that identified the presence of onsite contamination with no evidence of offsite contaminant migration. The remedial investigation/ feasibility study conducted in 1989 and 1990 confirmed these results. This Record of Decision (ROD) addresses both source control and management of contaminant migration, and is a final remedy. The primary contaminants of concern affecting the soil, sediment, ground water, and surface water are VOCs including TCE and toluene; other organics including pesticides; and metals including arsenic, chromium, and lead.

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - Wheeling Disposal Service, MO
First Remedial Action - Final
Contaminated Media: soil, sediment, gw, sw
Key Contaminants: VOCs (TCE, toluene), other organics (pesticides), metals (arsenic, chromium, lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 81
	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

EPA/ROD/R07-90/044
Wheeling Disposal Service, MO
First Remedial Action - Final

Abstract (Continued)

The selected remedial action for this site includes upgrading the existing landfill cap with a revegetated clay and soil cover; monitoring onsite ground and surface water; abandoning onsite wells; and implementing institutional controls including deed restrictions, and site access restrictions such as fencing. The estimated present worth cost for this remedial action is $1,205,800, which includes an annual O&M cost of $42,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS: Performance criteria for ground water and surface water will be developed, and may be based on Federal MCLs or Ambient Water Quality Criteria, or State water quality standards. If contaminant levels exceed these criteria, ground water treatment and/or leachate collection and treatment may be required.

RECORD OF DECISION

DECLARATION

WHEELING DISPOSAL SERVICE COMPANY LANDFILL

AMAZONIA, MISSOURI

Prepared by:

U.S. Environmental Protection Agency

Region VII

Kansas City, Kansas

SEPTEMBER 1990

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Wheeling Disposal Service Company Landfill
Amazonia, Missouri

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Wheeling Disposal Service Company Landfill (the site) near Amazonia, Missouri, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Contingency Plan, 40 C.F.R. Part 300. This decision is based on the Administrative Record file for this site.

The State of Missouri concurs on the selected remedy. A letter from the State of Missouri stating its concurrence is included in this Record of Decision (ROD) package.

ASSESSMENT OF THE SITE

The site is a closed industrial and sanitary waste landfill which received approximately 81,000 cubic yards of industrial waste between 1975 and 1986. The principal threat posed by the site is associated with exposure to the hazardous substances contained in the wastes which were disposed in the onsite disposal units. Due to the principal threat, several secondary threats exist onsite in the form of contaminated ground water and surface water. Several seeps located onsite in a north ravine and the shallow onsite ground water are contaminated with hazardous substances, primarily volatile organic compounds such as trichloroethylene and carbon tetrachloride.

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

DESCRIPTION OF THE REMEDY

The selected remedy is intended to be a final remedial action for the site and, subsequently, addresses all contamination associated with the site. The major components of the selected remedy include:

- Upgrading the existing cover over the disposal units;

- Long-term monitoring of ground water and surface water;

- Implementing site maintenance activities;

- Using deed restrictions to prevent farming on certain areas onsite;

- Installing security measures such as warning signs and/or fences; and,

- Closing certain onsite wells.

These response actions would minimize future ingestion/dermal contact of hazardous substances by containing and monitoring the onsite, contaminated ground water and surface water, and by maintaining an effective cover over the disposal units.

Although not required initially, contingencies for future collection and treatment of contaminated surface water and/or ground water are provided for in the selected remedy if performance criteria are exceeded at designated points of compliance.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective.

The EPA emphasizes the statutory preference for permanent solutions and use of treatment technologies. This approach emphasizes solutions that can ensure reliable protection over time. However, the approach is tempered by practicability to ensure that remedies selected are appropriate. Further, this process considers the full range of factors pertinent to remedy selection and provides the flexibility necessary and appropriate to ensure that remedial actions selected are sensible, reliable solutions for identified site problems.

This remedy utilizes permanent solutions and alternative treatment technologies, to the maximum extent practicable for this site. However, because treatment of the hazardous substances was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element. Although treatment is not being selected, the selected remedy activities do effectively reduce hazards. The site hydrogeology consists in part of a loess/drift interface that acts to control the migration of leachate from the disposal areas. Thus, the migration of hazardous substances is limited and can be effectively monitored to protect human health and the environment. Upgrading and maintaining the cover in combination with site security measures minimizes the formation and migration of leachate, and prevents direct exposures to buried wastes.

Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment.

Morris Kay — 9-27-90

Morris Kay
Regional Administrator
Environmental Protection Agency, Region VII

Date

JOHN ASHCROFT
Governor

G. TRACY MEHAN III
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation,
and Historic Preservation

OFFICE OF THE DIRECTOR
P.O. Box 176
Jefferson City, MO 65102
314-751-4422

October 19, 1990

Mr. Morris Kay
Regional Administrator
U. S. Environmental Protection
Agency, Region VII
726 Minnesota Avenue
Kansas City, KS 66101

Dear Mr. Kay:

The Missouri Department of Natural Resources (MDNR) has reviewed the Proposed Plan for the Wheeling Disposal Superfund site in Amazonia, Missouri. The Department concurs with the U. S. Environmental Protection Agency's (USEPA) preferred alternatives of closing certain on-site wells, installing security warning signs, seeking deed restrictions to prevent farming, upgrading the existing cover over the disposal areas, and beginning long term monitoring of groundwater and surface water.

Based on current available information, the Wheeling Disposal site has not contaminated groundwater offsite. Therefore, the proposed plan meets USEPA's identified objective to: "Eliminate current and prevent future unacceptable exposures to groundwater, surface water, surface soils and sediments, and subsurface soils". Should future offsite contamination exist MDNR would require that the proposed plan be modified to address the problem.

If you have any questions regarding this matter, please do not hesitate to contact me.

Very truly yours,

DEPARTMENT OF NATURAL RESOURCES

ORIGINAL SIGNED BY
RON KUCERA

G. Tracy Mehan, III
Director

GTM:rgh

cc: Mr. Robert Morby, USEPA

RECORD OF DECISION

DECISION SUMMARY

WHEELING DISPOSAL SERVICE COMPANY LANDFILL

AMAZONIA, MISSOURI

Prepared by:

U.S. Environmental Protection Agency

Region VII

Kansas City, Kansas

SEPTEMBER 1990

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SECTION 1.0 SITE NAME, LOCATION, AND DESCRIPTION

The Wheeling Disposal Service Company Landfill site (site) is located in a rural setting near Amazonia, Missouri (population 314), approximately six miles north of St. Joseph, Missouri (population 76,691) and six miles southwest of Savannah, Missouri (population 4,158) (Figure 1). The property is owned by Wheeling Disposal Service, Inc. (Wheeling), St. Joseph, Missouri, and consists of two contiguous parcels of land covering approximately 200 acres (Figure 2).

The site is situated in bluffs approximately 1/4 to 1/2 mile east of the Missouri River floodplain. The site is located on a topographic divide with surface runoff flowing both to the north and to the south. The runoff leaving the site to the north flows into Mace Creek via an unnamed tributary. The runoff from the southern part of the site flows into an unnamed tributary of Dillon Creek which then flows into Mace Creek. Mace Creek eventually flows into the Missouri River two miles south of the site.

Several private residences are located within a one-mile radius of the site. Most of these residences have private wells. Two residences located approximately 1/4 mile west of the site and the city of Amazonia receive their drinking water from a water supply district originating in St. Joseph. Also, the City of Savannah uses a well in the Missouri River alluvium located approximately one mile northwest of the site for supplying part of Savannah's public drinking water supply.

The site, formerly an industrial and sanitary landfill, consists of nine (9) solid waste trenches, five (5) liquid waste trenches, two (2) evaporation ponds, a farm chemicals area, three tannery waste disposal areas, and a rinsed container area (see Figure 3).

SECTION 2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Site History

Wheeling operated a sanitary and industrial landfill from a period in the 1970s until it was closed in 1986. In 1975, the Missouri Department of Natural Resources (MDNR) issued a permit limiting industrial waste disposal to a ten acre area in the central portion of the site. Information available to the Environmental Protection Agency (EPA) indicates that the following wastes were disposed during the period of Wheeling's operation:

- Leather tanning sludges;
- Pesticides;
- Asbestos;
- Laboratory wastes;
- Building debris;

FIGURE 1. SITE LOCATION MAP

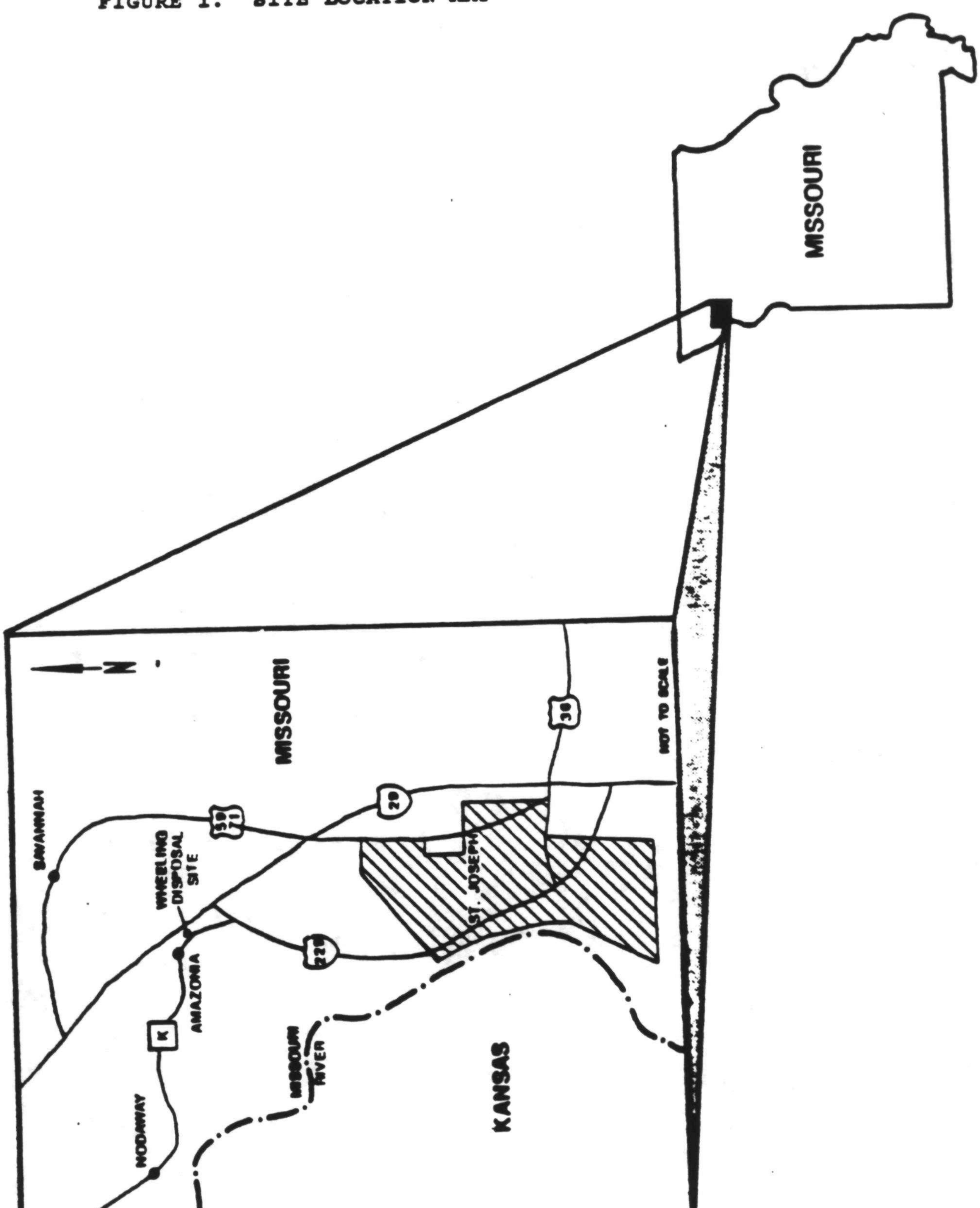


FIGURE 2. SITE LOCATION MAP

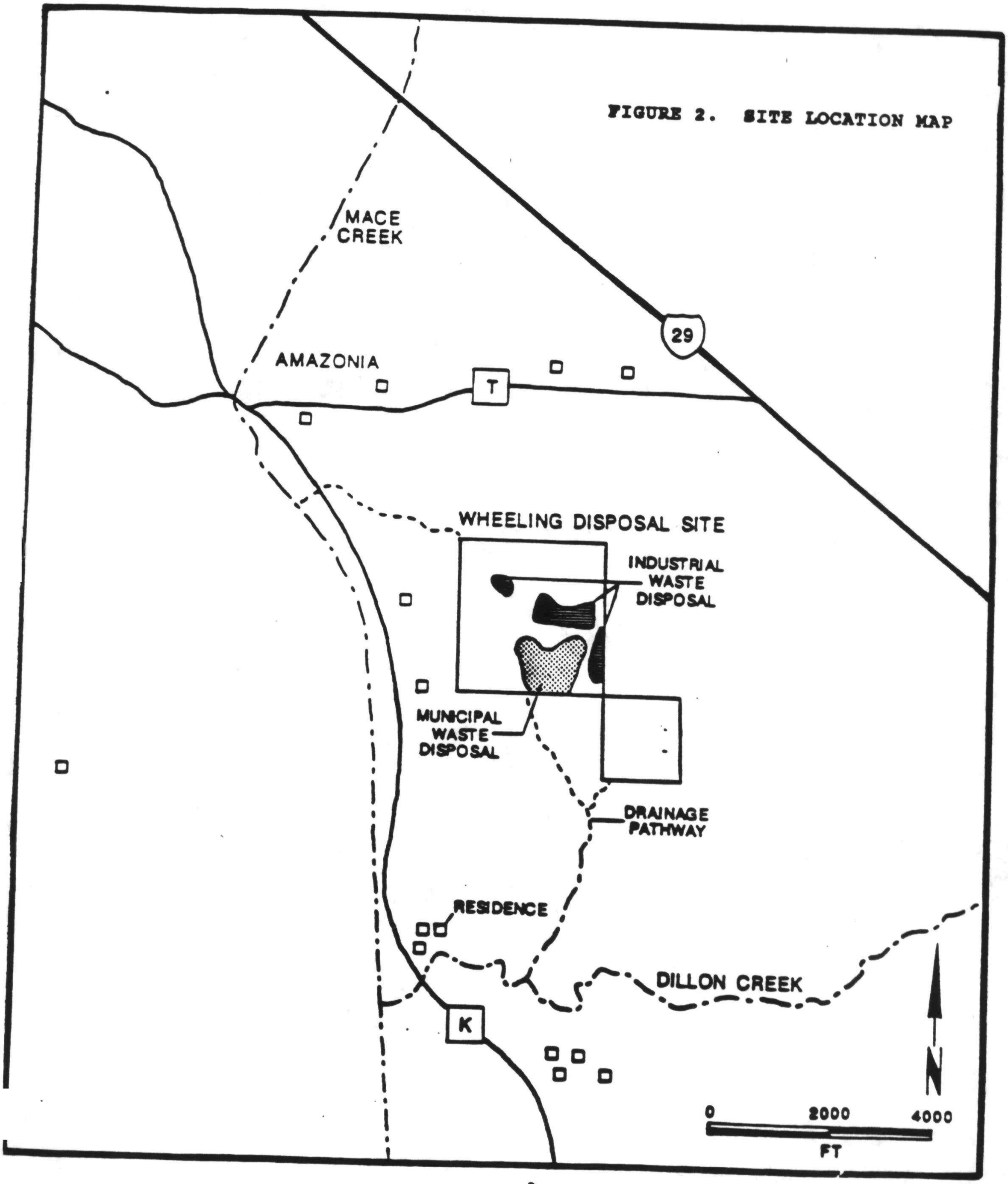
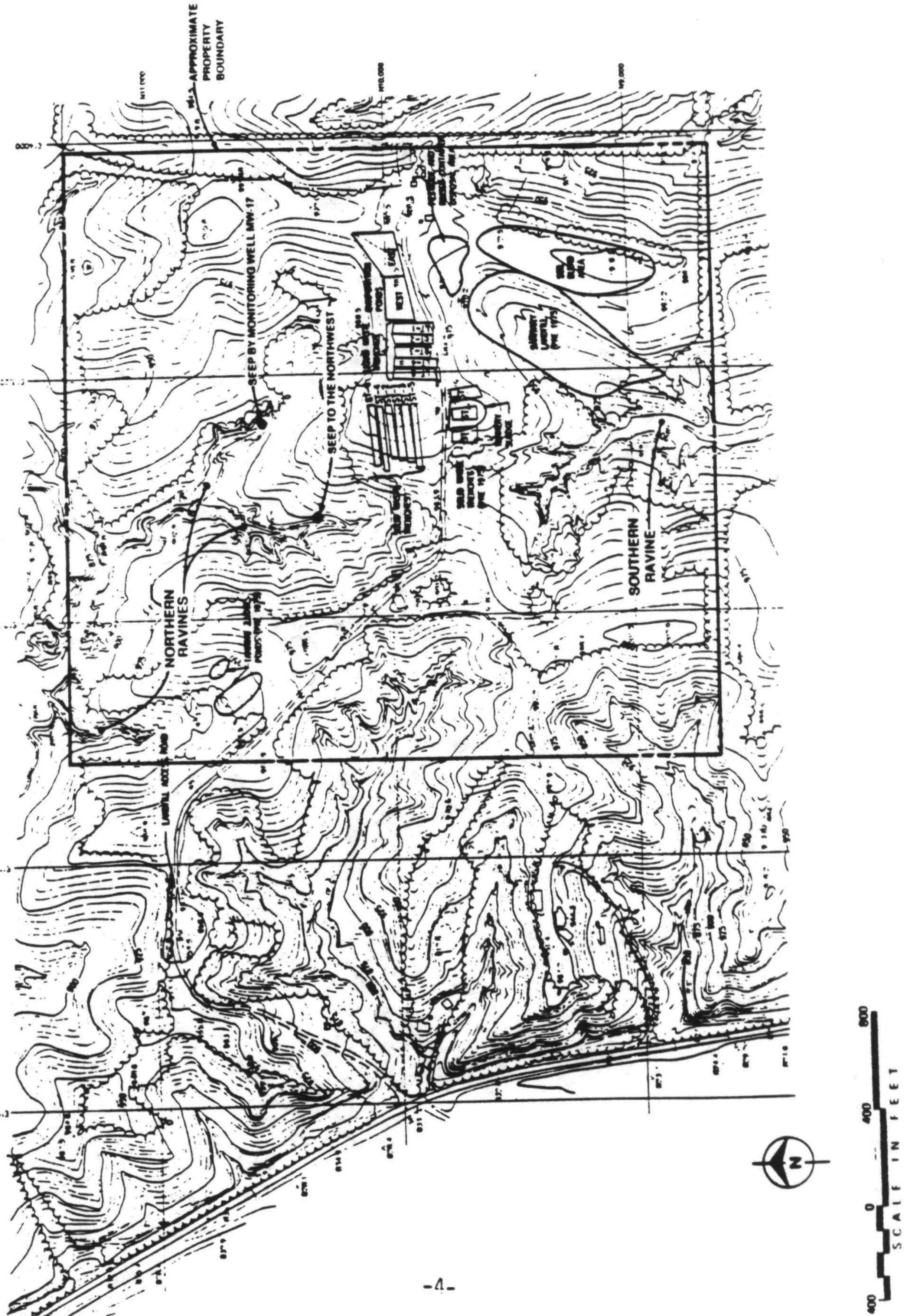


FIGURE 3. SITE DISPOSAL UNITS



- Paint sludges;
- Battery wastes (flashlight batteries);
- Cyanide wastes;
- Neutralized pickle liquor; and,
- Miscellaneous crushed drums.

