United States
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Office of
Emergency and
Remedial Response

EPA/ROD/R06-87/015
November 1986

EPA

Superfund Record of Decision:

Mid-South Wood, AR

TECHNICAL REPORT DATA *(Please read Instructions on the reverse before completing)*		
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15. SUPPLEMENTARY NOTES		

16. ABSTRACT

The Mid-South Wood Products site is located in Polk County, Arkansas, approximately 1/2 mile southwest of Mena, Arkansas. The 57-acre site includes the following areas: the Old Plant site, the Small Old Pond and Old Pond areas, the North and South Landfarms, the landfill, Clear Lake and an existing chromated copper arsenate (CCA) treatment plant. The Old Plant site was used to treat wood with pentachlorophenol (PCP) and creosote; the Small Old Pond was the original impoundment for waste PCP and creosote. These two areas have been covered with soil. The Old Pond area was used to store PCP and creosote sludge and has since been graded and covered with soil; materials from the Old Pond were spread over the Landfarm areas and mixed into the soil; the Landfill area contains deposits of sawdust, woodchips, and other waste wood products; Clear Lake receives runoff from all the above areas; the CCA treatment plant contains an ongoing wood treating operation where the surface drainage from the plant is put in sumps.

The plant site was originally developed by a lumber company in the late 1930s as a post and pole production plant. In 1967, Edward Hines Lumber Company purchased the plant and operated it as a PCP and creosote wood treating plant until 1977 when the CCA treating process was first introduced at the plant. In September 1978, Edward Hines Lumber Co. sold the plant to Mid-South Wood Products, Inc. Investigation of the
(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Mid-South Wood Products, AR First Remedial Action Contaminated Media: sw, gw, surface soils, surface sediments Key contaminants: creosote compunds (PAHs), PCP, CCA, arsenic, chromium		

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EPA/ROD/R06-86/015
Mid-South Wood Products, AR
First Remedial Action

16. ABSTRACT (continued)

Mid-South Wood Product site began in 1976 when several fish kills were reported in waterways downstream of the site. The Arkansas Department of Pollution Control and Ecology (ADPC&E) tested the ground water, surface water, ponds, and three wells; they found low levels of PCP in the wells and higher levels in the surface water samples and arsenic and chromium in the ground water and surface water. In December 1981, ADPC&E concluded that a contamination problem existed and recommended initial remedial actions be taken. Contaminants were found in the site surface soils, surface sediments, surface water, and ground water beneath the site. The primary contaminants of concern include: creosote compounds (PAHs), PCP, CCA, arsenic, and chromium.

The selected remedial action includes: excavation of onsite contaminated soils, with the exception of those existing in the Old Pond area, and consolidation with the contaminated soils in the North Landfarm area; stabilization of any free oil, liquid, or sludge found in the heavily contaminated area of the Small Old Pond/Old Plant area and placement of these wastes in the North Landfarm area; grading and covering the contaminated soils consolidated in the North Landfarm and RCRA top-soil clay cap; investigating the Old Pond area to locate any free oil, liquids, or sludges and in-situ stabilization of these materials; capping the Old Pond area with a RCRA top-soil clay cap; remedial action at the CCA treatment facility; completing installation of the french drain system at the site and pumping water to the treatment system; treating the ground water by removing organics through carbon filtration (any ground water found to be contaminated with inorganics will be treated by carbon filtration then used as makeup water for the CCA treatment facility); disposal of oils and sludges collected in the french drains in an EPA approved hazardous waste disposal facility; discharging treated water from the ground water treatment facility to surface drainage; and installation of a ground water monitoring system. The estimated capital cost is approximately $3,500,000 with annual O&M costs of $153,500.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

RECORD OF DECISION

SITE

Mid-South Wood Products located in Polk County, Arkansas, approximately 1/2 mile southwest of Mena, Arkansas.

DOCUMENTS REVIEWED

I am basing my decision on the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Mid-South Wood Products site:

B&F Engineering, Inc., 1984. Phase I and II Report Site Investigation, Mid-South Wood Products, Inc. Prepared for Edward Hines Lumber Company.

B&F Engineering, Inc., 1983. Phase I Report Site Investigation, Mid-South Wood Products, Inc. Prepared for Edward Hines Lumber Company.

Environmental Protection Agency, 1986. Feasibility Study Report, Mid-South Wood Products Site, Mena, Arkansas. Prepared by CH_2M Hill Southeast, Inc.

Environmental Protection Agency, 1986. Supplemental Remedial Investigation - CCA Plant, Mid-South Wood Products Site, Mena Arkansas. Prepared by CH_2M Hill Southeast, Inc.

Environmental Protection Agency, 1985. Endangerment Assessment, Mid-South Wood Products Site, Mena, Arkansas. Prepared by CH_2M Hill Southeast, Inc.

Environmental Protection Agency, 1984. Remedial Investigation Report, Mid-South Wood Products Site, Mena, Arkansas. Volumes 1, 2, and 3. Prepared by Soil & Materials Engineering, Inc. and CH_2M Hill Southeast, Inc.

Law Engineering Testing Company, 1984. Phase II Hydrogeologic Investigation, Mid-South Wood Products Site, Mena, Arkansas. Prepared for Edward Hines Lumber Company.

Law Engineering Testing Company, 1983. Phase I Hydrogeologic Investigation, Mid-South Wood Products Site, Mena, Arkansas. Prepared for Edward Hines Lumber Company.

- Summary of Remedial Altenative Selection.
- Public comments received during April 28 - May 19, 1986, on the Feasibility Study.
- Community Relations Responsiveness Summary, November 1986 (attached).

Summary of Remedial Alternative Selection
Mid-South Wood Products
Mena, Arkansas
October 1986

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MID-SOUTH WOOD PRODUCTS SITE
RECORD OF DECISION
NOVEMBER 1986

ERRATA

The figures used in this document to illustrate the site depict the site boundaries incorrectly. Edward Hines Lumber Co., Inc. (potentially responsible party) has recently purchased a tract of land that previously bordered the site along the southwest property line. Therefore, contaminated soil and groundwater considered offsite during the development of the feasibility study and located in this southwestern drainageway is now part of the site (i.e., the site boundaries have been extended to the southwest to include all offsite contamination found in that area during site investigations).

SITE LOCATION AND LAYOUT

The Mid-South Wood Products site is located in western Arkansas, approximately 1/2 mile southwest of downtown Mena, in Polk County (Figure 1). The Mid-South site is comprised of approximately 57 acres. The northeastern half of the site contains an ongoing wood treating operation which is using a chromated copper arsenate (CCA) process. The current site layout is depicted in Figure 2.

Areas of remedial investigation for the Mid-South site include the Old Plant site, the Small Old Pond and Old Pond areas, the North and South Landfarms, the Landfill, Clear Lake and the existing CCA treatment plant.

The Old Plant site is where the pressure cylinders used for treating wood with pentachlorophenol (PCP) and creosote were located. The Small Old Pond was the original impoundment for waste PCP and creosote and is located adjacent to the Old Plant. The Old Plant site and Small Old Pond areas occupy approximately 10,000 square feet and have since been covered with soil.

The Old Pond is an area west of the Old Plant site, approximately 112,500 square feet in size, where PCP and creosote sludge were stored before the pond was filled in. The landfarm areas are located on both sides of a ridge running through the southwest part of the plant property. The area south of the ridge is approximately 84,000 square feet and drains to the south and west. The area north of the ridge is approximately 150,000 square feet and drains to the north. These are areas on which material from the Old Pond was spread over the surface and mixed into the soil as part of the Old Pond closure. Some of the mixture was put back into the Old Pond area. The Old Pond area has been graded and covered with soil. The Landfarm areas have not been covered.

The Landfill area is the result of depositing sawdust, woodchips and other waste wood products in a swale area to the west of the Old Plant and north of the Old Pond. The swale has been filled to approximately the surrounding grade and has no vegetative cover. In 1980, Mid-South constructed a dike across the lower end of the landfill to contain runoff which in turn created a small area of ponded water called Clear Lake. Clear Lake apparently receives runoff from the Landfill, the Old Plant and Small and Old Pond areas.

The existing CCA treatment plant is located adjacent to the Old Plant Site. It consists of a pressure-treating cylinder, several elevated tanks for storage of the treatment solution, a concrete drip pad and a wood drying kiln. The concrete drip pad is used to collect excess CCA solution which is allowed to drip onto the structure after treatment. Once the lumber has dried, it is stored in an area located in the northeastern section of the site. Some surface drainage from the CCA plant area is contained by either concrete-lined sumps at the drip pad or an unlined overflow sump adjacent to the treating cylinder.

DESCRIPTION OF THE REMEDY

The Feasibility Study evaluated alternative treatment technologies including incineration and biological treatment. These technologies were not retained due to engineering impracticability (a detailed discussion can be found in the Summary of Remedial Alternative Selection).

EPA has negotiated a remedy with the potential responsible parties which includes a remedial action plan summarized below.

- Excavation of on-site contaminated soils, with the exception of those existing in the Old Pond area, and consolidation with the contaminated soils in the North Landfarm area.
- Stabilization of any free oil, liquid, or sludge found in the heavily contaminated area of the Small Old Pond/Old Plant area and placement of these wastes in the North Landfarm area.
- The contaminated soils consolidated in the North Landfarm will be graded and covered with a RCRA top-soil clay cap.
- Field investigation into the Old Pond area to locate any free oil, liquids or sludges. Insitu stabilization of these materials.
- The Old pond area will be covered with a RCRA top-soil clay cap.
- Remedial action at the CCA treatment facility.
- Complete installation of the french drain system already partially installed at the site and pump water to the treatment system.
- Treat the ground water by removing organics through carbon filtration. Any groundwater found to be contaminated with inorganics will be treated by carbon filtration then used as makeup water for the CCA treatment facility.
- Dispose of oils and sludges collected in the french drains in an EPA approved hazardous waste disposal facility.
- Discharge treated water from the groundwater treatment facility to surface drainage.
- Installation of a groundwater monitoring system to monitor the effectiveness of the remedy.

Selection of this remedy is contingent upon the responsible parties performing bench studies during the remedial design and providing EPA with results that support the use of stabilization as part of the remedy. If stabilization proves ineffective, an alternative action will be required for those wastes for which stabilization has been proposed.

DECISION

Consistent with the Comprehesive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the National Oil and Hazardous Substance Contingency Plan (40 CFR Part 300), I select the remedy described above for the Mid-South Wood Products site. I have determined that this is cost-effective and is protective of public health and welfare and the environment. The action will require operation and maintenance to maintain the effectiveness of the remedy. Since wastes will be left on-site, the remedial action will be reviewed every five years to assure that the remedy is still protecting public health and the environment. The State of Arkansas has been consulted on EPA's remedy (i.e., Combined Excavation and Groundwater Recovery/Treatment) which was the basis for the negotiated remedy, and provided verbal concurrence. I have considered the cleanup standards of Section 121 of the Superfund Amendments and Reauthorization Act of 1986 (SARA), including the cleanup standards thereof, and certify that the portion of the remedial action covered by this Record of Decision complies to the maximum extent practicable with Section 121 of CERCLA (as amended by Section 121 of SARA).

Negotiations with the potentially responsible parties have been successful regarding the selected remedy; however, in the event that negotiations on the Consent Decree are unsuccessful, on-going litigation will be pursued by EPA and the Department of Justice in an effort to secure performance of the remedial action.

11. 14. 1986
Date

Frances E. Phillips
Acting Regional Administrator

Attachments

SITE HISTORY

The plant site was originally developed by Nebraska Bridge Supply and Lumber Company as a post and pole production plant in the late 1930's. Nebraska Bridge Supply and Lumber Company, operating under the name of Three States Lumber Company, installed the first pressure-treating system in 1955.

The plant was purchased by Edward Hines Lumber Company in 1967. The plant was operated as a pentachlorophenol and creosote wood treating plant by Hines until 1977 when the CCA treating process was first introduced at the plant. Edward Hines Lumber Company sold the plant in September of 1978 and the new owner soon afterwards formed the corporation of Mid-South Wood Products, Inc.

Since the CCA plant was designed to be a closed loop, recycling system, and Mid-South Wood Products, Inc., did not plan to use PCP or creosote in their operation, the Old Pond was no longer required after 1978, although some CCA wastewater apparently was put into the Old Pond during the first year of operation. The pond was reportedly closed by pumping the sludge from the pond, spraying it over the Landfarm area, and mixing the sludge into the soil. A portion of the soil and sludge mixture was placed back into the pond leaving the remaining waste mixture on the Landfarm area. Use of the CCA wood treating process has continued since 1977, and is currently ongoing.

The site has been under investigation since 1976, when it was reported that Rock Creek and the Mountain Fork River suffered a 100-percent fish kill for a distance of 8 1/2 miles downstream of the site and a 10 percent fish kill to a distance of 17 1/2 miles downstream of the site. An Arkansas Game and Fish officer traced the kill back to the site, which was owned and operated at that time by Hines Lumber. An 8-inch pipe existed at that time from the Old Pond to the drainage ditch along the southern boundary of the property. The drain valve had apparently been opened and part of the pond contents released. There is some indication from the records that several fish kills had previously occurred in waterways downstream of the site, although it is not stated whether the cause was traced to the Hines' property.

