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March 1997

EPA Superfund Record of Decision:

Monroe Auto Equipment (Paragould Pit), aka: Monroe Finch Road Landfill, aka: Monroe Auto Pit Superfund Site, Paragould, AR 9/26/1996

STATE OF ARKANSAS
DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
8001 NATIONAL DRIVE, P.O. BOX 8913
LITTLE ROCK, ARKANSAS 72219-8913

RECORD OF DECISION

MONROE AUTO PIT
(Finch Road Landfill)

SEPTEMBER 1996

RECORD OF DECISION
CONCURRENCE DOCUMENTATION
FOR THE
MONROE AUTO PIT SUPERFUND SITE
(FINCH ROAD LANDFILL)

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DECLARATION FOR THE RECORD OF DECISION (ROD)

SITE NAME AND LOCATION

Monroe Auto Pit
Paragould, Arkansas

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Monroe Auto Pit Superfund site, in Paragould, Arkansas, which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, (CERCLA),42 U.S.C. §9601 et.seq. and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR Part 300. This decision is based on the Administrative Record for this site.

ASSESSMENT OF THE SITE

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

This is a ROD for Monroe Auto Pit, which consists of two major elements. The function of the soil and sludge remedy is to reduce the risks associated with exposure to contaminated materials and prevent potential ground water and surface water contamination. The second element of the selected remedy will address the contaminated ground water plume.

The major components of the selected remedy include:

Soil and Sludge

- Capping the sludge disposal area in accordance with RCRA Subtitle C requirements.

- Installing a french drain around the area of sludge deposits. The french drain would intercept perched ground water before it enters the contaminated area. The captured ground water would be transported via buried piping to a discharge point located in the intermittent stream southwest of the site.

- Prohibiting future development of the site.

- Conducting environmental monitoring to ensure effectiveness of the remedial action.

Ground water

- Reducing contaminant concentrations through naturally attenuating processes such as biological/chemical/physical degradation, adsorption and dispersion.

- Placing ground water use restrictions on the site property.

- Conducting ground water monitoring of on- and near-site monitoring wells and residential wells.

- Implementing immediate and secondary contingency actions if necessary to protect human health and the environment.

STATUTORY DETERMINATIONS

The selected remedy for soil/sludge and ground water 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 selected remedy utilizes permanent solutions and alternative treatment to the maximum extent practicable for this site. However, because treatment of the principal threats at the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as the principal element.

Because this remedy will result in hazardous substances remaining on-site 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 of human health and the environment.

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for Jane N. Saginaw
Regional Administrator

Randall E. Mathis, Director
Arkansas Department of Pollution Control and Ecology

DATE: September 26, 1996

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THE DECISION SUMMARY

MONROE AUTO PIT

1.0 SITE NAME, LOCATION AND DESCRIPTION

1.1 NAME AND LOCATION

The Monroe Auto Pit Superfund site, also known as the Monroe Finch Road Landfill, is located in northeastern Arkansas in unincorporated Greene County, approximately three miles southwest of Paragould, as shown on Figure 1. The site lies immediately west of Arkansas Highway 358, approximately three miles west of its intersection with U.S. Highway 49. The site lies in the Northwest Quarter of the Northeast Quarter of Section 17, Township 16 North, Range 5 East, in the Paragould West 7½-minute quadrangle. The southwestern corner of the site is at latitude 36° 01" 0' and longitude 90 34" 30'.

1.2 DESCRIPTION

The site is owned by Monroe Auto Equipment Company, One International Drive, Monroe, Michigan. The property is identified as parcel no. 4071-1 in the Greene County Tax Assessor's office. The legal description provided in the property deed is "all that part of the South Half of the Northwest Quarter of the Northeast Quarter of Section 17, Township 16 North, Range 5 East lying West of the Highway No. 358" (Warranty Deed 1973). The site layout is shown on the topographic map provided as Figure 2. Approximately four acres of the Monroe property, including the sludge disposal area that covers less than one acre of the site, is currently surrounded by a six-foot tall chain-link fence topped with barbed wire. Most of the site is cleared of trees and is covered with native vegetation.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 SITE HISTORY

In 1973, Monroe purchased a seven-acre tract of land in Greene County, Arkansas. The site included an inactive sand and gravel borrow pit which was subsequently approved by the Arkansas Department of Pollution Control and Ecology (ADPC&E) in 1973 for use as a landfill. Approximately 15,400 cubic yards of alum and lime electroplating sludge/slurry from the waste water treatment lagoons at Monroe's Paragould manufacturing plant was deposited

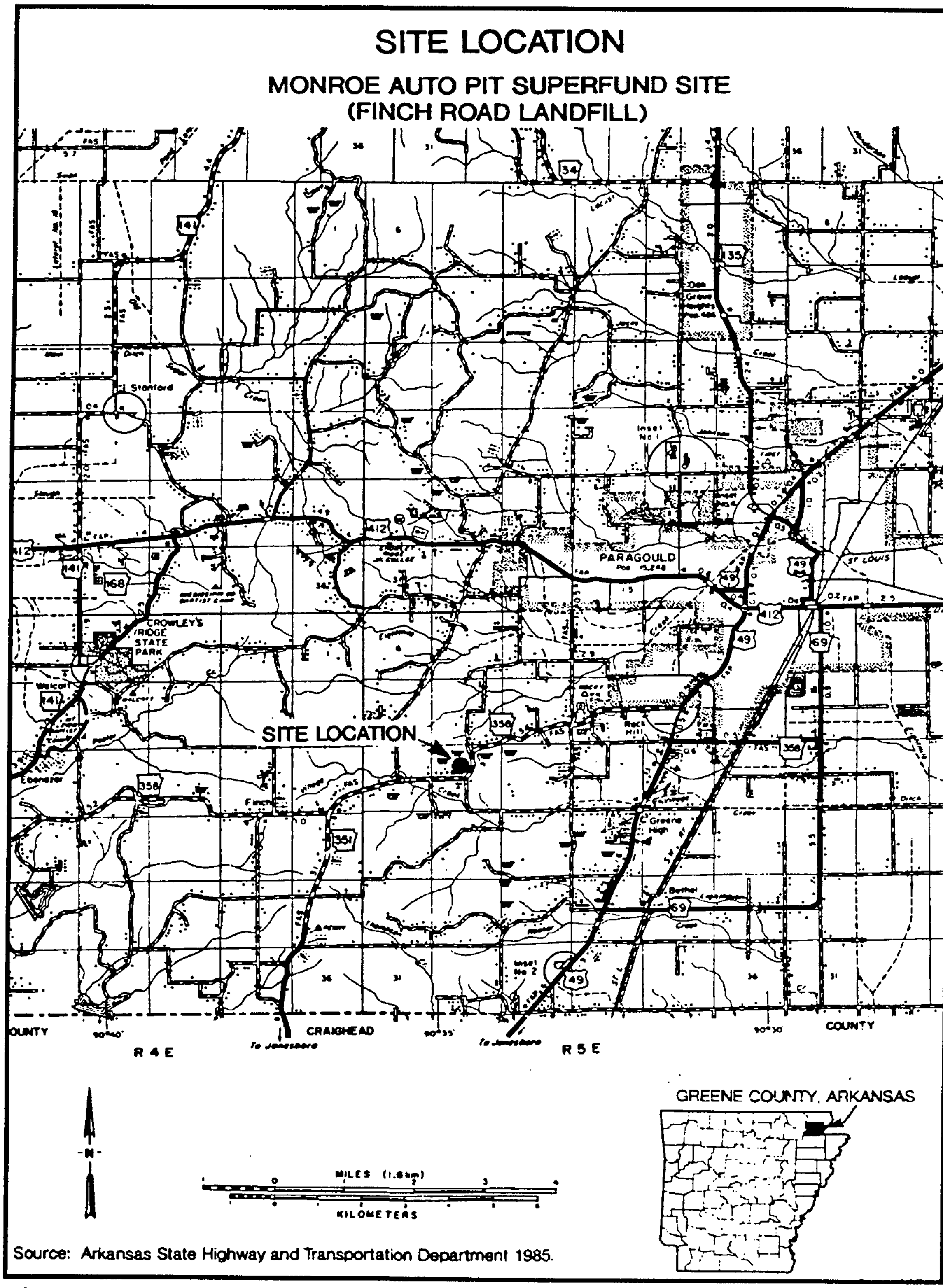

SITE LOCATION
MONROE AUTO PIT SUPERFUND SITE
(FINCH ROAD LANDFILL)
SITE LOCATION
PARAGOULD
CROWLEY'S RIDGE STATE PARK
Stanford
Finch
CRAIGHEAD
COUNTY
R 4 E
R 5 E
GREENE COUNTY, ARKANSAS
N
MILES
KILOMETERS
Source: Arkansas State Highway and Transportation Department 1985.

Figure 1

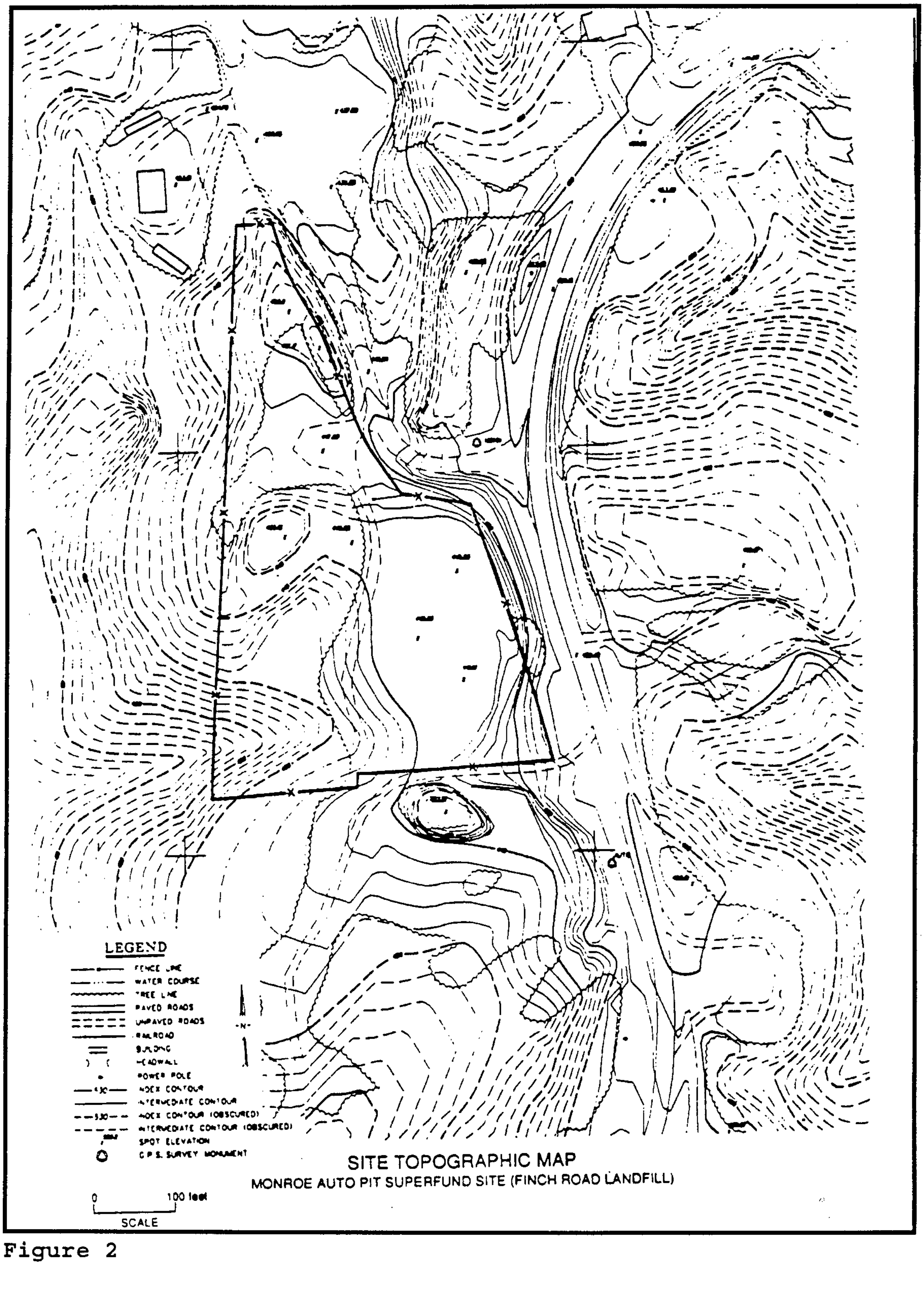

LEGEND
FENCE LINE
WATER COURSE
TREE LINE
PAVED ROADS
UNPAVED ROADS
RAILROAD
BUILDING
HEADWALL
POWER POLE
INDEX CONTOUR
INTERMEDIATE CONTOUR
INDEX CONTOUR (OBSCURED)
INTERMEDIATE CONTOUR (OBSCURED)
SPOT ELEVATION
G.P.S. SURVEY MONUMENT
N
SITE TOPOGRAPHIC MAP
MONROE AUTO PIT SUPERFUND SITE (FINCH ROAD LANDFILL)
0
100 feet
SCALE

Figure 2

in the borrow pit between 1973 and 1978. The sludge contained approximately 85% liquid. The present dewatered volume is about 10,800 cubic yards of sludge and contaminated soil.

Based on boring samples, the sludge extends to an estimated maximum depth of 30 feet. The greatest contaminant concentrations and the majority of the sludge occur in an approximate interval of 5 to 25 feet below the surface.

Approximately four acres of the Monroe property, including the sludge disposal area that covers less than one acre of the site, are currently surrounded by a six-foot tall chain-link fence topped with barbed wire. The sludge is covered with approximately three to five feet of soil and the site is vegetated. The site has remained inactive since 1978 and access is controlled by the fence and a locked gate. The remaining three acres within the fence are, for the most part, cleared of trees and covered with native vegetation.

Under ADPC&E review, Monroe conducted a series of investigations at the site between 1979 and 1990. These included the installation of ground water monitoring wells, sampling and analysis of ground water, soil, surface water, and sediment, and geological surveys. Analysis of the samples collected from monitoring wells at the landfill indicated the presence of 1,1-dichloroethane [100μg/L (1989)] and 1,2-dichloroethylene [750μg/L (1988)]. Furthermore, a residential well (Gann well) located near the site also showed 1,1-dichloroethane [10μg/L (1987)] and 1,2-dichloroethylene [145μg/L (1987)].

The Environmental Protection Agency (EPA) proposed that the site be added to the National Priorities List (NPL) in 1989. In August 1990, the site was added to the NPL.

2.2 ENFORCEMENT ACTIVITIES

A Potentially Responsible Party (PRP) search conducted in 1990 under CERCLA Section 104(e), indicated that Monroe Auto Equipment was the only PRP for this site. On March 14, 1991, EPA issued notice of an impending Remedial Investigation and Feasibility Study (RI/FS) to the PRP. Monroe Auto Equipment responded to the notice with a good faith offer to perform the RI/FS. On June 28, 1991, EPA and Monroe Auto Equipment entered into an Administrative Order on Consent for Monroe to perform a RI/FS.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

A Community Relations Plan for the Monroe Auto Pit site was completed in June 1991. This Plan lists contacts and interested parties throughout government and the local community. It also establishes communication pathways to ensure timely dissemination of pertinent information, and emphasizes the need for community involvement. A public work shop was held on February 24, 1992 to discuss the progress of field work at the site and to inform the public of the availability of a Technical Assistance Grant (TAG) for the site.

In May 1995 ADPC&E assumed the role of lead agency for the Monroe Auto Pit site. The Proposed Plan was released to the public by ADPC&E on July 17, 1995. All of the site related documents are available at the Northeast Arkansas Regional Library, located at 120 North 12th Street, Paragould, Arkansas. A public comment period on the Proposed Plan was held from July 17 to August 17, 1995 with an extension granted until October 16, 1995. In addition, a public meeting was held on August 8, 1995 to present the results of the Remedial Investigation/Feasibility Study and the Proposed Plan. Another open house was held September 12, 1995 to answer any new questions and to explain the details of the plan. All comments received by ADPC&E prior to the end of the comment period, including those expressed verbally at the public meeting, are addressed in the Responsiveness Summary section of this Record of Decision.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

This ROD addresses the entire site as one operable unit. The remedial objective that is addressed in this ROD is the reduction or elimination of the actual and/or potential risk associated with the sludge pit and the contaminants in the ground water.

The objectives of this remedy are three fold, to prevent contact with the buried sludge and contaminated soil, to prevent infiltration of precipitation or ground water in the sludge deposit area, and to prevent the contamination of the residential well water supply.

The buried sludge was originally 15,400 cubic yards of alum and lime sludge from the waste water treatment lagoons. Processes related to shock absorber production contributed to the waste water. The sludge was approximately 85% water. The present dewatered volume is about 10,800 cubic yards of sludge and contaminated soil. Dermal contact with, or ingestion of the sludge and contaminated soil must be prevented because contact with the sludge poses a carcinogenic and non-carcinogenic risk level above that recommended by EPA.

The sludge was periodically covered with soil which absorbed some of the water, but was not an effective barrier to precipitation. Infiltration of precipitation and perched ground water through the sludge adds to the contaminant levels produced by the initial dewatering of the sludge. Future infiltration into the sludge area should be prevented, thus cutting off the source of ground water contamination.

The exact production zones of all of the private wells are not known, but most are assumed to produce from the lower Wilcox aquifer. Because this is only an assumption, the potential ingestion or dermal contact of contaminated ground water from the upper Wilcox aquifer from a residential well or from a well placed on the site in the future must be prevented. Monitoring of the on and near site monitoring wells (88 samples) shows a decrease in the contaminant levels away from the sludge area. Levels of volatile organic compounds have decreased over time (first monitoring 1988) and this trend should continue. Recent (1995) residential well water samples do not show contamination by volatile organics above analytical detection levels. Although modeling of contaminant movement has been done, monitoring should be continued.

The remedies evaluated in this ROD are measured against these objectives. Those remedies meeting these objectives are evaluated further to determine the best remedy for this site. The ultimate objective is the protection of human health and the environment.

5.0 SUMMARY OF SITE CHARACTERIZATION

5.1 LAND USE/POPULATION

The most predominant land use near the site is single-family residences. Based on a field survey conducted in 1992, there are 52 single-family residences and six mobile homes within a one-mile radius of the site. Many of these are associated with small farms and related agricultural pursuits. Agricultural uses include crop farming and livestock production. The field survey identified four commercial land uses. These land uses were individual enterprises and included antique sales, convenience stores, and automobile repair establishments. Industrial land uses are limited to gravel quarries and an overhead electrical power line. There are no schools, nursing homes, churches, hospitals, or recreational facilities within a one-mile radius of the site.

In 1992, the estimated population within a one-mile radius of the Finch Road Landfill site was 159 persons, residing in 58 households. Assuming the rate of population increase (from 1984 till 1992) remains constant there will be an estimated total of 69 residences and 190 persons within a one-mile radius of the site by the year 2000.

5.2 CLIMATE

Greene County has hot summers, mild winters, high humidity and abundant rainfall. The mean annual temperature is 60°F with temperatures infrequently exceeding 100°F in the summer or falling below 10°F in the winter . Precipitation averages 49 inches per year with a fairly even distribution throughout the year. In a typical year, April is the wettest month and October is the driest. Only minor amounts of snowfall contribute to the yearly precipitation. In the average year, thunderstorms occur on 55 days; however, damaging winds seldom accompany these storms. The most intense storm each year averages 1.4 inches of rain in an hour; the average yearly 24 hour maximum rainfall is between 3.0 and 3.5 inches. Approximately 110 days in the year will have a total precipitation greater than 0.01 inches. The mean annual wind speed averaged through the afternoon mixing layer is approximately 6 miles per hour.

5.3 SURFACE TOPOGRAPHY

The land surface near the site is very irregular. The site topographic map, Figure 2, shows that the ground surface slopes downward from Highway 358 on the eastern site boundary, and that the land is relatively flat over the sludge disposal area. Two ravines, sloping southwesterly, lie west of the sludge disposal area and within the fenced area. An intermittent spring is present in each of the ravines. A shallow seasonal pond is also present within the fenced area, and is found northwest of the sludge disposal area. Site elevations range from approximately 413 to 460 feet above mean sea level (MSL).

5.4 SURFACE HYDROLOGY

Surface water is intermittently present at three locations on the site (Figure 3). A depression on the western edge of the site, approximately 25 feet in diameter, forms a pond from storm water runoff during periods of heavy rainfall. The depression dries during periods of low rainfall.

Two intermittent springs in the southwestern corner of the site discharge to a small stream. The springs may be discharge points for the perched ground water zone. Flow rates from the springs have been observed to be greatest immediately following prolonged periods of heavy precipitation, and quickly decrease after precipitation ends.

Precipitation that does not run off either infiltrates, evaporates, or is absorbed by the vegetation on the site. Surface water at the site can easily infiltrate the sandy loess and gravel deposits and migrate to the perched water zones. In a few areas of the site, clay near the surface prevents rapid infiltration and puddles can stand for several days in these perched zones. In summer months, evaporation can reach a third of an inch per day.

Surface water runoff leaves the site through two ravines, as shown on Figure 3. Surface water in the ravines enters an intermittent creek that joins Village Creek nearly a mile southwest of the site. The water of Village Creek enters the St. Francis river at it's confluence with Straight Slough, over 25 miles southeast of where surface water runoff from the site would enter Village Creek. Secondary contact recreation, and domestic, industrial, and agricultural water supplies are uses of waters near the site.

Due to the intermittent nature of the pond and springs, the surface water exposure pathway is incomplete. The only exposure possible would be by persons coming into contact with surface water on site.