These wastes were disposed in the various disposal units indicated on Figure 3. Certain disposal units received only one type of waste, such as tannery sludge, while other areas received a combination of wastes.

The facility ceased operating from June 1980 until September 1981. In September 1981, the facility reopened under conditions of two new permits issued by MDNR. One permit was for the industrial waste disposal and the other was for operation of a sanitary landfill. The sanitary permit was subsequently revoked. The facility continued receiving industrial wastes until 1986.

Closure activities undertaken by Wheeling included filling, grading, recontouring and capping of the former waste disposal area. An inspection by MDNR in 1986 indicated that the landfill had not received any wastes for some time. A site visit by EPA in May 1987 confirmed that the site had been covered with soil, graded, and no longer received wastes for disposal.

2.2 Previous Investigations/Reports

Between 1973 and 1978, Wheeling installed onsite ground water monitoring wells. MDNR performed periodic inspections at the site beginning in 1975 and continuing through 1986. Inspection reports cited a number of permit violations including the failure to cover wastes with compacted earth after depositing them in a waste trench, disposal of hazardous materials outside of permitted areas, and improper construction of solid waste trenches. Monitoring by MDNR at the site between 1976 and 1980 did not identify significant ground water contamination; however, the analyses were limited primarily to metals.

In December 1980, a preliminary assessment and site inspection were performed by Ecology and Environment, Inc. (E&E) for the EPA. The report presented background information concerning the site, including geology and hydrogeology. The report concluded that there was no significant evidence of leaching or offsite migration of contaminants, but noted the potential for lateral seepage beneath the site. The site was given a medium to high priority for further monitoring, based on the active status of the landfill and because of the types of wastes which had been disposed at the site.

The EPA sampled onsite ground water monitoring wells and springs in November 1982. Analyses of these samples revealed barium, manganese and arsenic existing at concentrations above safe drinking water standards, and trace amounts of at least five organic compounds. The report concluded that there was no evidence of offsite migration of contaminants but recommended further monitoring and inspections.

The EPA conducted a follow-up inspection of the site and sampled onsite monitoring wells and springs and three offsite private wells in November 1983. Concentrations of metals above safe drinking water standards and twelve organic priority pollutants were detected in onsite wells and springs. Priority pollutants included 1,2 dichloroethane, trichloroethylene (TCE), 2-butanone, benzoic acid, chloroform, bis(2-ethylhexyl) phthalate, bromodichloromethane, and chlorodibromomethane. Trace amounts of organic compounds and concentrations of iron and manganese above the safe drinking water standards were detected in the samples from offsite private wells and springs. However, there was no conclusive evidence of offsite migration. The report recommended further periodic monitoring and inspections.

Roy F. Weston, Inc. prepared an Endangerment Assessment for the EPA for the site in January 1985. The report reviewed results and data from previous investigations and concluded that while organic contamination existed in onsite wells and springs, there was no evidence of offsite migration. As in the earlier studies, continued monitoring was recommended because of the potential for offsite transport of ground water contaminants.

The Missouri Department of Health (MDOH) performed sampling of offsite private wells and creeks in the site vicinity in January 1986. Results of the sampling indicated the presence of aluminum, barium, iron, and manganese in the stream samples and the presence of aluminum in samples from two of the private wells. Levels of contaminants were not considered to pose a significant health threat.

In response to complaints from local residents concerning the possibility of contamination of drinking water supplies, the EPA and MDOH sampled wells and springs in the site vicinity in early 1987. Results confirmed earlier sampling events indicating that onsite ground water is contaminated but is not migrating offsite.

2.3 Enforcement History

On August 29, 1983, MDNR notified Wheeling that the site was proposed for inclusion on the Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri. The Wheeling site was placed on the Registry on January 3, 1984.

The EPA notified the owner and 39 generators of their potential liability in a series of general notice and information request letters dated either May 1987, September 1987, February 1988 or April 1988. On September 27,1989, EPA entered into a de minimis administrative order on consent with three asbestos generators. These parties agreed to pay past, Remedial Investigation and Feasibility Study (RI/FS), Remedial Design and

Remedial Action (RI/RA), and Operation and Maintenance (O&M) costs based on their volumetric share of wastes. With regard to RD/RA and O&M costs, these parties also paid a premium of two.

Special notice letters were sent in April 1988 to Potentially Responsible Parties (PRPs) requesting them to make a good faith offer to perform the RI/FS. On August 24, 1989, five generators and the owner entered into an Administrative Order on Consent to perform the RI/FS.

SECTION 3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS and Proposed Plan for the site were released to the public on August 13, 1990. The Administrative Record file, which included the RI/FS reports and the Proposed Plan, was made available to the public at information repositories maintained at the Rolling Hills Library, in Savannah, Missouri, and at the EPA Region VII Superfund Records Center, Kansas City, Kansas. The notice of availability for these documents was published in the St. Joseph News-Press/Gazette and the Savannah Reporter on August 12, 1990 and August 16, 1990, respectively. A public comment period was held from August 13, 1990 through September 11, 1990. In addition, a public meeting was held on August 29, 1990. At this meeting, representatives from the EPA and MDNR answered questions about problems at the site and the remedial alternatives under consideration. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision. In summary, the public participation requirements as defined in CERCLA 113(k)(2)(B)(i-v) and 117 were satisfied.

This decision document presents the selected remedial action for the Wheeling Disposal Service Company Landfill site, near Amazonia, Missouri, chosen in accordance with the provisions of CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan (NCP). The selection of a response action for this site is based on the Administrative Record.

SECTION 4.0 SCOPE OF RESPONSE ACTION

This Record of Decision addresses the principal and secondary threats identified at the site, including contamination found in ground water, surface water, surface soils and sediment, and subsurface soils.

Although the site geology controls and highly limits exposure to the principal and secondary threats, there is a potential threat of contaminated ground water and surface water extending offsite, as well as the potential for contact with onsite contaminated soils and sediments. To address the risks from such exposures, the following remedial action objective was identified:

* Eliminate current and prevent future unacceptable exposures to ground water, surface water, surface soils and sediments, and subsurface soils.

SECTION 5.0 SUMMARY OF SITE CHARACTERISTICS

The Remedial Investigation (RI) field work, conducted in two phases by the PRPs under EPA oversight from February 1989 to February 1990, included the following activities to define the types of contaminants at the site, potential routes of contaminant migration and routes of exposure, population and environmental areas that could be affected, and site-specific factors that may affect the remedial actions at the site:

- A geologic and hydrogeologic investigation that included the drilling of nine deep borings and six shallow borings, the sampling of soil from the nine deep borings, installation of fifteen monitoring wells in the boreholes, and subsequent sampling of the ground water from the fifteen new monitoring wells and nine pre-existing wells;

- Surface soil sampling primarily in areas of known previous landfill activities as well as a background surface soil sample;

- Discrete subsurface soil sampling in areas of known previous landfill activities, as well as a background discrete subsurface soil sample;

- Sediment sampling from locations within the northern and southern ravines on the property and the onsite dry pond;

- Sampling from the seeps located in the northern ravines of the site as well as a background surface water sample;

- Characterization of the existing cover located over the previous disposal units by observation and physical analysis of the soil;

- Private well survey to the east of the site in an effort to determine the number of wells in use, distance of the wells from the site, hydrogeological relation of wells to the site, and physical characteristics of the wells; and,

- Surface water sampling along the property boundary in the ravine located in the northern portion of the site.

Several types of contamination - volatile organic compounds (VOCs), organic compounds (including pesticides), and metals - were found during the RI in varying concentrations and in various media including ground water, surface water, sediment, surface soils and subsurface soils. The elevated concentrations of VOCs in the ground water and surface water indicate a release of chemicals from the original disposal areas. The elevated concentrations of metals and pesticides in the surface soils indicate either degradation of the cover or improper construction of the cover. The following section presents the results and conclusions of the RI.

Tables and diagrams presented in this section are either derived in part or entirely duplicated from the RI report written by Burns & McDonnell Engineering Company, contractor for the PRPs who undertook the RI/FS.

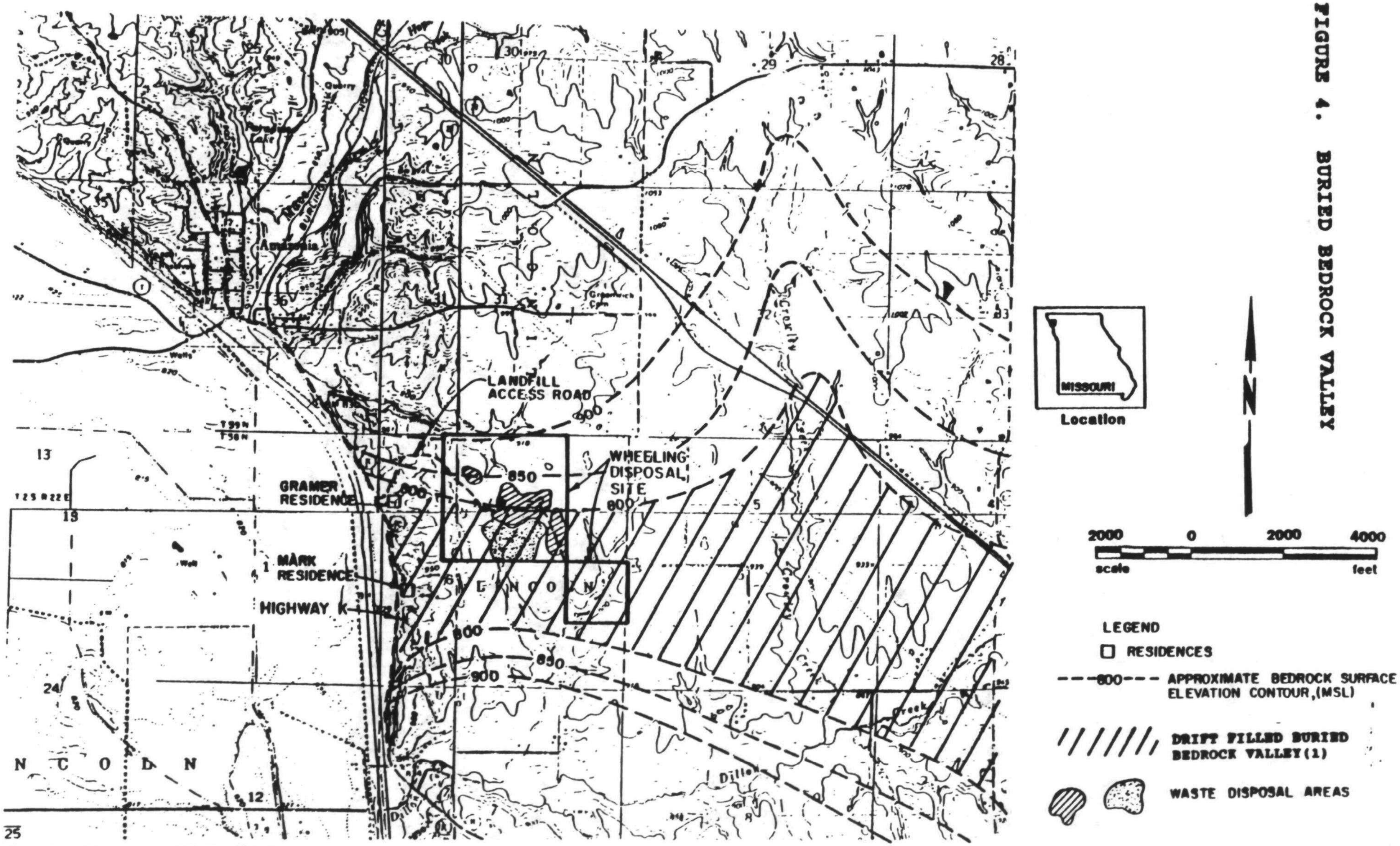
5.1 HYDROGEOLOGIC SETTING

The regional geology has been developed from geologic reports and boring logs obtained from the Missouri Geological Survey. This data shows that the Amazonia, Missouri area is underlain by, in descending order: unconsolidated deposits of the Holocene and Pleistocene Series, Quaternary System; and consolidated bedrock deposits of the Douglas Group, Virgillian Series, Pennsylvanian System.

The surficial units consist of Holocene alluvium within the Missouri River valley and Pleistocene loess and glacial drift in the uplands to the east of the Missouri River valley. The glacial drift consists predominantly of interbedded cohesive clay layers, and granular sand and gravel layers. The glacial drift is thickest over an east-west trending buried bedrock valley that underlies the site (Figure 4).

The geology of the Wheeling Disposal site was characterized based on the borings drilled during the 1989 Remedial Investigation (RI) and information gathered during earlier site investigation activities. This data has identified three

FIGURE 4. BURIED BEDROCK VALLEY



Source: USGS 7 1/2 Minute Quad.

(1) REFERENCE: WATER POSSIBILITIES FROM THE GLACIAL DRIFT OF ANDREW COUNTY, 1957, WATER RESOURCES REPT. 15, MISSOURI GEOLOGICAL SURVEY

stratigraphic units in descending order: loess, glacial drift, and bedrock. These units are described in the following subsections.

Loess

The loess is of Wisconsin-Illinoian age and consists of 4 to 35 feet of clayey silt and silt which contains minor amounts of sand. The loess is thickest on the central ridge where the wastes were disposed, and thinnest near the ravines located around the periphery of the disposal areas. Constant head permeability test results indicate that the hydraulic conductivity of the loess ranged from 1.0×10^{-6} to 2.6×10^{-5} centimeters per second (cm/s).

Glacial Drift

The loess is unconformably underlain by Pre-Illinoian aged glacial drift. The glacial drift ranges from 48 to 155 feet thick and is comprised of interbedded granular and cohesive deposits. The drift is thickest within the deepest portion of the bedrock valley located beneath the southern portion of the site. The thickness of individual cohesive layers ranges from 2 to 10 feet. The thickness of individual granular layers ranges from less than one foot to 22 feet. These sand and gravel layers are thickest within the deepest portion of the buried bedrock valley. Constant head permeability test results indicate that the hydraulic conductivity of the cohesive layers ranged from 6.7×10^{-9} cm/s to 6.1×10^{-8} cm/s. Slug test results indicate that the hydraulic conductivity of the granular layers ranged from 1.38×10^{-5} cm/s to 5.45×10^{-2} cm/s.

Bedrock

The glacial drift is unconformably underlain by Pennsylvanian aged bedrock. Shale belonging to the Lawrence Formation outcrops in the unnamed tributary located along the northern boundary of the site. The bedrock surface at this location is at approximately 880 feet above the mean sea level elevation (msl) which corresponds to the northern edge of the buried bedrock valley. Shale and limestone bedrock was also encountered in four of the borings drilled during the RI. The lowest elevation for which the bedrock was encountered in the borings was 789 feet msl.

The regional hydrogeologic classification of the deposits underlying the Amazonia, Missouri area can be generally categorized into the Holocene alluvium aquifer, the Pleistocene glacial drift water bearing unit, and the Pennsylvanian bedrock aquitard.

The Holocene alluvium that occurs within the Missouri River valley has been characterized as suitable for development as both a potable and irrigation water supply source. The City of Amazonia formerly used two wells screened in the alluvium for a potable water source. The City of Savannah, Missouri currently uses a well screened in the alluvium as a potable water source. This well is located approximately one mile northwest of the site.