Subsequent to the fishkill, state and federal agencies began testing for the presence of PCP, arsenic and chromium on private property west and northwest of the Mid-South site. Testing was initiated by the Arkansas Department of Pollution Control and Ecology (ADPC&E) in November 1980 with the collection of groundwater samples and sediment samples at and adjacent to a nearby pond. Results from these samples revealed the presence of low levels of PCP, arsenic and chromium in some groundwater and surface water samples. In February 1981, water from four nearby wells was analyzed by the EPA which reported finding PCP (10 ppb) in one well. About this same time, the Arkansas Department of Health tested water from a pond, spring, and three wells. The Department of Health found trace levels of PCP in the wells and higher levels in surface water samples. In December 1981, the ADPC&E performed sampling at the Mid-South site. They concluded that a contamination problem existed and recommended that initial remedial actions be taken.

In 1982, the Mid-South Wood Products site was added to the proposed National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA or "Superfund").

On March 31, 1983, ADPC&E issued an Administrative Order, requiring that Hines and Mid-South, as potentially responsible parties (PRPs), perform certain short term remedial actions and that they submit a work plan for a full investigation of the site to be conducted on a specified schedule. On December 17, 1983, the ADPC&E requested that the EPA implement a remedial investigation/feasibility study (RI/FS) to develop alternative remedial actions for the site.

SITE STATUS

In late 1983, the EPA issued a work assignment through its Zone II Superfund Contract to perform the RI/FS. Activities of the remedial investigation included collecting and analyzing surface water, groundwater, surface soils, subsurface soils, and sediment samples from onsite and offsite locations. Samples were analyzed for semi-volatile organics (these include PCP and primary creosote compounds) and metals (including arsenic and chromium). Data generated by the responsible parties' consultants were utilized to the maximum extent possible.

Results of onsite and offsite sampling conducted during the period January through April 1984 are discussed in the Remedial Investigation Report (EPA, 1984). In November 1985, a Supplemental Remedial Investigation (SRI) of the operating CCA plant area was performed. Activities of the SRI included collecting and analyzing surface and subsurface soils and groundwater from the area immediately adjacent to the CCA plant. The results of the study were presented in the Supplemental Remedial Investigation Report (EPA, 1986).

Physiography

The Mid-South site and City of Mena are located in the Ouachita Mountains physiographic sub-province. Both lie in the Caddo Basin and are bounded by the Fourche Mountains to the north and the Caddo and Cossatot Mountains to the south. The site is located on the northern flank of a broad syncline. Bedrock onsite dips to the southwest and consists predominantly of shale with occasional sandstone beds. Residual soils at the site consist of clayey silts and sands, silty to sandy clays, and some angular gravel. The highest point on the site (elevation 1,146 feet msl) is found in the north-central area. Site relief is approximately 25 feet.

The site's natural topography has been modified by activities associated with the wood-treatment processes. These include the excavation for waste storage and later filling of the Small Old Pond and Old Pond areas, filling of the Old Plant area, establishment of the Landfill and two Landfarms for waste disposal, and creation of Clear Lake.

Surface Water Hydrology

Surface water drainage in the vicinity of the site and surface drainage patterns at the site are shown in Figures 3 and 4. A drainage divide (maximum elevation of 1,146 feet) crosses the eastern half of the site in a northwest to southeast direction passing through the CCA plant area. Drainage east of this divide is via an unnamed tributary and drainage ditch into Prairie Creek, a tributary of the Ouachita River. West of the divide, most of the site drainage is through Clear Lake, East Fork Moon Creek (which passes through Pope Pond), Moon Creek, Rock Creek, Mountain Fork River, and eventually into the Little River. There is also a diversion ditch around the north end of the landfill which intercepts surface runoff from the current Mid-South operation before emptying into East Fork Moon Creek. Along the south border of the site, there is some offsite drainage along an ephemeral stream system which parallels the railroad tracks. Southwest of the topographic divide this stream system intercepts site drainage from the South Landfarm area and the Old Pond area (Figure 4), and apparently received waste from the Old Pond prior to 1976 or 1977. East of the topographic divide the stream system intercepts runoff from the drip pad, part of the CCA plant and from treated wood storage areas.

Groundwater Hydrology

Groundwater at the site occurs primarily in weathered bedrock and in fractured sandstone and shales. Soils onsite have low hydraulic conductivities and limited capacities to transmit water. A major fracture zone onsite is associated with a fault which trends through the site from west to east along the trace of the East Fork of Moon Creek. This fault, named the "anomolous zone" by the Hines' consultants, is characterized by highly fractured shales and strikes northwest through the site, underneath the Old Pond area. The depth to water in the bedrock varies from 10 to 30 feet below land surface.

Groundwater flows at the Mid-South site are controlled primarily by topography and follow a pattern similar to that described for surface water (see Figure 5). East of the divide, groundwater flows offsite to the east and southeast. West of the divide, groundwater flows to the west, south, and southwest. Much of it passes through the Landfill (an area with high water level), then radially into East Fork Moon Creek, Moon Creek, and the Old Pond area.

Beneath the topographic ridge at the Landfarm is a groundwater high for the site. This appears to be a recharge area and groundwater flows radially from this area. Groundwater on the north side of the Landfarm flows to the north to East Fork Moon Creek. The water table contours indicate that groundwater is discharging into the stream. Groundwater also flows west and south of this divide toward the drainage feature paralleling the railroad track to the south and ultimately discharges into Moon Creek within one-half mile west of the Mid-South site.