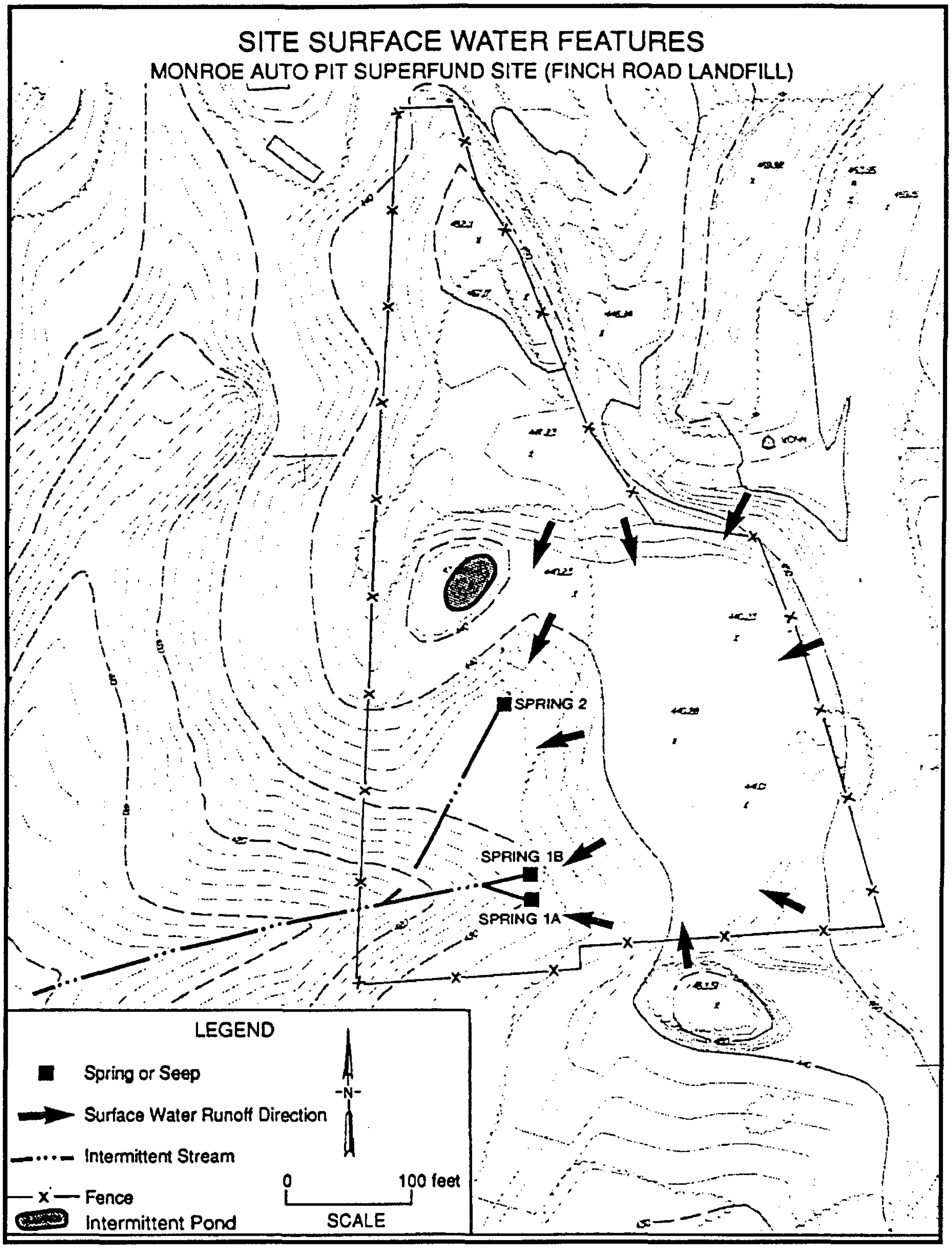

SITE SURFACE WATER FEATURES
MONROE AUTO PIT SUPERFUND SITE (FINCH ROAD LANDFILL)
SPRING 2
SPRING 1B
SPRING 1A
LEGEND
Spring or Seep
Surface Water Runoff Direction
Intermittent Stream
Fence
Intermittent Pond
N
0
100 feet
SCALE

Figure 3

5.5 GEOLOGY

Pliocene sand and gravel (Crowley's Ridge deposits) from braided and meandering stream environments overlie Eocene clay, silt, sand and lignite deposits. In the site area, the Crowley's Ridge deposits unconformably overlie the Eocene Wilcox Group. The Jackson and Claiborne Groups have been eroded away on the northern sections of the Ridge. Figure 4 shows a regional cross-section of this area.

At the site, the Crowley's Ridge deposits characteristically contain cobbles up to two inches in diameter, mixed with sand, clayey sand, and silty sand. The deposits are up to 70 feet in thickness east of the site, where the deposits have not been excavated. These deposits are 10 to 15 feet thick on the site where sand and gravel excavation occurred during quarry operations. In some gravel pits surrounding the site, these sands and gravels were excavated to the top of the Wilcox Group. A cross section through the sludge disposal area (Figure 5) at the location shown on Figure 6, shows the extent of sludge deposits and cover material in relation to the site lithology.

At the site, individual thicknesses of sand and clay layers in the Wilcox Group vary from less than one inch to several feet. However, a consistent, very stiff clay layer in the Wilcox Group correlates between boreholes across the site. The clay layer has an estimated thickness of 40 to almost 70 feet. Several lignite deposits were also encountered in this clay, which is typical of the Wilcox in this area. Fine to medium-grained sands underlie the thick clay at all monitoring well locations. Other cross-sections are included in the RI report.

5.6 HYDROGEOLOGY

Two primary ground water zones have been identified at the site: The upper zone of the Wilcox aquifer and the lower zone of the Wilcox aquifer. Perched ground water has also been identified in some locations near the sludge disposal area. The following subsections discuss the occurrence and hydraulic characteristics of these three zones.

5.6.1 Perched Ground Water Zones

Perched ground water intermittently occurs across the site. Thin layers of stiff clay, up to several inches in thickness, were observed at depths between five feet and 50 feet. After periods of precipitation, the soil above these clay layers has been found to be saturated, creating localized zones of perched ground water. During these high water periods (water levels can change by as much as 10 feet), water discharges from the springs. Five monitoring wells are installed in the perched ground water zone at the site. Water level measurements were taken monthly for one year to document the seasonal fluctuations. These measurements indicate that perched ground water is seasonal and intermittent. The presence and amount of perched ground water are dependent upon precipitation.

Subsurface field investigations have shown that one localized perched ground water zone may

REGIONAL GEOLOGIC CROSS SECTION ALONG AND ADJACENT TO CROWLEY'S RIDGE

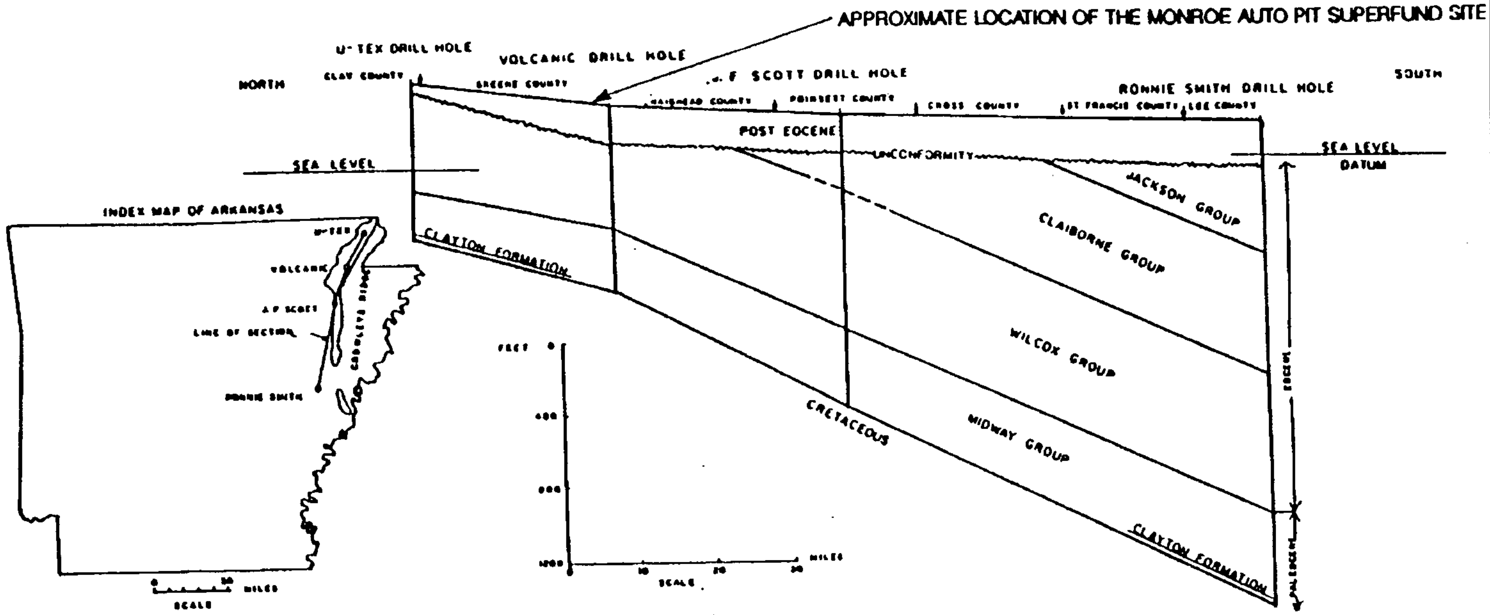


Figure 4

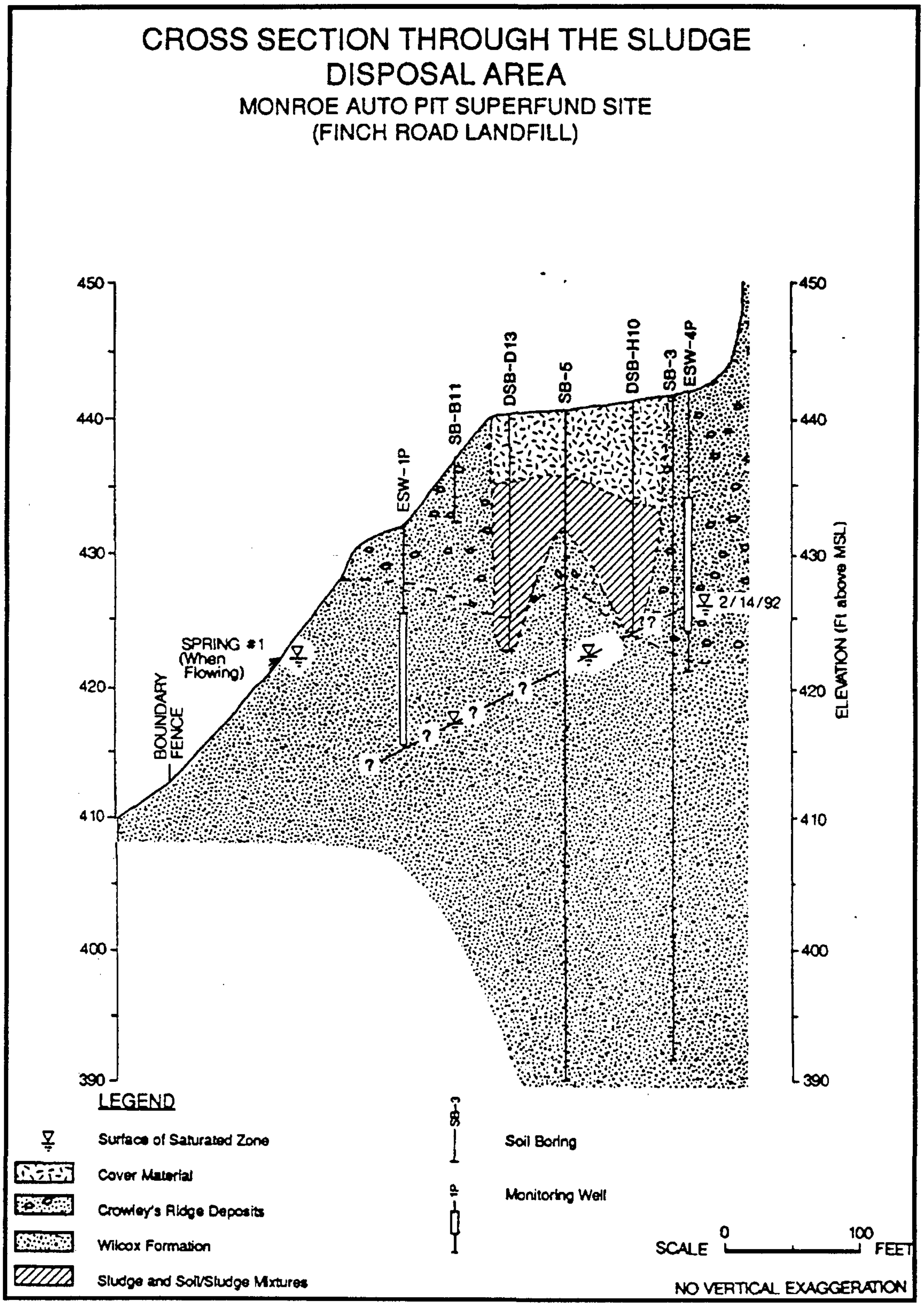

CROSS SECTION THROUGH THE SLUDGE DISPOSAL AREA
MONROE AUTO PIT SUPERFUND SITE
(FINCH ROAD LANDFILL)
ELEVATION (Ft above MSL)
BOUNDARY FENCE
SPRING #1 (When Flowing)
ESW-1P
SB-B11
DSB-D13
SB-5
DSB-H10
SB-3
ESW-4P
2/14/92
LEGEND
Surface of Saturated Zone
Cover Material
Crowley's Ridge Deposits
Wilcox Formation
Sludge and Soil/Sludge Mixtures
Soil Boring
Monitoring Well
SCALE
0
100
FEET
NO VERTICAL EXAGGERATION

Figure 5

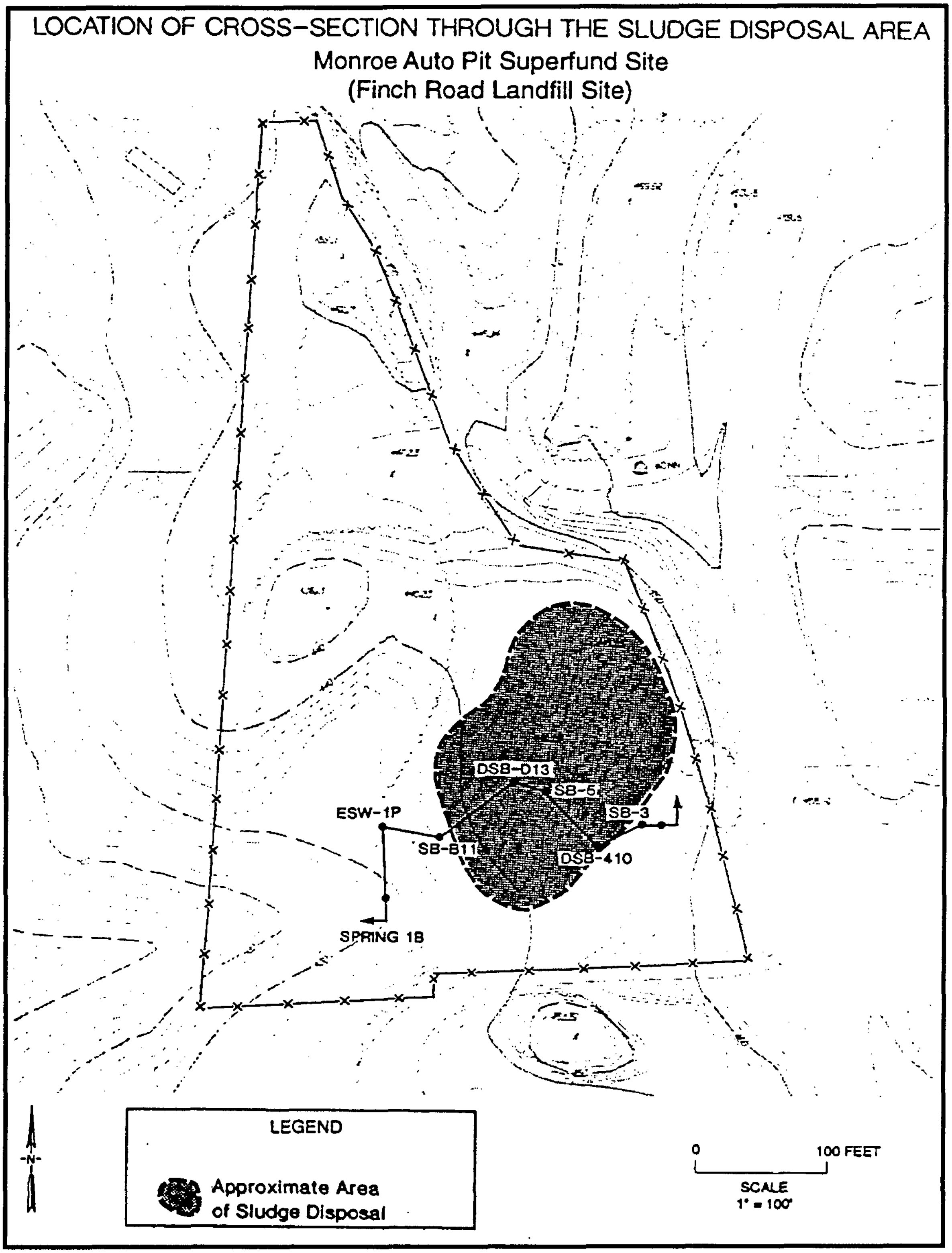

LOCATION OF CROSS-SECTION THROUGH THE SLUDGE DISPOSAL AREA
Monroe Auto Pit Superfund Site
(Finch Road Landfill Site)
DSB-D13
SB-5
SB-3
ESW-1P
SB-B11
DSB-410
SPRING 1B
N
LEGEND
Approximate Area of Sludge Disposal
0
100 FEET
SCALE
1" = 100'

Figure 6

be continuous beneath the area of sludge/soil contamination. The elevation of the perched ground water surface has been recorded at approximately 416 to 427 feet above MSL (13 to 26 feet below land surface [bls]) when present in the monitoring wells. The perched ground water gradient slopes in the general direction of the ravines south-southwest of the sludge disposal area.

The perched ground water flow pattern, assuming that the perched zone is continuous across the site, is shown on Figure 7. It is believed that this water may discharge through the springs in the two ravines. Perched ground water is also likely to percolate into the underlying Wilcox aquifer through discontinuities in the underlying low-permeability zone.

A deeper perched zone has been identified on the northern portion of the site. The ground water surface elevation in this zone was measured at approximately 381 feet above MSL (approximately 70 feet bls) in February 1992. This perched zone is likely formed from a clay lens that was encountered at a depth of approximately 80 feet bls. Multiple perched water zones are typical of alluvial formations such as the Wilcox Group and in areas where local infiltration is the major form of recharge for the aquifer.

5.6.2 Upper Wilcox Aquifer

Two ground water zones were encountered in the Wilcox aquifer through the total depth of the subsurface investigation (Figure 8). The upper zone behaves as an unconfined aquifer composed of interbedded sand and clay. Five monitoring well clusters and six single wells monitor the upper Wilcox aquifer. These wells are designated as ESW # -1 (lower part of the upper aquifer) and ESW # -3 or A (upper part of the upper aquifer). Exceptions to these labels are ESW 1A- intermediate perched zone, ESW 8 and 9- lower part of the upper aquifer, and ESW 6- the lower Wilcox aquifer. Approximately 10 to 70 feet of Crowley's Ridge deposits overlie the Wilcox aquifer upper zone in the site area. A clay layer greater than 40 feet in thickness forms the base of the Wilcox aquifer upper zone. At the southern boundary of the site, the surface of the clay layer was encountered at approximately 266 feet above MSL (174 feet bls).

The ground water flow pattern in the upper zone of the Wilcox aquifer is shown on Figure 9. The flow pattern is seen to radiate from the western portion of the site toward the northeast and southeast quadrants. Water levels fluctuate by a few inches up to one foot seasonally. The hydraulic gradient in the SE direction (Mar '93) is 0.005 ft/foot and in the NE direction, 0.006 ft/foot. The saturated thickness of the upper Wilcox aquifer is approximately 50 feet. A downward gradient may exist in the upper zone of the Wilcox aquifer. This vertical gradient is due in part to the low hydraulic conductivity of the clay and recharge from the overlying Crowley's Ridge deposits to the upper zone of the Wilcox aquifer. The hydraulic conductivity in the vicinity of ESW-13-1 is approximately 420 gallons per day per square foot (gpd/ft^2) or 2.0 x 10^{-2} centimeters per second (cm/s). The aquifer is composed of silty sand, with lenses of sandy, silty clay.

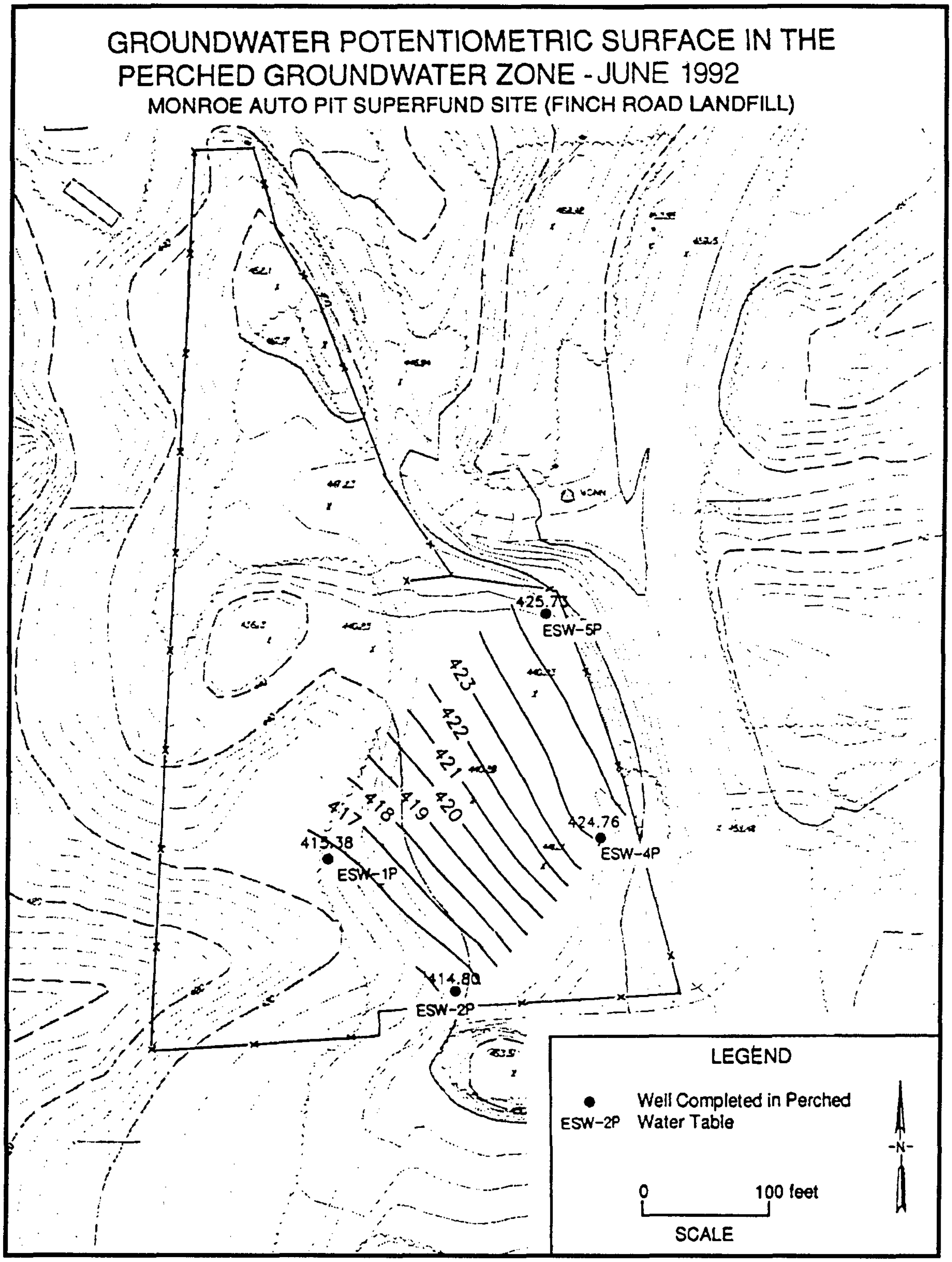

GROUNDWATER POTENTIOMETRIC SURFACE IN THE PERCHED GROUNDWATER ZONE - JUNE 1992
MONROE AUTO PIT SUPERFUND SITE (FINCH ROAD LANDFILL)
425.73
ESW-5P
423
422
421
420
419
418
417
424.76
ESW-4P
415.38
ESW-1P
414.80
ESW-2P
LEGEND
Well Completed in Perched Water Table
ESW-2P
0
100 feet
SCALE
N