At some locations the Pleistocene glacial drift is sufficiently transmissive to be characterized as suitable for development as a potable water source (Missouri Geological Survey, 1957). Ground water yields from this water-bearing unit can be expected to range from 5 to 50 gallons per minute. The higher yields are associated with the thick sand and gravel deposits that occur within the buried bedrock channel. There are records of six private water supply wells screened in the glacial drift within one mile of the site. Only one well is currently known to be used as a potable water source. In 1990, the MDNR Division of Geology and Land Survey classified the geologic system beneath the Wheeling Disposal Service site to be a useable aquifer.

The Pennsylvanian age bedrock generally acts as an aquitard due to the low transmissivity of these deposits and is not a suitable source of potable water due to high salinity and hardness of the ground water. The thick shale sequences within the Pennsylvanian bedrock retards vertical ground water migration.

During the RI, 23 wells on the Wheeling Disposal site were monitored for ground water elevation (See Figure 5 for the locations). These wells were installed in paired nests with one well monitoring the top of the water table and the paired well monitoring deeper ground water. These wells are screened in the glacial drift and range from 33 to 174 feet deep.

One unconfined ground water system is present within the shallow glacial drift. A prominent downward vertical gradient averaging 0.7 feet/foot was measured in the shallow and deep monitoring well nests. This indicates that the site is a source of ground water recharge for the glacial drift.

Rainfall which percolates through the upper loess material encounters the less permeable clays of the upper glacial drift. The less permeable clays act as an aquitard. As a result, the shallow ground water flows north on the north side of the site and south on the south side of the site (See Figure 6). On the north side, the shallow ground water surfaces in the north ravines in the form of very low flowing seeps (1/2 gallon per minute). On the south side, all of the shallow ground water eventually migrates deeper into the glacial drift.

The ground water potentiometric surface within the upper glacial drift as measured in August 1989 is presented in Figure 7. The ground water flow direction within the upper glacial drift is roughly perpendicular to the site topographic contours with an average horizontal gradient of 0.06 feet/foot to the north and 0.045 feet/foot to the south.

FIGURE 5. BORING/MONITORING WELL LOCATIONS

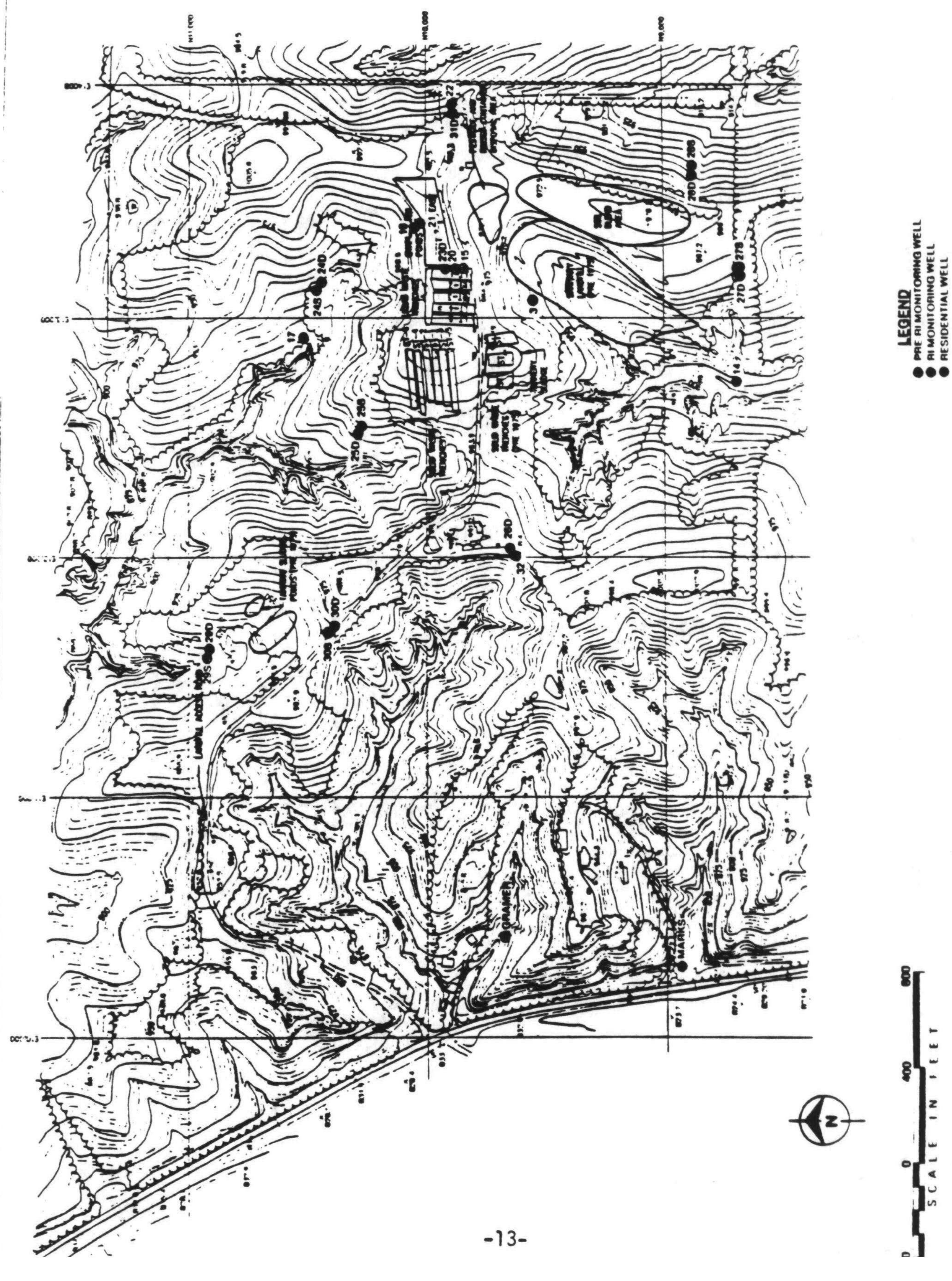


FIGURE 6. GENERALIZED GEOLOGIC PROFILE

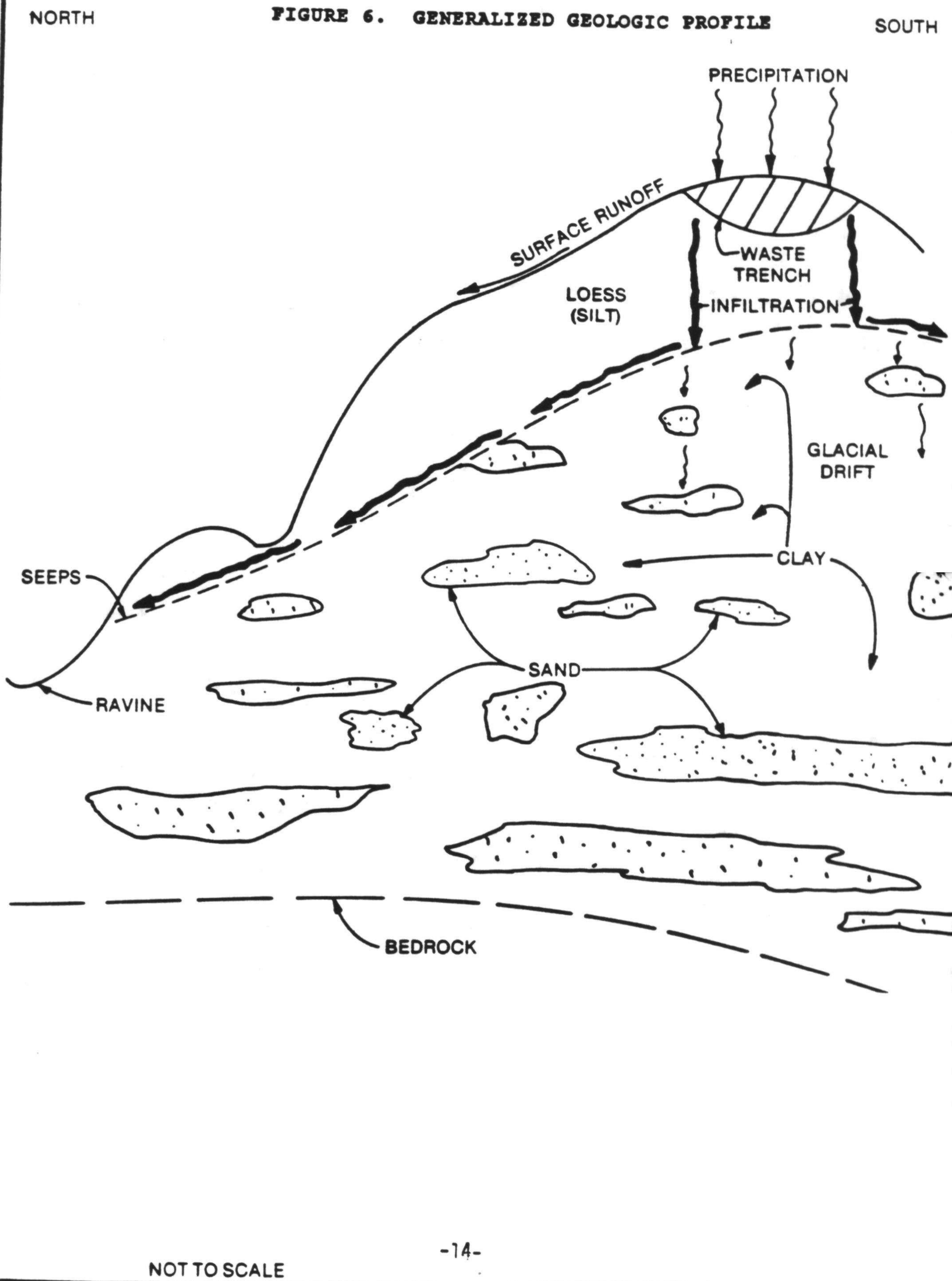
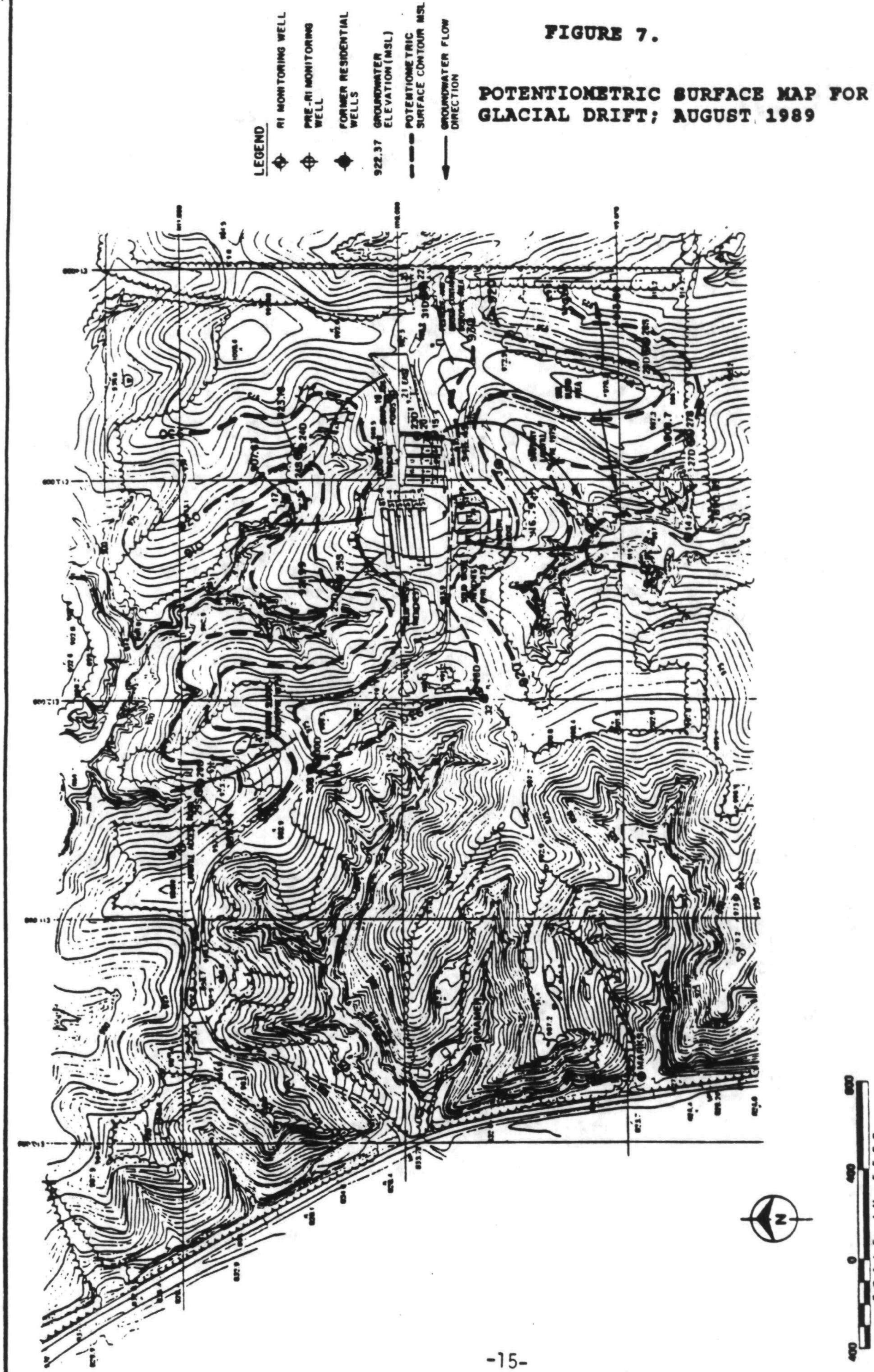


FIGURE 7.

POTENTIOMETRIC SURFACE MAP FOR UPPER GLACIAL DRIFT; AUGUST 1989



Assuming an average hydraulic conductivity of 3.5×10^{-5} cm/s for the upper glacial drift on the north portion of the site, an average horizontal hydraulic gradient to the north of 0.06 feet/foot, and an effective porosity of 25 percent for the glacial drift, the average horizontal ground water flow velocity to the north would be nine feet per year (ft/yr). Assuming an average hydraulic conductivity of 7.6×10^{-4} cm/sec for the upper glacial drift on the south portion of the site, an average horizontal hydraulic gradient of 0.045 feet/foot to the south, and an effective porosity of 25 percent for the glacial drift, the average horizontal ground water flow velocity to the south is 140 ft/yr.

Volatile Organic Compounds (VOCs) were detected in a seep in the north ravine in 1983, eight years after onsite disposal began. That seep is located approximately 380 feet from the nearest disposal area indicating VOC contaminated ground water may have traveled approximately 50 ft/yr. Thus, the actual horizontal ground water flow velocity (50 ft/yr) is consistent with EPA's theoretical estimate (9 to 140 ft/yr).

There are an insufficient number of deep wells to establish ground water flow direction and rate within the deep glacial drift deposits. However, the deep glacial drift ground water is presumed to follow the contour of the bedrock (Figure 4). Thus, the deep ground water should flow south from the north ravine located onsite and east along the buried preglacial valley with eventual discharge to the One Hundred and Two River. The ultimate discharge point of the ground water and surface water at the Wheeling Disposal site is the Missouri River or its alluvial aquifer.

5.2 SOURCE CHARACTERISTICS

The closed landfill disposal units, past operating practices and closure procedures are the sources for elevated levels of contamination found at the site in the ground water, surface water, surface soils, sediments and subsurface soils. Both industrial and sanitary landfill units were used between 1964 and 1986. Information regarding the disposal units varies dramatically in detail depending upon whether the unit was used prior to 1975 or after 1975. As previously mentioned, the records required by the permits and maintained by Wheeling Disposal Service, Inc. and by MDNR document with great detail the types, volume and locations of industrial waste disposed at the site after 1975. Information regarding the volume of waste received prior to 1975 does not exist. However, aerial photographs and the permit application reports submitted by Wheeling Disposal Service document the types and locations of the pre-1975 disposal units.

In addition, a magnetometer survey was conducted over the area of pre-1975 solid waste trenches and the area containing rinsed containers in an attempt to more clearly define the limits of those areas. Large buried metallic objects would cause anomalous magnetic field readings which would be detected during the survey. No magnetic anomalies were present which indicated disposal of metallic objects beyond the boundaries of the rinsed container disposal area, the pre-1975 solid waste trenches or the sanitary landfill as shown in Figure 3.

All disposal units (both pre-1975 and post-1975) were constructed and closed using onsite soils and did not include leachate collection systems. During the RI, the cover over the disposal units was found to range from approximately two to five feet in thickness. RI results indicate that the hydraulic conductivity for the cover is approximately 1×10^{-9} cm/s. However, inspections (both historic and recent) document the tendency for the cover material to fracture and to quickly absorb rainfall.

As defined in the NCP, the wastes that cannot be reliably controlled in place are principal threats. At this site, wastes disposed in the closed disposal units may be the principal threat to human health and the environment. Hazardous substances contained in these wastes potentially migrate in the various media and produce secondary threats such as contaminated ground water, surface water, and surface soils and sediment.

5.3 Contaminated Media

5.3.1 Subsurface Soil

Analytical results indicate the presence of VOCs, highly mobile contaminants, in areas of previous landfilling activities. Concentrations of methylene chloride at 180 parts per billion (ppb), and TCE at 20 ppb were detected in Boring 23D (refer to Figure 5) at the 12 to 13 foot sampling interval. Boring 23D is located immediately east of the liquid waste disposal trenches in the central portion of the site. Neither of these contaminants was encountered at greater depths in this boring. No other subsurface soil data showed evidence of VOC contamination which was attributable to the site.