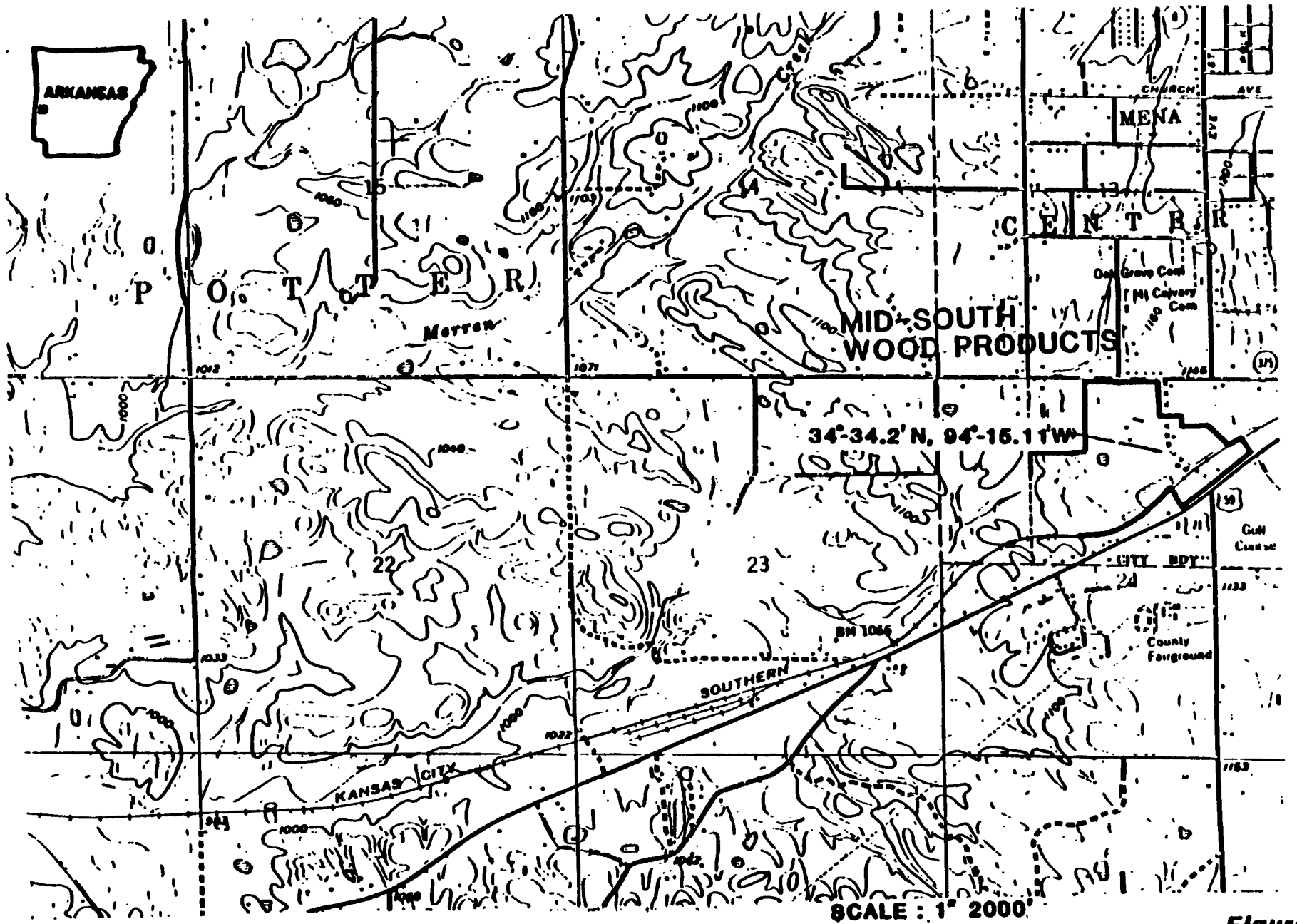


Figure 1

LOCATION OF MID-SOUTH WOOD PRODUCTS SITE IN RELATION TO MENA, ARKANSAS

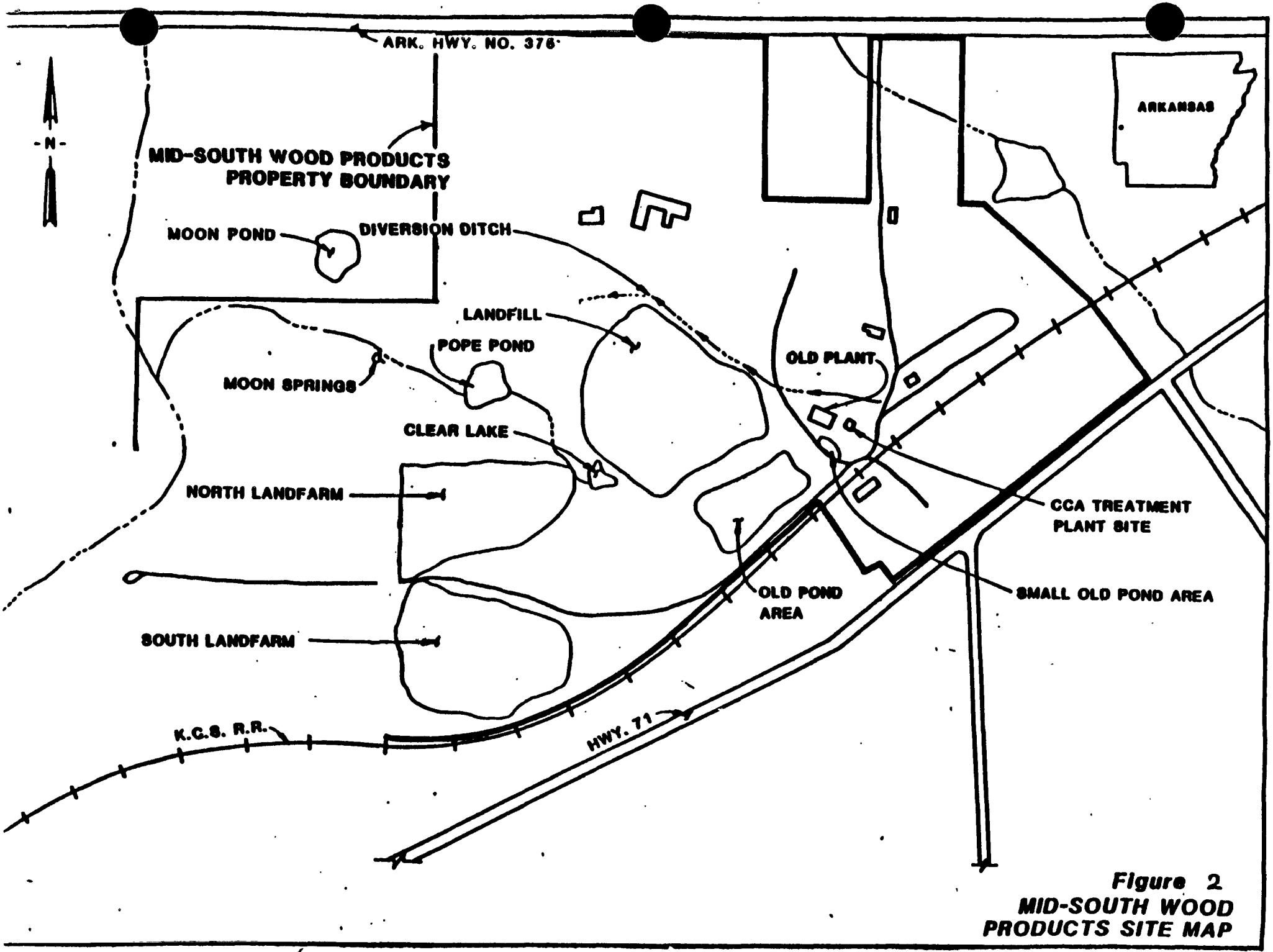
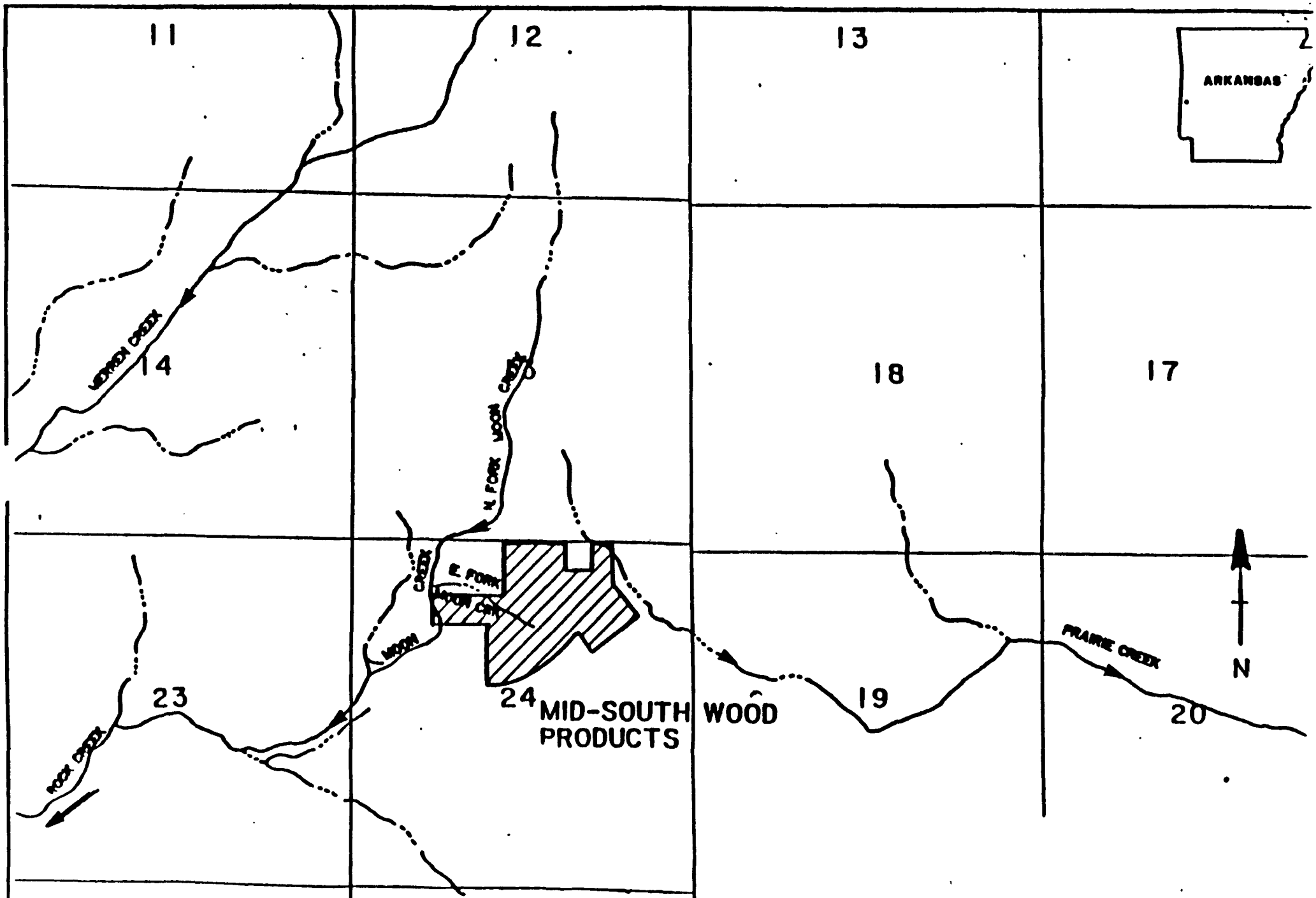


Figure 2
MID-SOUTH WOOD PRODUCTS SITE MAP



Map from S[illegible] Material Engineers, Inc. and CH2M HILL [illegible]theast, Inc. (1984)

Figure 3

SURFACE WATER DRAINAGES IN T[illegible] VICINITY OF THE MID-SOUTH WOOD PRODUCTS SITE

Water Supply

The City of Mena and several of the smaller towns have developed surface water supplies. Mena receives its municipal water supply from Ward Lake and Irons Fork reservoir located approximately 2.5 miles north and 6 miles northeast of the site, respectively. The two sources are projected to give Mena a yield of 8.6 million gallons per day. The remainder of the rural water supply comes primarily from groundwater, which occurs in the Paleozoic age bedrock. These rocks are not a major aquifer and groundwater is derived principally from the secondary porosity of the rock. The quality of the groundwater is considered only fair due to elevated concentrations of iron and manganese, and it generally requires treatment for municipal water supplies.

Several private water wells are located around the site. Recently, Hines Lumber Company has extended the city water supply pipeline along County Road 375 to eight homes located downgradient of the Mid-South site that were previously on private wells. This action has effectively removed all known downgradient groundwater usage between the onsite source areas and the groundwater discharge area along East Fork of Moon Creek.

Cultural

Polk County is a rural county with approximately 65 percent of its population in rural areas. Polk County had a population of about 14,800 people in 1975 with the City of Mena being the largest single population center with about 4,500 people. The majority (83 percent) of Polk County is forested and about 15 percent is agricultural land. There are approximately 720 farms in Polk County with cattle and chickens as the major agricultural products.

NATURE AND EXTENT OF CONTAMINATION

The Mid-South site is the repository for waste products from three separate wood-preservative processes. These wastes contain a suite of creosote compounds (known as polynuclear aromatic hydrocarbons, PAH); pentachlorophenol, (PCP); and chromated copper arsenate (CCA).

The most commonly detected organic compounds present in samples collected during the remedial investigation are listed below:

Pentachlorophenol	Chrysene
Acenaphthene	Acenaphthylene
Fluoranthene	Anthracene
Naphthalene	Fluorene
Benzo(a)anthracene	Phenanthrene
Benzo(a)pyrene	Pyrene
Benzo(b)fluoranthene	Dibenzofuran
Benzo(k)fluoranthene	2-Methylnaphthalene

The inorganic contaminants found on the site are arsenic and chromium. Eight soil samples from the site were analyzed for dioxin (2,3,7,8 TCDD) and none was detected. Table 1 presents a summary of mean values of each contaminant found onsite and offsite**, listed by sampling media. Table 2 presents similar data on contaminants from near the CCA plant. A more detailed evaluation of contaminants is available in the RI Report (EPA, 1984), the Endangerment Assessment Report (EPA, 1985), and the SRI Report (EPA, 1986) for the Mid-South site.

** A majority of the property considered offsite during the site investigation has been purchased by Edward Hines Lumber Co. The site boundaries have now been expanded to include this property. Additionally, a portion of the offsite contamination exhibited in Table 1 may now be found in this area.

The majority of the contaminants are associated with the surface soil and subsurface contamination in the form of oils, groundwater and soil/sludge mixtures. Since the Old Pond was closed out, as described previously, there is an unknown amount of non-absorbed (free) oil, containing creosote compounds and/or PCP, located in and around the Old Pond/Small Old Pond and Old Plant/CCA Plant areas. The oil is primarily located in fill material, weathered bedrock (soil) and bedrock fractures.

Trenching exploration by Hines' consultants also located free oil near Moon Springs. It appears that some of the oil has migrated from the Old Pond area to Moon Springs via the geologic fault located during the site investigations.

Considerable quantities of contaminated soils and sludges exist primarily in the Pond and Landfarm areas. To evaluate the extent of contaminated soil on the site, concentrations of each contaminant were compared with depth and location data collected during the site remedial investigations. Figures 6 to 9 present the areal distribution of the contaminated soil for arsenic, chromium, pentachlorophenol and creosote compounds (sum of PAH compounds). The actual depths of contaminants vary with the area. The figures showing the extent of contaminant distribution were developed utilizing the following assumptions: the sampling efforts had adequately characterized contamination at the site; and contamination varied uniformly between sampling points in both concentration and distribution.

As indicated on Figure 6, the largest amount of contaminated soil which contains over 20 ppm of arsenic is located within a 200-foot radius of the current CCA plant with a maximum observed concentration of 1435 ppm of arsenic. Chromium concentrations indicate a similar pattern. The CCA process area is the main source of arsenic and chromium contamination at the Mid-South site. A RCRA-related inspection performed in April 1985 identified several problem areas within the CCA plant that were contributing to the release of contaminants. The Supplemental Remedial Investigation performed in November 1985 confirmed the release of CCA solution from the plant area.

Tables 1 and 2 indicate the degree of contamination found in groundwater on the site. As the mean values illustrate, there is considerable contamination onsite, primarily organic compounds.

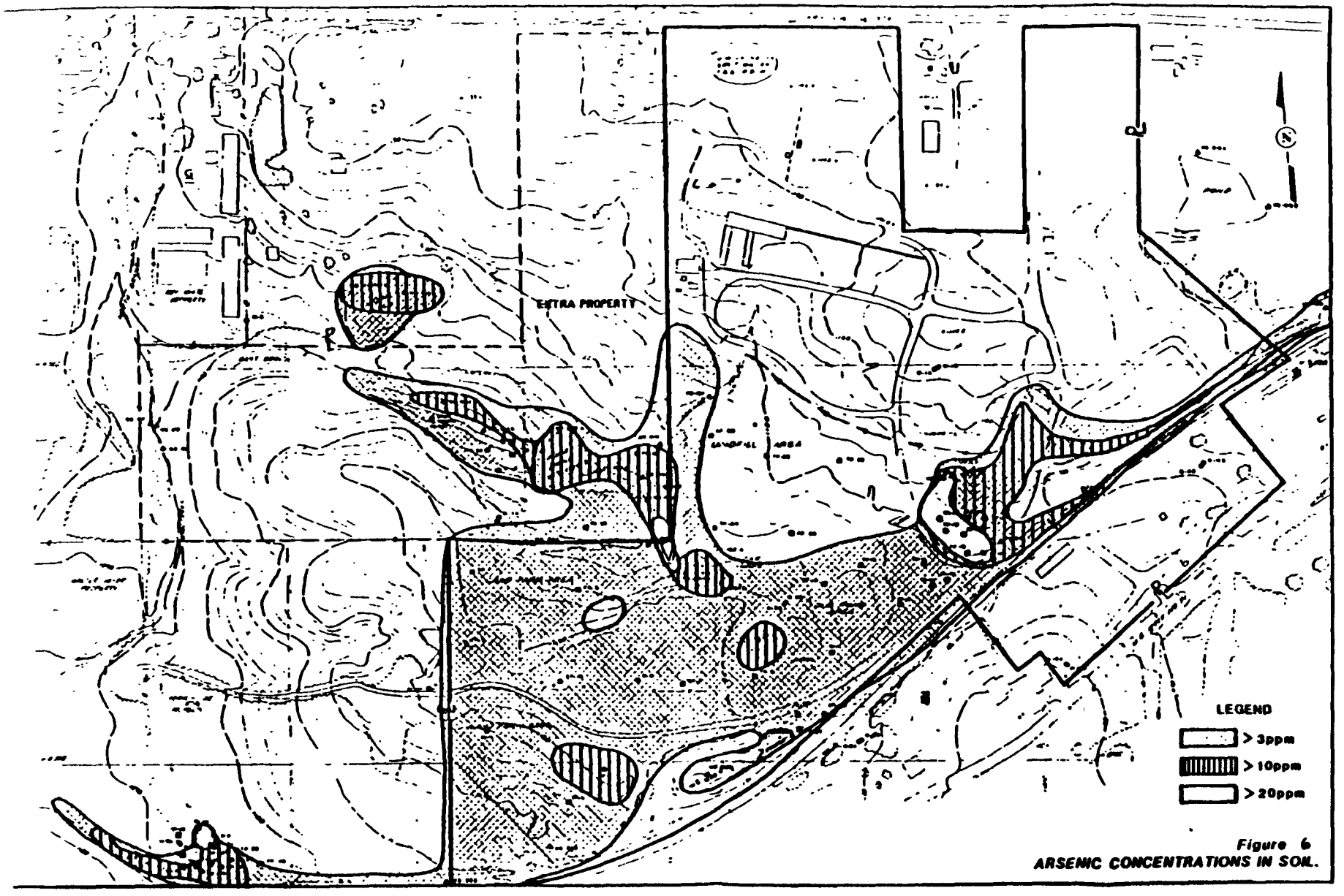


Figure 6
ARSENIC CONCENTRATIONS IN SOIL.