Figure 7

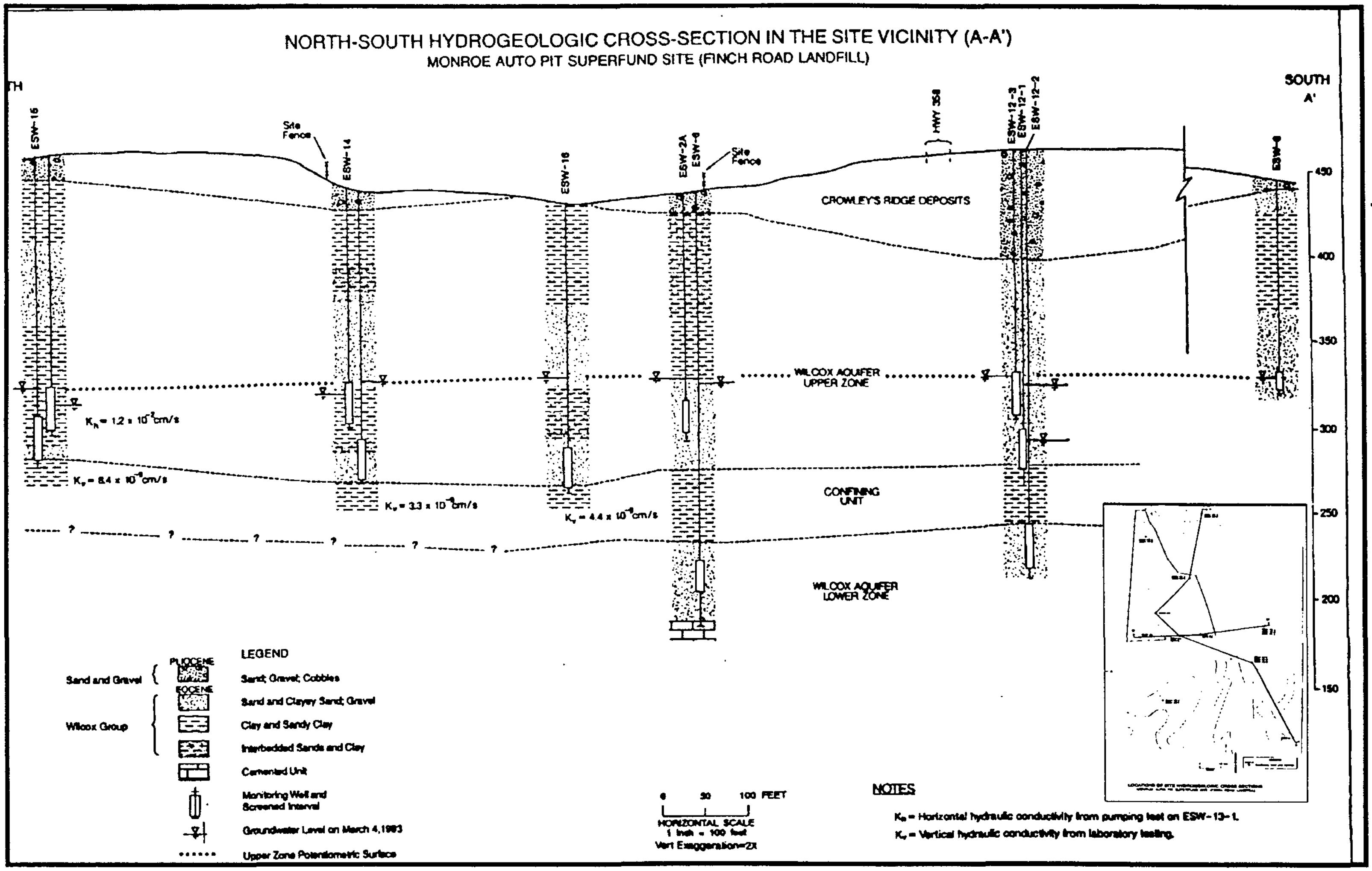
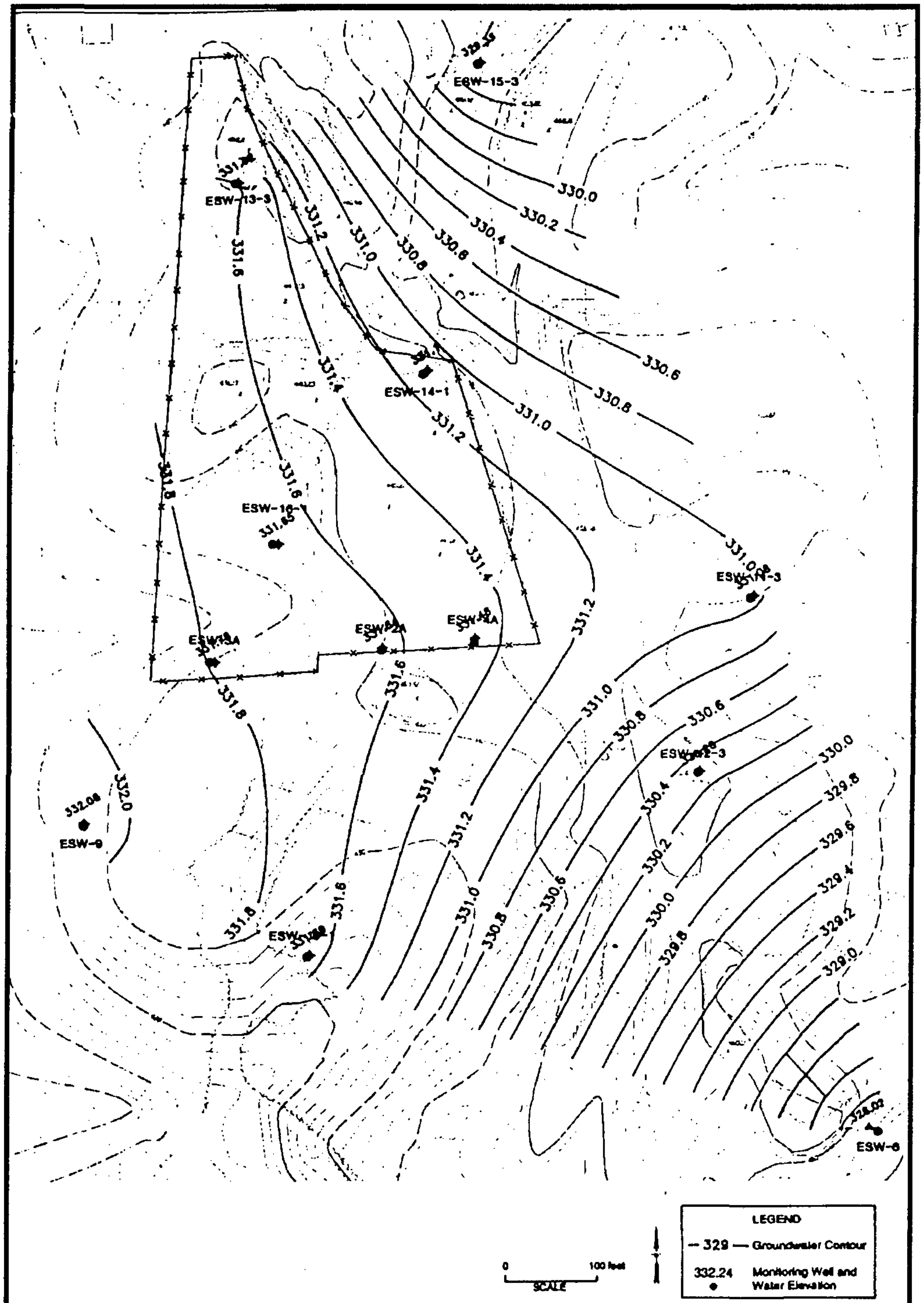

NORTH-SOUTH HYDROGEOLOGIC CROSS-SECTION IN THE SITE VICINITY (A-A')
MONROE AUTO PIT SUPERFUND SITE (FINCH ROAD LANDFILL)
SOUTH
A'
ESW-16
Site Fence
ESW-14
ESW-2A
ESW-8
HWY 358
ESW-12-3
ESW-12-1
ESW-12-2
CROWLEY'S RIDGE DEPOSITS
WILCOX AQUIFER UPPER ZONE
CONFINING UNIT
WILCOX AQUIFER LOWER ZONE
450
400
350
300
250
200
150
LEGEND
Sand and Gravel
PLIOCENE
Sand; Gravel; Cobbles
EOCENE
Wilcox Group
Sand and Clayey Sand; Gravel
Clay and Sandy Clay
Interbedded Sands and Clay
Cemented Unit
Monitoring Well and Screened Interval
Groundwater Level on March 4,1993
Upper Zone Potentiometric Surface
0 50 100 FEET
HORIZONTAL SCALE
1 inch = 100 feet
Vert Exaggeration=2X
NOTES
Kh = Horizontal hydraulic conductivity from pumping test on ESW-13-1.
Kv = Vertical hydraulic conductivity from laboratory testing.

Figure 8



GROUNDWATER POTENTIOMETRIC SURFACE IN THE WILCOX AQUIFER
UPPER ZONE - MARCH 1993
MONROE AUTO PIT SUPERFUND SITE (FINCH ROAD LANDFILL)

Figure 9

5.6.3 Lower Wilcox Aquifer

A confined ground water aquifer, the Wilcox aquifer lower zone, has been identified below the Wilcox aquifer upper zone. The lower zone of the Wilcox aquifer is separated from the upper zone by a clay confining layer more than 40 feet thick. Hydraulic conductivity tests performed on samples of this clay yielded vertical hydraulic conductivity values on the order of 10^{-9} cm/sec.

Five monitoring wells monitor the lower Wilcox aquifer. These wells are designated by ESW # -2, except for well ESW- 6. The lower Wilcox aquifer is composed of fine to medium-grained sand and fine gravel, which coarsens with depth. At the southern site boundary, this zone is approximately 36 feet thick, extending from 226 feet above MSL to 190 feet above MSL.

The ground water flow pattern in the lower aquifer is shown on Figure 10. The ground water flow is primarily to the east and southeast from the site, and the gradient appears to be relatively smooth across the monitored area. Based on aquifer pump tests (May '92) the hydraulic gradient near ESW 13-2 averages 0.002 ft/foot. The hydraulic gradient was calculated at 56 ft/day (2.0 X 10^{-2} cm/sec).

5.7 NATURE AND EXTENT OF CONTAMINATION IN THE SLUDGE AND SOIL

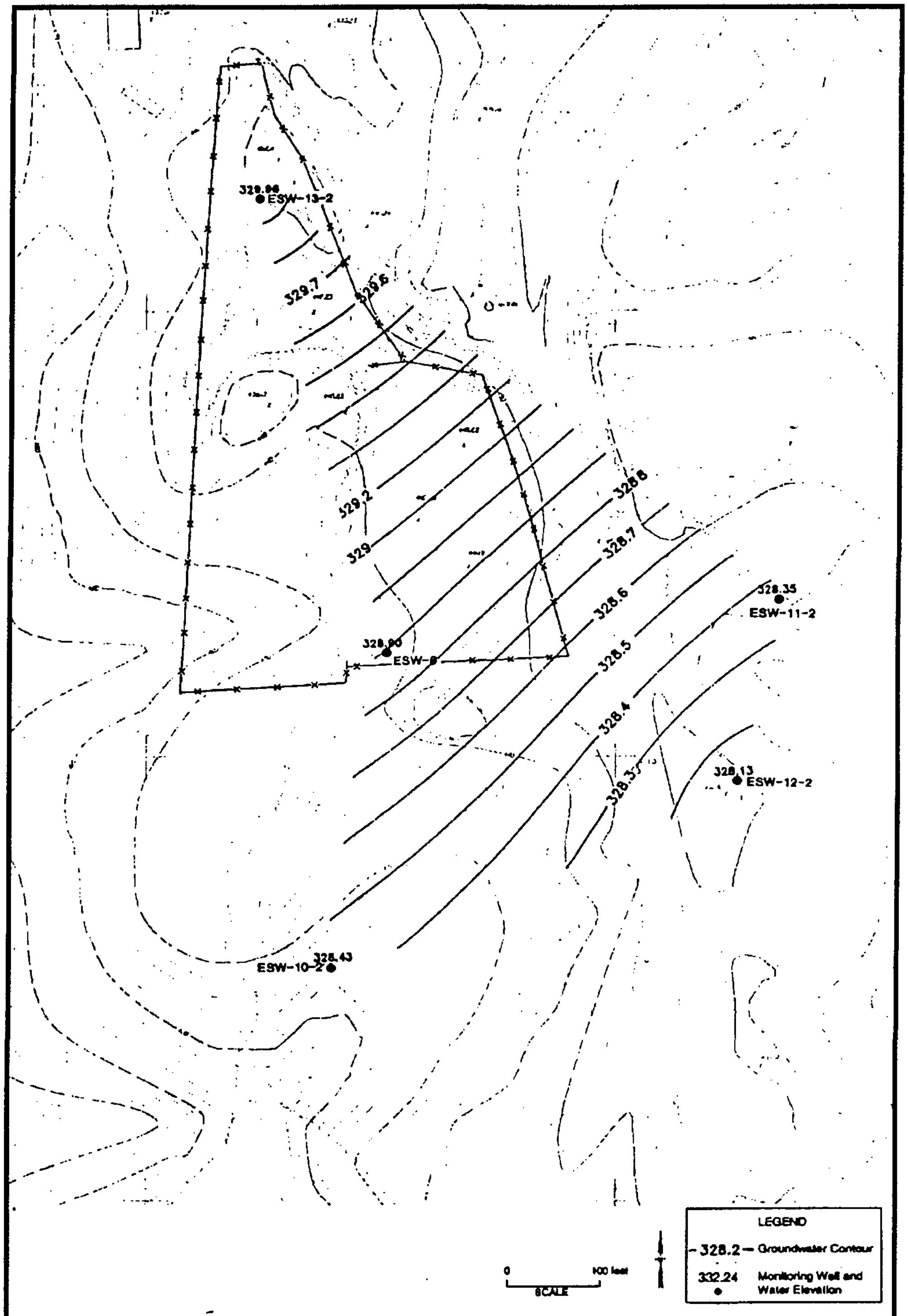
Twenty one soil borings were placed over the sludge disposal area. Samples of surface soil, shallow subsurface soil near the inferred interface between the soil/sludge and the overlying fill material, and samples of deep subsurface sludge and soil were analyzed for volatile organic compounds (VOCs), semivolatile organics, and inorganics.

Three VOCs, eight semivolatile organics, and four inorganics were detected in surface soil samples (less than 2.5 feet below the surface) at concentrations greater than twice their background concentrations. Maximum concentrations detected in the surface soil are shown on Table 1.

Thirteen VOCs, seven semivolatile organics, and eighteen inorganics were detected in shallow subsurface soil (a depth of 2.5-7.5 feet) at concentrations greater than twice their background levels.

Fifteen VOCs, eight semivolatile organic compounds, and eighteen inorganics were detected in deep subsurface soil/sludge samples (greater than 7.5 feet deep) at concentrations greater than twice their background concentrations. Maximum concentrations detected in the subsurface soil/sludge samples are shown on Table 2.

Analyte concentrations are randomly distributed across the site, and the detected concentrations do not show the existence of any spatial pattern. The estimated horizontal extent of sludge



GROUNDWATER POTENTIOMETRIC SURFACE IN THE WILCOX AQUIFER
LOWER ZONE - MARCH 1993
MONROE AUTO PIT SUPERFUND SITE (FINCH ROAD LANDFILL)

Figure 10

TABLE 1
MAXIMUM CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES[1]
Monroe Auto Pit Superfund Site
(Finch Road Landfill)

Parameter	Maximum Concentration
VOCs	
TCE	14 J ug/Kg
Ethylbenzene	1.0 J ug/Kg
Total Xylenes	7.0 J ug/Kg
Semivolatile Organics	
2-Chlorophenol	12 J ug/Kg
1,2,4-Trichlorobenzene	10 J ug/Kg
Naphthalene	14 J ug/Kg
4-Chloro-3-methylphenol	14 J ug/Kg
2,4-Dinitrophenol	27 J ug/Kg
Fluoranthene	5.0 J ug/Kg
Pyrene	5.0 J ug/Kg
di-n-Octylphthalate	30 J ug/Kg
Inorganics	
Chromium	60.6 J mg/Kg
Lead	586 J mg/Kg
Manganese	1440 J mg/Kg

J - Estimated Value
1 - 0-2.5 feet below surface
Samples taken 1992-1993

Complete data tables that include quantitation limits for all analytes are provided in Appendix H of the Remedial Investigation (RI)

TABLE 2
MAXIMUM CONCENTRATIONS DETECTED IN SUBSURFACE SOIL AND SLUDGE SAMPLES[1]
Monroe Auto Pit Superfund Site
(Finch Road Landfill)

Parameter	Maximum Concentration
VOLATILE ORGANICS	
Vinyl Chloride	31,000J ug/Kg
1,1-Dichloroethane	66,000 ug/Kg
1,2-Dichloroethylene	60,000J ug/Kg
1,1,1-Trichloroethane	210J ug/Kg
Trichloroethylene	91J ug/Kg
Benzene	15J ug/Kg
Tetrachloroethylene	310J ug/Kg
Toluene	16,000J ug/Kg
Ethylbenzene	220J ug/Kg
Total Xylenes	6,700 ug/Kg
SEMIVOLATILE ORGANICS	
bis(2-Ethylhexyl)phthalate	96,000J ug/Kg
Naphthalene	6400J ug/Kg
di-n-Octylphthalate	550J ug/Kg
Phenol	16,000J ug/Kg
Phenanthrene	42,000J ug/Kg
INORGANICS	
Antimony	63.1 mg/Kg
Arsenic	19.6J mg/Kg
Beryllium	0.88J mg/Kg
Cadmium	1.2 mg/Kg
Chromium	4,030J mg/Kg
Lead	3,240J mg/Kg
Manganese	319J mg/Kg
Mercury	0.12J mg/Kg
Nickel	23.8J mg/Kg
Zinc	508 mg/Kg
Cyanide	15.7 mg/Kg

J - Estimated Value
1 - 2.5-30 feet below surface

Complete data tables that include quantitation limits for all analytes are provided in Appendix H of the Remedial Investigation (RI) deposits is shown on Figure 11. The horizontal extent covers approximately 30,000 square feet, or approximately 0.7 acres. The sludge extends to an estimated maximum depth of 30 feet, although the greatest contaminant concentrations, and the majority of the sludge deposits, were identified through an approximate interval of 5 to 25 feet. The depth of the sludge deposits' bottom surface is erratic. Both the total depth and thickness vary greatly between boring locations. The total volume of sludge and contaminated soil is estimated to be approximately 10,800 cubic yards. Variations in the total sludge depth and thickness are to be expected because the sludge was deposited in an abandoned quarry. An examination of other quarries in the area shows that great variations in excavation depths are common, as excavation appears to cease upon encountering clay lenses in the Wilcox deposits.

5.8 NATURE AND EXTENT OF CONTAMINATION IN THE GROUND WATER

Contaminants in the ground water move with the water. In the perched zone, this would be out through the springs or downward into the upper Wilcox aquifer. In the upper Wilcox aquifer, the contaminants move in a northeasterly and a southeasterly direction. The metals have a greater affinity for the fine grained sediments and will move slower than the organics, but in the same direction.

A volume of perched water sufficient for sampling was present at only one monitoring well location (ESW-2P, 1992). No VOCs or semivolatile organics were detected in a ground water sample collected from this well. Inorganic concentrations were generally less than those in samples from the Wilcox aquifer. Eight inorganics were detected in unfiltered samples and six in filtered samples. It must be noted, however, that this monitoring well is located on a side-gradient from the sludge disposal area, if a continuous perched zone is assumed to exist across the site.

Some of the perched water appears to discharge through the springs following a significant rain event. Surface water representative of the springs in the ravines southwest of the sludge disposal area was also sampled. Four volatiles organics, three semivolatile organics and nine inorganics were detected (Table 3). Sediment samples from the creek showed a marked decrease in contamination away from the site. The perched water is seasonal and its flow has a limited extent.

The maximum concentrations of contaminants detected in the Wilcox aquifer upper zone in 1992 and 1993 are listed in Table 4. The presence of 1,1-DCA and 1,2-DCE are taken as indicators of ground water contamination because these two compounds are consistently detected across the site in the upper Wilcox aquifer. The detected concentrations decrease away from the sludge disposal area (Figure 12). A comparison of April 1992 data to previous data (1988-1990, 66 samples total) show a general decrease in volatile organic concentrations (Table 5). Data from wells installed in 1992 is insufficient to establish a trend.