Mercury and magnesium, inorganic contaminants which are relatively immobile contaminants under conditions at this site, were detected in borings 24D and 27D at 5.03 parts per million (ppm) and 9570 ppm, respectively, above background levels. Cyanide was detected in the bedrock boring 26D at the level of 1.77 ppm, slightly above the detection limit. Mercury and cyanide were not detected above background levels (0.19 ppm and 1.0 ppm) at greater depths in the same borings. Magnesium levels were only slightly elevated in relation to other background magnesium levels (5190 ppm) detected on the site.

Discrete subsurface soil samples were taken from the 0 to 18 inch and 18 to 36 inch intervals below the surface in the pre-1975 and post-1975 tannery waste disposal areas as shown on Figure 5. These "root" zone intervals were chosen due to the crops which are grown in these locations. Chromium is the primary contaminant of concern for tannery wastes and was detected above onsite background levels (22.8 ppm) at both locations. Specifically, chromium was found at levels up to 594 ppm and 89.1 ppm in the pre-1975 and post-1975 locations, respectively.

5.3.2 Surface Soils and Sediments

Tables 1 and 2 present the levels of contaminants which were found above onsite background levels. Figures 8, 9 and 10 indicate the site locations for the sample locations presented in Tables 1 and 2.

Results of samples analyzed during the RI for pesticides revealed the presence of pesticides at low levels, except for one sample at location 52 where aldrin was found at 8600 ppb. The high aldrin level in the south ravine required additional investigation. The results for that work are presented in Figure 11. In summary, the 8600 ppb aldrin level found in the first phase is not representative of the aldrin level in the south ravine. The highest aldrin concentration found in the second phase was 226 ppb. The typical level is below 20 ppb.

The cluster of various types of pesticides at the former farm chemicals disposal area, location 49, and downgradient of that area, location 65, indicates that the source of those contaminants may be due to an ineffective closure such as using contaminated onsite soil for the cover material. The presence of chromium in the cover material over the disposal trenches at a concentration 100 times above background levels is also consistent with the conclusion that contaminated onsite soil was used for cover material.

5.3.3 Ground Water

Tables 3 and 4 present the contaminants which were identified in onsite ground water at levels above background levels. VOCs and pesticides do not occur naturally in nature and, as such, any detectable level of these contaminants is considered above background. Table 4 also presents the corresponding background concentrations and the supporting references. Figure 5 indicates the well locations noted in Tables 3 and 4.

TABLE 1. SUMMARY OF ORGANIC CONSTITUENTS DETECTED IN SURFACE SOILS AND SEDIMENTS

CONSTITUENT	MAXIMUM CONCENTRATION (UG/L)	LOCATIONS OF DETECTED LEVELS
PESTICIDES		
ALDRIN	8600	33, 44, 52*, 65
ATRAZINE	372	35, 41, 49*, 65
A CHLORDANE	380	33, 35, 44, 52*, 65
G CHLORDANE	350	33, 35, 44, 52*, 65
DIAZINON	816	46, 49*, 5051, 65
DIELDRIN	470	35, 40, 44, 45, 5051, 52*, 65
DISULFOTON	99	46*, 47, 49, 5051
4-DDD	13	44*, GRAMER
4,4-DDE	31	44, 65*
4,4-DDT	6	44
2,4-D	56	49
PHORATE	80	49
SEVIN	626	45, 46, 47, 49*, 5051, 56
2,4,5-T	13	40, 49, 65*

(*) DESIGNATES LOCATION OF MAXIMUM CONCENTRATION

TABLE 2. SUMMARY OF METAL CONSTITUENTS DETECTED IN SURFACE SOILS AND SEDIMENTS

CONSTITUENT	BACKGROUND[1] CONCENTRATION (UG/L)	MAXIMUM CONCENTRATION (UG/L)	LOCATIONS OF LEVELS ABOVE BACKGROUND
ANTIMONY	< 7	14.9	LT-SW, LT-NE, ST-NE
CHROMIUM	< 22.8	2000	43, 45, 46*, 47, 49, 5051, 53, 54, LT-SW, LT-SE, LT-NE, LT-NW, ST-SW, ST-NE, LT-NW
MERCURY	< 0.19	0.49	46, ST-NW*

(*) DESIGNATES THE LOCATION OF MAXIMUM CONCENTRATION

(1) DEVELOPED FROM A COMBINATION OF THE FOLLOWING REFERENCES:

TABLE 3.2 FROM "THE SOIL CHEMISTRY OF HAZARDOUS MATERIALS," JAMES DRAGUN, 1988, Page 79; IN RELATIVELY HUMID REGIONS; TOTAL METALS.

"WATER POSSIBILITIES FROM THE GLACIAL DRIFT OF ANDREW COUNTY," DALE L. FULLER, J.R. McMILLEN, HARRY PICK, W.B. RUSSELL, AND JACK S. WELLS; MISSOURI GEOLOGICAL SURVEY AND WATER RESOURCES, 1957, Pages 7-8.