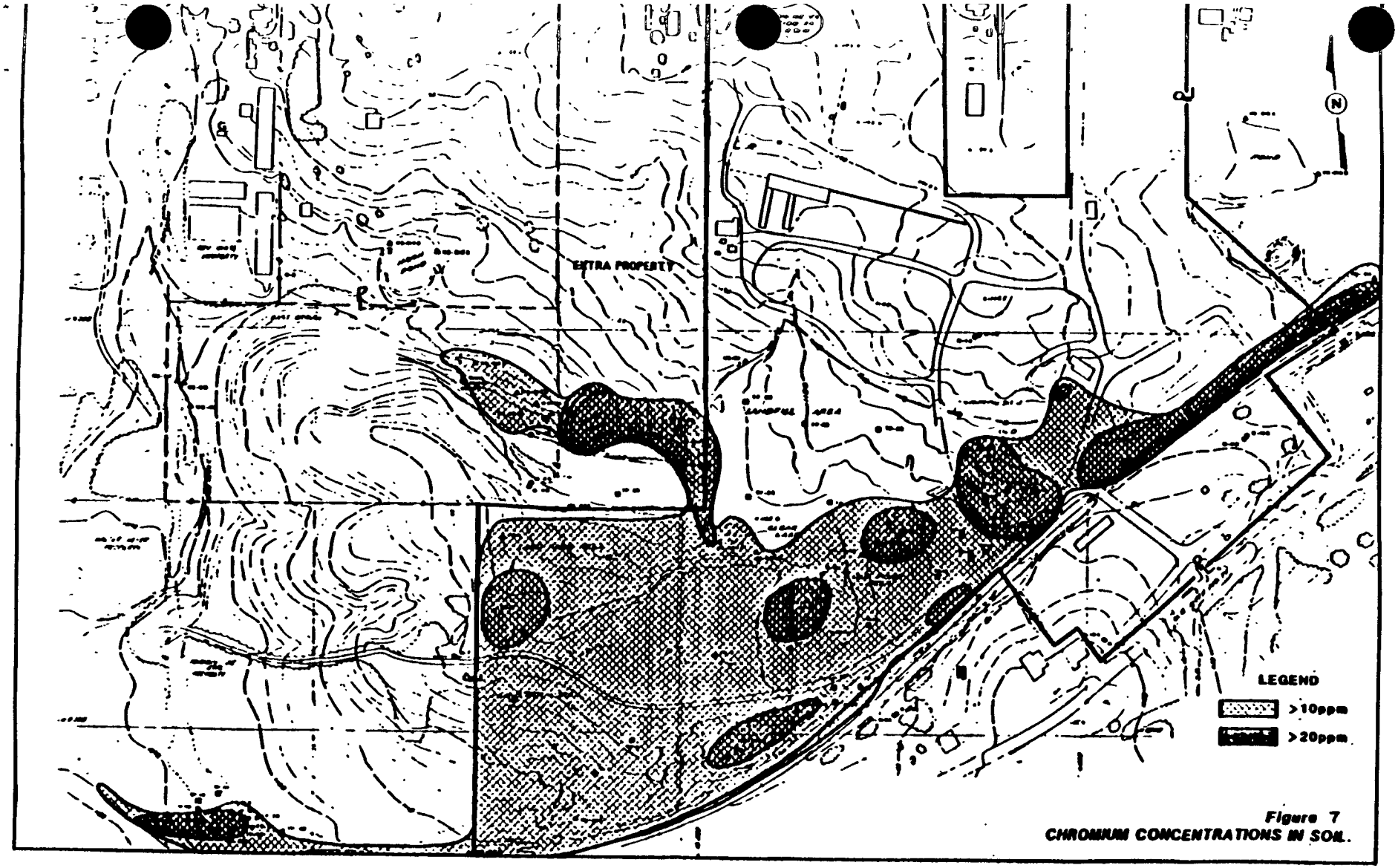


Figure 7
CHROMIUM CONCENTRATIONS IN SOIL.

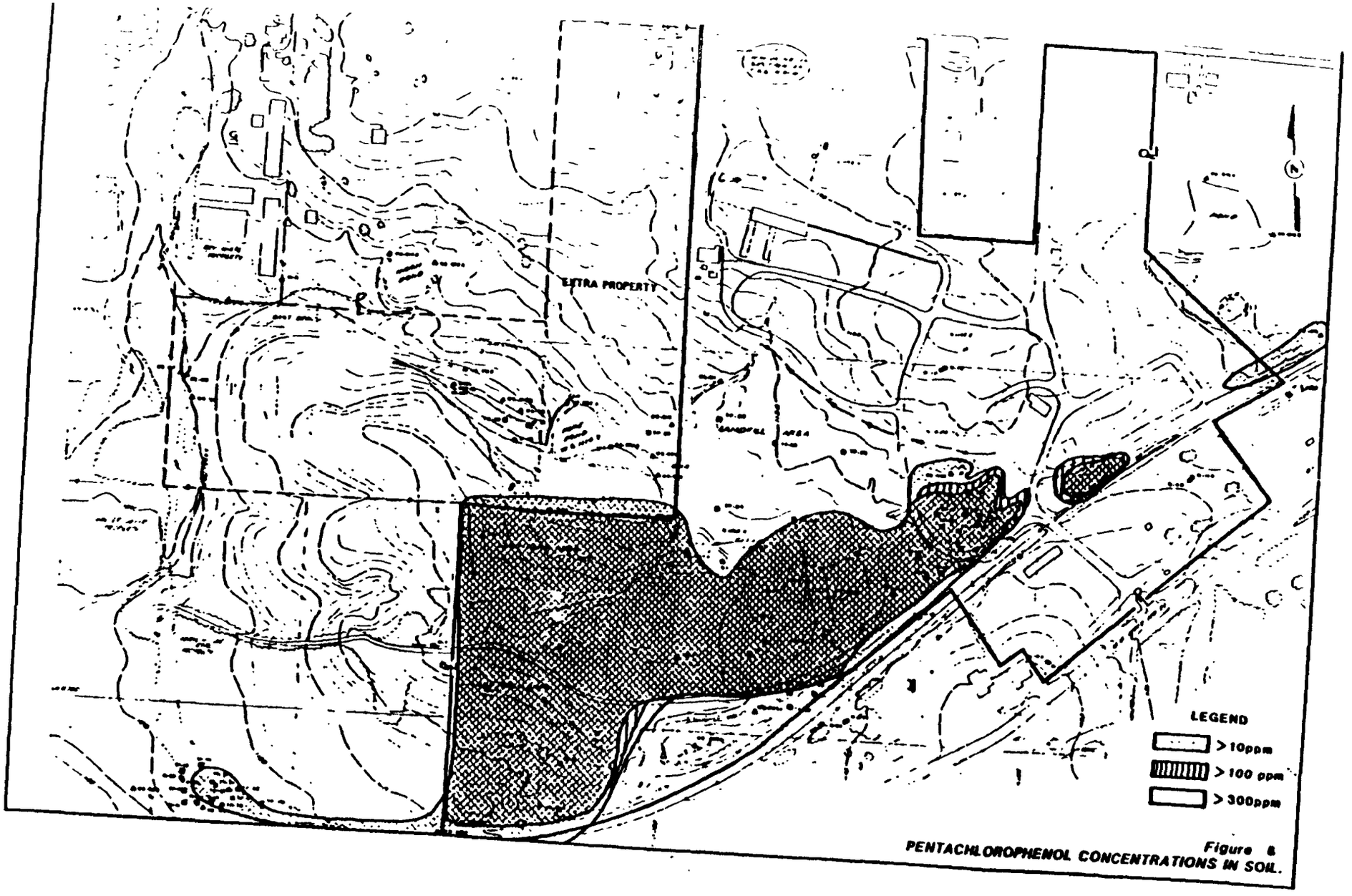


Figure 6
PENTACHLOROPHENOL CONCENTRATIONS IN SOIL.

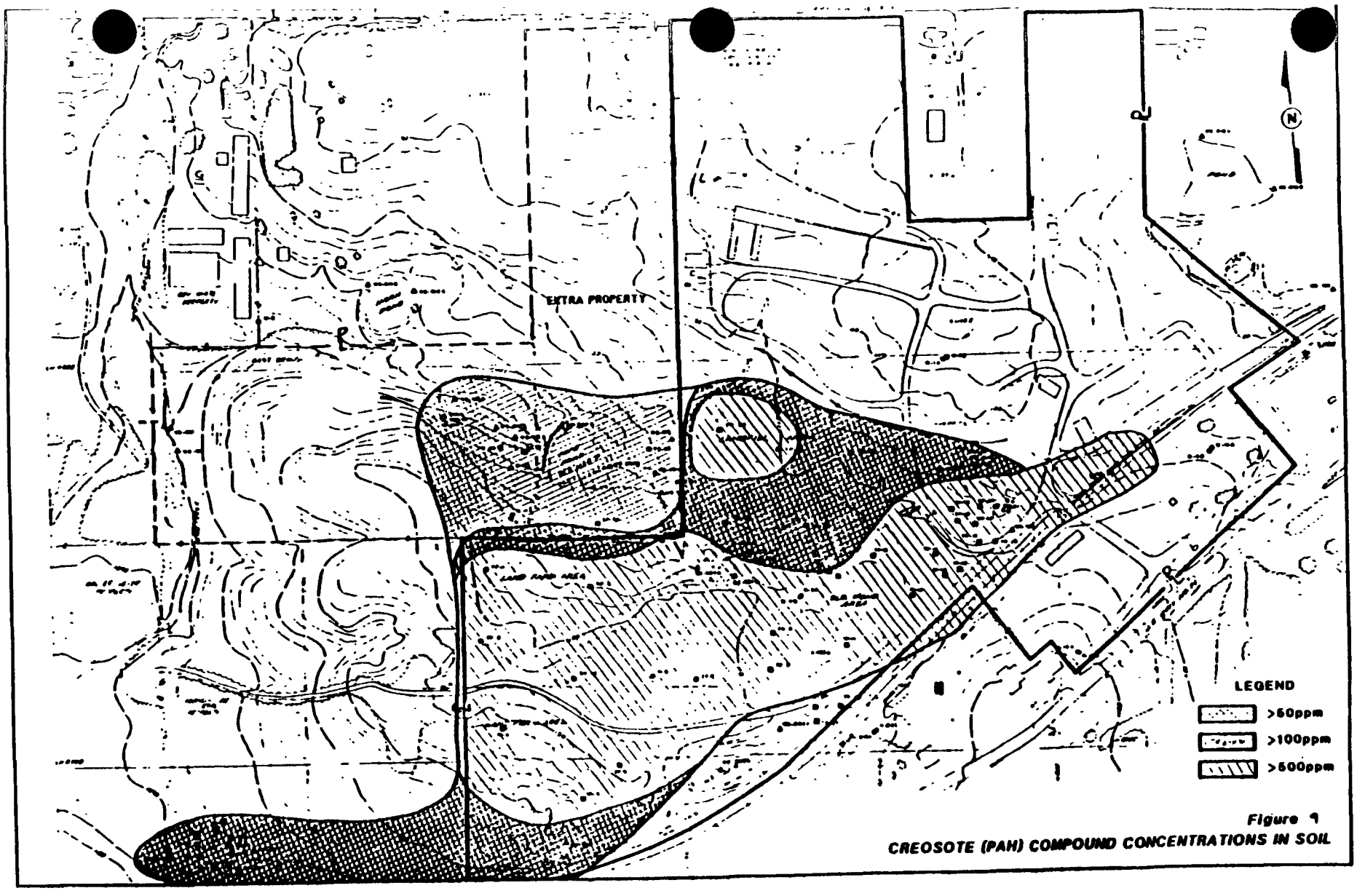


Figure 9
CREOSOTE (PAH) COMPOUND CONCENTRATIONS IN SOIL

Table

ARITHMETIC MEANS OF CONTAMINANTS (ppb), MID-SOUTH WOOD PRODUCTS SITE, 1984 SAMPLES

	Surface Water		Groundwater		Surface Soils (0-12")		Subsurface Soils		Sediments	
	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite
Arsenic	124	28	26*	7	5,450	3,290	3,360	3,880*	16,300	20,300*
Chromium, Total	341	14	27*	8	18,100	11,400	12,000	200*	22,900	24,600*
Fluoranthene	11	358	2,400	3	1,310,000	4,500	126,000	1,350	189,000	4,310
Pentachlorophenol	267	260	3,240	195	2,820,000	417	155,000	211	116,000	3,040
Pyrene	7	231	2,000	3	1,010,000	5,170	96,100	967	146,000	4,660
Acenaphthene	7	149	3,410	6	514,000	100	91,500	314	27,800	313
Acenaphthylene	ND	Tr	Tr	9	21,000	Tr	2,740	ND	48	20
Anthracene	ND	129	2,670	Tr	239,000	467	42,000	157	15,500	301
Benzo(a)anthracene	1	57	445	Tr	221,000	867	18,600	306	29,400	981
Benzo(a)pyrene	ND	Tr	ND	ND	23,500	Tr	Tr	49	905	264
Benzo(b)fluoranthene	2	38	259	Tr	180,000	1,100	9,360	189	37,200	1,180
Benzo(k)fluoranthene	2	38	1	Tr	180,000	317	9,400	89	35,600	761
Chrysene	1	56	429	Tr	231,000	1,580	16,400	343	39,700	1,080
Dibenzofuran	ND	94	905	2	125,000	ND	75,200	343	662	51
Fluorene	ND	185	2,870	3	336,000	Tr	94,600	183	13,700	103
2-Methylnaphthalene	ND	2	5,480	2	3,000	ND	109,000	2,320	824	879
Naphthalene	ND	ND	9,140	2	4,500	ND	188,000	31	1,290	24
Phenanthrene	ND	514	6,130	6	1,180,000	333	251,000	1,550	59,100	1,080

Data does not include As and Cr samples from CCA plant vicinity.