Samples containing elevated VOC and semivolatile organic concentrations, as compared to

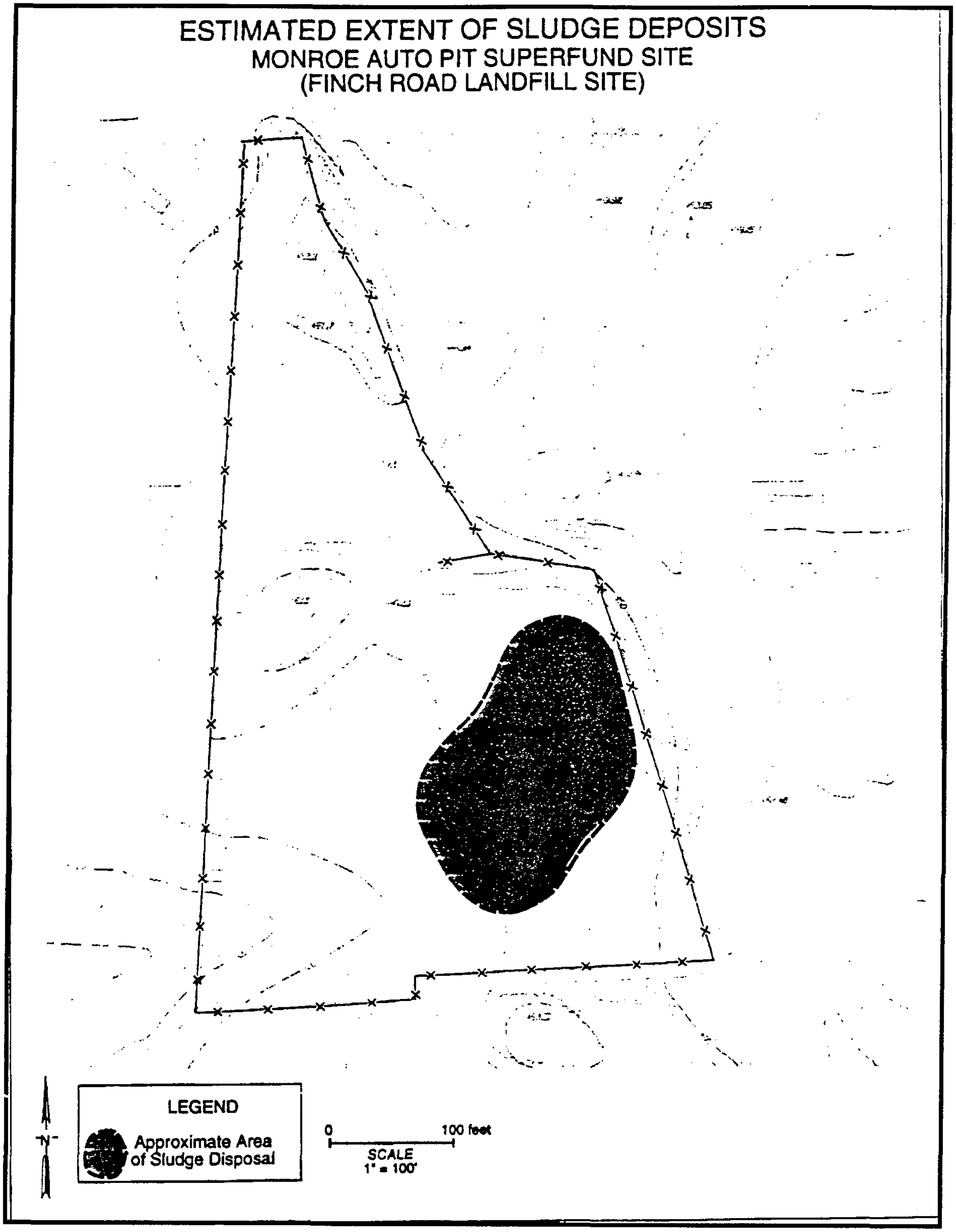

ESTIMATED EXTENT OF SLUDGE DEPOSITS
MONROE AUTO PIT SUPERFUND SITE
(FINCH ROAD LANDFILL SITE)
LEGEND
Approximate Area of Sludge Disposal
N
0
100 feet
SCALE
1" = 100'

Figure 11

TABLE 3
SURFACE WATER ANALYTICAL DATA
Monroe Auto Pit Superfund Site
(Finch Road Landfill)

Sample ID	**SW1-1**	**SW2-1**	**SW3-1**	**SW4-1**
	Pond	Ravine	Ravine	Ravine
Volatile Organic Compounds (ug/L)				
Dilution Factor	1.0	1.0	1.0	1.0
Carbon Disulfide	1.0U	1.0U	0.3J	0.03J
1,1-Dichloroethane	1.0U	1.0U	1.0U	1.3
2-Butanone	10U	10U	10J	10U
Trichloroethylene	1.0U	0.2J	1.0U	1.0U
Semivolatile Organic Compounds (ug/L)				
Dilution Factor	1.0	1.0	1.0	1.0
Diethylphthalate	10UJ	0.1J	0.1J	0.2J
di-n-butylphthalate	0.1J	0.1J	0.1J	0.3J
bis(2-Ethylhexyl)phthalate	10U	10U	10U	15J
Inorganics (ug/L)				
Arsenic	6.6J	2.0UJ	2.0UJ	2.0U
Barium	49.6UJ	60.4J	71.1J	120J
Chromium	16.7J	10.0U	10.0U	10.0U
Manganese	98.6UJ	18.5	24.9	353

NOTES:

U - Undetected; quantity shown is the detection limit.

J - Estimated quantity.

UJ - Undetected; quantity shown is estimated detection limit.

na - Not analyzed.

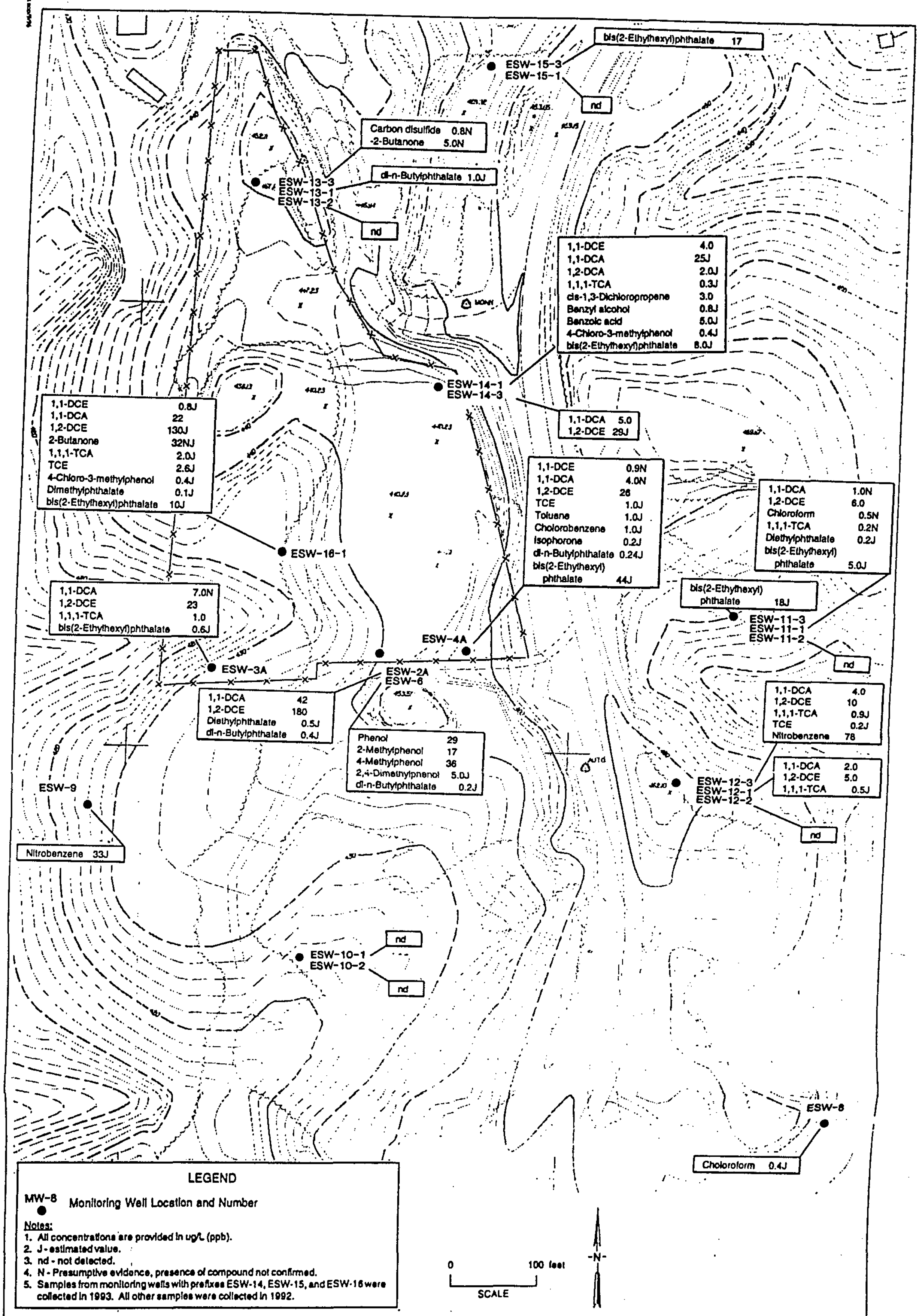
Only the analytes detected in deep surface water samples are shown.
Complete data tables that include quantitation limits for all analytes are provided in appendix H of the Remedial Investigation (RI)
Data 1992-1993

TABLE 4
RANGES OF CONTAMINANTS DETECTED IN UPPER WILCOX GROUNDWATER MONITORING WELLS

Constituent	MaximumConcentration
Volatile Organic Compounds (ug/L)	
Chlorethane	1.0 J
1,1-Dichloroethene	4.0
1,1-Dichloroethane	42
1,2-Dichloroethene (total; cis & trans)	180
1,2-Dichloroethane	2.0 J
Chloroform	0.5 N
2-Butanone	32 NJ
1,1,1-Trichloroethane	2.0
cis-1,3-Dichloropropene	3.0
Carbon Tetrachloride	0.3 J
Trichloroethylene	0.4 J
Semivolatile Compounds (ug/L)	
Nitrobenzene	78
Isophorone	0.2 J
Benzyl alcohol	0.8 J
Benzoic acid	5.0 J
4-Chloro-3-methylphenol	0.4 J
Diethylphthalate	0.5 J
Dimethylphthalate	0.1 J
Di-n-butylphthalate	0.4 J
bis(2-Ethylhexyl)phthalate	44 J
Total (Unfiltered) Inorganics (ug/L)	
Arsenic	122
Barium	1,290
Beryllium	12.0
Chromium	1,090
Lead	235
Manganese	2,450
Mercury	0.4
Zinc	4,220
Dissolved (Filtered) Inorganics (ug/L)	
Arsenic	5.7
Barium	51.3
Chromium	14.4
Manganese	69.3
Zinc	221

Notes:

J - Estimated quantity. N - Presumptive evidence; presence of compound not confirmed.
NJ - Presumptive evidence; presence of compound not confirmed. Quantity is estimated
Only the analytes detected in Wilcox groundwater samples are shown.
Complete data tables that include quantitation limits for all analytes are aprovided in Appendix H
Data 1992 - 1993



ORGANIC CONCENTRATIONS IN GROUNDWATER IN THE WILCOX AQUIFER

MONROE AUTO PIT SUPERFUND SITE (FINCH ROAD LANDFILL)

ES ENGINEERING-SCIENCE

Figure 12

TABLE 5
Organic Constituents in the Ground Water of the Wilcox Aquifer Upper Zone Over Time
Monroe Auto Pit Superfund Site

Parameter	ESW-2A	ESW-3A	ESW-4A	ESW-8	ESW-9	ESW-10-1	ESW-11-1	ESW-11-3
1,1-Dichloroethane ($\mu g/l$)								
Mar-88	97	6.0	17	ni	ni	ni	ni	ni
Dec-88	77	8.2	21	ni	ni	ni	ni	ni
Nov-89	100	10	23	<5.0	<5.0	<5.0	ni	ni
Feb-90	93	6.7	140	<5.0	<5.0	<5.0	ni	ni
Apr-92	42	7.0 N	4.0 N	<1.0	<1.0	<1.0	1.0 N	<1.0
Apr-93	na	na	na	na	na	na	na	na
Aug-93	41	6.0	11.0	<1.0	<1.0	<1.0	0.4 J	<1.0
1,2-Dichloroethylene ($\mu g/l$)								
Mar-88 (cis-)	750	7.8	110	ni	ni	ni	ni	ni
Dec-88 (cis-)	490	11	120	ni	ni	ni	ni	ni
Nov-89 (cis- & trans-)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ni	ni
Feb-90 (cis- & trans-)	<5.0	17	<5.0	<5.0	<5.0	<5.0	ni	ni
Apr-92 (cis- & trans-)	180	23	26	<1.0	<1.0	<1.0	6.0	<1.0
Apr-93 (cis- & trans-)	na	na	na	na	na	na	na	na
Aug-93 (cis- & trans-)	170	18	39	0.2 J	<2.0	<1.0	1.8	<1.0

ni - Well not installed   na - Not analyzed   J - Estimated value   N - Presumptive evidence   R - Rejected data

TABLE 5
Organic Constituents in the Ground Water of the Wilcox Aquifer Upper Zone Over Time
Monroe Auto Pit Superfund Site
continued

Parameter	ESW-12-1	ESW-12-2	ESW-13-1	ESW-13-3	ESW-14-1	ESW-14-3	ESW-15-1	ESW-15-3	ESW-16
1,1-Dichloroethane (μg/l)									
Mar-88	ni	ni	ni	ni	ni	ni	ni	ni	ni
Dec-88	ni	ni	ni	ni	ni	ni	ni	ni	ni
Nov-89	ni	ni	ni	ni	ni	ni	ni	ni	ni
Feb-90	ni	ni	ni	ni	ni	ni	ni	ni	ni
Apr-92	2.0	4.0	<1.0	<1.0	ni	ni	ni	ni	ni
Apr-93	na	na	na	na	25 J	5.0	<1.0	<1.0	12.0
Aug-93	1.4	2.0	<1.0	<1.0	7.0	3.0	<1.0	<1.0	13.0
1,2-Dichloroethylene (μg/l)									
Mar-88 (cis-)	ni	ni	ni	ni	ni	ni	ni	ni	ni
Dec-88 (cis-)	ni	ni	ni	ni	ni	ni	ni	ni	ni
Nov-89 (cis- & trans-)	ni	ni	ni	ni	ni	ni	ni	ni	ni
Feb-90 (cis- & trans-)	ni	ni	ni	ni	ni	ni	ni	ni	ni
Apr-92 (cis- & trans-)	5.0	10.0	<1.0	<1.0	ni	ni	ni	ni	ni
Apr-93 (cis- & trans-)	na	na	na	na	<1.0	29.0 J	<1.0	<1.0	59.0 J
Aug-93 (cis- & trans-)	5.6	5.5	<1.0	<1.0	49.0	16.0	<1.0	<1.0	94.0

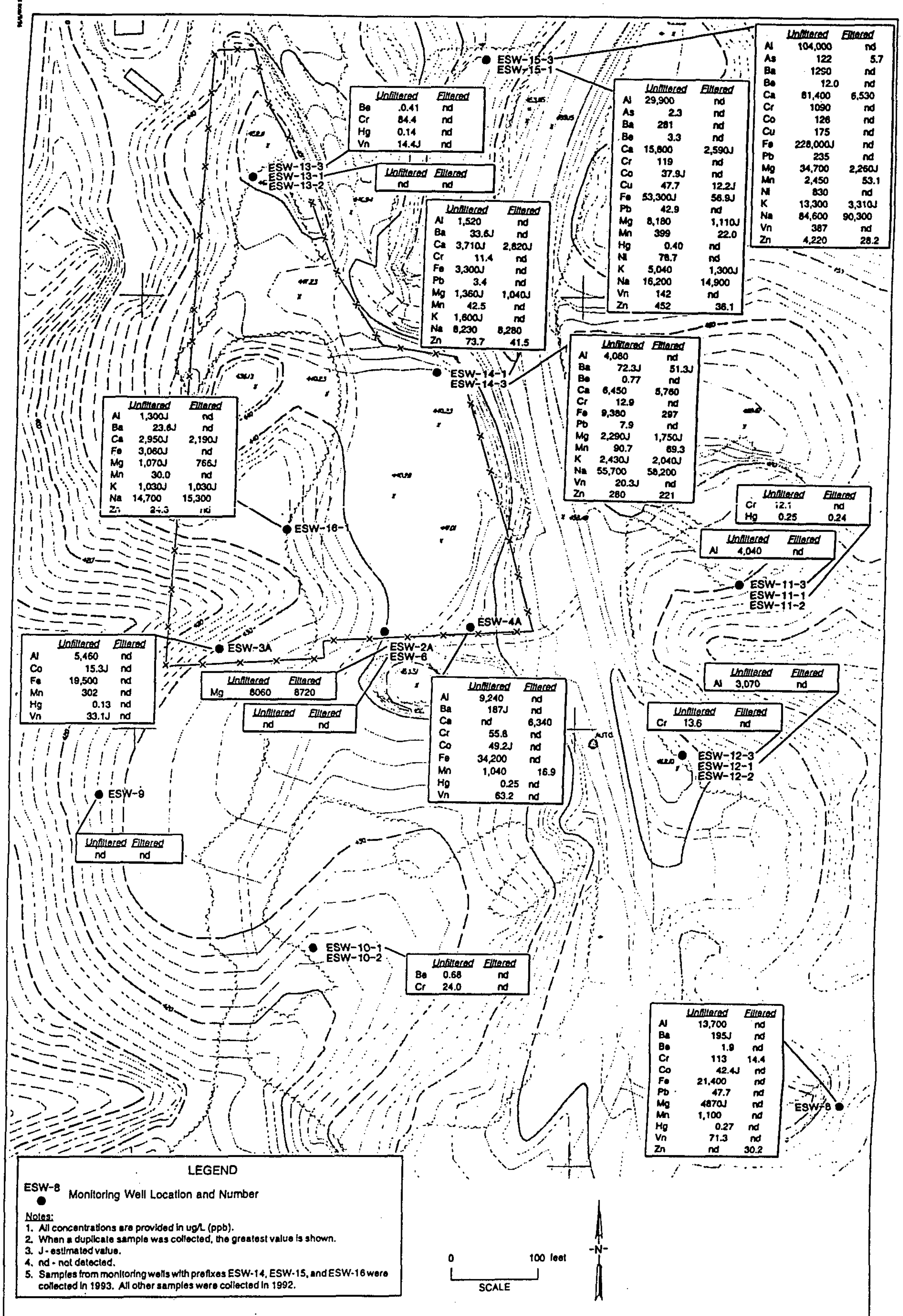
ni - Well not installed na - Not analyzed J - Estimated value N - Presumptive evidence R - Rejected data background concentrations, did not contain corresponding elevated concentrations of inorganics. The inorganic concentrations detected in ground water samples (1992-93) showed no pattern across the site, and did not always decrease in a down gradient direction (Figure 13). However, greater inorganic concentrations did correspond to higher levels of total dissolved solids measured in the samples. This fact, along with the much lower inorganic concentrations in filtered samples as compared to unfiltered samples, indicates that a large proportion of the total inorganic mass in the ground water samples is due to soil particles in the samples. The lack of a spatial pattern is probably due to natural variability of the Wilcox aquifer. Contamination appears to be confined to the upper Wilcox aquifer. The best water production and the depths of the private wells indicate that most of the wells draw water from the lower Wilcox aquifer. The upper Wilcox aquifer is considered the most likely exposure route, but private wells are not believed to produce from this zone. This is the only potential exposure pathway.

Ground water samples from the Wilcox aquifer lower zone were not found to contain detectable concentrations of VOCs or inorganics. Only one sample contained detectable concentrations of semivolatile organics (Table 6). The lower Wilcox aquifer is separated from the upper Wilcox aquifer by approximately 40 feet of low permeability clay. The lower Wilcox aquifer is not contaminated and this exposure pathway is not considered further.

5.9 RESIDENTIAL WATER SUPPLIES

Residential water supplies are obtained from the Wilcox aquifer. The production zones are uncertain because few drilling logs or well construction records were found, and well owners had little or no knowledge of the well depths. It is likely that most wells are completed in the lower zone because monitoring wells at the site show that this zone provides greater well yields than the upper zone. Well records that could be found indicated that production from 40 to 100 feet bls. in wells south of the site and 150 to 210 feet bls. in wells north of the site. Given the topography and the high yields of the wells south of the site, all of these wells could potentially be in the same aquifer, the lower Wilcox aquifer. Four VOCs, three semivolatile organic compounds (SVOCs), and seven inorganics were detected in residential water supply samples in 1992. The VOC and SVOC levels are estimated as indicated by the J qualifiers. Concentrations of these contaminants are below the Safe Drinking Water Act Maximum Contaminant Levels (MCLs). Concentrations of organics and inorganics in residential water supply samples (1992) are shown on Figure 14. The wide dispersal pattern (up and down gradient of the site) and the lack of organic contamination concurrent with the metals indicates that the contamination is not site related. Residential well sampling since the RI indicate that organics are below the detection limit if they are present and inorganic concentrations, when detected, remain at about the same level.

A comparison of the April 1992 data with previous (1989) data collected prior to the CERCLA activities indicates that the concentrations of VOCs and semivolatile organics have generally remained stable over the monitoring period. The majority of the wells show concentrations of



INORGANIC CONCENTRATIONS IN GROUNDWATER IN THE WILCOX AQUIFER
MONROE AUTO PIT SUPERFUND SITE (FINCH ROAD LANDFILL)

ES ENGINEERING-SCIENCE

Figure 13

TABLE 6
WILCOX AQUIFER LOWER ZONE
GROUNDWATER ANALYTICAL DATA SUMMARY
Monroe Auto Pit Superfund Site
(Finch Road Landfill)

Sample ID	ESW-6	ESW-10-2	ESW-11-2	ESW-12-2
Volatile Organic Compounds (ug/L)				
No VOCs Detected				
Semivolatile Organic Compounds (ug/L)				
Phenol	29	10UJ	10U	10U
2-Methylphenol	17	10UJ	10U	10U
4-Methylphenol	36	10UJ	10U	10U
2,4-Dimethylphenol	5.0J	10UJ	10U	10U
Di-n-butylphthalate	0.2J	10UJ	10U	10U
Total (Unfiltered) Inorganics (ug/L)				
No Inorganics Detected				
Dissolved (Filtered) Inorganics (ug/L)				
No Inorganics Detected				

NOTES:

U - Undetected; quantity shown is the detection limit.

J - - Estimated quantity.

UJ - Undetected; quantity shown is estimated detection limit.