FIGURE 8. SURFACE AND SEEP WATER AND SEDIMENT SAMPLING LOCATIONS

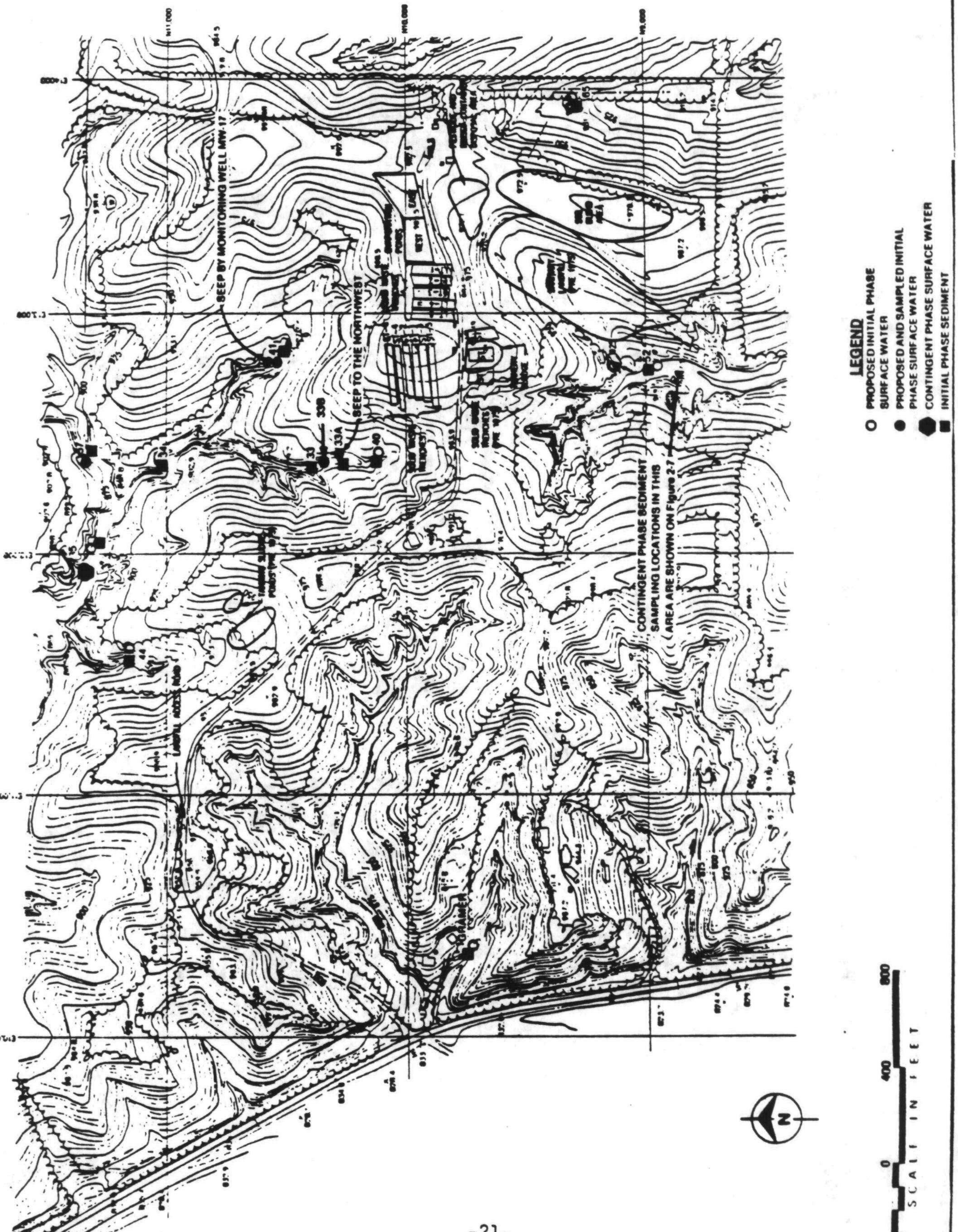


FIGURE 9. SURFACE SOIL AND DISCRETE SUBSURFACE SAMPLING LOCATIONS

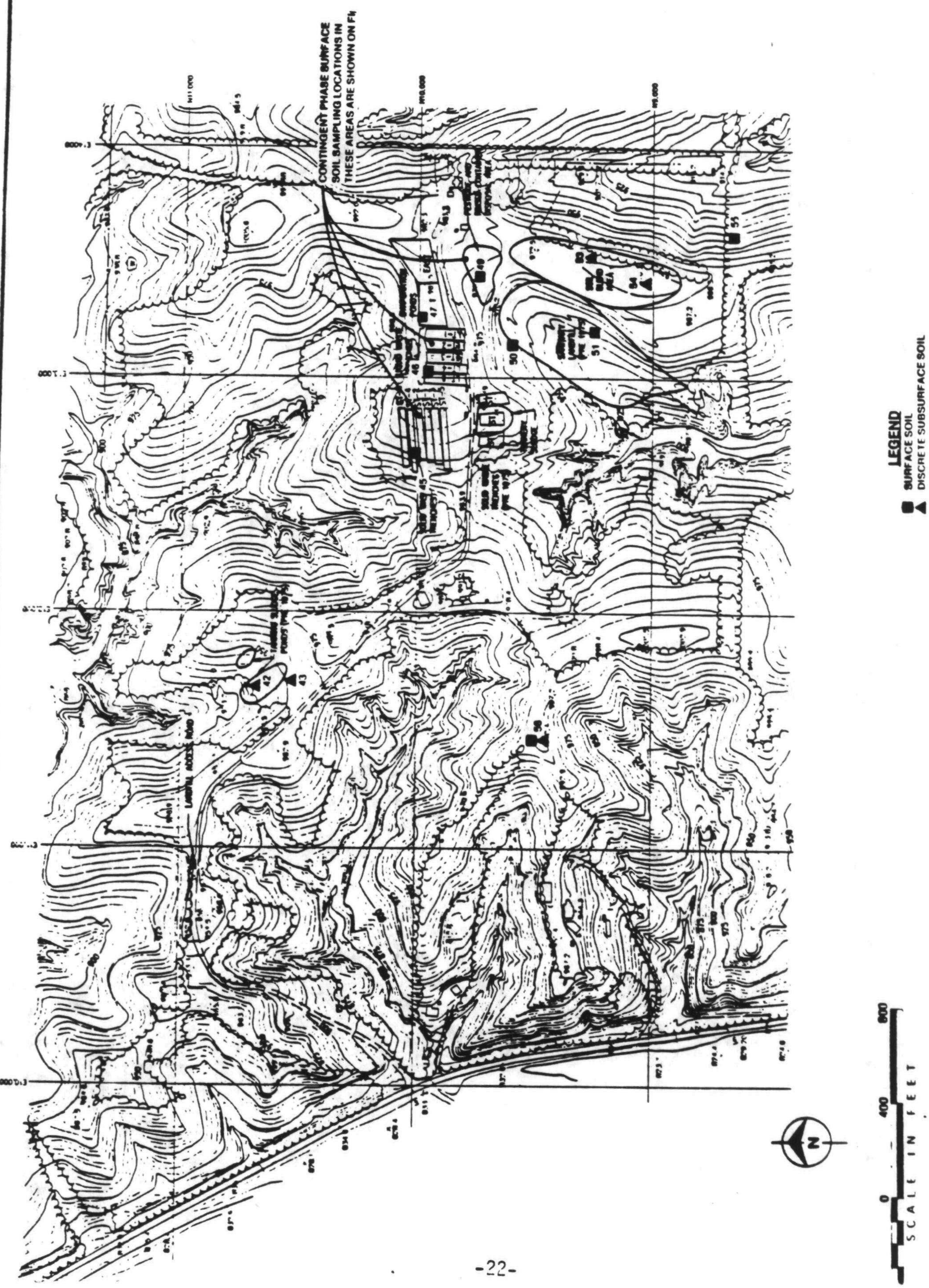


FIGURE 10. CONTINGENT PHASE SURFACE SOIL SAMPLING LOCATIONS - DISPOSAL UNITS

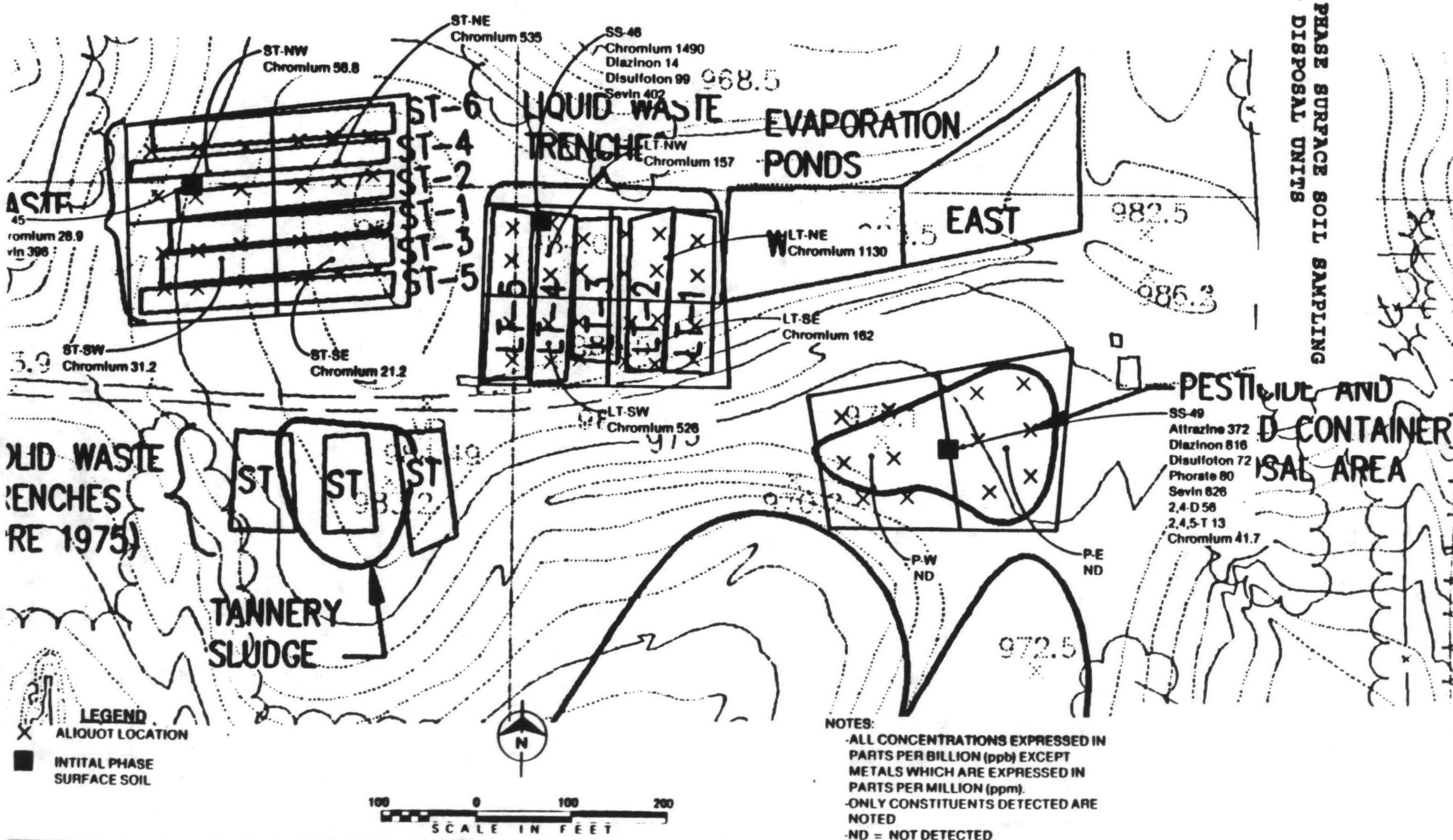


FIGURE 11. CONTINGENT PHASE SEDIMENT SAMPLING LOCATIONS - SOUTH RAVINE

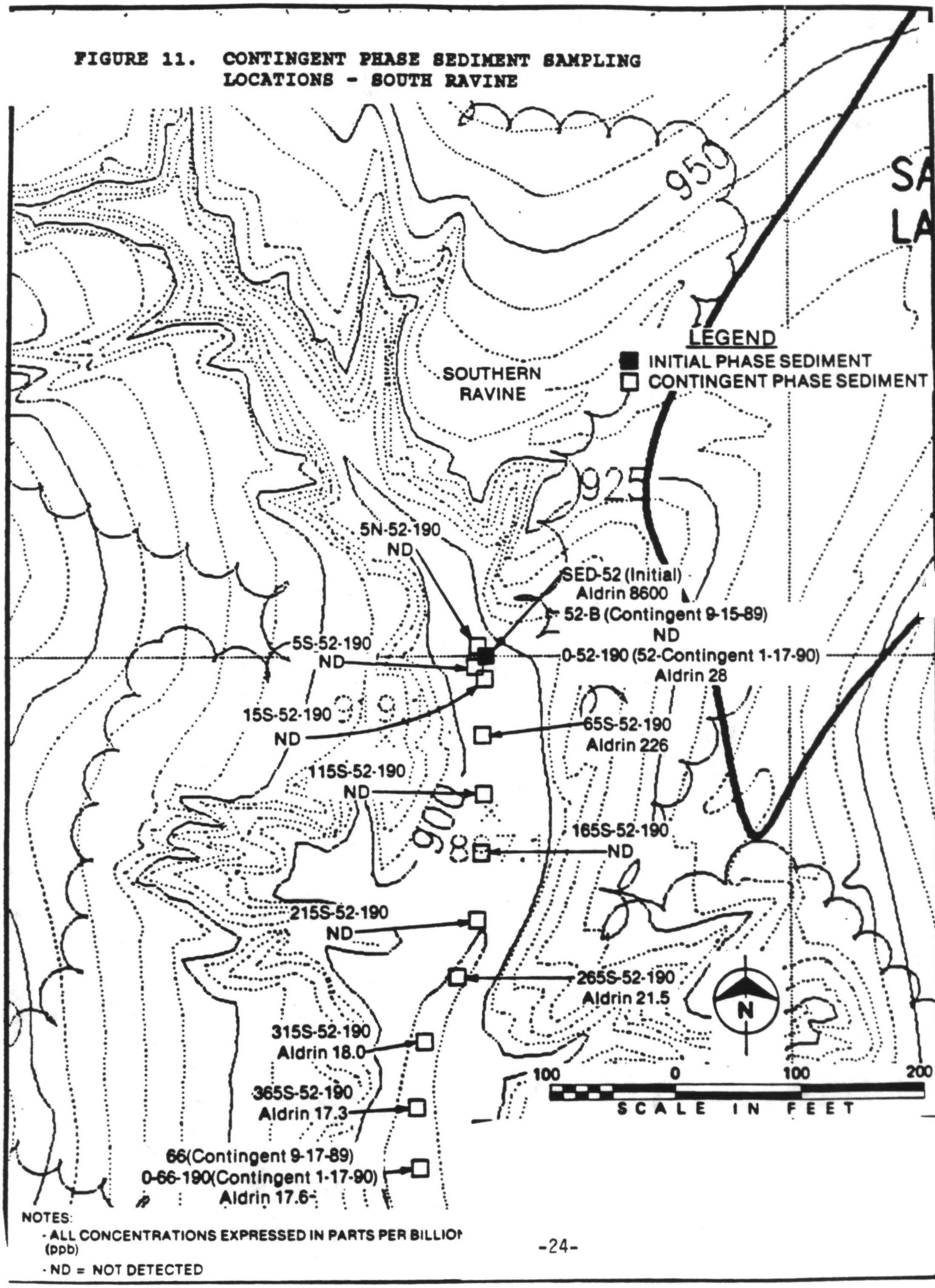


TABLE 3. SUMMARY OF ORGANIC CONSTITUENTS DETECTED IN GROUND WATER

CONSTITUENT	MAXIMUM CONCENTRATION (UG/L)	LOCATIONS OF DETECTED LEVELS
(VOLATILE ORGANIC COMPOUNDS)		
CARBON DISULFIDE	76	30D
CARBON TETRACHLORIDE	3100	3*, 25S, 31D
CHLOROFORM	128	3*, 25S, 31D
1,2-DICHLOROETHANE	106	3
1,2-DICHLOROETHENE	26	3*, 17
METHYLENE CHLORIDE	1000	17*, 20, 24S, 24D, 25D, 26D, 28D, 29D
TOLUENE	1600	MARKS*, 17, 20
TRICHLOROETHENE	1200	3, 17, 20*, 24S, 24D
(PESTICIDES)		
ATRAZINE	1.2	20, 23D*, 28S
NABAM	250	23D, 29S, 30S*,30D
SEVIN	63	GRAMER, 14*, 30D

(*) DESIGNATES LOCATION OF MAXIMUM CONCENTRATION

TABLE 4. SUMMARY OF METAL CONSTITUENTS DETECTED IN GROUND WATER

CONSTITUENT	BACKGROUND[1] CONCENTRATION (UG/L)	MAXIMUM CONCENTRATION (UG/L)	LOCATIONS OF LEVELS ABOVE BACKGROUND
ALUMINUM	< 1000	6550	14*, 30S
BARIUM	< 500	1440	14*, 29S
CADMIUM	< 1	5.0	28D, 29D
CALCIUM	< 141,200	391,000	14*, 27D, 28S, 29S
CHROMIUM	< 5	119	29S, 30S*
COBALT	< 10	14	29S
COPPER	< 30	33.9	30S
IRON	< 3800	16,300	14, 30S*
MAGNESIUM	< 30,500	118,000	14*, 30S
MANGANESE	< 400	3550	14*, 27D, 30S
NICKEL	< 50	207	14
VANADIUM	< 10	26	30S

(*) DESIGNATES THE LOCATION OF MAXIMUM CONCENTRATION

(1) DEVELOPED FROM A COMBINATION OF THE FOLLOWING REFERENCES:

TABLE 3.2 FROM "THE SOIL CHEMISTRY OF HAZARDOUS MATERIALS," JAMES DRAGUN, 1988, Page 79; IN RELATIVELY HUMID REGIONS; TOTAL METALS.

"WATER POSSIBILITIES FROM THE GLACIAL DRIFT OF ANDREW COUNTY," DALE L. FULLER, J.R. McMILLEN, HARRY PICK, W.B. RUSSELL, AND JACK S. WELLS; MISSOURI GEOLOGICAL SURVEY AND WATER RESOURCES, 1957, Pages 7-8.

VOC contamination has extended to the shallow ground water found underneath the site, primarily on the north side of the site. The results indicate that the VOC contamination has not migrated offsite or into the deep ground water underneath the site. Carbon tetrachloride and chloroform were detected in one deep well (31D) in one sampling event. However, several subsequent sampling events were conducted for well 31D and no contamination was detected. Well 3, located just south of the industrial disposal units, is the only VOC contaminated well on the south side of the site.

Pesticides detected in onsite ground water appear to be associated with onsite farming activities.

The first phase of samples analyzed for metals indicated high concentrations in most onsite wells but also indicated very high levels of suspended solids in the samples. High suspended solids is typically associated with either poor well development during construction or with failing to effectively screen out fine soil particles such as clays. A second phase of sampling was conducted in an effort to minimize suspended solids in the samples. The results from the second phase are presented in Table 4. The important point learned for this site is that future monitoring should use wells which are properly designed and constructed for the site's geology; specifically, drinking water quality wells will be required for future monitoring.

The data presented in Table 4 for monitoring wells 14, 29S and 30S indicate contamination with several metals. These results are suspect however because sampling events have experienced difficulties in minimizing suspended solids in these wells. The metal contaminants detected in wells 27D, 28S and 28D are aesthetic water quality concerns and appear to be related to the natural geology.

Toluene and sevin were found in the Marks' and Gramer's private wells, respectively. Based on analysis of the data, the source of these contaminants is not the Wheeling Disposal site.

5.3.4 Surface Water

Tables 5 and 6 present the contaminants which were identified at levels above background. Figure 8 identifies the locations of the surface water samples.

Three seeps which are contaminated with various VOCs were found onsite in the north ravine. As stated earlier, VOCs are highly mobile in ground water. The seeps are simply ground water daylighting. The concentrations found in the surface water are significantly higher than the VOC concentrations found in the

TABLE 5. SUMMARY OF ORGANIC CONSTITUENTS DETECTED IN SURFACE WATER

CONSTITUENT	MAXIMUM CONCENTRATION (UG/L)	LOCATIONS OF DETECTED LEVELS
(VOLATILE ORGANIC COMPOUNDS)		
CARBON TETRACHLORIDE	2,800	33B*, 33A, 41
CHLOROFORM	380	33A*, 41
DIBROMOCHLOROMETHANE	56	33A
1,1-DICHLOROETHANE	53	33A
1,2-DICHLOROETHANE	24,000	33B*, 33A
1,1-DICHLOROETHENE	9	33A
1,2-DICHLOROETHENE	201	33A*, 41
1,2-DICHLOROPROPANE	35	33A
METHYLENE CHLORIDE	510	41*, 33A
1,1,1-TRICHLOROETHANE	152	33A
TRICHLOROETHENE	15,000	33A*, 33B, 41
PESTICIDES		
ATRAZINE	6.9	41*, 33A
ETHYLENE DIBROMIDE	4.7	33A
OTHER		
CYANIDE	11.8	41

(*) DESIGNATES LOCATION OF MAXIMUM CONCENTRATION

TABLE 6. SUMMARY OF METAL CONSTITUENTS DETECTED IN SURFACE WATER

CONSTITUENT	BACKGROUND[1] CONCENTRATION (UG/L)	MAXIMUM CONCENTRATION (UG/L)	LOCATIONS OF LEVELS ABOVE BACKGROUND
ALUMINUM	< 1000	31,000	41*, 33A
CALCIUM	< 141,200	887,000	41*, 33A
CHROMIUM	< 5	32	41
COPPER	< 30	33.5	41
MAGNESIUM	< 30,500	220,000	41*, 33A
MANGANESE	< 400	1100	41
LEAD	< 15	24.5	41
VANADIUM	< 10	56	41

(*) DESIGNATES THE LOCATION OF MAXIMUM CONCENTRATION

(1) DEVELOPED FROM A COMBINATION OF THE FOLLOWING REFERENCES:

TABLE 3.2 FROM "THE SOIL CHEMISTRY OF HAZARDOUS MATERIALS," JAMES DRAGUN, 1988, PAGE 79; IN RELATIVELY HUMID REGIONS; TOTAL METALS.

"WATER POSSIBILITIES FROM THE GLACIAL DRIFT OF ANDREW COUNTY," DALE L. FULLER, J.R. McMILLEN, HARRY PICK, W.B. RUSSELL, AND JACK S. WELLS; MISSOURI GEOLOGICAL SURVEY AND WATER RESOURCES, 1957, PAGES 7-8.

ground water. As stated in Section 5.1 Hydrogeologic Setting, the loess/drift interface is capable of effectively controlling the shallow ground water flow. Since the wells are screened below this interface, the wells do not screen the zone of highest contamination.

The seeps are stagnant puddles and only flow during rainfall events. Sample 35, located at the property line and in the drainage path for the seeps, was sampled several times during both drought and wet conditions, and no contamination was found. However, computer modelling indicates the potential for the seep contamination to reach the property line during a rainfall event. The modelled concentrations for trichloroethene and 1,2-Dichloroethane at the property line are 1300 ppb and 1450 ppb, respectively.

The pesticide and metal levels identified in the seeps are not different from levels found in the ground water for the same types of contaminants.

SECTION 6.0 SUMMARY OF SITE RISKS

As part of the RI/FS process, a risk assessment was conducted in order to assess the current and potential risks to human health and to the environment due to the site. This section summarizes the findings concerning the quantified risks under both current site conditions, called the baseline risk assessment, and future site conditions. The risk assessment provides valuable information used to determine the need for cleanup action(s).

6.1 Identification of Contaminants of Concern

Close to fifty different contaminants were identified above background levels in various media onsite during the RI. Due to the wide variations in occurrence, concentrations, and toxicities between contaminants, a selection process was implemented to identify indicator chemicals for evaluation in the risk assessment. Indicator chemicals are selected to focus the assessment on the chemicals that represent the most probable risk to the public and the environment. This process resulted in the selection of the following eleven indicator chemicals: aldrin, arsenic, barium, carbon tetrachloride, chlordane, chromium, dieldrin, 1,2-dichloroethane, lead, nickel and trichloroethene. Table 7 lists the highest concentration detected for each indicator chemical in each media.

TABLE 7. SUMMARY OF MAXIMUM CONCENTRATIONS FOR THE INDICATOR CHEMICALS BY MEDIA TYPE

INDICATOR CHEMICAL	GROUND WATER MAXIMUM CONCENTRATION[1] (UG/L)[2]	SURFACE WATER MAXIMUM CONCENTRATION (UG/L)	SEDIMENT AND SURFACE SOIL MAXIMUM CONCENTRATION (UG/G)[3]
VOLATILE ORGANIC COMPOUNDS			
CARBON TETRACHLORIDE	3,100	2,800	BDL
1,2-DICHLOROETHANE	106	24,000	BDL
TRICHLOROETHENE	1,200	15,000	BDL
PESTICIDES			
ALDRIN	BDL	BDL	8,600
CHLORDANE (TOTAL)	BDL	BDL	730
DIELDRIN	BDL	BDL	470
METALS			
ARSENIC[4]	53	26	10
BARIUM	1,440	400	BDL
CHROMIUM	119	32	2,000
LEAD	11.8	24.5	BDL
NICKEL	207	50	BDL

BDL - BELOW DETECTION LIMIT

(1) - METALS RESULTS ARE BASED ON UNFILTERED, SECOND PHASE DATA ONLY.

(2) - UG/L IS EQUAL TO A PART PER BILLION

(3) - UG/G IS EQUAL TO A PART PER MILLION

(4) - METAL CONCENTRATION IN GROUND WATER IS BASED ON UNFILTERED, FIRST PHASE DATA.

6.2 Exposure Assessment

Exposure assessment involves analysis of the following factors which will affect the quantification of risks: location of contamination, contaminant concentrations, exposure pathways, affected populations, and exposure frequency.

As presented in the Summary of Site Characteristics section, contamination was detected in the following media: surface soils and sediment, subsurface soils, ground water and surface water. Concentrations for the indicator chemicals varied significantly depending on site location. As a result, risks were calculated for each media depending on location.

The rural setting, demographics and existing deed restrictions (drafted by both the State and the property owner) for the site were important factors in determining the current, potential exposure scenarios. The following scenarios were used to calculate the current risks due to exposure to the contaminants:

(1) Trespassers crossing the north ravine and central disposal areas;

(2) Trespassers crossing the south ravine;

(3) Persons using the St. Joseph drinking water supply;

(4) Persons ingesting beef from cattle grazing on the site; and,

(5) Environmental receptors (plants, animals and fish).

The EPA calculated the future risk for someone residing onsite and using onsite ground water for drinking water and for other personal needs such as showering. This is a future risk scenario which is highly unlikely given the poor marketability of land used for industrial waste disposal and given the fact that an existing deed restriction prevents onsite residences.

Exposure analysis classified the population into adults and children. Exposure frequency varied depending on the pathway of exposure. As an example, the trespassers were assumed to spend eight hours per day, twelve days per year, for ten years (typical) to thirty (worst) in contact with the onsite contaminated media. Both "typical" and "worst" case risks are calculated due to the many assumptions involved in quantifying the baseline risks.

6.3 Toxicity Assessment

Seven of the eleven indicator chemicals are classified as possible, probable or known human carcinogens with arsenic being the known human carcinogen. In Appendix A, the cancer potency factors are presented for the indicator chemicals. These factors are used to calculate excess cancer risks associated with the site based on site contaminant concentrations. As defined in the NCP, the EPA considers individual excess cancer risks in the range of 1 in 10,000 (10^{-4}) to 1 in 1,000,000 (10^{-6}) as protective of human health with the 1 in 1,000,000 risk level as the point of departure. However, when a risk is in the 1×10^{-4} to 1×10^{-6} range, EPA makes a site specific determination as to whether the risk is unacceptable. The EPA implements response actions at all sites with an excess cancer risk greater than 1×10^{-4}.

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs are multiplied by the estimated intake of a potential carcinogen to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level.

Appendix A also lists the non-carcinogenic reference dose (RfD) levels for the indicator chemicals. The RfD is a concentration to which humans can be exposed on a daily basis without adverse effect. The RfDs are used to calculate the potential Hazard Index (HI) for each contaminant based on site contaminant concentrations. Potential Hazard Indices greater than 1.0 would be considered unacceptable.

Through the defined exposure pathways, carcinogenic and non-carcinogenic risks exist for the exposed population due to each contaminant. Cumulative contaminant risks are also calculated and evaluated for exposed populations by simply adding the individual contaminant risks.

6.4 Risk Characterization

Quantified carcinogenic and non-carcinogenic risks for all exposure scenarios and populations are presented in Appendix B. Table 8 presents key carcinogenic and noncarcinogenic risks.

The results for the baseline risk assessment show that no offsite unacceptable health risks (a cancer risk greater than 1 in 10,000 or a Hazard Index greater than 1.0) are present with "typical" conditions. However, the onsite "worst" case cancer risks for the Beef Ingestion, South Ravine (both adult and child), Total Adult and Total Child scenarios exceed the 1 in 1,000,000 point of departure standard. Also, the Hazard Index for the Child in the South Ravine and the Total Adult exposure scenarios exceed the 1.0 standard.

TABLE 8. KEY ENDANGERMENT ASSESSMENT RESULTS

RECEPTOR	NON-CANCER RISK (HAZARD INDEX) TYPICAL	WORST	CANCER RISK TYPICAL	WORST
SOUTH RAVINE ADULT	0.1	0.7	3×10^{-7}	6×10^{-6}
SOUTH RAVINE CHILD	0.1	2.1	2×10^{-7}	4×10^{-6}
BEEF INGESTION	0.03	0.4	7×10^{-7}	3×10^{-5}
ST. JOSEPH[3] WATER SUPPLY	8×10^{-9}		2×10^{-10}	
TOTAL ADULT[1]	0.1	1.0	8×10^{-7}	4×10^{-5}
TOTAL CHILD[2]	0.1	0.8	1×10^{-7}	1×10^{-6}
ONSITE RESIDENT[4]	N/A	135.0	N/A	4×10^{-2}

(1) WEIGHTED SUM OF ALL EXPOSURE SCENARIOS

(2) WEIGHTED SUM OF ALL EXPOSURE SCENARIOS EXCEPT BEEF INGESTION AND ST. JOSEPH WATER SUPPLY

(3) $8 \times 10^{-9} = 0.000000008$

(4) ONSITE RESIDENT RISKS ARE NOT INCLUDED IN THE "TOTAL" RISK SUMMATIONS

N/A - NOT APPLICABLE

One individual exposure scenario accounts for the majority of the above risks: exposure to sediment in the south ravine. Risks associated with exposure to south ravine sediment are predominantly due to one surface sediment sample from the south ravine in which the pesticide aldrin was detected at a concentration of 8600 parts per billion (ppb). As indicated in Section 5.3.2 Surface Soils and Sediments, subsequent sampling and analyses throughout the south ravine did not confirm the high aldrin level. Instead, the second highest aldrin level detected in the subsequent sampling was 226 ppb.