Tr - trace amount.

*Median value.

ND - Not detected.

Table 2

ARITHMETIC MEANS OF CONTAMINANTS (ppb), MID-SOUTH WOOD PRODUCTS SITE

CCA PLANT SITE AREA, 1985 SAMPLES

	Groundwater Well 14,15,16,17	Surface Soils (0 - 12")	Subsurface Soils
Arsenic	18	198	2
Chromium, Total	183	22	104
Fluoranthene	263	33,513	20,439
Pentachlorophenol	10,230	187,627	47,387
Pyrene	194	29,078	14,545
Acenaphthene	437	5,136	23,511
Acenaphthylene	ND	ND	ND
Benzo(a)anthracene	35	3,372	2,602
Benzo(b)pyrene	ND	1,215	786
Benzo(b)fluoranthene	ND	10,579	941
Benzo(k)fluoranthene	ND	1,801	770
Chrysene	37	5,527	2,985
Dibenzofuran	300	3,709	17,410
Fluorene	280	4,845	18,488
2-Methylnaphthalene	730	12,091	33,953
Naphthalene	2585	2,200	44,912
Phenanthrene	617	10,007	38,264
Anthracene	127	1,462	9,187

ND = Not Detected

The present physical condition of the site is unvegetated rolling topography which is subject to considerable soil erosion during rainfall events. Some temporary erosion control measures such as hay bale dikes and silt fences have been implemented by Hines Lumber, but with very limited success due to the large volume of sediment which erodes from the site. The presence of PCP (a potent herbicide) in the soil prevents the establishment of a vegetative cover under existing surface conditions. Given the present site conditions, there is ongoing migration of contaminated sediment and runoff from the site along with movement of contaminated groundwater and creosote compounds toward Moon Spring and Moon Creek. There also appears to be migration of surface runoff primarily from the CCA plant site to the east, toward Prairie Creek.

Pathways of migration from the contaminant sources onsite are by:

1) Surface drainage westward into Moon Creek;

2) Surface drainage eastward into Prairie Creek;

3) Subsurface (groundwater) movement westward to Moon Creek; and

4) Subsurface (groundwater) movement southwestward and eastward from the CCA plant.

There are no known drummed or liquid hazardous wastes on the Mid-South site other than about 270 drums of investigation derived wastes (contaminated water, disposable clothing and drilling wastes) from the RI and SRI field work. This material will be incorporated into the remedial action for the site.

Future Effects of Contaminants

Of the contaminants found on the site, six are recognized as carcinogens or suspected carcinogens. These are: arsenic; benzo(a)pyrene; benzo(a) anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; and chrysene. Additional contaminants of concern for toxic effects are chromium, naphthalene, and pentachlorophenol. The health and environmental effects of these compounds are addressed in the Endangerment Assessment Report (EPA, 1985).

Without some change in the physical condition of the site, the migration of contaminants will continue westward into Moon Creek and eastward toward Prairie Creek. Access to the site is presently unrestricted and the current industrial operation allows worker access to the site on a daily basis.

The Endangerment Assessment (EPA, 1985) evaluated the potential public health impacts of the current site conditions (taking no remedial action) on individuals under industrial and residential scenarios. These scenarios were established to simulate existing conditions (industrial) and possible

worst case, future conditions (residential) for the site. Table 3 summarizes the results of the endangerment assessment evaluations. This table presents a summary for potential carcinogen impacts (increased cancer risk) and potential noncarcinogen impacts (exceedence of allowable daily intake rates) by exposure to contaminated media. The information presented in the Endangerment Assessment supported the following objectives for remedial action.

Objectives for Remedial Action

The potential health risks identified for the Mid-South site are based upon contact with or ingestion of the contaminated soil and groundwater which contain arsenic and creosote compounds. If the source of contamination is removed or controlled, such that ingestion or contact is no longer possible, then the endangerment to human health and the environment is reduced to acceptable levels. Therefore, the following specific remedial objectives were selected for the Mid-South site.

- Minimize the threat to public health from the ingestion of or contact with onsite contaminated soil;
- Minimize the threat to public health from direct ingestion of shallow groundwater, both onsite and downgradient;
- Minimize erosion of contaminated soil and offsite migration to protect public health and environmental quality;
- Minimize leaching of contaminants into surface water and groundwater; and
- Identify cost effective alternatives for remediation of the site.

Endangerment Assessment (EPA 1985) concluded that the current site conditions present a potential threat to the public health and the environment.

ENFORCEMENT

EPA has identified two Potentially Responsible Parties (PRPs) namely, Edward Hines Lumber Co., Inc. (Hines) and Mid-South Wood Products of Mena, Inc. (Mid-South). EPA sent Notice Letters to Hines and Mid-South on March 18, 1982, offering them an opportunity to conduct the site investigations. EPA negotiated with the parties for voluntary action; however, no agreement was reached.

On August 8, 1985, EPA sent Notice Letters to Hines and Mid-South informing them of the completion of the remedial investigation/feasibility study (RI/FS) and EPA's intent to take remedial action at the site. However, on August 14, 1985, EPA decided to delay its decision on a remedy due to potential contamination problems resulting from the operation of the CCA wood treatment facility (an area which had not been

Table 3

POTENTIAL IMPACT SUMMARY OF THE NO-ACTION ALTERNATIVE[1]

MID-SOUTH WOOD PRODUCTS SITE

Onsite Media	Pathway	Industrial Scenario	Residential Scenario
Surface Soil	Ingestion	Potential increased cancer risk ADI[2] exceeded	Potential increased cancer risk ADI exceeded
Dust	Inhalation	No potential health threat	No potential health threat
Subsurface Soil	Ingestion	No potential health threat	Potential increased cancer risk ADI not exceeded
Groundwater	Ingestion	No potential health threat	Potential increased cancer risk ADI exceeded[3]
Surface Water	Dermal Absorption	Potential increased cancer risk	Potential increased cancer risk
Sediments	Ingestion	Potential increased cancer risk ADI not exceeded	Potential increased cancer risk ADI not exceeded

[1] Source: EPA, 1985 Endangerment Assessment, Mid-South Wood Products Site.

[2] ADI: Allowable Daily Intake (for noncarcinogens only).

[3] Assumes residential wells onsite - no potential health threat if public water supply provided.

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investigated during the original RI/FS activities. EPA performed a supplemental investigation during the winter of 1985. On April 17, 1986, EPA sent Notice Letters to Hines and Mid-South informing them of the completion of all RI/FS activities and its intent to take remedial action.

On May 8, 1986, EPA held a Public Hearing in Mena, Arkansas to discuss with local residents the remedies being considered for the Mid-South site.

Subsequent to the completion of the RI/FS, EPA has held several meetings with the PRPs to discuss remedial action. On April 24, 1986, a meeting was held in Dallas to discuss the Feasibility Study Report. On June 5, 1986, EPA met with the PRPs and listened to their proposal for remedial action. On September 9, 1986, EPA received a remedial action work plan from the PRPs. EPA and the PRPs met on September 17, 1986, to discuss this proposal. Based on the comments provided by EPA during the meeting and summarized in a letter sent to the PRPs on September 19, 1986, a revised proposal was received by EPA on October 7, 1986.

ALTERNATIVES EVALUATION SUMMARY

Based on the remedial investigation and endangerment assessment findings, remedial action alternatives were developed from a list of applicable remedial technologies to address the hazards posed by the site. Contaminants are found in the site surface soils, surface sediments and surface water and the groundwater beneath the site. Alternatives were developed to address the contaminants in all media.

Table 4 presents a list of the remedial technologies (grouped by response action) that were considered as potentially viable solutions for the Mid-South site. Descriptions of the remedial technologies considered applicable are summarized below.

Table 4
POTENTIAL REMEDIAL TECHNOLOGIES

Response Action	Remedial Technology
Containment	Capping, containment barrier, stabilization
Source Removal	Excavation and backfill, on-site landfill, offsite landfill
Source Treatment	Incineration, leaching/biotreatment, landfarming
Groundwater Remediation	Groundwater recovery, groundwater treatment

Other Responses	Fencing, regrading, topsoil addition and seeding (cover), deed restrictions, alternate water supply

In EPA's Feasibility Study Report cleanup action levels were derived to limit exposure to contaminated soils. Those contaminants most prevalent at the site and of the greatest concern form a public health standpoint were the carcinogenic PAHs and arsenic. Arsenic does not have a cleanup standard; therefore, the concentrations found in numerous background samples were evaluated and cleanup level was established for arsenic at 3 ppm (the mean background level).

Carcinogenic PAHs also do not have a simple concentration promulgated as a cleanup standard. Therefore, EPA must select a cleanup level relative to a desired excess lifetime cancer risk level. Using a model which was developed by EPA's Carcinogen Assessment Group, the cancer risk levels corresponding to a target range of 1x10-4 to 1x10-8 were generated. EPA selected a 1x10-6 value of 300 ppb as the cleanup level for total carcinogenic PAHs.

Due to the fractured nature of the bedrock below the site, it was determined that groundwater cleanup would be best accomplished with large surface area, french-drain type recovery systems. These systems should collect the majority of contaminated groundwater leaving the site. All contaminated surface waters will be treated prior to discharge.

Potential alternatives were screened using relative rating scales based on cost estimates, effects on public health and the environment, and accepted engineering practices. A summary of the screening is presented in Table 5. The alternatives retained after the screening process included:

- Onsite Landfill
- Multi-Layer Cap
- Topsoil-Clay Cap
- Soil Treatment
- Combined Excavation/Capping
- Groundwater Recovery/Treatment

Based on the information developed during the Mid-South investigation six remedial alternatives were evaluated as being feasible to eliminate or minimize the environmental or public health threat posed by the Mid-South site.

Each alternative was then developed in more detail and evaluated based on total present worth costs, public health effects, environmental effects, technical considerations and institutional concerns. Table 6 presents a summary of the detailed alternative evaluation.

Table 5
PRELIMINARY REMEDIAL ALTERNATIVE SCREENING
SUMMARY TABLE

Alternative	Associated Technologies	Results of Screening
1. No Action	None	Screened out - lack of contaminant control Retained for comparison purposes only
2. Limited Action	Fencing, monitoring, deed restrictions, alternate water supply	Screened out - lack of contaminant control
3. Capping		
a. Topsoil-Clay Cap	Cap with topsoil and clay, fencing, monitoring, deed restrictions	Retained
b. Multi-Layer Cap	Cap with topsoil, clay & synthetic liner, fencing, monitoring, deed restrictions	Retained
4. Cap & Containment Barrier	Cap with topsoil and clay, groundwater barrier, fencing, monitoring, deed restrictions	Screened out - does not provide significant additional containment for additional costs due to bedrock fracturing
5. Soil Treatment	Excavation, chemical leaching, biodegradation	Retained - responsible party alternative
6. Onsite Landfill	Excavation, backfill, landfill construction, fencing deed restrictions, monitoring	Retained
7. Offsite Landfill	Excavation, backfill, offsite transportation	Screened out - does not provide additional benefits over onsite landfill for additional costs Retained for comparison purposes only
8. Onsite Incineration	Excavation, mobile incineration	Screened out - costs high without increased comparable benefits
9. Combined Excavation/ Capping	Excavation, onsite landfill, topsoil-clay cap fencing, monitoring, deed restriction	Retained
10. Groundwater Removal/Treatment	French drain, carbon filtration, acid leaching of metals	Retained