Only the analytes detected in deep surface water samples are shown

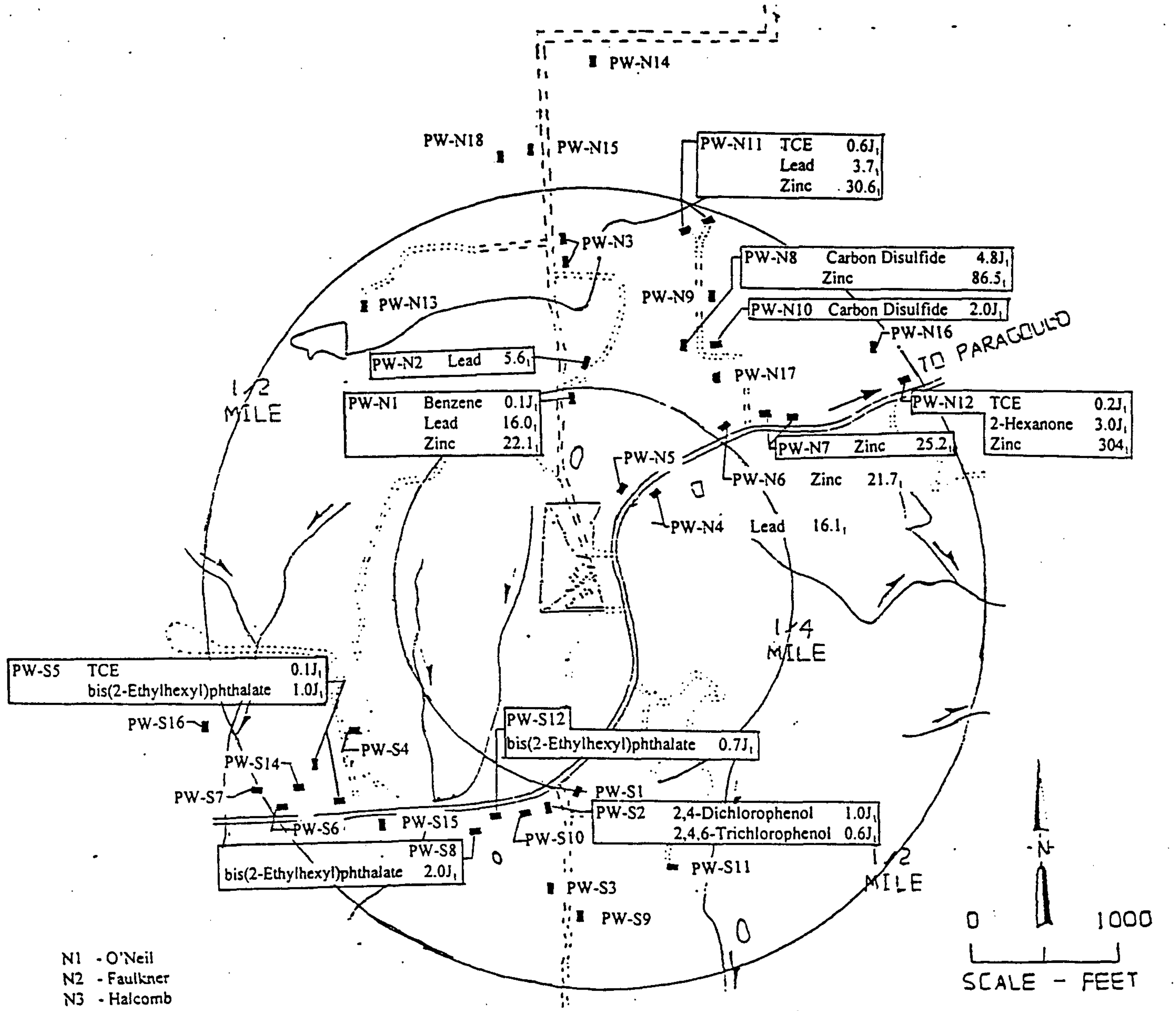
Complete data tables that include quantitation limits for all analytes are provided in appendix H of the Remedial Investigation (RI)

Data 1992 - 1993

ORGANIC AND INORGANIC CONCENTRATIONS IN RESIDENTIAL WELLS

Figure 14

MONROE AUTO PIT SUPERFUND SITE
(FINCH ROAD LANDFILL)



N1 - O'Neil
N2 - Faulkner
N3 - Halcomb
N4 - Thompson, J
N5 - Duncan
N6 - Chaffin
N7 - Meredith
N8 - Henry
N9 - McAlister
N10 - McCullar
N11 - Springston
N12 - Gunn
N13 - Fahr
N14 - Shelton

N15 - Johnson, G
N16 - Hampton
N17 - Lackey
N18 - Johnson, M
S1 - Cleveland
S2 - Kennedy
S3 - Templeton
S4 - Hale
S5 - Toler
S6 - Berndt

S7 - Robinson
S8 - Hodge
S9 - Dowler
S10 - Wortham
S11 - Krosp
S12 - Elam
S13 - Not Assigned
S14 - Anderson, D
S15 - Thompson, A
S16 - Hill, W

NOTES:
₁ 1992 samples
All units in µg/L (ppb)
J Estimated quantity

LEGEND

Paved Highway
Gravel Road or Drive
Monroe Auto Property
Fence
Residence and Private well Location (PW-S1)
Stream
Lake

volatile organics below the detection limits or not detected at all. The concentrations exhibit variations that can be considered normal under the sampling and analytical protocols that were used. Variations in the inorganic concentrations and their distribution can be attributed to natural variation within the Wilcox aquifer. No increasing or decreasing trends are observed in the data over time (1989-1995). Residential wells within one-half mile of the site are sampled semi-annually at this time. They will continue to be monitored, but the frequency may change in the future. Because the volatile organic compounds move faster than the metals and because they move with the ground water flow, one would expect to see the VOCs arrive at the wells ahead of the metals. Because this relationship is not seen, the contaminants do not appear to be site related.

6.0 SUMMARY OF SITE RISKS

An evaluation of the potential risks to human health and the environment from site contaminants was conducted in accordance with OSWER Directive 9285, Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), as part of the baseline risk assessment. The results of all the sampling conducted at the site during the RI were used to evaluate the risk that the site poses to human health and the environment.

The objectives of the baseline risk assessment were to (1) help determine whether additional response actions are necessary at the site; (2) provide a basis for determining remedial action goals that are adequately protective of human health and the environment; and (3) provide a basis for comparing potential health impacts of various remedial alternatives.

The baseline risk assessment was divided into two parts: 1) the human health evaluation and 2) the ecological evaluation. Human health risks are determined by evaluating chemical exposure limits and actual concentrations of contaminants present at a site. The contaminant concentrations are compared to the exposure concentration known or suspected to have a potential adverse impact. In the risk assessment, carcinogenic and non-carcinogenic risks are calculated. Conservative assumptions that weigh in favor of protecting human health are used in calculating risks. The environmental or ecological risk assessment is conducted to determine if there are any current or potential impacts on ecological receptors (such as birds or mammals) attributable to the unremediated site.

The national risk, or probability, that an individual may develop some form of cancer from everyday sources, over a 70-year life span, is estimated at three in ten. Activities such as too much exposure to sun, occupational exposures, or dietary or smoking habits contribute to this high risk. The three in ten probability is considered the "natural incidence" of cancer in the United States.

To protect human health, a risk range of one in ten thousand to one in one million excess cancer risk has been set as a goal for Superfund sites. This range may be expressed as 10^{-4} to 10^{-6}. For example, a risk of 10 means that 1 person out of one million could develop cancer as a result of a lifetime exposure to a site. The level of concern for non-carcinogenic contaminants is determined by calculating a Hazard Index (HI). There may be concern for potential exposure to a site where the HI values are greater than 1.0 for human populations who may reasonably be expected to be exposed.

The baseline risk assessment assumes a no-action alternative at the site. Baseline exposure estimates were based on future unrestricted access. Four acres of the site, including the pit and seasonal pond, are currently surrounded by a locked chain-link fence. However, it was assumed that the site is currently accessible to trespassers. Also, off-site residential well water was evaluated for risks associated with current domestic use.

The future land use is assumed to be residential. Estimates were based on the assumption that development of the Monroe site would result in unrestricted public access and full use of local resources by persons living on or near the site. An on site occupational scenario was also evaluated as an alternative future case.

Although the risks from both the average (AVG) and reasonable maximum exposure (RME) scenarios were calculated in the risk assessment, the RME risks were used to evaluate threats at the site because the current EPA policy mandates the use of the RME when evaluating the need for response actions at Superfund sites. The difference between the AVG and RME risk results from using different assumptions in the equations utilized to perform the risk calculations. For example, the exposure frequency for AVG is 275 days per year as opposed to 350 days per year for RME, and the exposure durations is 9 years for AVG as opposed to 30 years for RME. RME risks are greater, and thus more conservative, than average risks.

The highly toxic or highly mobile source materials that would present a significant risk to human health or the environment should exposure occur are considered principal threat wastes. On the other hand, source materials that generally can be reliably contained and that would present only a low risk in the event of release are considered low level threat wastes. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.430, recommends treatment to address the principal threats posed by a site whenever practicable, and engineering controls, such as containment, for waste that poses a relatively low long-term threat.

6.1 HUMAN HEALTH RISK ASSESSMENT

6.1.1 Ground water

Human health risks from ground water were calculated for three basic scenarios: current residential, future on site residential, and future off site residential use. Monitoring well and residential well results from 1992 were used for current risks. Ground water models for transport (MULTIMED, 1990) and infiltration of the landfill cover (HELP, 1989) were used for future scenarios. Cancer slope factors were from IRIS, 1992 and HEAST, 1992.

6.1.1.1 Current Exposures - Residential Wells Off Site
Current exposure risk was calculated assuming that the residential wells are connected to the upper Wilcox aquifer. The maximum detected levels of contaminants found in samples of eleven monitoring wells were used. Noncancer risk from exposures to residential well water is not significant (less than 0.01). Cancer risk from residential well water exposure ($1X10^{-8}$ for average and $1X\ 10^{-7}$ for RME) is below the target risk range of $1X10^{-4}$ to $1X10^{-6}$. No environmental threats from residential water supplies have been identified.

6.1.1.2 Hypothetical Future Exposures - Monitoring Wells On Site
This scenario assumes an on site residence with a well in the contaminated aquifer. It is also assumed that the concentration of contaminants do not decrease over time. The life time excess cancer risk from monitoring well water exposure is within the target risk range of $1X10^{-4}$ to $1X10^{-6}$ at $1X10^{4}$ to $1X10^{-5}$. Noncancer risk is above the target level of HI = 1 at 30 based on unfiltered monitoring well samples. The greatest contribution to total risk is from ingestion of drinking water and inhalation of vapors while showering. The greatest contributor to the ingestion risk is manganese; the greatest contributors to the inhalation risk are chlorobenzene and nitrobenzene. There is slightly less risk from filtered ground water than from unfiltered ground water (Table 7).

TABLE 7
SUMMARY OF HUMAN HEALTH RISK

Media	Cumulative Carcinogenic Risk	Cumulative Non-carcinogenic Risk
Soil/Sludge	$3\ X\ 10^{-3}$	50
Ground Water - unfiltered	$1\ X\ 10^{-4}$	30
Ground Water - filtered	$8\ X\ 10^{-5}$	1
Sediment	$1\ X\ 10^{-5}$	0.1

6.1.1.3 Hypothetical Future Exposures - Modeled Ground Water Concentrations Off Site
This third scenario is for a hypothetical residence 400 feet down gradient of the site with a well in the upper Wilcox aquifer. The HELP model was used to calculate the percolation rate through three types of landfill caps. These three scenarios result in percolation rates of 0.0018, 0.0181 and 10.0967 inches per year through the sludge. Results of the first two scenarios indicated no contaminant release from sludge to the ground water for 30 years. Results of the

third scenario, which had the highest percolation rate through the cap and therefore the highest potential for leaching, contaminant transport, and exposure, indicated that benzene, 1,2-dichloroethene, and vinyl chloride would leach into the ground water, resulting in estimated modeled concentrations of 23.7 μg/L, 28.5 μg/L and 57.8 μg/L, respectively. The resultant risk indicates a noncancer risk of $4X10^{-2}$ and a cancer risk of $1X10^{3}$ for the RME. The source of the noncancer risk is 1,2-dichloroethene, and the driving force of the cancer risk is vinyl chloride.

Engineering Science also modeled the transport of 1,1-DCA and 1,2-DCE in the upper Wilcox aquifer to a receptor 700 feet down gradient using the PLUME 2D model. It is assumed that biodegradation does not occur. Monitoring well values (1992) were used for the contaminant concentrations. Modeled concentrations were predicted to level off at 7 ppb and 55 ppb respectively. Monitoring results of residential wells in 1992 did not show these contaminants at concentrations above the detection limits.

6.1.2 Sediment

Risks of cancer and noncancer resulting from exposure of a potential trespasser to sediments are within acceptable ranges. The total RME cancer risk is $1X10^{-6}$, and the total RME HI is $1X10^{-1}$. Residential risk to sediment exposure also has a cancer risk below the acceptable range (total cancer risk = $1X10^{-5}$).

6.1.3 Soils/Sludge

The soil exposure pathway is not likely to be significant under current conditions since the contaminants are buried beneath 5 feet of clean fill that is stabilized with vegetation. Future exposure risk was calculated assuming that erosion may bring the contaminants to the surface. Future land use is also assumed to be residential land use that includes farming and livestock production. Risk estimates are based on the assumption that development of the Monroe site would result in unrestricted public access and full use of local resources by persons living on or near the site. The potential exposure pathways, as a result of on-site residents, include (1) ingestion of soil and ground water, (2) ingestion of contaminated home grown vegetables, meat, and milk, (3) dermal absorption of chemicals in the soil, sediments, and ground water, (4) inhalation of VOC emissions from ground water, and (5) inhalation of VOC emissions and dust particulates from the soil.

The noncancer risk from potential future residential exposure to soils is greater than the target limit value of HI=1. The total adult HI is 5, resulting mostly from dermal exposure. The chemical contaminant in soil that is most responsible for this risk is antimony. Cancer risk for adults is within the target risk range, but it is at the limit of that range. The greatest risks are from dermal absorption of contaminants in soil; the greatest contributor to this risk is vinyl chloride.

Risks to children are comparable to risks to adults, although they are higher for the soil ingestion pathway because of the greater ingestion rate assumed for children. Soil ingestion, however, was not the significant pathway for soil exposures. Risks for workers on the site and a potential trespasser who climbs the fence and is exposed to site soils would be less than that of a resident. The risks for these potential receptors are less than the residential risks presented here.

Soil and sludge data were combined to obtain the total risk from all soils to which future residents at the site may be exposed. For the ingestion pathway, the noncancer risk from sludge alone is four times greater than that from soil mixed with sludge; the cancer risk is 10 times greater. The higher concentrations of contaminants in the sludge are responsible for this difference. Consequently, assuming the same exposure parameters for exposure to sludge as were used for exposure to soil, the total noncancer and cancer risks for all pathways associated with sludge can also be assumed to be 4 and 10 times greater, respectively.

6.1.4 Summary of Human Health Risk

The cumulative carcinogenic risks for the three media based on reasonable maximum exposure concentration are shown in Table 7.

Soil/sludge and unfiltered ground water exhibited cumulative carcinogenic risks greater than 10^{-4}, and non-carcinogenic HI greater than 1. Therefore, in accordance with EPA's Risk Assessment Guidance for Superfund, only soil/sludge and ground water are considered to present a concern to human health.

Combining the contaminants and media of concern, the exposure pathways and receptors and the target goals for the contaminants of concern, remedial action goals were established (Table 8).

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.

6.2 Ecological Risk Assessment

An ecological risk assessment was conducted to evaluate the threats the site poses to the environment. Based upon this study, EPA determined that it is unlikely that there are any significant impacts on surrounding ecosystems at the Monroe Auto Pit site. However, there may be some localized impacts on the site.

Several contaminants of concern - iron, chromium, lead and mercury - actually or potentially exceed either sediment or water quality criteria and, therefore, pose an ecological risk to the amphibians using the ponds or seeps. The release of chemical stressors from the landfill may have a chronic impact on the seeps and any wildlife that may use them.

TABLE 8
REMEDIAL ACTION GOALS

Contaminant of Concern	Target Goal	Basis
Soil/Sludge		
Trichloroethylene	0.1-10 mg/Kg	Carcinogenic Risk
Vinyl Chloride	20-2,000 mg/Kg	Carcinogenic Risk
Antimony	6 mg/Kg	Noncarcinogenic Risk
Arsenic	0.02-2 mg/Kg	Carcinogenic Risk
Beryllium	0.07-7 mg/Kg	Carcinogenic Risk
Chromium VI	3-300 mg/Kg	Carcinogenic Risk
Lead	500 mg/Kg	EPA Guidance
Ground Water		
cis-1,2-Dichloroethylene	70 μg/L	MCL
trans-1,2-Dichloroethylene	100μg/L	MCL
bis(2-Ethylhexyl)phthalate	6 μg/L	MCL
Beryllium	4 μg/L	MCL
Chromium	50 μg/L	MCL
Lead	15μg/L	SDWA Action Level
Manganese	200 μg/L	MCL

7.0 DESCRIPTION OF ALTERNATIVES

7.1 Soil and Sludge Remedial Alternatives

Soil/sludge Alternatives

Alternative 1: No action
Alternative 2: Access and deed restrictions
Alternative 3: Soil and vegetative cover; access and deed restrictions
Alternative 4A: Cap; slurry wall; access and deed restrictions
Alternative 4B: Cap; french drain; access and deed restrictions
Alternative 5: Solidification/stabilization; on-site cap; access and deed restrictions
Alternative 6: Excavation; vapor extraction; solidification/stabilization; on-site cap; access and deed restrictions
Alternative 7: Excavation; off-site transport and disposal in Subtitle C or D landfill.

7.1.1 Alternative No. 1: No Action

No remedial actions will be conducted under this alternative, and no limitations will be placed on future uses of the site. All contaminated soil/sludge is within the site boundaries and access is physically restricted through an existing chain link fence. The sludge is covered by three to five feet of fill, currently preventing direct contact. Implementing no remedial activities at the site allows the existing contaminant source to remain in place. The potential for exposure to contaminants is not reduced in this alternative.

The present worth cost estimates for this and other soil/sludge alternatives are summarized in Table 9.

TABLE 9
SOIL/SLUDGE ALTERNATIVE COST SUMMARY

Alternative	2 Access and Deed Restriction	3 Soil and Vegetative Cover	4a Multi-layer Cap; Slurry Wall	4b Multi-layer Cap; French Drain	5 Solidification/ stabilization	6 Vapor extraction; Solidification/ stabilization	7 Off-site disposal (RCRA landfill)	7 Off-site disposal (sanitary/ industrial landfill)
Capital								
Low Estimate	0.00	276	588	733	3,037	3,339	4,600	1,900
High Estimate	0.00	330	817	1,460	7,879	8,418	10,000	3,700
O&M								
Low Estimate	107	134	134	134	134	134	N/A	N/A
High Estimate	117	134	134	134	134	134	N/A	N/A
Total Cost								
Low Estimate	106	410	722	867	3,171	3,473	4,600	1,900
High Estimate	117	465	951	1,594	8,013	8,552	10,000	3,700

Notes:
1. Costs are in thousands of dollars
2. No costs are incurred for Alternative 1 - No Action
3. N/A - Not applicable

7.1.2 Alternative No. 2: Access and Deed Restrictions

Under this alternative, the current cover will remain in place. Periodic inspections will be conducted and maintenance would be performed to help ensure that the cover remains intact. Maintenance, as needed, will consist of semi-annual mowing and repair of damaged fencing. Minor draining modifications may be conducted as needed to prevent ponding and promote surface water runoff.

Limitations will be placed on future uses of the site. A survey plat indicating the location of the waste disposal area with respect to permanently surveyed benchmarks will be prepared and filed with the local zoning authority. The plat will contain a note, prominently displayed, which states the owner's obligation to restrict disturbance of the waste.

7.1.3 Alternative No. 3: Soil and Vegetative Cover; Access and Deed Restrictions

The existing cover will be augmented by the addition of clean soil. The soil will be obtained locally and used to create a uniform slope across the site to promote drainage off of the sludge disposal area. After the cover has been improved to provide adequate drainage, a minimum six-inch layer of topsoil will be added to promote vegetative growth. The cover will be seeded with native grasses to reduce future erosion.

Periodic inspections will be conducted and repairs performed to ensure that the cover remains intact. Repairs, as needed, will consist of replacing eroded topsoil, reseeding bare areas, semi-annual mowing, and repair of damaged fencing.

The improved cover will be maintained. Limitations will be placed on future uses of the site. A survey plat indicating the location of the waste disposal area with respect to permanently surveyed benchmarks will be prepared and filed with the local zoning authority. The plat will contain a note, prominently displayed, which states the owner's obligation to restrict disturbance of the waste.

7.1.4 Alternative No. 4A: Cap; Slurry Wall; Access and Deed Restrictions

A bentonite slurry wall will be constructed surrounding the area of sludge deposits. The three-foot wide slurry wall will be installed to a depth of approximately 30 feet and will total approximately 2100 feet in length. The bottom of the wall will be below the total depth of the sludge deposits. However, slurry walls are most effective when they are tied into an impermeable layer. At the Monroe Superfund site such an impermeable clay layer is about 150 feet below the surface.

Site soils displaced as a result of excavation of the trench will be spread over the sludge area, and be covered by the cap. All excavation will be planned in uncontaminated areas. If stained soils exhibiting possible contaminant characteristics are encountered, they will be segregated and shipped for off-site disposal.

The slurry wall will be designed to provide a low-permeability barrier to restrict the movement of perched ground water into the sludge. Normally a slurry wall is tied into a low permeability layer at its base. Because the shallowest continuous clay layer is over 100 feet below the surface, this slurry wall will hang to a depth of 30 feet, which is below the level the sludge. This will mitigate to some extent perched water from entering the sludge from below the wall.

A cap meeting the general design requirements of the Arkansas Hazardous Waste Management Regulation 23 § 264.310 will be constructed. The cap evaluated under this alternative includes a 24-inch thick uncompacted soil layer comprised of six inches of uniformly distributed topsoil over 18 inches of sandy soil. The 24-inch soil layer will be underlain by a 24-inch compacted clay layer. Components and thicknesses of the cap specified here do not necessarily represent the final design parameters under this alternative. If this alternative is implemented, a detailed design will be submitted and the capping parameters will be further refined.

Deed restrictions will prohibit future development of the site. A survey plat indicating the location of the waste disposal area with respect to permanently surveyed benchmarks would be prepared and filed with the local zoning authority. The plat will contain a note, prominently displayed, which states the owner's obligation to restrict disturbance of the waste.

In addition to the cap, these restrictions will eliminate the risk of long-term contact with contaminated media. The baseline risk assessment assumed a future residential land use scenario for the calculation of future risks. The cap and deed restrictions will eliminate the possibility of residential land use at the site.

The multilayer cap will be periodically inspected for signs of erosion, subsidence, or damage caused by frost or burrowing mammals. Damaged areas will be repaired to restore the cap. The vegetation will be maintained through periodic mowing and reseeding of bare areas.

7.1.5 Alternative No. 4B: Cap; French Drain; Access and Deed Restrictions

A french drain will be constructed surrounding the area of sludge deposits. The three-foot wide french drain will be installed to a depth of approximately 30 feet and will total approximately 2100 feet in length. The bottom of the french drain will be below the total depth of the sludge deposits, and will extend through the perched zone into the underlying unsaturated zone. Site soils displaced as a result of excavation of the trench will be spread over the sludge area and covered by the cap. All excavation will be planned in uncontaminated areas, but if stained soils exhibiting possible contaminant characteristics are encountered they will be segregated and shipped off-site for disposal.

The french drain will intercept perched ground water before it enters the contaminated area. The captured ground water will be transported via buried piping to a discharge point located in the intermittent stream southwest of the site.

A french drain suitable for this site will be constructed by excavating a 30-foot deep trench and installing impermeable plastic sheeting along the sludge deposit side of the trench. A one- to two-foot thick gravel base will be placed in the trench; slotted PVC piping will be installed above the gravel base, and gravel fill will be installed to ground surface. The trench parameters and its construction method will be further refined in the detailed design process to provide improved performance.

A cap meeting the general design requirements of the Arkansas Hazardous Waste Management Regulation 23 § 264.310 will be constructed. The cap evaluated under this alternative includes a 24-inch uncompacted soil layer comprised of six inches of uniformly distributed topsoil over 18 inches of sandy soil. The 24-inch soil layer will be underlain by a 24-inch compacted clay layer. Components and thicknesses of the cap specified here do not necessarily represent the final design parameters under this alternative. If this alternative is implemented, a detailed design will be performed and the capping parameters will be further refined.