The EPA calculated risks associated with the situation where individuals lived onsite. For the exposure of onsite residents to onsite ground water, four additional people in 100 (4×10^{-2}) could contract cancer . The hazard index for the same exposure scenario was calculated to be as high as 135.0. It should be noted that deed restrictions for the Wheeling site prevent installation of wells and residences onsite.

The Environmental Risk Assessment identified that the site is within the native range of three federally endangered species: the bald eagle, the Indiana bat and the interior least tern. However, because the site does not contain the preferred habitat of these species, it is highly unlikely that exposure of site contaminants to these species will occur. The uptake of contaminants from the soil through the root system was modelled for vegetables. No evidence of toxicity to site plants has been noted. No significant exposure pathway for chlorinated, volatile organic compounds (VOCs) from the north ravine seeps has been identified. Under current conditions, no adverse impacts were identified for the local flora and fauna ecosystems. This assessment will be re-evaluated in the event that offsite migration occurs.

The EPA bases its remedial action decisions on the Reasonable Maximum Exposures (RME) calculated for a particular site. For the Wheeling Risk Assessment, the EPA has determined that the risks presented as the typical case scenarios are the RME risks. The EPA does not find the worst case to be the RME risks. One reason is that it is based on an anomolous south ravine aldrin level detected in the first round of samples. Also, the EPA finds the future risk to onsite residents to have a very low probability of occurrence due to the deed restrictions preventing such an exposure.

As defined in the Section 5.0 Site Characteristics, the principal threat associated with the Wheeling site is the waste disposed in the closed disposal units. Risk assessment indicates that exposures due to the principal threat and related secondary threats are either within the acceptable risk range or a low probability of occurrence. As a result, remedial actions at the site will be based on the typical case risks. Worst case risks and future risks will be used to identify monitoring requirements.

In addition, the EPA has determined that cancer cleanup goals will be based on the 1 in 1,000,000 cancer standard and upon the 1.0 Hazard Index standard due to the many assumptions associated with quantifying risks for a remote site such as the Wheeling site. State and Federal Applicable or Relevant and Appropriate Requirements (ARARs) will be used to define cleanup goals, as appropriate.

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

SECTION 7.0 DESCRIPTION OF ALTERNATIVES

The alternatives analyzed in detail are presented below and are numbered to correspond with the numbers in the RI/FS reports. All costs and implementation times are estimated.

Alternative I:	No Action
Alternative II:	Long-term ground water and surface water monitoring program, closure of certain onsite wells, and installation of security measures (warning signs and/or fences).
Alternative III:	Same as Alternative II with the addition of upgrading the existing cover over the disposal areas, and site maintenance activities to maintain the containment system.

Common Elements

Except for the "No Action" alternative, all other alternatives for the site will be required to comply with the following Applicable or Relevant and Appropriate Requirements (ARARs): 1) the Missouri Solid Waste Management (MSWM) Law of 1988 (Sections 260.200 to 260.245, RSMo, Supplement 1973), and the MSWM Regulations, 10 CSR 80 (Effective December 29, 1988); 2) the Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 6901 et.seq.; 3) the Missouri Water Quality Standards (MWQS), 10 CSR 20-7.031; 4) the Federal Safe Drinking Water Act (SDWA) of 1974, as amended in 1986, 42 U.S.C. § 300f et. seq.; and 5) the Federal Clean Water Act (CWA) of 1977, as amended by the Water Quality Act (WQA) of 1987, 33 U.S.C. § 1251 et. seq.

Since the landfill closed before the 1988 MSWM went into effect, the State regulations, which include, among other things, closure and post-closure plans, are not legally applicable to the Wheeling site. The purpose of these closure and post-closure plans is to ensure that where wastes are permitted to be disposed, measures will be taken to protect against environmental harm that could result from migration of contaminants from the permitted area to soil or ground water. When Wheeling Disposal Service, Inc. closed its facility voluntarily, it did not follow procedures that subsequently became law. Therefore, the activities taken by Wheeling Disposal Service in closing the facility were not necessarily protective of the environment. It is, therefore, relevant and appropriate to impose the State's closure and post-closure procedures to ensure protectiveness to human health and the environment.

The MSWM closure and post-closure procedures can be met by substituting the RI/FS and the Record of Decision for the closure and post-closure plans. State closure procedures further require submittal of plans for the following activities: placement of a soil and vegetative cover, and ground water monitoring and leachate collection and treatment, if necessary.

Wheeling Disposal Service ceased receiving RCRA-type hazardous wastes prior to the effective date of the RCRA amendments (November 19, 1980), and these alternatives do not involve placement/disposal of RCRA-regulated waste. Therefore, the RCRA Subtitle C closure standards are not legally applicable. However, the standards have been determined by EPA to be relevant and appropriate due to the types of wastes being managed and the circumstances of the release.

Closure of the disposal areas will comply with appropriate portions of the RCRA regulations affecting landfill closure. Specifically, the site will be capped with a final cover designed and constructed to provide long-term minimization of the migration of liquids through the capped area, and to maintain its integrity over time while functioning with minimum maintenance (40 CFR 264.111, 264.228, and 264.310). In addition, the cap will be designed and constructed to promote drainage and minimize erosion of the cover. Consistent with the requirements of 40 CFR 264.117, long-term Operation and Maintenance (O&M) will be conducted to monitor the ground water and surface water around the landfill, and to ensure the integrity of the cap.

The RCRA minimum technology requirements are not applicable to the capping alternatives, because the remedy does not involve a new RCRA unit, a lateral expansion of an existing unit, or a replacement unit. These requirements are relevant but not appropriate because the Risk Assessment does not provide justification for such controls. In addition, based on the results of the Risk Assessment, leachate collection is not deemed necessary by EPA or the state of Missouri. These two decisions - RCRA minimum technology standards, and leachate collection and treatment - will, however, be reviewed every five years or more frequently if conditions such as surface water quality, ground water quality, or local land use change.

The EPA and MDNR have determined that ground water monitoring is required for this site. In addition, EPA and MDNR have determined that surface water monitoring is required for this site due to the documented surface water contamination and the associated potential health hazards.

ALTERNATIVE I

Years to Implements: Not Applicable
Capital Cost: $ 0
Annual Operation and Maintenance (O&M) Costs: $ 0
Present Worth: $ 0

CERCLA, as amended, requires that the "No Action" alternative be evaluated at every site to establish a baseline for comparison. No monies would be expended for monitoring, control, or remediation of the site. Maintenance of the existing cover over the disposal areas would not be required and potentially would degrade to an unacceptable condition which would expose the landfill wastes at the surface. Also, monitoring of the contaminated onsite ground water and surface water would not be required, thus potentially allowing the contaminated waters to migrate offsite undetected. Existing deed restrictions prevent construction of onsite residences and installation of wells intended for personal use.

ALTERNATIVE II

Years to Implement: Less than 1 year to implement, and monitoring for the life of the landfill.
Capital Cost: $ 103,600
Annual O&M Costs: $ 40,200
Present Worth (30 years; 10%): $ 721,600

A ground water and surface water monitoring program would be implemented to provide for early identification of any changes in ground water and surface water quality, and allow for timely response if action is required. The ground water program would monitor both the shallow and deep ground water below the site. For the purpose of estimating costs, the FS report proposes a monitoring well system composed of thirteen existing wells and four new wells from which ground water samples would be collected and analyzed on an annual frequency. Sampling four seeps in the north ravine on a semi-annual frequency and analyzing for volatile organic compounds (VOCs) is proposed in the FS report .

Offsite ground water quality and surface water quality would be required to meet the appropriate criteria as defined in the Missouri Water Quality Standards (MWQS) 10 CSR 20-7.031 (5)(B), Federal Safe Drinking Water Act (SDWA) and the Federal Clean Water Act (CWA). Potential ARARs are listed in Appendix C for the indicator chemicals. The ground water and surface water monitoring programs would define the points of compliance for the offsite ground water and surface water quality standards. The following new institutional controls would be required for the Wheeling site property: (1) deed restrictions to prevent farming of the disposal areas; and, (2) security signs and/or fences to warn trespassers that the property is a closed industrial landfill and to prevent farming in restricted areas.

Maintenance of the existing cover over the disposal areas would not be required and, potentially, would degrade to an unacceptable condition which would expose the wastes at the surface.

Several existing onsite wells would be closed by filling the wells from surface to depth with a material of low permeability such as a concrete-type material called grout. The purpose is to prevent wells of questionable design from acting as conduits in allowing contaminated ground water to spread both vertically and horizontally.

ALTERNATIVE III

Years to Implement: Less than 1 year to implement, and monitoring for the life of the landfill.
Capital Cost: $ 560,600
Annual O&M Cost: $ 42,000
Present Worth (30 years; 10%): $ 1,205,800

This alternative is identical to Alternative II with the addition of upgrading the existing disposal cover and providing for maintenance of the cover. The site closed using conventional methods, including soil cover of the various disposal areas. The RI documented that the existing cover varies in depth from two to five feet, and that infiltration through the cover produces a leachate which surfaces a significant distance away in the north ravines.

For cost estimating purposes, the FS proposes upgrading the existing cover by placing an additional two feet of compacted clay and six inches of top soil over the disposal areas, seeding the disposal areas and grading the site to improve drainage. This cap design complies with the technical requirements of the Missouri Solid Waste Management Act of 1988. Upgrading the cover would reduce infiltration and, subsequently, reduce leachate production. Maintenance would reduce the potential of the cover degrading to a condition which would expose the wastes to the surface.

SECTION 8.0 <u>SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES</u>

This section profiles the performance of the three alternatives against the nine criteria which EPA and MDNR use to evaluate alternatives. The nine criteria are divided into three groups: (1) Threshold Criteria - alternatives which do not satisfy these criteria are eliminated; (2) Primary Balancing Criteria - these criteria are used to weigh major trade-offs among alternatives; and, (3) Modifying Criteria - these criteria are taken into account after the public comment period.

Threshold Criteria

- Overall Protection of Human Health and the Environment:

Alternative I, the "No Action" alternative, would not be protective of human health and the environment. The contaminated ground water and surface water would migrate offsite unmonitored which presents future health risks to ground water users, and future environmental risks to the unnamed north tributary and to Mace Creek. Alternative I is not considered further in this analysis as an option for this site.

Alternatives II and III would be protective of human health and the environment by (1) monitoring onsite contaminated ground water and surface water, thereby allowing for a timely response action, if necessary, and, (2) preventing the potential exposure to contaminated onsite ground water. With implementation of either Alternative II or III, the possibility of someone being exposed to the principal threat for the Wheeling site is eliminated.

- Compliance with ARARs:

Alternatives II and III would both be required to comply with Federal and State regulations for offsite surface water and ground water (Federal Safe Drinking Water Act and Clean Water Act, and the Missouri Water Quality Standards).

Alternative II would satisfy the closure requirements of the Missouri Solid Waste Management Act of 1988 (MSWM). However, the lack of site maintenance and the documented leachate surfacing in the north ravine indicate that Alternative II would not satisfy the RCRA landfill closure requirements for Operation and Maintenance and for cover design, respectively. Alternative III would satisfy the landfill closure requirements of both MSWM and RCRA.

Balancing Criteria

- Long-term Effectiveness and Permanence:

Alternatives II and III depend upon deed restrictions to prevent exposure to onsite ground water and to landfill wastes. These deed restrictions are considered permanent in that they are legally attached to the land and unaffected by changes in ownership. In addition, the deed restrictions would require that EPA and MDNR be notified of any attempt to change the land use.

Both alternatives also depend upon monitoring programs to prevent future offsite exposure to contaminated ground water and surface water. The monitoring programs would provide long-term effectiveness given the facts known about the site hydrogeology and the remoteness of the site.

In effect, the contaminated material remaining onsite will be reliably controlled over time using either Alternative II or III.

In addition, the upgraded cover and site maintenance activities provided for in Alternative III would reduce the volume of contaminated ground water (leachate) produced in the disposal area and would reduce the likelihood of the existing cover degrading to a condition which exposes landfill wastes to the surface. The long-term effectiveness of Alternative III is superior to Alternative II due to the benefits provided by the cover-related activities.

- Reduction of Toxicity, Mobility, or Volume Through Treatment:

The National Contingency Plan (NCP) promotes the aggressive use of treatment technologies to achieve reliable remedies while acknowledging the practical limitations on the use of treatment. This approach is tempered by practicability to ensure that the remedies selected are appropriate and the program responds to the threats posed by a site.

Alternatives II and III do not incorporate treatment -- deed restrictions are considered to be institutional controls, and cover upgrading and monitoring activities are considered containment controls. However, the cover upgrading activities provided for in Alternative III would reduce the mobility and leachate volume from the disposal area. This, in turn, would reduce the volume of contaminated ground water and surface water. Also, the monitoring programs would alert the appropriate parties, including EPA and MDNR, in the event that contaminated ground water or surface water migrates offsite. At that time, remedial action(s) may be warranted which could involve treatment of contaminated ground water and/or surface water.

- Short-term Effectiveness:

Implementation of Alternatives II and III would result in low potential for unacceptable short-term risks to human health. While monitoring activities would increase exposure to contamination, all workers would be protected by use of appropriate personal protective equipment. Environmental impacts associated with these alternatives would be low as little disturbance of the site would be necessary to implement these alternatives.

- Implementability:

Implementation concerns for Alternatives II and III are low. The equipment and materials required are readily available, and the procedures to be followed are common. No special agreements or permits would be required to implement these alternatives.

- Cost:

The estimated present-worth cost of Alternative II is $721,600. This is the lowest present-worth cost of the two alternatives. The estimated present-worth cost for Alternative III is $1,205,800.

Modifying Criteria

- State Acceptance:

The Missouri Department of Natural Resources (MDNR), representing the State of Missouri, has concurred that Alternative III is the preferred alternative. A copy of the State's concurrence letter is presented following the Declaration.

- Community Acceptance:

The reservations, concerns, and supporting or opposing comments of the community on the RI/FS, the Proposed Plan, and other information in the Administrative Record were made known to the EPA during the thirty day comment period and the public meeting with the community on August 29, 1990. The public's comments will be addressed in the responsiveness summary, which is a component of this Record of Decision for the site.

SECTION 9.0 THE SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, the EPA has determined that Alternative III is the most appropriate remedy for the Wheeling Disposal Service site near Amazonia, Missouri. Alternative III includes upgrading the existing cover over the disposal area, long-term monitoring of ground water and surface water, implementing site maintenance activities, installing security measures (warning signs and/or fences), and closing certain onsite wells.

Specific details for each component of Alternative III are not defined at this time. The remedial design will define the exact details to include, but not be limited to, the following:

Upgrading the Existing Cover

* The areas requiring cover upgrading;
* The design of the upgraded cover;
* The type and source of soils to be used in the cover;

Long-term Monitoring

* The number of ground water wells and surface water sampling locations;
* The design of monitoring wells which precludes filtering of metals samples;
* The depths screened by the wells;
* The frequency of sampling the wells and surface water locations;
* The chemical analyses required for the samples;

Site Maintenance Activities

* The types of maintenance activities; and,
* The frequency of maintenance activities.

Security Measures

* The areas requiring security measures;
* The type(s) of security measures;

Closing Certain Onsite Wells

* The wells to be closed;

* The technique to be used to close these wells;

As required by the NCP, compliance points for the ground water and surface water monitoring programs will be located to determine the long-term effectiveness of the selected remedy and to provide an early warning before hazardous substances migrate offsite and endanger human health or the environment. The ground water monitoring system will monitor both the shallow ground water at the loess/drift interface and the deeper ground water extending to bedrock. Performance criteria will be developed and based upon Applicable or Relevant and Appropriate Requirements (ARARs) such as the Missouri Water Quality Standards (MWQS), Federal Safe Drinking Water Act (SWDA) and the Federal Clean Water Act (CWA).

The performance criteria will be used to define whether the selected remedy will maintain protection of human health and the environment over time. In the event that the monitoring program indicates exceedance of the performance criteria, then additional remedial activities may be required to protect human health and the environment. These additional activities may include, but would not be limited to, ground water and/or surface water leachate collection and treatment.

SECTION 10.0 STATUTORY DETERMINATIONS

CERCLA requires EPA to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA specifically requires the selected remedial action to 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 that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

10.1 Protection of Human Health and the Environment

The selected remedy protects human health and the environment through deed restrictions which prevent any person from establishing a residence on the site, using onsite ground water and farming of disposal areas. In addition, the selected remedy requires the cover to be upgraded and maintained over the disposal areas thereby eliminating potential exposures to uncovered wastes. Further, the selected remedy will monitor ground water and surface water to prevent offsite migration of hazardous substances. No unacceptable short-term or cross-media impacts will be caused by implementation of the remedy.

10.2 Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with all applicable or relevant and appropriate chemical, action and location specific requirements (ARARs). The ARARs are presented below.