Table 6
SUMMARY OF DETAILED EVALUATION OF REMEDIAL ALTERNATIVES

Alternative	Present Worth Cost ($) Construction	Present Worth Cost ($) O&M	Public Health Considerations	Environmental Considerations	Technical Considerations	Institutional Considerations
1. No Action	Not applicable	Not Applicable	Continued potential for direct contact or ingestion	Continued potential for surface and groundwater contamination with associated biotic impacts	Not effective	Continued contact hazard requiring input from agencies to deal with problems.
2. Topsoil-Clay Cap	2,819,000	83,240	Removes direct contact hazard	Wastes isolated but not destroyed. Reduces migration pathways	Demonstrated technology Continued maintenance Less infiltration protection than multi-layer cap	Prohibits use of land area Requires deed restrictions Continued monitoring
3. Multi-Layer Cap	3,826,000	83,240	Removes direct contact hazard.	Wastes isolated but not destroyed. Reduces migration pathways	Demonstrated technology. Continued maintenance Provides greater protection from infiltration than topsoil-clay cap	Prohibits use of land area Requires deed restrictions Continued monitoring
4. Onsite Landfill	5,586,000	127,250	Removes direct contact hazard. No transportation risk	Wastes isolated but not destroyed	Demonstrated technology. Continued maintenance and treatment of leachate possibility for system failure	Continued monitoring Requires deed restrictions Prohibits use of land area
5. Soil Treatment	4,000,000 to 8,000,000 (Approximate)	Not applicable	Reduces direct contact hazard	Organic wastes reduced Inorganics not treated	Undemonstrated technology Process failure is possible. Continued monitoring of effluent Inorganics not treated	Undemonstrated technology may affect the acceptability of the process
6. Combined Excavation/ Capping	4,698,000	122,750	Reduces direct contact hazard.	Wastes isolated but not destroyed. Reduces migration pathways	Demonstrated technology Continued maintenance Contains most contaminated waste	Requires deed restrictions Continued monitoring Prohibits use of land area

Table 6 Cont'd
SUMMARY OF DETAILED EVALUATION OF REMEDIAL ALTERNATIVES

Alternative	Present Worth Cost		Public Health Considerations	Environmental Considerations	Technical Considerations	Institutional Considerations
	Capital	OGM				
7. Groundwater Recovery/Treatment	1,643,000	1,865,000	Reduces onsite groundwater contaminants, reduces ingestion hazard	Minimizes migration of waste to surface water via groundwater pathway	Demonstrated technology. System failure possible, continued maintenance, does not treat all contaminants	Continued monitoring of effluent

Development of Remedial Alternatives

The technologies listed above represent an assemblage of potential technologies that could be implemented in various combinations to remediate the hazardous waste problems at the Mid-South site. Each technology is applicable for a specific function as part of a remedy and, as such, represents a portion of the overall remedial action that is necessary at the site. Where two similar technologies were applicable (and acceptable) for a single alternative, the lower cost technology was selected.

The Mid-South site presents two media of concern: contaminated surface soil/sediments and contaminated groundwater. To develop potential remedial alternatives for these media, the screened technologies were combined to encompass a range of possible alternatives for this site.

Each alternative, except for No Action and Groundwater Recovery/Treatment, addresses contaminated soil media (including the small volumes of contaminated surface water) to varying extents. The Groundwater Recovery/Treatment alternative as modified, was determined to be the only possible, effective alternative for direct groundwater remediation and is presented separately. This alternative can be combined with any of the other alternatives depending on the desired level of remediation and cost of implementation.

For all alternatives, except for the No Action alternative, the remedial investigation-derived wastes, described previously will be disposed of by batch treatment onsite. Contaminated fluid will be treated in the groundwater treatment unit and solids will be incorporated with solids being disposed of under the chosen site remedy. Emptied barrels will be cleaned and salvaged. For the no action alternative, the barrels will be left onsite. For this small amount of waste, alternative evaluations will not be made and the same cost is assumed to be additive to each alternatives. Based on initial estimates, the disposal cost has been estimated to be approximately $10,000.

In addition, remedial actions for the CCA plant will be necessary to control further releases of arsenic and chromium from the plant via runoff. The drip pad (see Figure 10) has a surface area of approximately 22,000 square feet and during the first hour of a 25-year, 24-hour storm (0.3 inches/hour in Mena) approximately 4,000 gallons of runoff will be produced from the drip pad. The pad is sloped toward the collection trench and plant sumps to collect the runoff. An open stormwater storage tank exists, however, the volume of the plant sumps and stormwater storage tank are not maintained to contain 4,000 gallons of runoff in the event of a storm. Under current operation, the stormwater pump must be turned on manually to function. As a result, much of the contaminated runoff is released to the environment by overflow of the stormwater sump into the adjacent ditch and overflow sump. In addition, the pad is not completely curbed and open joints and cracks exist in the concrete providing additional pathways for migration.

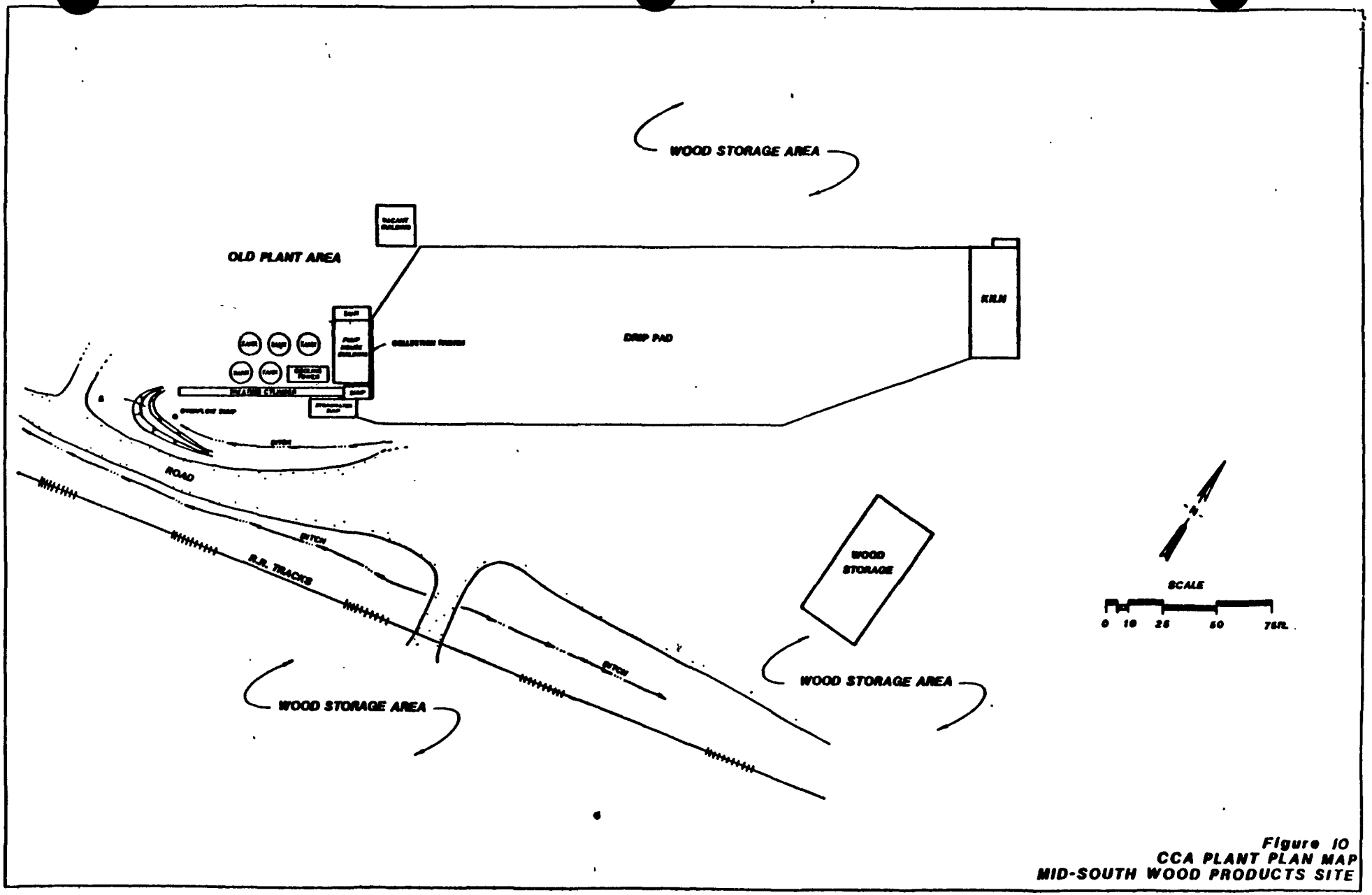

Figure 10
CCA PLANT PLAN MAP
MID-SOUTH WOOD PRODUCTS SITE

To remedy the CCA plant releases, better stormwater containment must be installed and properly operated. The actual volume of stormwater to be collected will be established based on state or federal regulatory limitations placed on the quality of the water leaving the plant. For estimation purposes, the first hour of a 25-year, 24-hour storm (4,000 gallons) is assumed. Under average rainfall conditions this stormwater would be expected to be heavily contaminated. A stormwater storage tank could be connected to the existing stormwater sump by a system composed of a level actuated pump designed to cutoff when the storage tank becomes filled. The water in the tank should be used as makeup water for the CCA process or run through a water treatment system prior to discharge.

To contain runoff on the drip pad, the drip pad should be curbed along its entire perimeter. A 6-inch high by 8-inch wide concrete curb will be substantial enough to remain intact and provide the needed drainage control. Protection against infiltration through the drip pad can be enhanced by sealing all existing joints and cracks in the concrete.

To implement this alternative for stormwater control at the CCA plant, it is estimated that the cost would be approximately $12,500. This cost will be additive to any selected remedial action undertaken at this site.

Description of Alternatives

Upon completion of the screening process, a set of remedial alternatives was assembled to address the remedial needs of the Mid-South site. The assembled alternatives were selected to demonstrate a reasonable range of remedial actions which are applicable to the Mid-South site and which are based upon technical implementability and environmental suitability within the limits of the specified objectives. The Groundwater Recovery/ Treatment alternative addresses only groundwater remediation within the shallow bedrock, and can be combined with any of the other alternatives, as deemed necessary by the EPA.

A summary of the results of the detailed evaluation of retained alternatives is presented in Table 6. Brief discussions of these final alternatives are presented in the following sections of this document.

Alternative 1 No Action

Section 300.68(f) of the NCP specifies that the "No Action" alternative be evaluated. Under this alternative, no remedial action would be implemented at Mid-South. Section 300.68(g)(3) states:

> "Those alternatives that do not effectively contribute to the protection of public health and welfare and the environment shall not be considered further."

The absence of remedial action would allow for long term erosion of the site due to wind and precipitation. The following threats to public health and the environment would be posed if no remedy was implemented at the site:

- Direct contact with surface soils;
- Migration due to surface water runoff;
- Fugitive dust emissions;
- Migration due to leaching and subsequent groundwater contamination.

Because the risks to public health and the environment associated with the "No Action" alternative are unacceptable, this alternative is eliminate from consideration.

Alternative 2 Excavation with Onsite Landfill

This alternative includes the construction of an onsite landfill that complies with provisions of RCRA and State of Arkansas regulations (See Figures 12, 13 & 14). It has been stated by Hines Lumber Company that they own a sufficient amount of property adjacent to the site for construction of a landfill; therefore, it was assumed that no extra property needs to be purchased and that a sufficient amount of fill material is available on the adjacent property. This alternative includes the following operations:

- Excavation of onsite and offsite contaminated soils;
- Dust control;
- Backfill and grading of the site;
- Construction of an onsite landfill;
- Waste placement in the landfill;
- Fencing of landfill area; and
- Implementation of groundwater monitoring and deed restrictions.

The total volume to be removed is approximately 80,000 cubic yards. Figure 11 shows the extent of total contaminated soils to be excavated which would meet the above criteria.