Deed restrictions will prohibit future development of the site. A survey plat indicating the location of the waste disposal area with respect to permanently surveyed benchmarks will be prepared and filed with the local zoning authority. The plat will contain a note, prominently displayed, which states the owner's obligation to restrict disturbance of the waste.

In addition to the cap, these restrictions will eliminate the risk of long-term contact with contaminated media. The baseline risk assessment assumed a future residential land use scenario for the calculation of future risks. The cap and deed restrictions will eliminate the possibility of residential land use at the site.

The multilayer cap and the french drain outlet will be periodically inspected for signs of erosion, subsidence, or damage caused by frost or burrowing mammals. Damaged areas will be repaired to restore the cap. The vegetation will be maintained through periodic mowing and reseeding of bare areas.

7.1.6 Alternative No. 5: Solidification/Stabilization; On-site Landfill; Access and Deed Restrictions

Solidification/stabilization will involve excavation and removal of soil and sludge containing contaminants that exceed remedial action goals. The total volume of soil and sludge requiring excavation is estimated to be between 11,000 and 20,000 cubic yards. Temporary erosion control measures will be implemented to isolate the disposal pit area and displaced soil/sludge from the intermittent creek and springs. Impermeable tarps will be placed on the ground surface prior to placement of the excavated material and similar tarps will also be placed over the individual piles to avoid producing airborne particulates and contaminated runoff. Other erosion control measures will be implemented as necessary.

Soil and sludge will be excavated from the disposal pit by backhoe or similar means. This material will be staged in piles located in the northern fenced portion of the site pending treatment. Soil sampling will be conducted within the excavation to confirm complete excavation.

A hazardous waste landfill, meeting the general design requirements of the Arkansas Hazardous

Waste Management Regulation 23 §264 Subsection N, will be constructed in the excavation area. Treated material will be placed into the landfill and a cap will be constructed over the landfill. Periodic inspections of the cap and fence will be performed to identify areas on the fence and cap that need maintenance. Maintenance will include fence repairs, periodically mowing the cap, reseeding bare spots on the cap, and repairing erosion areas.

Deed restrictions will also be placed on the parcel of land that will limit future development of the site in the event Monroe relinquishes the site to another party. Access would continue to be restricted by the existing fence. A survey plat indicating the location of the waste disposal area with respect to permanently surveyed benchmarks will be prepared and filed with the local zoning authority. The plat will contain a note, prominently displayed, which states the owner's obligation to restrict disturbance of the waste.

7.1.7 Alternative No. 6: Excavation; Vapor Extraction; Solidification/Stabilization on-site Landfill; Access and Deed Restriction

Alternative No. 6 will require excavation and removal of an estimated 11,000 to 20,000 cubic yards of soil and sludge containing contaminants that exceed remedial action goals. Soil sampling will be conducted within the excavation to confirm required excavation depths within the sludge pit. The excavated material will be staged in piles located in the northern fenced portion of the site pending treatment.

Initial treatment will employ vapor extraction for organics removal. Excavated soil and sludge will be placed in piles on an impermeable barrier. Perforated pipes will be placed in the piles and vacuum pumps will pull ambient air through the contaminated soil/sludge, volatilizing VOCs from the soil. Air pollution control requirements under this alternative are not anticipated to be necessary, but could be added if needed. Due to space limitations onsite, excavated soils/sludge will be treated in batches.

Following the vapor extraction treatment, the soil/sludge will be solidified to immobilize the inorganic contaminants. While one batch is being solidified, another batch will be excavated and treated by vapor extraction. A hazardous waste landfill, meeting the general design requirements of the Arkansas Hazardous Waste Management Regulation 23 §264 Subsection N, will be constructed in the excavation area. Treated material will be placed into the landfill and a cap will be constructed over the landfill.

Solidification/stabilization of the soils and sludge will be conducted by mixing the soil/sludge with Portland cement, resulting in a mixture that will physically immobilize the inorganic contaminants. Solidification/stabilization will be conducted as described in Alternative No 5. Excavation will be limited to soils/sludge containing inorganics in excess of remedial action goals; the volume of soil/sludge to be treated is estimated to be between 11,000 and 20,000 cubic yards.

Maintenance of the cap and fence will be conducted through periodic inspections performed to identify areas on the fence and cap that need maintenance. Maintenance will include fence repairs, annual mowing of the vegetative cover, reseeding of bare spots on the cap, and repairing eroded areas. Implementation of this alternative may require construction of temporary erosion control structures, repair of eroded areas, and reseeding.

Deed restrictions will also be placed on the parcel of land that will limit future development of the site in the event Monroe relinquishes the site to another party. Access will continue to be restricted by the existing fence. A survey plat indicating the location of the waste disposal area with respect to permanently surveyed benchmarks will be prepared and filed with the local zoning authority. The plat will contain a note, prominently displayed, which states the owner's obligation to restrict disturbance of the waste.

7.1.8 Alternative No. 7: Excavation; Off-Site Transport and Disposal in Subtitle C or D Landfill

This alternative requires excavation, by backhoe or similar means, and removal of an estimated 11,000 to 20,000 cubic yards of soil and sludge containing contaminants in excess of remedial action goals. Soil sampling will be conducted in the excavation to confirm removal of contaminated soil and sludge. The excavated material will be loaded without any treatment into lined dump trucks and transported to either a regional sanitary landfill (such as the Greene County landfill) or to a RCRA-permitted hazardous waste landfill. Uncontaminated soils from local borrow pits will be used to backfill the excavation. The site will subsequently be graded, covered with a 12-inch topsoil layer, and vegetated. No access controls or deed restrictions will be necessary following completion of these actions. If the delisting petition was approved by EPA, the delisted waste could then be disposed in a sanitary or industrial landfill. If a delisting petition was not approved, pretreatment of the waste might be necessary to meet Land Disposal Restrictions (LDRs) before the waste could be disposed of in a hazardous waste landfill.

7.2 GROUND WATER REMEDIAL ALTERNATIVES

Alternative 1:	No action
Alternative 2:	Natural attenuation; ground water and residential water supply monitoring; ground water use restrictions
Alternative 3:	Ground water extraction; carbon adsorption; reinjection.

7.2.1 Alternative No. 1: No Action

Under this alternative, no action will be taken at the site and no ground water monitoring of the existing wells will be performed. Reduction of the ground water contaminant levels will occur through natural processes such as biological, chemical, and physical degradation, adsorption and dispersion.

The present worth cost estimates for this and other ground water alternatives are summarized in Table 10.

TABLE 10
GROUND WATER ALTERNATIVE COST SUMMARY

Alternative	1 No Action	2 Natural Attenuation, Monitoring, Use Restrictions	3 Ground Water Extraction, Carbon Adsorption, Reinjection
Capital			
Low Estimate	0	70	472
High Estimate	0	71	608
O&M			
Low Estimate	0	686	2656
High Estimate	0	1114	2830
Total Cost			
Low Estimate	0	757	3129
High Estimate	0	1186	3438

Notes: 1. Costs are in thousand dollars.

7.2.2 Alternative No. 2: Natural Attenuation and Degradation; Ground Water Use Restrictions; Ground Water Monitoring and Residential Water Supply Monitoring
Under this alternative, contaminant reduction will occur through natural processes such as biological, chemical and physical degradation, adsorption, and dispersion. The use of potentially contaminated ground water will be restricted by placing ground water use restrictions on the site property. Ground water monitoring of on and near site wells and residential wells will be conducted.

Initially, ground water use restrictions will be placed only on the site property. Residential wells within one-half mile of the site will be sampled regularly for VOCs, semivolatile organics, and inorganics, as currently conducted. Ground water from monitoring wells on and near the site will be sampled regularly for VOCs, semivolatiles, and inorganics. The sampling data will be reviewed to evaluate trends in ground water quality and to determine the effectiveness of natural attenuation. Initially, residential wells will be sampled semiannually.

Monitoring wells will be sampled semiannually until four rounds of sampling are accomplished. At that time, the data will be evaluated and the monitoring frequency could be changed to annually. Existing wells that have sampling data for four sampling rounds for VOCs, semivolatiles (including BEHP), and inorganics will continue to be sampled annually. To better insure the possibility of obtaining a sample, sampling should be scheduled during the "wet" season. Sampling protocol will follow that in the Statement of Work. Once a trend has been defined, sampling may be conducted on a less frequent basis. A Statement of Work, including a Sampling and Analysis Plan will be submitted by Monroe and approved by ADPC&E.

Should monitoring indicate statistically significant degradation of residential water supplies due to site contaminants, the affected residents will be put on bottled water or a point of use water supply treatment, and the well(s) will be immediately resampled. If a statistically significant change in ground water quality occurs in the monitoring wells, the affected wells will immediately be resampled. If any changes are verified, more frequent sampling should be performed. If necessary, active remediation or physical/ hydraulic containment measures will be evaluated. Should active remediation or containment measures become necessary, a ROD amendment or explanation of significant differences will be issued.

A monitoring plan in the Statement of Work will address the monitoring criteria. Sampling will most likely be conducted by Monroe, but could also be conducted by a contractor to Monroe, a regulatory agency or agency contractor. In the past, residential wells have been sampled by the Arkansas Department of Health, as well as Monroe contractors.

Based on ground water modeling, it is assumed that the contaminant concentrations will not exceed the Remedial Action Objectives (RAO) target goals or the MCLs at the residential wells. Because all modeling is based on some assumptions about the aquifer, contingency plans are included in this ROD. The performance standards will be met by this alternative. Ground water use restrictions on the site will prevent future exposure to on site water users (residents). Monitoring of the residential wells and monitoring wells will prevent potential future threats to residential water supplies. Immediate and secondary contingency actions are included to protect human health and the environment.

This alternative could be easily implemented as contractors, supplies, and equipment are available locally or from regional vendors. The residential wells are currently being sampled and the sampling could be expanded to include the site wells with a few months notice. Cost for this alternative is included in Table 10. Maintenance will include well upkeep, sampling analysis, data validation, and reporting.

The estimated present worth for this alternative, including capital costs and 30 years of O&M costs, ranges from $760,000 to $1.2 million.

7.2.3 Alternative No. 3: Ground Water Extraction; Carbon Adsorption; Reinjection
This alternative requires extraction of ground water from the Wilcox aquifer upper zone by

strategic placement of ground water recovery wells. The extracted ground water will be passed through a treatment unit located onsite. If RAO target goals are exceeded off-site, temporary restrictions will be placed on ground water use. These restrictions will remain in effect until target goals are met.

The extraction well locations and pumping rates will be determined during the design phase. Collection of additional data during the design of a remediation system may be necessary in order to further characterize the hydraulic nature of the aquifer in the area of the recovery and injection wells.

Following treatment, ground water meeting RAO target goals will be reinjected into the Wilcox aquifer up gradient of the contaminant plume. Monitoring of the treated effluent will be conducted to assure that reinjected ground water complies with RAO target goals. Maintenance will include system operation, sampling, analysis, data validation, and reporting.

The estimated present worth for this alternative, including capital costs and 30 years of O&M costs, ranges from $3.1 million to $3.4 million.

7.3 ARARS

CERCLA, Section 121, and the National Contingency Plan (NCP), 40 CFR Part 300, (revised March 8, 1990) require an assessment of alternative site responses to determine whether they attain applicable or relevant and appropriate federal and state environmental and public health requirements (ARARs) or provide grounds for invoking one of the identified waivers.

Identification of ARARs must be done on a site-specific basis. The NCP and CERCLA do not provide across-the-board standards for determining whether a particular remedial action will produce an adequate remedy at a particular site. Rather, the process recognizes that each site will have unique characteristics that must be evaluated and compared to those applicable and relevant requirements that apply under the given circumstances. In accordance with the requirements of the NCP Section 300.400(g), the remedial action selected must meet all ARARs unless a waiver from specific requirements can be granted.

For remedial actions performed under CERCLA Section 121(e), permits for compliance with the Resource Conservation and Recovery Act (RCRA), National Pollutant Discharge Elimination System (NPDES), and the Clean Air Act (CAA) regulations for onsite remedial actions are not required. However, CERCLA Section 121(d) requires that the selected alternative meet relevant and appropriate regulatory standards or performance levels where possible, even though a permit is not required. Relevant and appropriate regulatory standards address problems or situations sufficiently similar to those encountered at a CERCLA-regulated site; therefore, their use is well-suited to the particular site of concern. ARARs are defined as follows:

- Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental, state environmental, or facility siting law, that specifically address a hazardous substance, pollutant, contaminant, remedial action location, or other circumstance found at a CERCLA site.

- Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site.

ARARs may be divided into the following categories:

- Chemical-specific requirements are health- or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants, or contaminants. These limits may take the form of action levels or discharge levels.

- Location-specific requirements are restrictions on activities that are based on the characteristics of a site or its immediate environment. An example would be restrictions on wetlands development.

- Action-specific requirements are controls or restrictions on particular types of activities in related areas such as hazardous waste management or waste water treatment. An example would be RCRA incineration standards.

7.3.1 Action-Specific ARARs for Soil/Sludge

ADPC&E Regulation No. 23 §264.111 - requires that closure of the landfill must be conducted in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates escape of hazardous waste.

ADPC&E Regulation No. 23 §264.114 - requires that contaminated equipment, structures, and soils be properly disposed of or decontaminated.

ADPC&E Regulation No. 23 §264.251 - The waste piles should be constructed and operated in a manner that complies with ADPC&E Regulation No. 23 §264.251, which specifies waste pile design and operating requirements.

ADPC&E Regulation No. 23 §264.258 - The waste piles should be closed in compliance with this regulation which provides requirements for the closure of waste piles.

ADPC&E Regulation No. 23 §268 - Monroe Auto Equipment disposed waste water treatment sludge from electroplating operation (F006 waste) at the site between 1973 and 1978. Since the specific source of the sludge at the landfill is known, the time at which the waste was disposed does not affect the waste listing and the waste would be subject to land disposal restrictions, if excavated and treated.

ADPC&E Regulation No. 2 ARARs - State standards under Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas, are ARARs for remedial actions involving discharge of treated ground water. The standards may be applicable if discharges are expected to affect surface waters addressed under this regulation. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

State standards under the Arkansas Underground Injection Control Code are ARARs if treated ground water is reinjected to the aquifer. The standards may be applicable if ground water is reinjected into ground waters addressed under these regulations. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

Clean Air Act (CAA)

40 CFR, Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAPs) - provides standards for emissions of particular air pollutants from specific sources. Parts of NESHAPs may be relevant and appropriate if treatment results in release of a regulated pollutant.

Clean Water Act (CWA)

The Clean Water Act (CWA) requirements may be applicable because treatment may generate fluids that need to be treated and discharged. The CWA applies to point-source direct discharges into navigable waters and indirect discharges to a publicly owned treatment works (POTW). In the case of indirect discharges to a POTW, the POTW sets forth pretreatment standards.

Arkansas Water and Air Pollution Control Act

Arkansas air and water quality regulations resemble the national standards set forth by the U.S. EPA under the Clean Air and Clean Water Acts, but require preconstruction review by the state. In addition, Section 5 of the Arkansas Air Pollution Control Regulations outlines specific limitations for particulate emissions from new or modified sources. These limits are based solely on the amount of material being processed (lb/hr).

Arkansas Noncriteria Air Pollutants Control Strategy

ADPC&E has implemented an evaluation of the emissions of noncriteria air pollutants from all sources in order to determine if a permit should be issued or if an existing source should be required to retrofit control equipment. The Noncriteria Air Pollutants Control Strategy (NAPCS) is based upon Threshold Limit Values (TLVs) for chemical substances adopted by the American Conference of Governmental Industrial Hygienists (ACGIH). According to NAPCS, the predicted ambient air concentration of gases and vapors is considered acceptable if it is less than 1/100 of the ACGIH TLV. The ambient concentration is determined by using appropriate atmospheric dispersion models over a 24-hour average. The spacing between receptors used in the model is 100 meters (in the area of the highest concentration). The NAPCS may consider 8 and 24-hour averages, first highs, as well as annual averages for use in assessing risk.

As stated in the NAPCS, when the substance emitted is a particulate compound and persistence in the environment is expected, the predicted annual average concentration is considered acceptable if it does not exceed the dosage mass of the LD_{50} (lethal dose for 50%) expression divided by 10,000.

DOT ARARs

Department of Transportation requirements for the transportation of hazardous wastes on public highways (49 CFR 171.1 - 172.558) are applicable to the off-site transport of hazardous waste. State requirements for manifesting wastes and notifying the State of out-of-state shipments of wastes are also applicable.

7.3.2 Action-Specific ARARs for Ground Water

CAA ARARs

National emission standards for hazardous air pollutants (NESHAPs) established under 40 CFR, Part 61, are not applicable because the site does not contain any of the source categories regulated under this program. Parts of the NESHAPs may be relevant and appropriate, however, if remediation such as ground water treatment, results in the release of a substance regulated under the NESHAPs.

CWA ARARs

Discharges of treated ground water to the intermittent stream on the site may render requirements of 40 CFR, Part 125, relevant and appropriate. These regulations address criteria and standards for the national pollutant discharge elimination system (NPDES). Although an NPDES permit would not be required for this discharge, parts of 40 CFR, Part 125, may contain substantive requirements that could be relevant and appropriate because the remedial action would be similar to the action that the requirements were meant to address.

ADPC&E ARARs

State standards under Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas, are ARARs for remedial actions involving discharge of treated ground water. The standards may be applicable if discharges are expected to affect surface waters addressed under this regulation. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

State standards under the Arkansas Underground Injection Control Code are ARARs if treated ground water is reinjected to the aquifer. The standards may be applicable if ground water is reinjected into ground waters addressed under these regulations. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

Location Specific ARARs
ADPC&E Reg. 23§264.310, Closure and Post-Closure Care of a Landfill. The standards may be applicable to the closed landfill. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

8.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

The state is required to use certain criteria to evaluate alternatives for addressing a Superfund site. These nine criteria are categorized into three groups: threshold, primary balancing, and modifying. The threshold criteria must be met in order for an alternative to be eligible for selection. The primary balancing criteria are used to weigh major tradeoffs among alternatives. The modifying criteria are taken into account after public comment is received on the preferred alternative as identified and described in the Proposed Plan of Action.

8.1 NINE CRITERIA

The nine criteria used in evaluating all of the alternatives are as follows:

Threshold Criteria

- Overall Protection of Human Health and the Environment addresses the way that an alternative would reduce, eliminate, or control the risks posed by the site to human health and the environment. Total elimination of risk is often impossible to achieve. However, a remedy must minimize risks to assure that human health and the environment are protected.

- Compliance with ARARs, or "applicable or relevant and appropriate requirements," assures that an alternative will meet all related federal, state, and local requirements.

Primary Balancing Criteria

- Long-term Effectiveness and Permanence addresses the ability of an alternative to reliably provide long-term protection for human health and the environment after the remediation goals have been accomplished.

- Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment assesses how effectively an alternative will address the contamination on a site. Factors considered include the nature of the treatment process; the amount of hazardous materials that will be destroyed by the treatment process; how effectively the process reduces the toxicity, mobility, or volume of waste; and the type and quantity of contamination that will remain after treatment.

- Short-term Effectiveness addresses the time it takes for remedy implementation. Remedies often require several years for implementation. A potential remedy is evaluated for the length of time required for implementation and the potential impact on human health and the environment during implementation.

- Implementability addresses the ease with which an alternative can be accomplished. Factors such as availability of materials and services and other obstacles are considered.

- Cost (including capital costs and projected long-term operation and maintenance costs) is considered and compared to the benefit that will result from implementing the alternative.

Modifying Criteria

- EPA Acceptance addresses whether EPA agrees with, opposes, or has no comment on the proposed remedy.

- Community Acceptance addresses comments and concerns raised by the community and other members of the public during the public comment period for the Proposed Plan and Administrative Record. The State considers these comments in making its final remedy selection. The comments are addressed in the responsiveness summary that is part of this ROD.

8.2 COMPARATIVE ANALYSIS

8.2.1 Sludge Pit Area

Overall Protection of Human Health and the Environment • Alternative 1 (no action) would result in exposure and an increase in contaminant migration as the existing cover erodes or if the site is developed. Because the no action alternative is not protective of human health and the environment, it will not be considered further in the evaluation process.

Alternatives 2 through 6 offer the same level of protection to human health because each alternative incorporates a cap or cover to prevent exposure, and because site access restrictions and deed restrictions will prevent future development of the site. Alternative 7 offers additional protection even in the absence of maintenance and site access restrictions.

Compliance With ARARs • All alternatives comply with all identified ARARs provided they are properly implemented.

Long-term Effectiveness and Permanence • Alternative 7 provides the greatest long-term protection because wastes are removed from the site. Alternatives 4 through 6 offer greater reliability of protection against future migration of waste constituents through the use of physical barriers or treatment of the waste. Of these, alternative 4B provides greater reliability. The french drain provides a higher level of protection than a slurry wall because ground water is less likely to contact contaminated soil and sludge. Both alternatives 4A and 4B offer reliability in the form of an improved cap to hinder infiltration. Alternatives 5 and 6 provide reliability in the control of contaminant migration through the use of treatment. Alternatives 2 and 3 offer the least long-term effectiveness. Under alternatives 2 and 3, the potential threat of leaching of the waste constituents into the ground water would remain at the site.

Reduction of Toxicity, Mobility, or Volume Through Treatment • Only Alternatives 5 and 6 utilize treatment as a mechanism to achieve reduction in mobility. Alternative 6 utilizes treatment as a mechanism to achieve reduction in toxicity and mobility, but both Alternatives 5 and 6, result in an increase in volume of contaminated material.

Short-term Effectiveness • Implementation of alternatives 2, 3, 4A, and 4B, pose no threat of exposure to workers or to the community, and they pose no environmental threat. Implementation of alternatives 5, 6, and 7, present threats of exposure to workers, the community, and the environment because the waste would be excavated. These alternatives would require worker protection and monitoring to ensure protection of human health.

Implementability • No limitations have been identified for implementation of Alternatives 2 and 3. Alternatives 2 and 3 can be implemented with local or regional equipment, personnel, and materials. Alternatives 4A, 4B, 5, and 6 may be more difficult to implement because these services are offered by fewer contractors and are not available locally. Alternative 7 requires acceptance of the waste by off-site disposal facilities. If the material is disposed of as a hazardous waste, it would have to be transported out of state for disposal.

Cost • Cost comparisons are shown in Table 9. It should be noted that costs associated with Alternatives 5 and 6 assume that the waste is in compliance with RCRA land disposal restrictions.

EPA Acceptance • EPAs comments on the draft proposed plan were incorporated into the final proposed plan prior to the public comment period.

Community Acceptance • All comments received have been addressed in the responsiveness summary, which is attached to this Record of Decision. The public, in general, would prefer to see Alternative 7 implemented because a removal of the sludge from the pit will permanently eliminate the human health and environmental threats from the site. The site could then be developed into a residential setting and may result in an increase of the neighboring property values. The residents believe that the french drain would result in further migration of the contaminants from the site into surface water. However, the french drain would capture ground water flow before it reaches the sludge deposits. To ensure that no contaminated water is discharged to surface water, the water from the french drain discharge point would be analyzed and, if necessary, treated to meet the Arkansas surface water quality standards.