Action-Specific ARARs:

Landfill closure and post-closure requirements defined in

- Missouri Solid Waste Management (MSWM) Law of 1988 (Sections 260.200 to 260.245, RSMo, Supplement 1973), and MSWM Regulations, 10 CSR 80 (Effective December 29, 1988); and,

- Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 6901 et.seq.

Chemical-Specific ARARs:

- Federal Maximum Contaminant Levels for inorganic and organics in drinking water supplies (40 CFR Part 141) as defined in the Safe Drinking Water Act (SWDA) of 1974, as amended in 1986, 42 U.S.C. § 300f et. seq.;

- Federal Ambient Water Quality Standards as defined by the Clean Water Act (CWA) of 1977, as amended by the Water Quality Act (WQA) of 1987, 33 U.S.C. § 1251 et. seq.;

- State of Missouri water quality standards for inorganics and organics in ground water and surface water (10 CSR 20-7.031).

Location-Specific ARARs:

- None

10.3 Cost-Effectiveness

The selected remedy is cost-effective because it has been determined to provide overall effectiveness proportional to its costs. The estimated net present worth for the selected remedy is $1,205,800. The selected remedy is the most costly of Alternatives II and III, but it provides a significant advantage in long-term reliability due to the cover activities.

10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedy provides a superior advantage based on the comparative analysis using the nine criteria. Specifically, for the balancing criteria:

- The long-term effectiveness of the selected remedy is superior to Alternative II due to the cover and maintenance of it;

- Only the selected remedy provides a reduction in mobility and volume of leachate due to the cover-related activities;

- Both Alternative II and the selected remedy provide equal and acceptable short-term effectiveness;

- Both Alternative II and the selected remedy provide equal and acceptable degrees of implementability; and,

- The selected remedy is more costly than Alternative II but provides superior long-term reliability based on the previous four balancing criteria.

The state of Missouri is in concurrence with the selected remedy. The EPA reviewed all written and verbal comments submitted during the public comment period, including the public meeting. Upon review of these comments, EPA has determined that no significant changes to the preferred remedy, as it was originally identified in the Proposed Plan, is necessary.

10.5 Preference for Treatment as a Principal Element

The NCP states that the remedy selection process is founded on the overarching mandate to protect human health and the environment. The EPA emphasizes the statutory preference for permanent solutions and use of treatment technologies. This approach emphasizes solutions that can ensure reliable protection over time. However, the approach is tempered by practicability to ensure that remedies selected are appropriate. Further, this process considers the full range of factors pertinent to remedy selection and provides the flexibility necessary and appropriate to ensure that remedial actions selected are sensible, reliable solutions for identified site problems. The EPA will always seek to reduce hazards to levels that ensure that contaminated material remaining onsite can be reliably controlled over time.

This remedy utilizes permanent solutions and alternative treatment technologies, to the maximum extent practicable for this site. However, because treatment of the hazardous substances was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element. Although treatment is not being selected, the selected remedy activities do effectively reduce hazards. The site hydrogeology consists in part of a loess/drift interface that acts to control the migration of leachate from the disposal areas. Thus, the migration of hazardous substances is limited and can be effectively monitored to protect human health and the environment. Upgrading and maintaining the cover in combination with site security measures minimizes the formation and migration of leachate, and prevents direct exposures to buried wastes.

Although not required initially, contingencies for future collection and treatment of contaminated surface water and/or ground water are provided in the selected remedy if performance criteria are exceeded at designated points of compliance.

APPENDIX A

SUMMARY OF CARCINOGENIC AND NON-CARCINOGENIC TOXICITY VALUES

	CANCER		NON-CANCER
CHEMICAL	**GROUP**	**ORAL CPF**	**RfD**
CARBON TETRACHLORIDE	B2	1.3×10^{-1}	7×10^{-3} (SUBCHRONIC) 7×10^{-4} (CHRONIC)
1,2-DICHLOROETHANE	B2	9.1×10^{-2}	NA
TRICHLOROETHENE	B2	1.1×10^{-2}	NA
ALDRIN	B2	1.7×10^{1}	3×10^{-5} (SUBCHRONIC AND CHRONIC)
CHLORDANE	B2	1.3×10^{0}	6×10^{-5} (CHRONIC)
DIELDRIN	B2	1.6×10^{1}	5×10^{-5} (SUBCHRONIC AND CHRONIC)
ARSENIC	A	NA	1×10^{-3} (SUBCHRONIC AND CHRONIC)
BARIUM	-	--	5×10^{-2} (SUBCHRONIC AND CHRONIC)
CHROMIUM (III)	-	--	1×10^{0} (CHRONIC)
LEAD	-	--	--
NICKEL	-	--	2×10^{-2} (SUBCHRONIC AND CHRONIC)

B2 - PROBABLE HUMAN CARCINOGEN

A - KNOWN HUMAN CARCINOGEN

CPF - CANCER POTENCY FACTOR (MG/KG/DAY)

RfD - REFERENCE DOSE (MG/KG/DAY)

APPENDIX B

HAZARD INDICES FOR ADULT TRESPASSER SCENARIO

Chemical	Route	Typical Case	Worst Case
Chromium	Ingestion	$4.32x10^{-7}$	$2.13x10^{-6}$
Dieldrin	Ingestion	$3.68x10^{-3}$	$1.06x10^{-2}$
	Dermal Contact	$2.09x10^{-3}$	$5.97x10^{-3}$
	TOTAL-Dieldrin	$5.77x10^{-3}$	$1.66x10^{-2}$
Carbon tetrachloride	Dermal Contact*	$1.40x10^{-3}$	$1.57x10^{-2}$
	Inhalation*	$3.24x10^{-4}$	$3.51x10^{-3}$
	TOTAL-CCl_4*	$1.72x10^{-3}$	$1.92x10^{-2}$
1,2-Dichloro-ethane	Dermal Contact	ND	ND
	Inhalation	ND	ND
	TOTAL-1,2-DCA	ND	ND
Trichloro-ethene	Dermal Contact	ND	ND
	Inhalation	ND	ND
	TOTAL-TCE	ND	ND

*Carbon tetrachloride Hazard Indices are calculated using oral chronic RfD.

HAZARD INDICES FOR 6-9 YEAR OLD CHILD TRESPASSER SCENARIO

Chemical	Route	Typical Case	Worst Case
Dieldrin	Soil Ingestion	$1.03x10^{-2}$	$2.96x10^{-2}$
	Dermal Contact	$6.67x10^{-3}$	$1.91x10^{-2}$
	TOTAL-Dieldrin	$1.69x10^{-2}$	$4.87x10^{-2}$
Carbon tetrachloride	Inhalation	$9.07x10^{-4}$	$9.83x10^{-3}$
	Dermal Contact	$2.41x10^{-3}$	$2.13x10^{-2}$
	TOTAL-CCl_4	$3.32x10^{-3}$	$3.11x10^{-2}$
1,2-Dichloro-ethane	Inhalation	ND	ND
	Dermal Contact	ND	ND
	TOTAL-1,2-DCA	ND	ND
Trichloro-ethene	Inhalation	ND	ND
	Dermal Contact	ND	ND
	TOTAL-TCE	ND	ND

ND - Not Determined

HAZARD INDICES FOR ADULT TRESPASSER IN SOUTH RAVINE SCENARIO

Indicator	Route	Typical Case	Worst Case
Aldrin	Sediment ingestion	1.84×10^{-2}	0.41
Chlordane	Sediment ingestion	5.72×10^{-3}	2.85×10^{-2}
Dieldrin	Sediment ingestion	2.56×10^{-3}	1.34×10^{-2}
Aldrin	Dermal contact	1.04×10^{-1}	0.23
Chlordane	Dermal contact	3.23×10^{-3}	1.62×10^{-2}
Dieldrin	Dermal contact	1.45×10^{-3}	4.47×10^{-2}
Aldrin	TOTAL	1.23×10^{-1}	0.64
Chlordane	TOTAL	8.95×10^{-3}	7.60×10^{-3}
Dieldrin	TOTAL	4.00×10^{-3}	2.10×10^{-2}
All	TOTAL	1.36×10^{-1}	0.67

HAZARD INDICES FOR 6-9 YEAR OLD CHILD TRESPASSER IN SOUTH RAVINE SCENARIO

Indicator	Route	Typical Case	Worst Case
Aldrin	Sediment ingestion	5.17×10^{-2}	1.15
Chlordane	Sediment ingestion	1.60×10^{-2}	8.00×10^{-2}
Dieldrin	Sediment ingestion	7.16×10^{-3}	3.76×10^{-2}
Aldrin	Dermal contact	3.34×10^{-2}	0.74
Chlordane	Dermal contact	1.04×10^{-2}	5.18×10^{-2}
Dieldrin	Dermal contact	4.61×10^{-3}	2.44×10^{-2}
Aldrin	TOTAL	5.50×10^{-2}	1.89
Chlordane	TOTAL	2.64×10^{-2}	0.13
Dieldrin	TOTAL	1.18×10^{-2}	6.20×10^{-2}
All	TOTAL	9.32×10^{-2}	2.08

HAZARD INDICES FOR ADULT TRESPASSER NEAR NORTH RAVINE

Indicator	Route	Typical Case	Maximum Case
Carbon tetrachloride	Inhalation	3.69×10^{-2}	5.56×10^{-2}
1,2-Dichloroethane	Inhalation	ND	ND
Trichloroethene	Inhalation	ND	ND

HAZARD INDICES FOR CHILD TRESPASSER NEAR NORTH RAVINE

Indicator	Route	Typical Case	Maximum Case
Carbon tetrachloride	Inhalation	1.03×10^{-1}	1.56×10^{-1}
1,2-Dichloroethane	Inhalation	ND	ND
Trichloroethene	Inhalation	ND	ND

UPPER BOUND CANCER RISKS FOR ADULT TRESPASSER SCENARIO

Chemical	Route	Typical Case	Worst Case
Dieldrin	Ingestion	$1.29x10^{-8}$	$1.11x10^{-7}$
	Dermal Contact	$7.28x10^{-9}$	$6.26x10^{-8}$
	TOTAL-Dieldrin	$2.02x10^{-8}$	$1.74x10^{-7}$
Carbon tetrachloride	Dermal Contact	$7.46x10^{-10}$	$2.51x10^{-8}$
	Inhalation	$1.29x10^{-10}$	$5.30x10^{-9}$
	TOTAL-CCl_4	$8.75x10^{-10}$	$3.04x10^{-8}$
1,2-Dichloro-ethane	Dermal Contact	$1.03x10^{-10}$	$3.37x10^{-9}$
	Inhalation	$6.26x10^{-11}$	$2.57x10^{-9}$
	TOTAL-1,2-DCA	$1.66x10^{-10}$	$5.93x10^{-9}$
Trichloro-ethene	Dermal Contact	$3.39x10^{-10}$	$1.10x10^{-8}$
	Inhalation	$1.33x10^{-10}$	$5.44x10^{-9}$
	TOTAL-TCE	$4.72x10^{-10}$	$1.64x10^{-8}$
All	Ingestion	$1.29x10^{-8}$	$1.11x10^{-7}$
	Dermal Contact	$8.49x10^{-9}$	$1.19x10^{-7}$
	Inhalation	$3.25x10^{-10}$	$1.33x10^{-8}$
	TOTAL-All	$2.17x10^{-8}$	$2.43x10^{-7}$

UPPER BOUND CANCER RISKS FOR CHILD TRESPASSER

Indicator	Route	Typical Case	Worst Case
Dieldrin	Soil Ingestion	2.82×10^{-8}	8.06×10^{-8}
	Dermal Contact	2.36×10^{-8}	6.80×10^{-8}
	TOTAL-Dieldrin	5.18×10^{-8}	1.49×10^{-7}
Carbon tetrachloride	Inhalation	2.81×10^{-10}	3.04×10^{-10}
	Dermal Contact	1.05×10^{-8}	9.24×10^{-8}
	TOTAL-CCl_4	1.08×10^{-8}	9.54×10^{-8}
1,2-Dichloro-ethane	Inhalation	1.37×10^{-10}	1.47×10^{-9}
	Dermal Contact	1.45×10^{-9}	1.25×10^{-8}
	TOTAL-1,2-DCA	1.59×10^{-9}	1.39×10^{-8}
Trichloro-ethene	Inhalation	1.87×10^{-11}	2.02×10^{-19}
	Dermal Contact	4.74×10^{-10}	4.06×10^{-8}
	TOTAL-TCE	4.93×10^{-10}	4.26×10^{-8}
All	All	6.42×10^{-8}	3.01×10^{-7}

UPPER BOUND CANCER RISKS FOR ADULT TRESPASSER IN SOUTH RAVINE

Indicator	Route	Typical Case	Worst Case
Aldrin	Sediment ingestion	4.11×10^{-8}	3.47×10^{-6}
Chlordane	Sediment ingestion	1.95×10^{-9}	3.69×10^{-8}
Dieldrin	Sediment ingestion	8.98×10^{-9}	1.78×10^{-7}
Aldrin	Dermal contact	2.33×10^{-7}	1.96×10^{-6}
Chlordane	Dermal contact	1.11×10^{-9}	2.08×10^{-8}
Dieldrin	Dermal contact	5.07×10^{-9}	1.01×10^{-7}
Aldrin	Total	2.74×10^{-7}	5.43×10^{-6}
Chlordane	Total	3.06×10^{-9}	5.78×10^{-8}
Dieldrin	Total	1.41×10^{-8}	2.78×10^{-7}
All	Total	2.91×10^{-7}	5.76×10^{-6}

UPPER BOUND CANCER RISKS FOR CHILD TRESPASSER IN SOUTH RAVINE

Indicator	Route	Typical Case	Worst Case
Aldrin	Sediment ingestion	8.96×10^{-8}	1.99×10^{-6}
Chlordane	Sediment ingestion	4.25×10^{-9}	2.12×10^{-8}
Dieldrin	Sediment ingestion	1.95×10^{-8}	1.03×10^{-7}
Aldrin	Dermal contact	7.54×10^{-8}	1.68×10^{-6}
Chlordane	Dermal contact	3.58×10^{-9}	1.78×10^{-8}
Dieldrin	Dermal contact	1.64×10^{-8}	8.61×10^{-8}
Aldrin	Total	1.65×10^{-7}	3.67×10^{-6}
Chlordane	Total	7.83×10^{-9}	3.90×10^{-8}
Dieldrin	Total	3.59×10^{-8}	1.89×10^{-7}
All	Total	2.09×10^{-7}	3.90×10^{-6}

UPPER BOUND CANCER RISKS FOR ADULT TRESPASSER NEAR NORTH RAVINE

Indicator	Route	Typical Case	Maximum Case
Carbon tetrachloride	Inhalation	1.47×10^{-8}	8.40×10^{-8}
1,2-Dichloroethane	Inhalation	7.10×10^{-9}	4.00×10^{-8}
Trichloroethene	Inhalation	1.51×10^{-8}	8.64×10^{-8}
All	Total	3.69×10^{-8}	2.10×10^{-7}

UPPER BOUND CANCER RISKS FOR CHILD TRESPASSER NEAR NORTH RAVINE

Indicator	Route	Typical Case	Maximum Case
Carbon tetrachloride	Inhalation	3.20×10^{-8}	4.94×10^{-8}
1,2-Dichloroethane	Inhalation	1.55×10^{-8}	2.33×10^{-8}
Trichloroethene	Inhalation	3.28×10^{-8}	4.95×10^{-8}
All	Total	8.03×10^{-8}	1.22×10^{-7}

HAZARD INDICES AND UPPER BOUND CANCER RISKS FOR PUBLIC WATER USERS

Indicator	Hazard Index	Cancer Risk
Carbon tetrachloride	8.09×10^{-9}	7.36×10^{-11}
1,2-Dichloroethane	NA	3.19×10^{-11}
Trichloroethene	NA	4.91×10^{-11}

HAZARD INDEX AND UPPER BOUND CANCER RISK FOR BEEF INGESTION

	Typical Case	Worst Case
Hazard Index	2.75×10^{-2}	0.389
Cancer Risk	6.74×10^{-7}	3.27×10^{-5}

APPENDIX C

FEDERAL HEALTH ADVISORIES[1]

CHEMICAL	ONE-DAY (UG/L)	TEN-DAY (UG/L)	LONG-TERM (UG/L)	LIFETIME (UG/L)
ALDRIN	0.3	0.3	0.3	--
ARSENIC	--	--	--	--
BARIUM	5,000	5,000	5,000	5,000
CARBON TETRACHLORIDE	4,000 (C)	200 (C)	70 (C) 300 (A)	--
CHLORDANE	60 (C)	60 (C)	0.5 (C) 0.5 (A)	--
CHROMIUM (TOTAL)	1,000	1,000	200 (C) 800 (A)	100
DIELDRIN	0.5	0.5	0.5 (C) 2 (A)	--
1,2-DICHLOROETHANE	700	700	700 (C) 2,600 (A)	--
LEAD	--	--	--	--
NICKEL	1,000	1,000	100 (C) 600 (A)	100
TRICHLOROETHENE	--	--	--	--

(C) DENOTES VALUE DEVELOPED FOR CHILD

(A) DENOTES VALUE DEVELOPED FOR ADULT

(1) DRINKING WATER HEALTH ADVISORIES; OFFICE OF DRINKING WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY; APRIL 1990

SUMMARY OF FEDERAL DRINKING WATER ARARS[1]