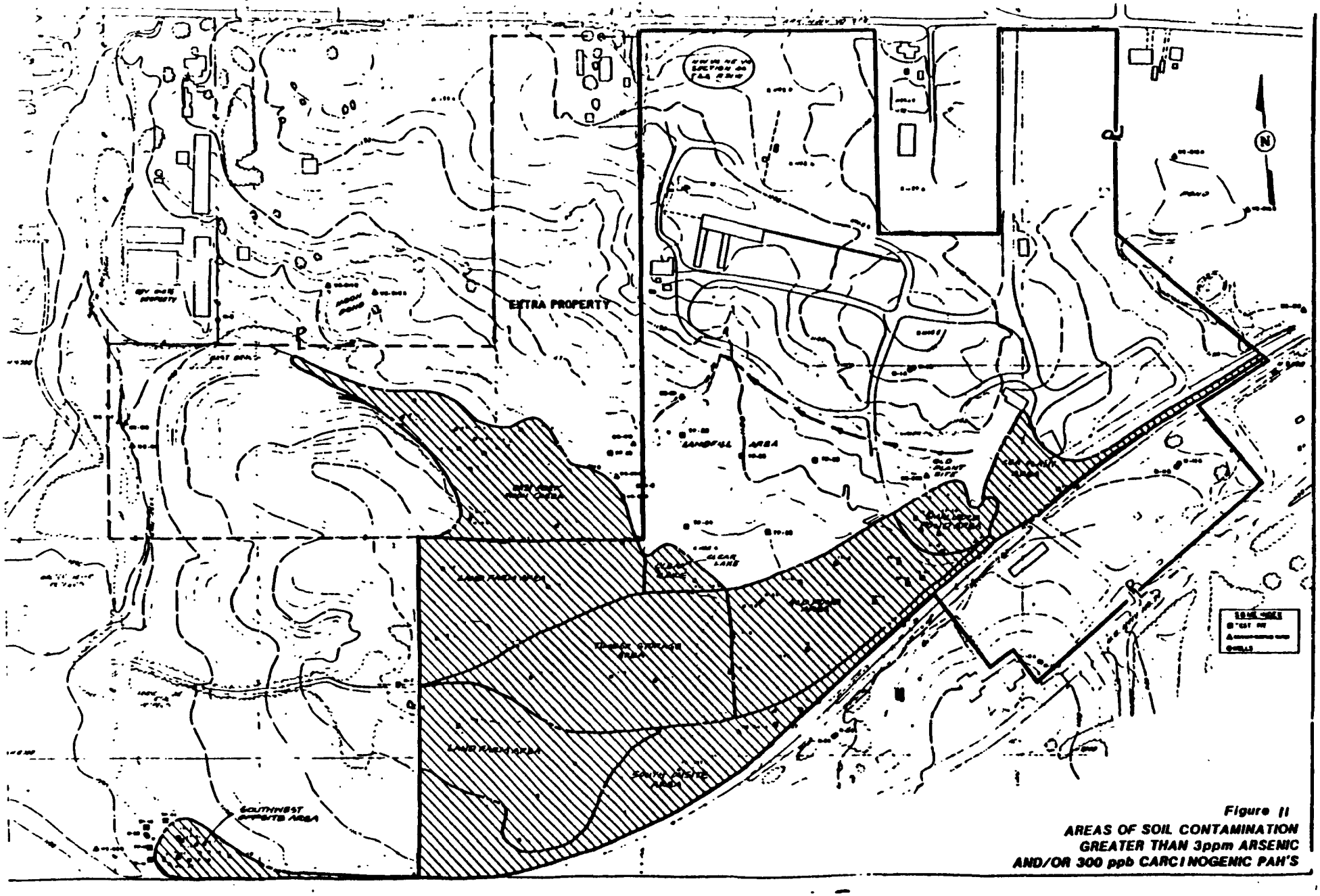

Figure 11
AREAS OF SOIL CONTAMINATION
GREATER THAN 3ppm ARSENIC
AND/OR 300 ppb CARCINOGENIC PAH'S

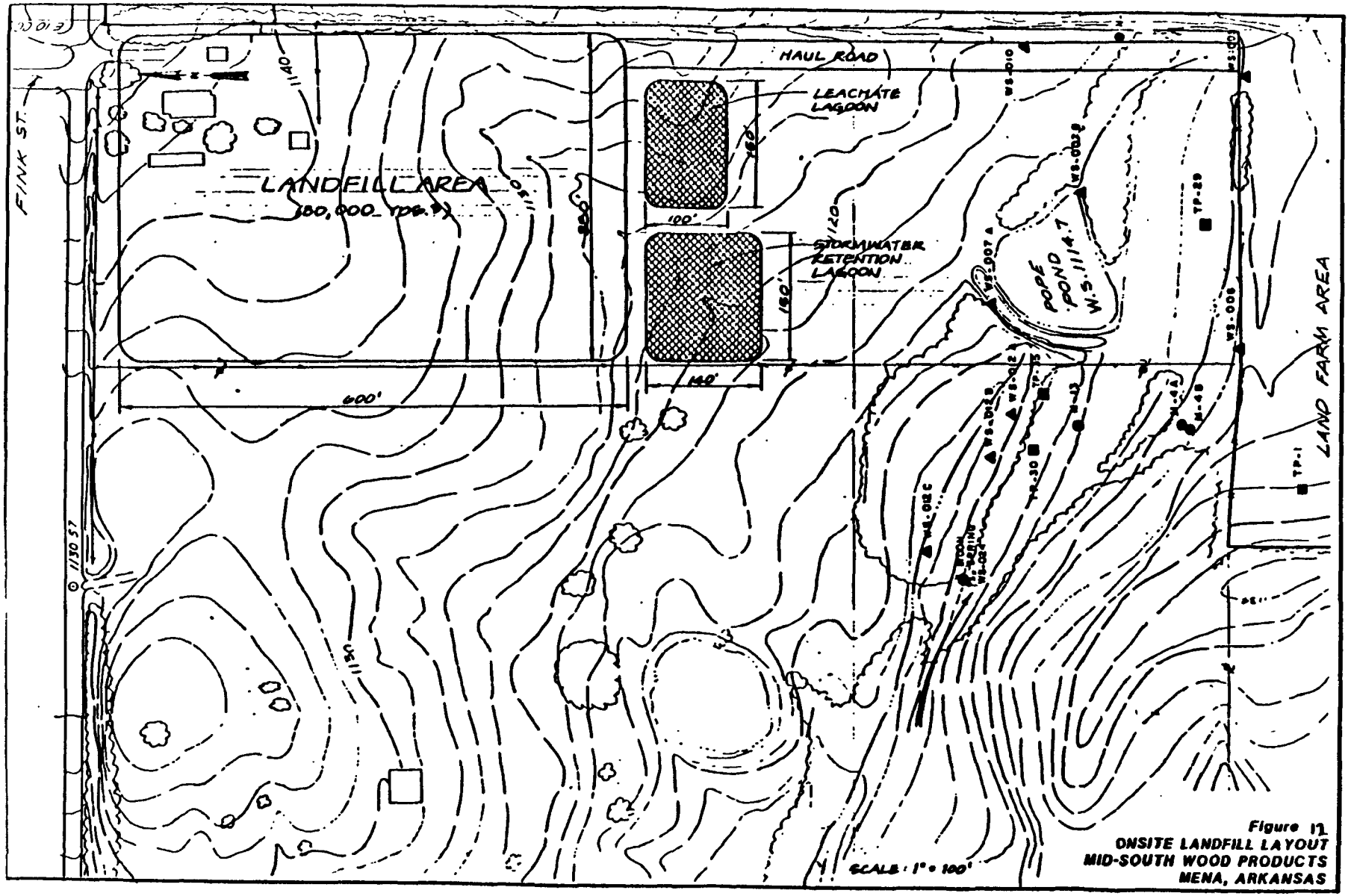

Figure 12
ONSITE LANDFILL LAYOUT
MID-SOUTH WOOD PRODUCTS
MENA, ARKANSAS

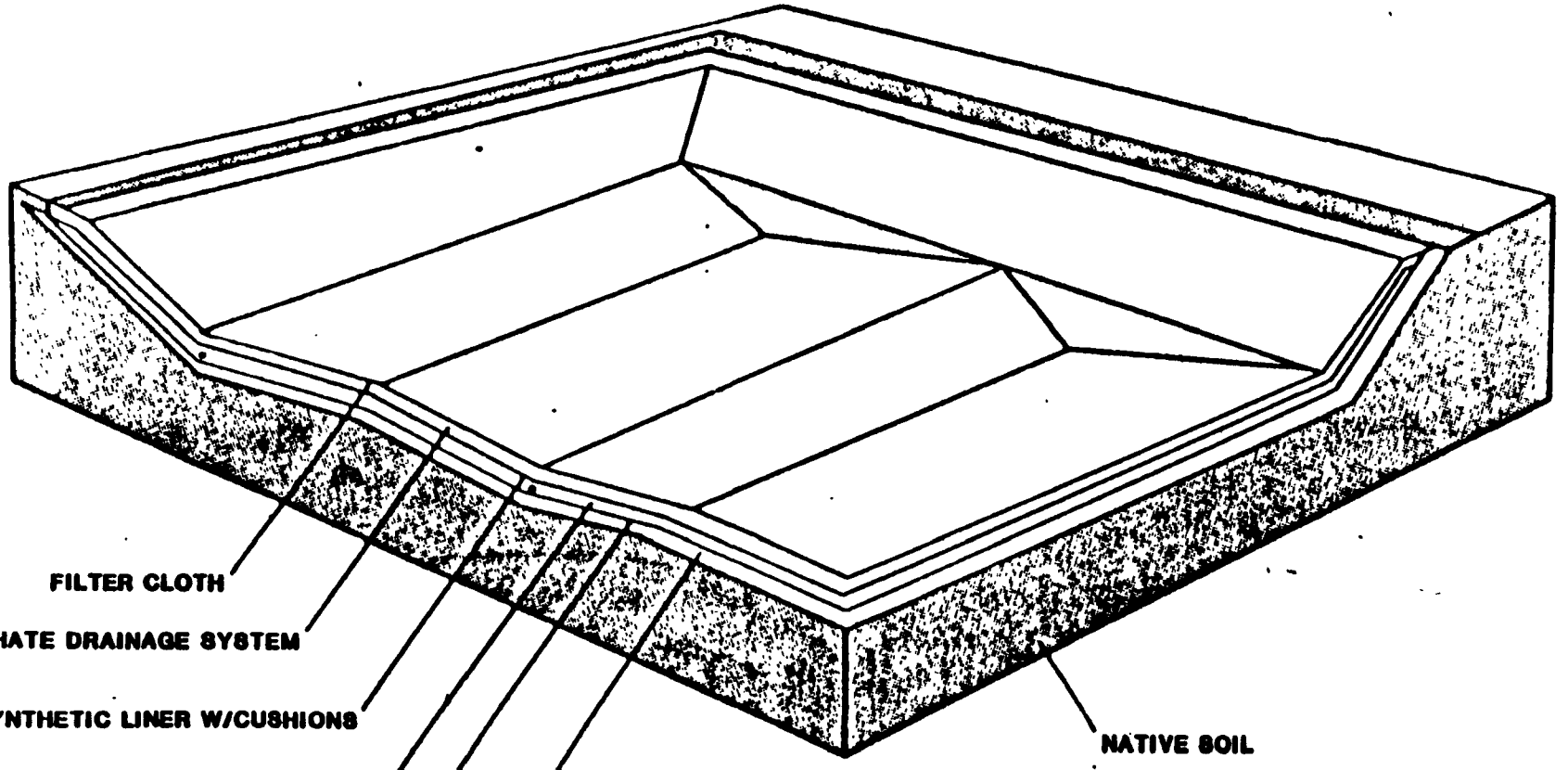

Figure 13
ONSITE LANDFILL DOUBLE LINER
MID-SOUTH WOOD PRODUCTS
MENA, ARKANSAS

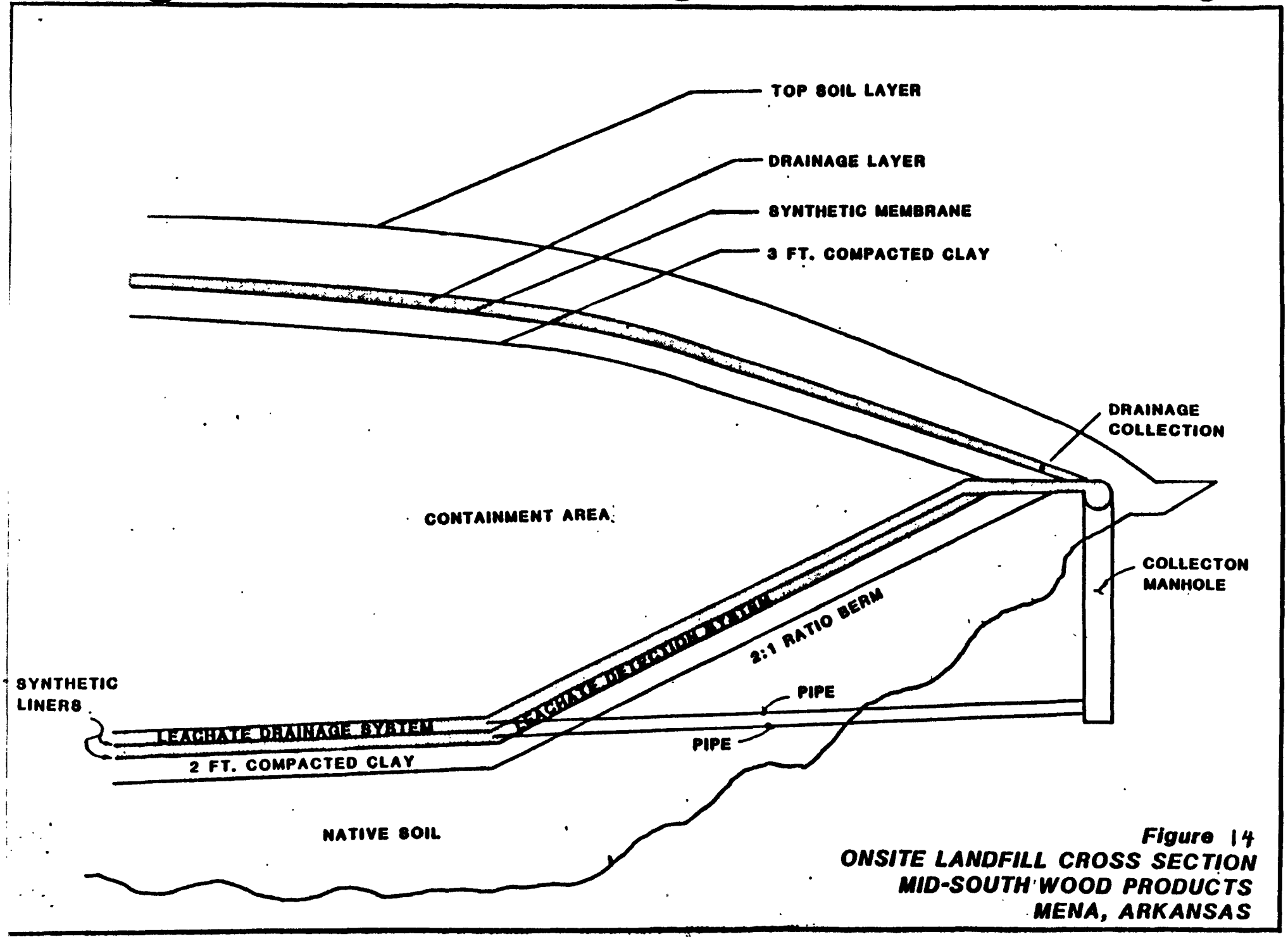

Figure 14
ONSITE LANDFILL CROSS SECTION
MID-SOUTH WOOD PRODUCTS
MENA, ARKANSAS

Alternative 3 Multi-Layer Cap

This alternative includes the excavation of wastes and contaminated soil from areas onsite and consolidation onto the main portion of the site. An area of 20 acres will be covered by a multi-layer RCRA cap system (See Figure 15). Site security will be implemented by including fencing, signs, and regular inspections. Groundwater monitoring will also be performed. This alternative includes the following operations:

- Excavation of onsite contaminated soils adjacent to the CCA plant and in the Moon Creek drainageway;
- Excavation of offsite contaminated soil;
- Site grading;
- Construction of a cap and cover system;
- Groundwater monitoring;
- Fencing of site and deed restriction.