8.2.2 Ground Water

Overall Protection of Human Health and the Environment • All alternatives offer the same immediate protection. Alternative No. 2 restricts the use of onsite ground water and includes monitoring that would provide early detection of contaminant migration or degradation in the quality of residential water supplies. Alternative No. 3 would effectively reduce the total mass of contaminants. Alternative No. 3 would decrease the time necessary for mass reduction as compared to that achieved under Alternative 1 or 2, but may not significantly lessen the time for attainment of the ARAR for BEHP over the time required for natural attenuation alone. Alternative No. 1 does not include monitoring, so contaminant migration or attenuation cannot be evaluated.

Compliance With ARARs • All alternatives are expected to result in long-term compliance with ARARs in the residential water supplies. Natural attenuation and degradation, which would occur under all alternatives, are expected to result in ARAR compliance for 1,2-DCE and for BEHP.

Long-term Effectiveness and Permanence • All alternatives are predicted to result in a reduction in risk and are expected to result in compliance with ARARs in residential water supplies. Alternative 2 offers the additional protection of restrictions on uses of ground water at the site. Alternative 3 would reduce the total mass of contamination in the aquifer in less time than Alternatives 1 and 2.

Reduction of Toxicity, Mobility, or Volume Through Treatment • Only Alternative 3 employs treatment. Under Alternative 3, the mass of contaminants in the aquifer would be reduced. These contaminants would be transferred to activated carbon, which would require regeneration or disposal at an off-site facility.

Short-term Effectiveness • None of the alternatives pose a threat to the local community. Alternative 3 poses a potential threat to site workers who are exposed to contaminated ground water, but these threats would be mitigated by the use of protective equipment.

Implementability • Alternative 1 requires no action. Alternative 2 is easily implementable and services are available locally or regionally. Alternative 3 is easily implementable with commercially available products and services. This alternative would, however, require extensive O&M activities.

Cost • Cost comparisons are shown in Table 10. Alternative 2 would be the most cost effective. Alternative 3 may result in a shortened remediation time, but the low concentrations of the contaminants in ground water and the large volume of water (estimated at 40 million gal./yr.) that would need to be treated, make alternative 3 inefficient. Alternative 3 would also require disposal or renewal of carbon filters at an added cost. Alternative 1 is the least costly. The difference in time required for remediation does not justify the additional cost of treatment.

EPA Acceptance • EPAs comments on the draft proposed plan were incorporated into the final proposed plan prior to the public comment period.

Community Acceptance • Public comments and responses to those comments are included in the responsiveness summary. The public would prefer alternative 3, treatment, or being connected to the Paragould public water supply system. The residents believe that their water is contaminated, when in fact, tests show that the water meets the criteria for safe drinking water.

9.0 THE SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, a detailed analysis of the alternatives using the nine criteria, and public comment; both EPA and the State have determined that a combination of alternative 4b for soil/sludge, a french drain and a cap, and alternative 2 for ground water, natural attenuation and degradation with monitoring, is the most appropriate remedy for the Monroe Auto Pit Superfund site in Paragould, Arkansas.

9.1 SOIL AND SLUDGE REMEDIATION

The selected remedy for addressing the contaminated soil/sludge in the pit area is Alternative 4b. The original waste contained a high volume of liquids, which is believed to have been the primary source for ground water contamination at the site. Sludge samples collected during the RI contained no free liquids. Analytical data from testing of leachate produced by the toxicity characteristic leaching procedure (TCLP) show very low leachability of the contaminants in the soil and sludge. (The TCLP data are presented in Section 4 of the RI). In accordance with the NCP Section 300.430 and OSWER Directives, the State has determined that the soil/sludge deposits in the pit area pose a relatively low, long-term threat; and that through the use of engineering controls (such as containment) and deed restrictions the soil/sludge material can be reliably contained.

A french drain will be constructed surrounding the area of sludge deposits. The three-foot wide french drain will be installed to a depth of approximately 30 feet and will total approximately 2100 feet in length. The bottom of the french drain will be below the total depth of the sludge deposits, and will extend through the perched zone into the underlying unsaturated zone. Site soils displaced as a result of excavation of the trench will be spread over the sludge area, and be covered by the cap. All excavation will be planned in uncontaminated areas; but if stained soils exhibiting possible contaminant characteristics are encountered they will be segregated and shipped off-site for disposal.

A french drain will restrict ground water movement into the area of contaminated soil and sludge. The french drain will also intercept perched ground water before it enters the contaminated area. The captured ground water will be transported via buried piping to a discharge point located in the intermittent stream southwest of the site. Water from the french drain will be tested to ensure the Arkansas surface water quality criteria are met.

A french drain suitable for this site will be constructed by excavating a 30-foot deep trench and installing impermeable plastic sheeting along the sludge deposit side of the trench. A one- to two-foot thick gravel base will be placed in the trench; slotted PVC piping will be installed above the gravel base, and gravel fill will be installed to ground surface. The trench parameters and its construction method will be further refined to provide improved performance in the detailed design process.

The cap evaluated under this alternative includes a 24-inch uncompacted soil layer comprised of six inches of uniformly distributed topsoil over 18 inches of sandy soil. The 24-inch soil layer will be underlain by a 24-inch compacted clay layer. Components and thicknesses of the cap specified here do not necessarily represent the final design parameters under this alternative. If this alternative is implemented, a detailed design will be provided and the capping parameters will be further refined.

Deed restrictions will prohibit future development of the site. A survey plat indicating the location of the waste disposal area with respect to permanently surveyed benchmarks would be prepared and filed with the local zoning authority. The plat will contain a note, prominently displayed, which states the owner's obligation to restrict disturbance of the waste.

In addition to the cap, these restrictions will eliminate the risk of long-term contact with contaminated media. The baseline risk assessment assumed a future residential land use scenario for the calculation of future risks. The cap and deed restrictions will eliminate the possibility of residential land use at the site.

The multilayer cap and the french drain outlet will be periodically inspected for signs of erosion, subsidence, or damage caused by frost or burrowing mammals. Damaged areas will be repaired to restore the cap. The vegetation will be maintained through periodic mowing and reseeding of bare areas.

ADPC&E believes that based on the current information the selected remedy will provide the best balance among the alternatives with respect to the two threshold and five primary balancing criteria. The alternative will: (1) prevent direct contact, ingestion and inhalation of contaminants in the sludge and ancillary contaminated soil and debris; (2) prevent the future migration of contaminants from the sludge area to the surface; and (3) prevent the potential for future migration of contaminants to the ground water. The selected remedy if implemented properly, will comply with all applicable and relevant or appropriate requirements identified for the site.

The alternative will achieve long-term permanence and effectiveness. The cap combined with the french drain will permanently isolate the contaminants in the sludge pit area from surrounding media. There are no expected unmanageable short-term risks associated with this alternative. The alternative is implementable and cost effective. Even though a residential scenario was utilized to calculate the risks associated with the contaminants at the site, none of the alternatives, with the exception of Alternative 7, will allow the residential development of the site to occur.

The estimated capital cost to implement the selected remedy ranges from $730,000 to $1.5 million. The capital cost includes engineering, equipment and materials, testing, and site support. The annual O&M costs is estimated at $14,000 per year in 1993 dollars. The estimated present worth for the selected remedy, including capital costs and 30 years of O&M costs, ranges from $870,000 to $1.6 million.

9.2 GROUND WATER REMEDIATION

The selected remedy addresses the ground water contamination through natural attenuation, degradation, and monitoring. The source of the contamination is the liquids that were part of the original sludge deposited in the pit. When first deposited, the sludge was about 85% liquid. These liquids migrated into the ground water where we find them today. In this respect, the source of continuing contamination has been removed.

The levels of the contaminants of concern seen in the upper Wilcox aquifer on the site decrease away from the sludge pit area. It is expected that this trend of decreasing values will continue. Regular monitoring of the monitoring wells and the residential wells will provide continuous evaluation of the effects of natural attenuation and degradation in the ground water system. In the unlikely event that monitoring indicates statistically significant degradation of residential well water, the affected residents will be put on bottled water or a point of use water supply treatment, and the well(s) will be immediately resampled. If a statistically significant change in ground water quality occurs in the monitoring wells, the affected wells will immediately be resampled. If any changes are verified, more frequent sampling should be performed. If necessary, active remediation or physical/ hydraulic containment measures will be evaluated. Should these measures become necessary, a ROD amendment or an explanation of significant differences will be issued.

Ground water use restrictions will be in place on the site until the contaminant levels are below the remedial action goal levels. Monitoring wells to be sampled will be sufficient in number and location to delineate the contaminant plume and to detect contaminant migration. Contaminated ground water must be kept within the legal site boundaries. The exact monitoring wells and their locations will be determined as part of the design phase for the french drain. Monitoring shall be semi-annually for two years or until four samples have been taken for volatiles, semi-volatiles (including BEHP), and metals for statistical analysis. The statistical method used will be as specified in the Statement of Work. Monitoring could be required for 30 years or more.

Capital costs for this alternative are estimated from $70,000 to $71,000. This would include development of a sampling plan and abandonment of wells not kept in the monitoring system. Operation and maintenance costs for this remedy include sampling, analysis, data validation, and reporting. The cost is estimated at $73,000 to $120,000 per year in 1993 dollars. This figure assumes that the current monitoring plan does not change. The estimated present worth including capital costs and 30 years of O&M costs is from $760,000 to $1.2 million.

10.0 STATUTORY DETERMINATIONS

The primary responsibility at Superfund sites is to select remedial actions that are protective of human health and the environment. Section 121 of CERCLA also requires that the selected remedial action comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws, unless a waiver is granted. The selected remedy must be cost-effective and utilize permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. The Statute also contains a preference for remedies which employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how the selected remedy meets the statutory requirements.

10.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

10.1.1 Soil and Sludge

The soil/sludge selected remedy meets all of the soil and sludge remedial action objectives through limitations on site development and inadvertent access, and by eliminating the potential for long-term direct contact with contaminated soil/sludge. Contaminant mobility will be minimized or prevented because the french drain will isolate the contaminated soil/sludge from the perched ground water table and the cap will minimize infiltration and erosion. Deed restrictions and site access restrictions will prohibit any use of the site that would result in contact with contaminated media, and will limit any human or environmental contact with contaminated media.

Short term risks associated with the selected remedy can be controlled by proper design and implementation. No adverse cross media impacts are expected from implementation of the selected remedy.

10.1.2 Ground Water

Because the onsite contamination is in the upper Wilcox aquifer and the private wells are believed to produce from the lower Wilcox aquifer, a complete exposure pathway does not exist at this time. A cap on the sludge deposit area and a french drain will prevent infiltration of precipitation and perched ground water into the sludge. The selected remedy will protect human health and the environment by natural attenuation and degradation of the contaminants of concern. Ground water use restrictions for the on site ground water will prevent contact with contaminated ground water. Monitoring of the residential wells will provide continuous assessment of the effects of natural attenuation and in this way protect human health and the environment. There are no short-term threats associated with the selected remedy for ground water that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the remedy.

10.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The selected remedy of cap, french drain, access and deed restrictions for soil and sludge and natural attenuation and degradation, ground water use restrictions, and ground water monitoring for ground water remediation will comply with all applicable or relevant and appropriate requirements (ARARs), if properly designed and implemented. The ARARs for the selected remedy are presented below.

10.2.1 Soil and Sludge

Action-Specific ARARs

ADPC&E Regulation No. 23 §264.111 - closure of the landfill, must be conducted in a manner that minimizes the need for further maintenance and controls, and minimizes or eliminates escape of hazardous waste.

ADPC&E Regulation No. 23 §264.114 - requires that contaminated equipment, structures, and soils be properly disposed of or decontaminated.

ADPC&E Regulation No. 23 §264.251 - The waste piles should be constructed and operated in a manner that complies with ADPC&E Regulation No. 23 §264.251, which specifies waste pile design and operating requirements.

ADPC&E Regulation No. 23 §264.258 - The waste pile should be closed in compliance with this regulation which provides requirements for the closure of a waste pile.

Regulation No. 23 §268 - Monroe Auto Equipment disposed of waste water treatment sludge from electroplating operations (F006 waste) at the site between 1973 and 1978. Since the specific source of the sludge at the landfill is known, the time at which the waste was disposed does not affect the waste listing and the waste would be subject to land disposal restrictions, if excavated and treated.

Clean Air Act (CAA)
40 CFR, Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAPs) - provides standards for emissions of particular air pollutants from specific sources. Parts of NESHAPs may be relevant and appropriate if treatment results in release of a regulated pollutant.

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The Clean Water Act (CWA) requirements may be applicable because treatment may generate fluids that need to be treated and discharged. The CWA applies to point-source direct discharges into navigable waters and indirect discharges to a publicly owned treatment works (POTW). In the case of indirect discharges to a POTW, the POTW sets forth pretreatment standards.

Arkansas Water and Air Pollution Control Act
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ADPC&E ARARs
State standards under Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas, are ARARs for remedial actions involving discharge of ground water. The standards may be applicable if discharges are expected to affect surface waters addressed under this regulation. If not applicable, portions of this regulation are relevant and appropriate to address conditions similar to those posed by some of the remedial actions that are under consideration.

Arkansas Noncriteria Air Pollutants Control Strategy
ADPC&E has also implemented an evaluation of the emissions of proposed emission of noncriteria air pollutants from all sources in order to determine if a permit should be issued or if an existing source should be required to retrofit control equipment. The Noncriteria Air Pollutants Control Strategy (NAPCS) is based upon Threshold Limit Values (TLVs) for chemical substances adopted by the American Conference of Governmental Industrial Hygienists (ACGIH).

According to NAPCS, the predicted ambient air concentration of gases and vapors is considered acceptable if it is less than 1/100 of the ACGIH TLV. The ambient concentration is determined by using the spacing between receptors used in the model of 100 meters (in the area of the highest concentration). The NAPCS may consider 8 and 24-hour averages, first highs, as well as annual averages for use in assessing risk.

As stated in the NAPCS, when the substance emitted is a particulate compound and persistence in the environment is expected, the predicted annual average concentration is considered acceptable if it does not exceed the dosage mass of the LD_{50} (lethal dose for 50%) expression divided by 10,000.

DOT ARARs

Department of Transportation requirements for the transportation of hazardous wastes on public highways (49 CFR 171.1 - 172.558) are applicable to the off-site transport of hazardous waste. State requirements for manifesting wastes and notifying the State of out-of-state shipments of wastes are also applicable.

ADPC&E ARARs

State standards under Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas, are ARARs for remedial actions involving discharge of treated ground water. The standards may be applicable if discharges are expected to affect surface waters addressed under this regulation. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

State standards under the Arkansas Underground Injection Control Code are ARARs if treated ground water is reinjected to the aquifer. The standards may be applicable if ground water is reinjected into ground waters addressed under these regulations. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

10.2.2 Ground Water

The selected remedy meets all action and location specific ARARs. Chemical specific ARARs would not be immediately met under this remedy. Groundwater modeling predicts that for 1,2-DCE concentrations ARARs would be attained within one year. ARARs for BEHP will be met in the future, possibly within 30 years. ARARs are not expected to be exceeded in residential water supplies at any time.

10.2.3 Action-Specific ARARs for Ground Water

CAA ARARs

National emission standards for hazardous air pollutants (NESHAPs) established under 40 CFR, Part 61, are not applicable because the site does not contain any of the source categories regulated under this program. Parts of the NESHAPs may be relevant and appropriate, however, if remediation such as with ground water treatment, results in the release of a substance regulated under the NESHAPs.

CWA ARARs

Discharges of treated ground water to the intermittent stream on the site may render requirements of 40 CFR, Part 125, relevant and appropriate. These regulations address criteria and standards for the national pollutant discharge elimination system (NPDES). Although an NPDES permit would not be required for this discharge, parts of 40 CFR, Part 125, may contain substantive requirements that could be relevant and appropriate because the remedial action would be similar to the action that the requirements were meant to address.

ADPC&E ARARs

State standards under Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas, are ARARs for remedial actions involving discharge of treated ground water. The standards may be applicable if discharges are expected to affect surface waters addressed under this regulation. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

State standards under the Arkansas Underground Injection Control Code are ARARs if treated ground water is reinjected to the aquifer. The standards may be applicable if ground water is reinjected into ground waters addressed under these regulations. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

Location Specific ARARs

ADPC&E Reg. 23§264.310, Closure and Post-Closure Care of a Landfill. The standards may be applicable to the closed landfill. If not applicable, portions of this regulation may be relevant and appropriate if the regulation was intended to address conditions similar to those posed by some of the remedial actions that are under consideration.

10.3 COST EFFECTIVENESS

10.3.1 Soil and Sludge

ADPC&E believes that the selected remedy for soil and sludge will eliminate the risks to human health at an estimated cost of $870,000 to $1.6 million. Even though the selected remedy does not provide for a reduction in the toxicity or volume of contaminants in the soil and sludge, the capping and the french drain will substantially reduce the mobility of the contaminants. The selected remedy provides an overall effectiveness proportionate to its costs, such that it represents a reasonable value for the money that will be spent.

10.3.2 Ground Water

The low concentrations of contaminants in the upper Wilcox aquifer and the lack of a complete contaminant pathway make the selected remedy the most cost effective remedy for ground water. ADPC&E believes this remedy will eliminate the risks to human health and the environment at an estimated cost of $760,000 to $1.2 million, therefore the selected remedy provides an overall effectiveness proportionate to its cost, such that it represents a reasonable value for the money that will be spent. The difference in time required for remediation does not justify the additional cost of treatment.

10.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

10.4.1 Soil and Sludge

ADPC&E has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for contaminated soil and sludge. Of those alternatives that are protective of human health and the environment and comply with ARARs, ADPC&E has determined that the selected remedy provides the best balance in terms of long-term effectiveness and permanence; reduction in toxicity, mobility, or volume achieved through treatment; short-term effectiveness; implementability; and cost while also considering the statutory preference for treatment as a principal element and considering EPA and community acceptance.

10.4.2 Ground Water

All of the ground water alternatives are equal with respect to long-term effectiveness and permanence, short-term effectiveness and Implementability. All of the alternatives will meet the action and chemical ARARs at some future date. Alternative 3 is the only alternative to employ treatment of the ground water. Balancing cost effectiveness against treatment, alternative 2 achieves the same goals with less cost and a minimal increase in time. Because a complete contaminant pathway may or may not exist at this time, ADPC&E believes alternative 2 is the appropriate remedy for this site.

10.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

The selected remedy for soil/sludge and ground water 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 selected remedy utilizes permanent solutions and alternative treatment to the maximum extent practicable for this site. However, because treatment of the principal threats of the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as the principal element.

Because this remedy will result in hazardous substances remaining on-site 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 of human health and the environment.

11.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Monroe Auto Pit site was released for public comment in July 1995. The Proposed Plan identified alternative 4b, cap, french drain, access and deed restrictions, as the preferred alternative for soil and sludge remediation and alternative 2, natural attenuation, ground water and residential water supply monitoring, and ground water use restriction as the preferred alternative for the ground water remediation. ADPC&E reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary.

12.0 RESPONSIVENESS SUMMARY

This Responsiveness Summary has been prepared to provide written responses to comments received at the public meeting and during the Public Comment Period for the Proposed Plan of Action for the Monroe Superfund Site. One public meeting was conducted on August 8, 1995 during the Public Comment Period. The transcript of this meeting is included in the Administrative Record. Written comments on the Proposed Plan were submitted by Monroe Auto Equipment Incorporated, McMath Law Firm, P.A., and a few concerned citizens.

Comment #1

Everyone I know in this area is having to use bottled water for drinking and cooking now. The recommended action will do nothing to improve this situation except wait and hope it goes away.

Response # 1

The private wells within a $^{1}/_{2}$ mile radius of the site have been and will continue to be tested. All results obtained to date indicate that the concentration of contaminants in these wells are below MCLs. This means that the water from private wells is safe to drink. In addition, this Record of Decision provides the means by which to ensure the safety of the drinking water in the future. The decision by area residents to use bottled water to cook and drink is voluntary. Ground water models indicate that the contaminants will degrade naturally to safe levels before they could possibly reach any of the residential wells.

Comment #2

Environmental laws/processes focus on environmental and health issues. In doing this, economic issues (such as property values) may be indirectly impacted, but these types of economic issues do not directly influence the decision making process.

I saw several references to cost benefits. It would seem that if you determine that the cost is too high to do anymore than outlined, you would specify that some of the savings be directed toward rectifying damages.

Response #2

The cost of a remedy is just one of the nine criteria considered in the remedy selection process. The two threshold criteria 1) overall protection of human health and the environment, and 2) compliance with ARARs (applicable or relevant and appropriate requirements of federal and state environmental statutes), must be met prior to other considerations. ADPC&E believes that the selected remedy for the Monroe Auto Pit provides the best balance among the alternatives with respect to the threshold and primary balancing criteria. Therefore it is not justifiable to choose a more expensive remedy when a less expensive remedy can meet all the objectives.

Comment #3

It is difficult to understand how this French Drain option is going to do anything except catch all the pollution and put it in the creek. I certainly would not allow this to happen to my property.

Response #3

The purpose of placing a french drain around the sludge pit is to intercept the perched ground water before it enters the contaminated area. The perched ground water collected at the french drain is expected to be "clean." However, the water will be tested and, if necessary, treated to ensure that the State's surface water quality criteria are met.

Comment #4

As I understand the action that you intend to take, no solidification of the contaminated material will take place and no effort to filter the hydrocarbons out of the aquifer will take place. I do not think this is good enough.

Response # 4

As part of the Remedial Investigation/Feasibility Study (RI/FS), Monroe conducted a Treatability Study on several treatment technologies. Solidification/Stabilization was one of the technologies investigated in that study.

In general, solidification is used to reduce/eliminate the rate at which contaminants leach from a contaminated matrix. One way to measure the performance of solidification/stabilization is for the solidified matrix to pass the TCLP test. In Monroe's case, however, the study indicated that prior to any treatment, sludge/soil present at the pit would pass the TCLP tests.

The chlorinated hydrocarbons present in the on-site ground water will degrade by natural processes. Based on ground water modeling and the analytical data from the monitoring wells and private wells to date, it appears that the contaminant levels will degrade naturally within a reasonable time period without endangering human health or the environment. Filtering contaminants out (pump and treat) may reduce the time necessary to meet Target RAOs. The levels of contamination that we see at the site can easily degrade before they reach any off site well locations. This short time decrease does not warrant the extra expense.

Comment #5

I had nothing to do with the illegal dumping of the chlorinated hydrocarbons in the pit and do not understand why we must still have this problem.

Response #5

At the time, when Monroe disposed of its sludge into the pit, most of the environmental laws that are in-place today were nonexistent. Thus, Monroe did not dispose of the sludge into the pit illegally. The selected remedy specified in this ROD, if designed and implemented properly, will provide protection of human health and the environment.