CHEMICAL	MCL (UG/L)	PROPOSED MCL (UG/L)	MCLG (UG/L)
ALDRIN	--	--	--
ARSENIC	50	--	0
BARIUM	--	5,000	5,000
CARBON TETRACHLORIDE	5	--	0
CHLORDANE	--	--	0
CHROMIUM (TOTAL)	50	100	120
DIELDRIN	--	--	--
1,2-DICHLOROETHANE	5	--	0
LEAD	50	5	0
NICKEL	--	100	100
TRICHLOROETHENE	5	--	0

(1) DRINKING WATER REGULATIONS; OFFICE OF DRINKING WATER; U.S. ENVIRONMENTAL PROTECTION AGENCY; APRIL 1990

FEDERAL SURFACE WATER QUALITY CRITERIA[1]

CHEMICAL	HUMAN HEALTH WATER/FISH (UG/L)	HUMAN HEALTH FISH (UG/L)	AQUATIC LIFE FRESHWATER ACUTE (UG/L)	AQUATIC LIFE FRESHWATER CHRONIC (UG/L)
ALDRIN	0.00013	0.00014	3	--
ARSENIC	0.018	0.14	360	190
BARIUM	--	--	--	--
CARBON TETRACHLORIDE	0.25	4.5	--	--
CHLORDANE	--	--	2.4	0.0043
CHROMIUM (TOTAL)	170	3,400	1,700	210
DIELDRIN	0.00014	0.00014	2.5	0.0019
1,2-DICHLOROETHANE	0.38	99	--	--
LEAD	50	--	82	32
NICKEL	510	3,800	1,400	160
TRICHLOROETHENE	2.7	81	--	--

(1) FEDERAL WATER QUALITY CRITERIA; CLEAN WATER ACT; U.S. ENVIRONMENTAL PROTECTION AGENCY

MISSOURI WATER QUALITY STANDARDS[1]

CHEMICAL	AQUATIC LIFE (UG/L)	DRINKING (UG/L)	GROUND WATER (UG/L)
ALDRIN	0.000079	0.000074	0.000074
ARSENIC	20	50	50
BARIUM	--	1,000	1,000
CARBON TETRACHLORIDE	--	5	5
CHLORDANE	0.00048	0.00046	0.00046
CHROMIUM (TOTAL)	190 (CHRONIC) 280 (ACUTE)	50	50
DIELDRIN	0.000076	0.000071	0.000071
1,2-DICHLOROETHANE	--	5	5
LEAD	29 (CHRONIC) 190 (ACUTE)	50	50
NICKEL	770 (CHRONIC) 6,900 (ACUTE)	--	200
TRICHLOROETHENE	--	5	5

(1) MISSOURI WATER QUALITY STANDARDS; 10 CSR 20-7.031

RECORD OF DECISION

THE RESPONSIVENESS SUMMARY

WHEELING DISPOSAL SERVICE COMPANY LANDFILL

AMAZONIA, MISSOURI

Prepared by:

U.S. Environmental Protection Agency

Region VII

Kansas City, Kansas

SEPTEMBER 1990

RESPONSIVENESS SUMMARY

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1.0 OVERVIEW

In the Proposed Plan released to the public, the Environmental Protection Agency (EPA), with technical concurrence from the Missouri Department of Natural Resources (MDNR), made a preliminary selection for the preferred alternative. The EPA's recommended alternative addressed all contamination in all media at the site. The preferred alternative involved upgrading the existing cover over the disposal units, long-term monitoring of ground water and surface water, implementing site maintenance activities, using deed restrictions to prevent farming on certain areas and to prevent drinking onsite ground water, installing security measures, and closing certain onsite wells.

The comments received from the public during the public comment period focussed on two main topics: disposal practices during operation of the landfill and the landfill's impact on property values. Most comments were presented by residents living adjacent to the site. No comments were presented which required modifying the preferred alternative.

The Potentially Responsible Parties (PRPs) submitted several written comments. The PRPs disagree with certain details in how the state of Missouri's Solid Waste Act closure procedures should be considered an Applicable or Relevant and Appropriate Requirement (ARAR). The PRPs supported the preferred alternative.

2.0 BACKGROUND ON COMMUNITY INVOLVEMENT

Community interest in the Wheeling Disposal Service Company Landfill (site) dates back to the early 1970's. Due to severe odor problems associated with the disposal of tannery waste at the site, the local residents filed complaints with MDNR, state representatives and congressmen. In 1975, the community submitted to MDNR a petition with several hundred signatures asking MDNR to stop the disposal activities at the site.

In 1986 and 1987, several citizen complaints were submitted to MDNR and to Missouri Department of Health (MDOH) concerning water quality in private wells.

3.0 SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD

Comments received during the public comment period on the draft Feasibility Study (FS) and Proposed Plan are summarized briefly below. The comment period was held from August 13 to September 11, 1990. The comments are categorized by relevant topics.

A. Remedial Alternative Preferences/Questions/Concerns

1. One local resident stated that the selected remedy is inadequate for closure. The resident believes that the ground water is contaminated as proven by pesticide contamination in his private well.

   Response

   The selected remedy will comply with both EPA and MDNR landfill closure regulations. These regulations are the technical standards by which all landfills are closed. Secondly, risk assessment analysis indicates that the selected remedy will be protective of human health and the environment.

   The shallow ground water is contaminated onsite. However, results from the remedial investigation document that the site has not contaminated offsite ground water at this time. No pesticide contamination was detected in offsite private wells during the remedial investigation.

2. One commenter stated that all onsite water should be kept onsite. The commenter recommended including onsite dams to keep the surface water onsite.

   Response

   Technical justification is required to support each remedial activity. Remedial investigation results do not indicate contamination of offsite ground water or surface water due to the site.

   Several stagnant, onsite "seeps" in the north ravine are contaminated; however, no contamination has been detected leaving the site in the north ravine. The seeps are, in fact, stagnant and would require a rainfall to move offsite. Risk assessment analysis does not indicate unacceptable risks due to the site's surface water condition.

   The selected remedy includes monitoring of both surface water and ground water, and developing performance criteria for both media. Remedial activities will be conducted when monitoring results exceed performance criteria. These activities may include collection and treatment of surface water and/or ground water.

3. One commenter stated that the local soil is a loess/loam type which will wash away easily and, thus, not serve adequately as the cover material.

<u>Response</u>

The source of the cover material has not been determined at this time. The feasibility study proposes using onsite soils for the cover material, but the EPA has not approved of this proposal. The federal and state landfill closure laws require that the cover minimize infiltration <u>and maintenance.</u>

4. One commenter stated that the south, unnamed ravine usually has flowing water except during the last two years due to the drought.

<u>Response</u>

Drought conditions existed during the entire remedial investigation which prevented taking surface water samples from the south ravine. However, the surface water monitoring program will be flexible such that surface water sampling will be conducted in the south ravine if and when it begins to flow.

5. A group of PRPs, referred hereafter as the Wheeling Trust, provided the following comment:

"The preferred alternative designated in any Proposed Plan is driven by the baseline risk assessment conducted for that particular site. Public review of any proposed plan will no doubt produce a wide variety of comments some of which may propose a more extensive alternative than justified by the baseline risk assessment.

The Proposed Plan for the Wheeling Disposal site adequately addresses the risks determined in the site baseline risk assessment. Some comments concerning the Proposed Plan may be justified and should be incorporated into the Proposed Plan. However, other comments which present alternatives more protective to human health and the environment but are not justified based upon the risks presented in the baseline risk assessment should not be incorporated into the Proposed Plan."

<u>Response</u>

For the Wheeling site, the EPA has followed the remedy selection process as defined in the National Contingency Plan. This process is based upon using risk assessment methods to justify the need for remedial activities. The selected remedy for the Wheeling site satisfies all risk-based requirements and protects human health and the environment.

6. The Wheeling Trust provided a comment that it does not consider the Missouri Solid Waste Management Act (MSWM) to be an ARAR for the site, and the Wheeling Trust urges EPA to reconsider their position. Specifically, the Wheeling Trust's principal objection is that the regulations contain a discretionary component requiring that landfill closure plans contain, if not already present at the site, methane control systems, leachate collection systems, and/or ground water monitoring wells <u>if deemed necessary</u> by MDNR. As a result, if the MSWM regulations are selected as ARARs, in effect, EPA will be rewriting these regulations to substitute <u>EPA's judgement</u> over the MDNR for the discretionary component of the regulations.

<u>Response</u>

In order for a state law, standard, or regulation to become an ARAR, it must be applicable or relevant and appropriate <u>and</u> more stringent than a federal law, standard, or regulation. State ARARs were included in CERCLA for the purpose of achieving the higher level of protectiveness in states where the state standard is higher than the federal standard. When EPA adopts a state ARAR, it is adopting the substantive requirements of the state law, standard or regulation. The procedural requirements of the particular state law, standard or regulation are not relevant to the level of cleanup and are therefore not adopted. The thrust of the Wheeling Trust's objection is that the procedural requirements of the state ARAR will not be followed. This objection is simply not relevant. The EPA is adopting the substantive requirements of state law by requiring the state's regulations on landfill closure be implemented. Since these regulations requiring leachate collection systems and ground water monitoring, if necessary, are stricter standards than the federal standards which do not impose such requirements, EPA is achieving the desired goal of implementing the law that requires the higher level of protectiveness.

7. In response to EPA's statement that Wheeling Disposal Service did not follow closure procedures that subsequently became law, the Wheeling Trust provided a comment that the Wheeling Disposal Service did follow procedures addressed in the MSWM, except for the submittal of a formal closure/post-closure plan. The disposal units at the site were covered with clayey soil and vegetation was established to help minimize erosion, control drainage, and provide a pleasing appearance.

<u>Response</u>

The MSWM states that to prevent a solid waste disposal area from being a blight on the land, a hazard to health and safety, an air pollution problem or a source of pollution to any water course, the owner/operator of any solid waste disposal area shall obtain approval of the method of closure prior to closure. Placement of cover and establishment of vegetation in such a manner as to minimize erosion, control drainage and provide a pleasing appearance is but a part of the closure procedure. Also, if deemed necessary, installation may be required for a methane control system, leachate collection system and/or a ground water monitoring well system. Finally, post-closure plans shall include maintenance and monitoring activities to be performed.

The Wheeling Disposal Service did not submit a closure or post-closure plan. As a result, post-closure monitoring of the site was not implemented by Wheeling Disposal Service and, in effect, human health and the environment were not protected as hazardous substances were allowed to migrate potentially undetected.

8. The Wheeling Trust commented that EPA has incorrectly described the monitoring of ground water and surface water as a requirement under the MSWM. Review of the MSWM shows that this is not the case. The monitoring of ground water is an activity which <u>may</u> <u>be</u> implemented if deemed necessary. Surface water monitoring is not even considered in this regulation.

<u>Response</u>

Factually, the Wheeling Trust's comment is correct and the Record of Decision reflects the change in language regarding the MSWM ARAR. However, this change does not affect the selected remedy. Both MDNR and EPA deem ground water monitoring to be necessary at the site. Also, the MSWM states that the method of closure for a site shall prevent a solid waste disposal area from being a hazard to health and safety, among other things. Due to the documented surface water contamination in the north ravine, both MDNR and EPA deem surface water monitoring to be necessary to prevent the site from being a hazard to health and safety.

9. The Wheeling Trust commented that the Proposed Plan inaccurately summarized the monitoring program presented in the Wheeling Disposal Site Feasibility Study. The Proposed Plan failed to mention that two surface water samples were proposed in the monitoring program in addition to the two seep water samples.

<u>Response</u>

The Wheeling Trust's comment is correct and the Record of Decision reflects this change in description. However, this change does not affect the selected remedy in that a detailed surface water monitoring program has not been approved by the EPA at this time.

10. The Wheeling Trust commented that although none of the alternatives presented in the Proposed Plan address conventional treatment technologies, they do possess treatment of mobility through natural attenuation. During ground water movement through the subsurface, contaminants will adhere to the soil particles reducing their mobility in the ground water.

This mobility treatment through natural attenuation is discussed in the EPA responses to the NCP comments. In their response, EPA has recognized the benefit of natural attentuation as a treatment for mobility, especially in circumstances involving excessive time periods for conventional treatment such as pump and treat.

Response

Clearly stated in the NCP preamble (55 Federal Register No. 46, March 8, 1990, Page 8701), CERCLA's preference for achieving protection is through the use of treatment technologies that destroy or reduce the inherent hazards posed by wastes and result in remedies that are highly reliable over time. The purpose of treatment in the Superfund program is to significantly reduce the toxicity and/or mobility of the contaminants posing a significant threat wherever practicable and to reduce the need for long-term management of hazardous material.

The selected remedy for the Wheeling site does not reduce the toxicity of the contaminants and does not significantly reduce the need for long-term management of hazardous material; in effect, the selected remedy for the Wheeling site does not involve treatment as defined in the NCP. However, the Wheeling selected remedy does reliably protect human health and the environment over time through effective use of institutional and containment measures.

B. Remedial Investigation Questions and Concerns

11. Many comments were provided by various residents living near the site concerning the disposal practices during operation of the site. In essence, the nearby residents suspect that unpermitted disposal practices were conducted by Wheeling Disposal Service such that unpermitted wastes were disposed at the site and that unpermitted disposal units were used.

Response

Types of wastes and disposal areas were defined by the MDNR permits for the site. MDNR conducted two inspections before the site was permitted, 22 inspections during the years the site was in operation, and two post-closure inspections. These inspections identified several violations of the permits such as inadequate daily coverage of wastes with clay, improper construction of new disposal trenches and improper disposal of wastes. Also, EPA conducted several inspections and conducted an aerial photography study of the site. Finally, during the remedial investigation, a magnetometry study was conducted to identify the locations of disposal units; results from this study did not indicate unknown disposal units. The net effect of these inspections and studies confirms that the locations of disposal units are well known for this site.

The selected remedy includes a surface water and ground water monitoring program. This program will detect all contaminants - permitted or unpermitted - which are migrating from this site. Relative to the permitted wastes known to have been disposed at the site, the EPA does not expect that an unpermitted waste, if detected, would change the risk assessment and, subsequently, to require modifying or changing the selected remedy.

12. One commenter asked how the remedial investigation found the offsite ground water to be uncontaminated when a 1987 State report determined that the site was contaminating offsite ground water.

<u>Response</u>

In response to several citizen's concerns with ground water quality around the site, the Missouri Department of Health (MDOH) conducted a ground water and surface water study in the vicinity of the site during 1987. The MDOH study concluded that ground water and surface water in the area exceeds aesthetic drinking water criteria for several metals, but did not determine that the site was the source of the contamination. In agreement with the MDOH study, the remedial investigation found that ground water in the area would exceed drinking water standards for several naturally occuring metals if the wells are not effectively filtered.

13. Several commenters inquired if a cancer cluster study and thyroid disease study had been conducted for the area near the site.

<u>Response</u>

The Missouri Department of Health (MDOH) has reviewed the health status of the population living near the site. A review of mortality and natality rates for the zip codes around the site showed no rates statistically significantly higher than the site rate. In addition, MDOH conducted health interviews with the twenty families living closest to the landfill. No discernible patterns of illness were detected.

14. Several commenters expressed concern that the remedial investigation reports are biased since they are written by the Potentially Reponsible Parties (PRPs).

<u>Response</u>

The PRPs signed an agreement with the EPA to conduct the remedial investigation (RI) and write the RI and Feasibility Study (FS) reports. This agreement specifies that the PRPs are required to conduct the study and write the reports in compliance with the National Contingency Plan (NCP). All workplans for the study were reviewed by the EPA and MDNR. The EPA and MDNR conducted oversight of all field activities, including sampling. Quality assurance procedures were taken by the EPA such as taking split samples and analyzing the samples at a different laboratory than the laboratory used by the PRPs. All reports were reviewed by the EPA, professional consultants under contract to the EPA, MDNR and MDOH. In effect, the EPA considers the RI and FS reports to be accurate, factual and of acceptable quality upon which to base a decision.

C. Public Participation Process

During the public meeting, many questions covering many different topics were asked. The EPA, MDNR and/or MDOH answered most of the questions in the public meeting. These questions and responses were documented in the transcript for the public meeting which has been included in the administrative record for the site.

15. One commenter asked how the State could permit the Wheeling site without community involvement.

<u>Response</u>

MDNR personnel involved with the site at the time of permitting did not recollect any public involvement or participation regarding the permitting of the landfill. There were no regulations in effect at that time that would have required such participation.

D. Cost/Funding Issues

16. Several commenters inquired as to who is going to reimburse the residents for lost property value.

<u>Response</u>

The Superfund law authorizes specific funds to be used for a specific purpose and that purpose is to investigate and cleanup hazardous waste around the country. Devalued real estate due to hazardous waste sites is a problem; however, the Superfund law does not include authority to address this problem.

4.0 *COMMUNITY RELATIONS ACTIVITIES*

Community relations activities conducted at the Wheeling Disposal Service Company Landfill site during the remedial investigation have included:

The EPA conducted interviews with residents near the site in April 1988. The interviews were used in developing a community relations plan for the site.

The EPA released a fact sheet to interested citizens and to local newspapers in February 1989 which described that a remedial investigation (RI) had begun and what the RI would involve.

The EPA met with the city councils of Savannah and Amazonia on July 9, 1990 to present the results of the RI and to inform them of the upcoming ROD process and schedule.

The EPA released the administrative record, which included the Proposed Plan for public review and comment on August 13, 1990. Public notices of this event were placed in local newspapers.

The EPA and MDNR held a public meeting at the Clasbey Community Center in Savannah on August 29, 1990 to describe the RI/FS and the proposed plan, and to respond to citizen's questions. Approximately 50 people attended, including citizens, an elected official, and technical representatives of the PRPs. A transcript of this meeting will be placed in the administrative record.

The 30 day public comment period ended on September 11, 1990 without a request for an extension.