Comment #6

I formally request at least a six month delay before a final action decision is made.

Response #6

The Superfund Program emphasizes the importance of community involvement. Therefore, prior to the release of the Proposed Plan, EPA had conducted an ongoing community relations program to ensure that the citizens had ample opportunity to voice opinions, receive answers to their questions, and provide meaningful input into the decision making process.

Based on a number of requests, a two month extension of the comment period on the Proposed Plan of Action was granted. This made the comment period on the Proposed Plan a total of three (3) months. ADPC&E believes three months was sufficient for the comment period.

Comment #7

I am sending this written comment since it was requested, but I have no confidence that any change in the planned action will take place; I hope I am wrong.

Response #7

After careful consideration of all public comments on the Proposed Plan, ADPC&E determined that no significant changes to the preferred remedy are necessary.

Comment #8

When I moved here this area was a premier home site, now it is practically worthless. I was expecting some help from the government; I do not see it yet.

Response #8

Various elements could affect the property value at a given location. One such element is nearness to a Superfund site. Even though a Superfund site may not physically affect a given neighboring community in any way or fashion, the bad perception of living close to a Superfund site is one which cannot be easily altered. In this particular situation, as soon as all remedial objectives are met, the State will make efforts to delete the site from the National Priorities List (NPL) in an expedited manner. We hope that this action will provide some relief to property values surrounding the site.

Comment #9

When we would get results on our well water, and a letter from Monroe, saying everything checks out "fine". We trusted Monroe. We had no idea what the results showed. But after we received a copy of the Proposed Plan of Action, we got all our results out and started comparing them. There is none of them the same, and if there was a higher amount found from one time to the next. The limits go up, from what we understand by comparing them, we have question about the limits?

For example:

Surrogate	% Recovery	Q.C.	Limits
12/6/94			
Bromo-1-chloropropane	81	50	125
Flurobenzene	104	50	125
6/30/94			
1,4,Dichlorobutane	68	50	125
Flurobenzene	102	50	125

Does this mean we are in the limits? If it does, we sure are close to over going the limits.

Response #9

Above is an example of laboratory QA/QC information. Laboratory QA/QC samples are measures of instrument and laboratory performance. They provide data that is necessary to determine the quality of sample analyses. In this instance, laboratory grade water is spiked with the analyte of interest to monitor the accuracy of analysis of the laboratory performance method used.

The concentration of contaminants shown on your reports provide the necessary information in relation to quality of the water and, therefore, would be of significance to the well owners.

Comment #10

My husband never could drink our well water. It always made him sick. We never realized taking a shower may be harmful to my family. We still wouldn't have known if we hadn't went to the library and looked up all these words, and they all mean the same. They are all, very much a danger to human health. So taking all this and more into consideration, we feel we really need more time to really look at all this with our eyes open.

Response #10

The concentration of contaminants in private well waters are below MCLs and therefore the water from the private wells is safe to drink. This also implies that the water is not harmful to human health when taking a shower, washing dishes, or for any other domestic use.

Comment #11

Alternative No. 2 is not aggressive enough at cleaning up this site and protecting human health and the environment. It would seem much more appropriate to implement a combination of ground water Alternatives No. 2 and No. 3 and remove and treat ground water from all contaminated zones at least in the source area and immediately downgradient. Wells placed strategically downgradient of the site could be operated periodically to remove as much contaminants as possible, prevent contaminant migration and result in much better protection of human health and the environment at a reasonable cost.

Response #11

The upper Wilcox aquifer and the perched aquifer are the only zones to show contamination. The perched water zone has not produced enough water to sufficiently test, but because of its contact with the sludge when it was deposited, and because it appears to be linked hydraulically to the upper Wilcox aquifer, we have assumed that it has been contaminated as well. The levels of contamination that we see at the site can easily degrade before they reach any off site well locations. The private wells produce from the lower Wilcox aquifer which is not contaminated by the Monroe site. Ground water models have shown that with a cap of low permeability soil, that after 30 years the concentration of contaminants of concern 400 feet from the site are equal to zero. The RCRA type cap that is recommended for this site would allow even less infiltration than that of the model.

Based on the ground water modeling and the analytical data from the monitoring wells and private wells to date, it appears that the contaminant levels will degrade naturally within a reasonable time period without endangering human health or the environment.

Pumping of the contaminated water may decrease the amount of time necessary to reduce the contaminant levels for volatile organics, but only by one year as compared to two years for natural degradation. This short time decrease does not warrant the extra expense.

Comment #12

The planned capping of Alternative 4-B will not prevent leaking into the sludge and, as a result, there will be significant pressure against the liner in the french drain. All caps leak to some degree. It will be nearly, if not totally, impossible to construct a watertight "plastic sheeting" at such depths, so the hydrostatic pressure from sludge areas can migrate into the French drain. In addition, Alternative 4-B will not relieve the ground water leading to deeper aquifers which show some contamination. The design of Alternative 4-B will actually serve as a system to confine more pressure in a column over the sludge area and into the lower units since no cap is impervious.

For the reasons presented here, the ground water must be removed and treated. Otherwise, low levels of contaminants can continue to leach out and, once discovered in private deep wells, the plume of unacceptable contaminant levels could be very large, and very expensive to clean up.

Response #12

ADPC&E disagrees that implementation of Alternative 4b would result in continued leaching of contaminants into the ground water.

The cap intended for the Monroe Auto Pit shall be designed and constructed to meet the requirements of Arkansas Hazardous Waste Management Regulation 23 § 246.310. This low permeability cap minimizes infiltration of surface precipitation into the sludge pit and directs surface water away from the pit area. Thus, infiltration through the cap and into the sludge is insignificant.

In addition, gravitational force would direct the effluent from the french drain to a surface discharge point. Such a discharge must meet the Arkansas Surface Water Quality Standards.

Also, it is important to remember that the analytical data from testing of leachate produced by the toxicity characteristic leaching procedure (TCLP) show very low leachability of the contaminants from the sludge and that the sludge even in its present condition is no longer a primary source of ground water contamination.

Comment #13

I am very disappointed with this plan and I feel it should be taken out of the area completely and all wells (residential) should be replaced by Monroe and/or a rural water system placed in the area and Monroe pays for all expense.

Response #13

A complete removal of the sludge from the site has a number of advantages that other alternatives do not provide. The removal alternative offers additional overall protection of human health and the environment, provides the greatest long-term protection, and is the only alternative that, if implemented, would not require site access restrictions (fence) and site maintenance. The site could actually become a residential area. However, the relatively low long-term threat posed by the soil/sludge deposits in the pit area, combined with the agency's preference for on-site remedies are among the main factors that hamper selection of a treatment/removal remedy.

The State would certainly entertain the removal option if Monroe volunteers to do so. In the absence of this voluntary action, the State cannot justify the recommendation that removal be the preferred remedial action.

Residential well water meets the safe drinking water standards. Replacement of residential wells and/ or an extension of the rural water system to the areas near the site by Monroe is neither necessary nor justified.

Comment #14

I have a slime that forms in our bathroom everyday and you can not tell me where is it coming from! Please help us in this matter! We need suitable drinking water, now!

Response #14

The Arkansas Department of Health investigated the slime issue and found no bacteria in the well water. The slime in the bathroom must have another source. The residential well water is a suitable source of drinking water.

Comment #15

We can not sell our homes and move - because the mortgage companies will not loan money on this area. Homes and properties will not sell in this area.

Response #15

The State can only provide information regarding the status of the site to the mortgage company. The impact of the site information on mortgage company decisions is out of the control of ADPC&E. Please see Response #2.

Comment #16

We own 40 acres of land joining S-9 Dowler and S-11 Krosp property. We are very much interested in having the creek water and pond water on our property tested. There has been an incident with a layer of oily residue showing up on top of the ground as we tried to plant a tree on our property. Please let us know how to get the water tested and soil samples taken.

Response #16

Water has been observed to flow from a spring located in the ravines on the southwestern portion of the site for 12 to 24 hours following heavy or extended precipitation. Water from this spring and runoff from the sludge pit area enters the ravines and flows into an intermittent stream that leaves the site at the southwestern site boundary and joins Village Creek nearly a mile southwest of the site. During the site investigation, in general, the greatest surface water and sediment contaminant concentrations were observed near the site. These concentrations decreased downstream of the site. In addition, the above property appears to be at least 1000 feet east of this intermittent stream. Therefore, the suspected contaminants on the said property are not site related. ADPC&E does not plan to perform sampling at this time. If you wish, you may contact a certified laboratory in your area for sampling information.

Comment #17

Some of our property is within the one half mile radius of the Monroe Auto Superfund site, but we have never been contacted by Monroe, EPA, or ADPC&E. We would appreciate receiving any previous correspondence as well as any future correspondence. Also, we would like to request our water be tested as quickly as possible.

Response #17

Based on provisions set forth in this Record of Decision, all residential wells that are located within one half mile radius of the site will be periodically tested.

All future correspondence will be mailed to persons who are on the site's mailing list. Previous information on the site can be accessed at Northeast Arkansas Regional Library in Paragould, Arkansas.

Comment #18

We feel that the proposed solution to this problem is unsatisfactory because it leaves the Monroe Auto Pit intact.

Response #18

Analytical data from testing of leachate produced by the toxicity characteristic leaching procedure (TCLP) show very low leachability of the contaminants in the sludge. Therefore, the sludge/soil deposits in the pit pose a low long-term threat. This low long-term threat can be reliably contained by the engineering controls, namely, construction of a french drain and placement of an impermeable cap over the sludge deposit area. ADPC&E is committed to safeguarding human health and the environment against any possible adverse effect from this site and believes that the selected remedy will fully satisfy the above objective.

Comment #19

As long as the fence and the signs remain our property we be devalued. Please see Response #2.

Response #19

ADPC&E agrees that the fence and signs could adversely impact the property values. Despite this acknowledgment, site restriction will remain as part of the selected remedy.

Comment #20

We request an extension to the August 17 deadline, since we have not previously been aware of the seriousness of this problem. We need more time to study the proposals.

Response #20

A two month extension to the August 17 deadline was granted. Please see Response #6.

Comment #21

I'm really disappointed that no action is really being taken to solve the drinking water problem. Real or imaginary, everybody in the area feels like we've got problems with the water. Most everybody is drinking bottled water. We are really concerned about the health of our children and our families.

Response #21

ADPC&E disagrees. The residential wells within a half mile radius of the site will continue to be analyzed to ensure that residential wells meet the drinking water standards. In addition, in the unlikely event that monitoring indicates a degradation of residential water well quality due to site contaminants, proper contingency actions will be implemented.

Analytical results from residential wells near the site meet the safe drinking water standards. Therefore, consumption of water from these wells should not cause any adverse health effect to children or adults.

Comment #22

I believe that failure to remove or solidify that sludge is going to end up being a stigma on the community and remain to be a drain on property values in the area for ages. Please see Response #2.

Response #22

The impact of an alternative on the property values is not one of the criteria which would directly influence selection of a remedial alternative. The State agrees with the respondent that the removal alternative would help to improve the property values in this area.

The solidification/stabilization alternative would enlarge the size of the landfill and it is unlikely that it would impact the property values any differently than the selected remedy. As to why a removal alternative was not chosen, please refer to comment #13.

Comment #23

This is an earthquake area. It has a very destabilizing effect on some of these drains and caps and so forth and I'm real concerned that really hasn't been taken into consideration carefully enough.

Response #23

The Arkansas Hazardous Waste Management, Regulation 23, Section 264.18(a) states: (a) Seismic consideration. (1) portions of new facilities where treatment, storage, or disposal of hazardous waste will be conducted must not be located within 61 meters (200 feet) of a fault which had displacement in Holocene time.

Such a fault does not exist within the specified area of the site. Therefore, seismic considerations are not applicable to this site.

Comment #24

The idea of draining a french drain into the creek just sounds ridiculous to me. I don't see how the contaminants in that french drain is not just going to get into the creek and be a bigger hazard than we have right now.

Response #24

As an added precaution, a cap and french drain will be placed around the sludge pit. The cap will prevent infiltration of rainfall and run off. The french drain will direct the perched water away from the sludge. The perched water will be intercepted before it comes in contact with the sludge and will therefore be "clean" when it is discharged to the stream.

Comment #25

At Times Beach, Missouri, because of throwing out just plain old oil, they bought the town out. The sludge in Monroe Auto Pit came from paint booths, contaminants from there, plus some other waste water. Waste water means it came from wherever Monroe had grinding. And being a machinist and everything, you don't know what materials you have in alloys. Whatever Monroe does to this property is not going to eliminate contamination in the future. The health effect of contaminants are not fully known. At one time the Ocean Spray Cranberry Sauce was considered safe to eat, later it became known that it could cause cancer. So, the number one concern is health.

Response #25

The sludge at the pit contains a number of organic and inorganic contaminants. The remedial investigation report provides information to the extent and amount of these contaminants. At Times Beach the oil contained some of the most toxic substances known to humans (dioxin). Moreover, because it was spread on roads and streets to suppress dust, the public was in direct contact with these contaminants. At Monroe Auto Pit, however, the public has not been directly exposed to the contaminants. Addition of the cap and French drain, as it is specified under the preferred remedy, will isolate the sludge pit. This isolation will eliminate any possible mingling of contaminants in the sludge with other media (soil, water, and air). Protection of the public health and the environment throughout the state of Arkansas is also a concern of ADPC&E. ADPC&E believes that the selected remedy will provide adequate protection against any adverse health effect which may be caused by the site.

Comment #26

We are in the earthquake area and the New Madrid Fault is not too far away from Greene County. So whatever Monroe does to this property out there is not going to eliminate contamination in the future for that.

Response #26

See response #23.

Comment #27

It makes a difference if you are in an area that has been contaminated with a contaminant that was just freely thrown out because it was accounting by a big manufacturing firm that employs a lot of people. We don't like things thrown out and not taken care of. What are we going to do about it? According to this report, we're going to let it drain off into our water naturally.

Response #27

The contaminants present in the on site monitoring wells are in the upper Wilcox aquifer. These contaminants were originally in the sludge that was deposited in the pit by Monroe Auto Plant in Paragould. Over time the liquids in the sludge leached out and traveled down to the water table and into the water of the upper Wilcox aquifer. The monitoring wells on the site and those surrounding the site have been used to monitor the movement of contaminants in the ground water. From these analyses, the contamination is confined to the Monroe property at this time.

Using this data and information about how water moves in the aquifer, models of the expected movement of contaminants and how the contaminants change over time were developed. Using these models, contaminants are expected to degrade (change) and the levels lower naturally over time before they become a threat to residential wells.

Comment #28

What else can you do, other than try to lift every bit of it (sludge) out of there (pit) and carry it off?

Response #28

Please see response #18.

Comment #29

What is going to happen to our property value in this area? What type compensation are the land owners going to get out of this or their property in the future because you have none.

Response #29

Contaminants released to media outside the site boundary are below the federal and state regulatory action levels.

CERCLA does not authorize compensation for a reduction in property value, based on stigma of its nearness to a Superfund site. Please see Response #2.

Comment #30

Now, most streams that you'll see has got clear water, you know, but now I've got two or three places that stuff runs out and it's a milky looking and oily looking stuff that's coming out of there. That's not clear water. I don't know what it is and hadn't nobody told me anything and I hadn't really knew who exactly to ask, but I just kind of like to wonder what it is, how dangerous it is, and if it could be cleaned up. What could be done to it?

Response #30

Surface water studies on the site show that any contamination that could be carried by run off would enter the intermittent creek southwest of the site and that the level of contamination found in creek sediment decreases rapidly away from the site. Given this information, the site is probably not causing the cloudy or oily effects in your streams.

Comment #31

...this pamphlet it says "The majority of the liquids migrated into the ground water during the 1970's when the landfill was active and is believed to be a major source of ground water contamination at this site. The primary source of ground water contamination no longer exists at the site." Well, my next question is, where did this contamination go to? If it's not on the site, it looks to me like it's had to went somewhere. It's had to drain down, and that's why I think it's probably on this place of mine and maybe on surrounding areas.

Response #31

Presently, the contamination is in the ground water. The contaminants that were leachable from the sludge have left the sludge and are now in the ground water. The contaminated ground water is still within the site boundaries as indicated by the sample results from the monitoring wells. Monitoring wells have been placed around the site perimeter and in all three aquifers to monitor the movement of the contamination plume. This monitoring will continue to keep us up to date on how degradation of the contaminants is progressing.

Comment #32

I have several concerns. First is surface water contamination and I have asked for testing and whatever and haven't had any results or any satisfaction about what studies have been made about surface water contamination and any results of that. And I have, I guess the major creek that runs north of the dump site and it drains quite a bit of acreage west and some south toward the dump site through my property.

Response #32

From looking at a topographic map, the creek that you mentioned drains an area north of the site. The topography at the site is such that surface run off travels to the southwest and south from the sludge area. The site drainage area and the drainage area of your stream are separate and do not run together.

Comment #33

...What do you plan to do in the Remedial Action Plan that may involve extraction of any water from the site and where you propose to put that.

Response #33

The selected remedy would involve a french drain that would capture perched water and release it to the intermittent stream that flows southwest of the site. If a pump and treat method is implemented for the ground water remediation, the water would be treated and put back into the aquifer by wells to enhance the remediation.

Comment #34

...I feel like we need more time to evaluate what we're looking at and what the solutions are. ...And I don't know what's available through EPA, if the consultant route is still available to us.

Response #34

A two month extension of the public comment period was granted. By "consultant route", if it means a TAG grant, such a grant is not available at this stage of the remediation.

Comment #35

Monroe has not been very responsive to the property owners in this area. I've seen no studies to evaluate property values. All we can see is property values being devalued.

Response #35

The Superfund remediation process does not authorize studies on property values. The impact of the superfund remediation on the property values is not controlled by the State. Please see Response #2.

Comment #36

...after looking at that (report) it looks like something around thirteen out of twenty-six wells have shown signs of the contaminants that are on the site are now in the ground water in the surrounding area. We were originally told that the Gann well was the only well that was contaminated.

Response #36

The figure you are referring to shows the concentrations of organics and inorganics (metals) that were found in the residential samples taken in April 1992. Many metals are naturally occurring. The organic values are quantified as estimated values, which means that the actual values could be lower. The contamination in the Gann well showed levels that were 10 to 100 times greater. The monitoring wells that were placed adjacent to the Gann well continue to show levels of the same contaminants, but at lower levels. The contamination is confined to the upper Wilcox aquifer. The Gann well remains the only residential well that has shown signs of contamination.

Comment #37

The solution, as I mentioned, is unacceptable for fair people and we'd like to ask that we have additional time to study this report, to get some technical expertise to explain to us, collectively and individually, what our, the impact of this site has on us.

Response #37

The selected remedy if designed and implemented properly will provide protection of the human health and the environment. A two month extension of the public comment period was granted.

Comment #38

People won't fish in my pond that I built. They won't eat the fish.

Response #38

Surface water drainage into your pond does not appear to come from the site. Village Creek is the surface water connection from the site to your pond; however, your pond drains into

Village Creek. No contamination from the site should be in your pond.

Comment #39

So I think we need a little more time to investigate this because this stuff is coming out through everybody's water, I know it is, and I think there should be more wells checked to see how much contamination there actually is.

Response #39

Sampling to date indicates that trace amounts of contaminants occur in some wells. The distribution of contaminants does not indicate if the contamination is from the site or not from the sites. The highest concentrations of contaminants of concern occur on the site. In general, contaminants will move from areas of high concentration to areas of lower concentration. The highest readings will be near the source of contamination and decrease away from the source of contamination. Monitoring wells have been placed around the border of the site to monitor any increases in contaminant levels. Continued monitoring will be a part of the remediation plan.

Comment #40

...I object to leaving this pit to be a continuing problem for no telling how long. Eliminate the problem. Eliminate the problem. Cost should not be even considered. Monroe put it there, Monroe can remove it.

Response #40

The State is required to use nine criteria to evaluate alternatives for addressing a Superfund site. Since cost is one of the nine criteria, it cannot be ignored as the respondent has suggested. The rationale for not choosing a removal option is explained in response to comment #13. Also, please note that even a complete removal of the sludge will not eliminate the problems with the ground water immediately.

Comment #41

I'd like to know why I haven't received no paperwork on this stuff?

Response #41

The mailing list is compiled from attendance sheets at previous meetings, those persons submitting comments, and those persons who have requested to be placed on the mailing list either through Monroe, the State Department of Pollution Control and Ecology, or through

EPA. As a result of attending this meeting your name will be placed on the mailing list. All of the public records are accessible at the Northeast Arkansas Regional Library in Paragould, Arkansas or in our central files in Little Rock, Arkansas.

<u>Comment #42</u>

...there's one thing I haven't heard mentioned tonight is people that is getting sick from the well water. People that take a shower break out in rashes. They get fumes that makes them sick. And that is getting farther away from that all the time, and you're not going to make anybody in here believe it's not coming out of those wells, because it is.

<u>Response #42</u>

The only recorded incident of rashes from water use or fumes from the water are related to the Gann well. As stated earlier, the lab results from private well sampling indicate that the water is safe for drinking and other domestic uses.

<u>Comment #43</u>

...my concern is, I have two small children and I want to know if that water out there's going to kill them like it did the frogs?

<u>Response #43</u>

The frogs you saw at the site were in the decontamination tank. The chemicals used to decontaminate the drilling equipment would be toxic to frogs. The decontamination water is siphoned from this temporary tank into a holding tank at the site for proper disposal.

<u>Comment #44</u>

They (residents) have a fear of the unknown. They have a real concern about the health, not only acute but also chronic.

<u>Response #44</u>

The state understands the concerns of the local residents. The protection of human health is the top priority of the State.

<u>Comment #45</u>

And another thing surfaces, maybe not as strong as the rest of it but certainly a diminution in their property value over a period of time.

Response #45

The impact of a Superfund site on property values is not controlled by the State or the EPA. Please see Response #2.

Comment #46

They (the residents) have asked that I ask you folks to give them an extension of time on the comment period to consider either, hopefully, under the TAG program, hiring a consultant ...to come in and help them through this process.

Response #46

A two months extension period was granted. The TAG program is not available at this stage of the remediation process. Please see Response #6.

Comment From Monroe Auto Equipment

Monroe believes that the proposed plan will adequately protect human health and the environment. Monroe agrees that it is appropriate to leave the contaminated sludge/soil in place at the site. The installation of a cap will minimize infiltration and erosion while the French drain will isolate the contaminated soil/sludge from the perched ground water. Periodic maintenance of the cap will assure the long-term integrity of the cap. Deed restrictions and site access restrictions will further limit any potential contact with contaminated media. Because the primary source of ground water contamination no longer exists at the site, the concentrations of contaminants in the ground water will decrease through natural attenuation and degradation. Ground water use restrictions on the site and periodic monitoring of residential wells and monitoring wells will further protect public health. Although off-site migration of contaminants is not expected, the periodic monitoring would provide notice of migrations should it occur.

Response

The State agrees.