Alternative 4 Topsoil-Clay Cap

This remedial alternative has been included in the detailed evaluation as an alternative which will meet the remedial objectives of the Mid-South site and is a RCRA compliant cap alternative. The primary difference from the multi-layer cap is the deletion of the synthetic membrane. All other components of the alternative will be the same as discussed for the multi-layer cap.

This alternative will allow additional potential infiltration through the cap and into the contaminated soil, however, the calculated reduction of infiltration is still over 70 percent as compared with the present conditions at the site.

This alternative includes the excavation of wastes and contaminated soil and consolidation onto the main portion of the site as described for the multi-layer cap alternative. The entire site area of 20 acres will be covered by a topsoil-clay cap system. Site security will be implemented by including fencing, signs, and regular inspections. Groundwater monitoring will also be performed. This alternative includes the following operations:

- Excavation of contaminated soils adjacent to the CCA plant and in the Moon Creek and southwest drainageway;
- Excavation of offsite contaminated soils;
- Site grading;
- Construction of a cap and cover system;
- Groundwater monitoring;
- Fencing of site and deed restriction.

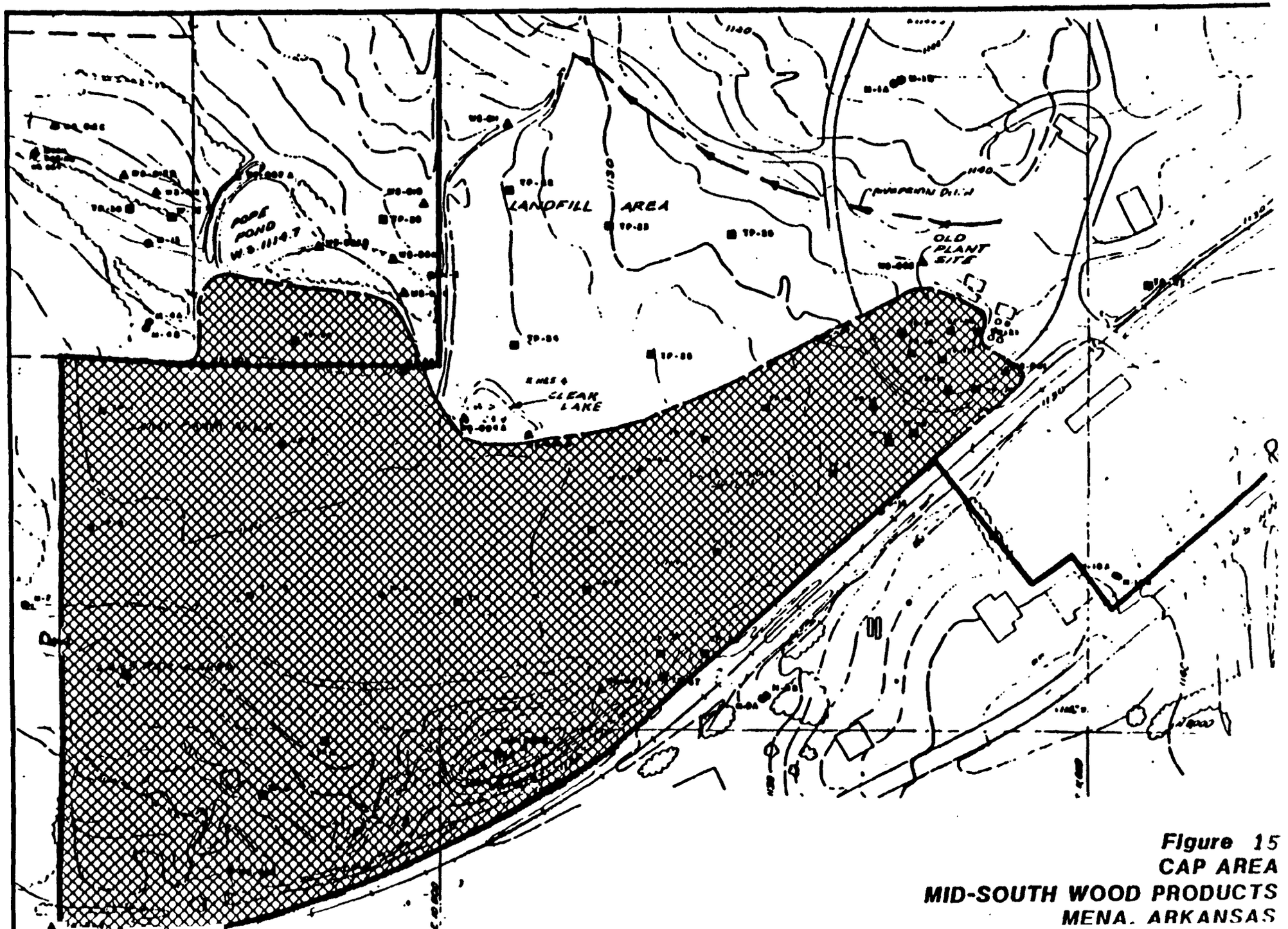

Figure 15
CAP AREA
MID-SOUTH WOOD PRODUCTS
MENA, ARKANSAS

Alternative 5 Soil Treatment

This remedial alternative (See Figure 16) along with groundwater recovery and treatment was been inferred as the preferred alternative of Hines Lumber Company throughout the preparation of the Feasibility Study Report. As previously mentioned, both alternatives have been investigated by the consultants for Hines. This combination would include the following operations:

- Excavation of contaminated soil;
- Dust control;
- Leaching of organic contaminants;
- Biological degradation of leachate;
- Discharge of effluent to surface drainage.

Alternative 6 Groundwater Recovery/Treatment

This alternative is designed to recover contaminated groundwater from six contaminated locations throughout the site and treat the water to acceptable levels so that it can be discharged.

The contaminated groundwater would be recovered by means of six french-drains as shown on Figure 17. Three of these systems have been partially installed by Hines Lumber; however, RW-1 is improperly oriented. Further, RW-2 needs to be lengthened, northward to intercept groundwater flowing around this drain. French-drains built as shown in Figure 18 should be located as indicated in Figure 17 for RW-1 (new alignment), RW-2 (extension), RW-4, RW-5, and RW-6. The design pumping rate of each french-drain would need to be determined after actual installation, but for cost comparison, each system has been sized for 5 gpm.

The treatment system incorporates the following unit operations and processes: flow equalization, batch chromium reduction followed by arsenic and chromium oxidation, precipitation, sedimentation, sand filtration, carbon adsorption, and sludge dewatering. A schematic of the treatment train is provided on Figure 19.

Alternative 7 Combined Excavation/Capping

Implementation of this alternative includes: excavation and onsite landfilling for contaminated soil and rock from the Old Pond, Small Old Pond, and CCA Plant portion of the site; and a topsoil-clay cap for the landfarm area. This alternative was developed to utilize source removal (excavation) for the heavily contaminated areas, which exists over a major geologic fault. The Landfarm area, which presents a primary threat through surface runoff contamination would be capped with a topsoil-clay cap. This alternative includes the following operations:

- Excavation of the contaminated soil and rock as noted above;
- Excavation of the contaminated soils to the southwest and northwest along East Fork Moon Creek and placement on the Landfarm area to be capped;

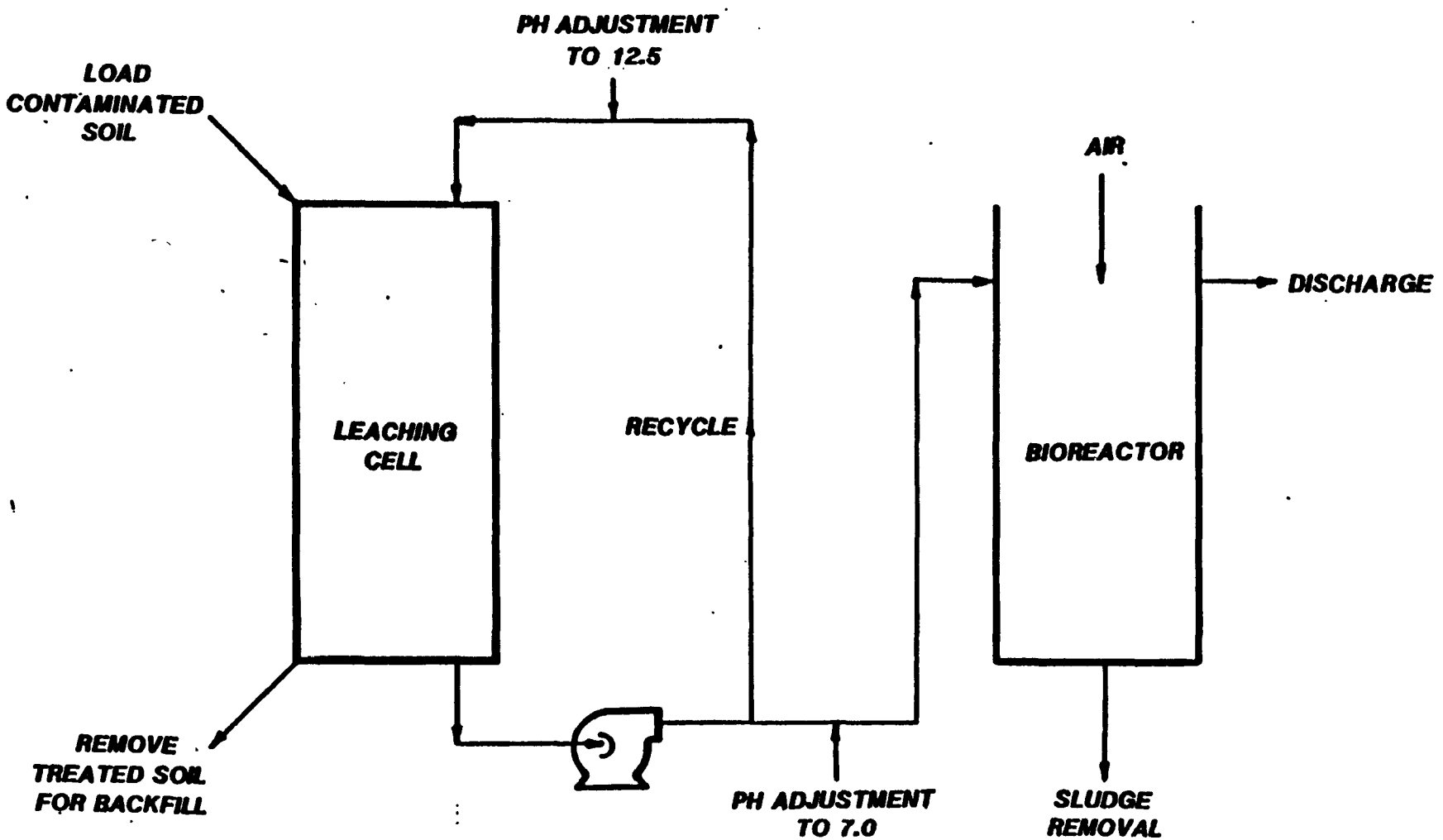

Figure 16
FLOWSHEET FOR LEACHING AND BIOTREATMENT
MID-SOUTH WOOD PRODUCTS SITE
MENA, ARKANSAS

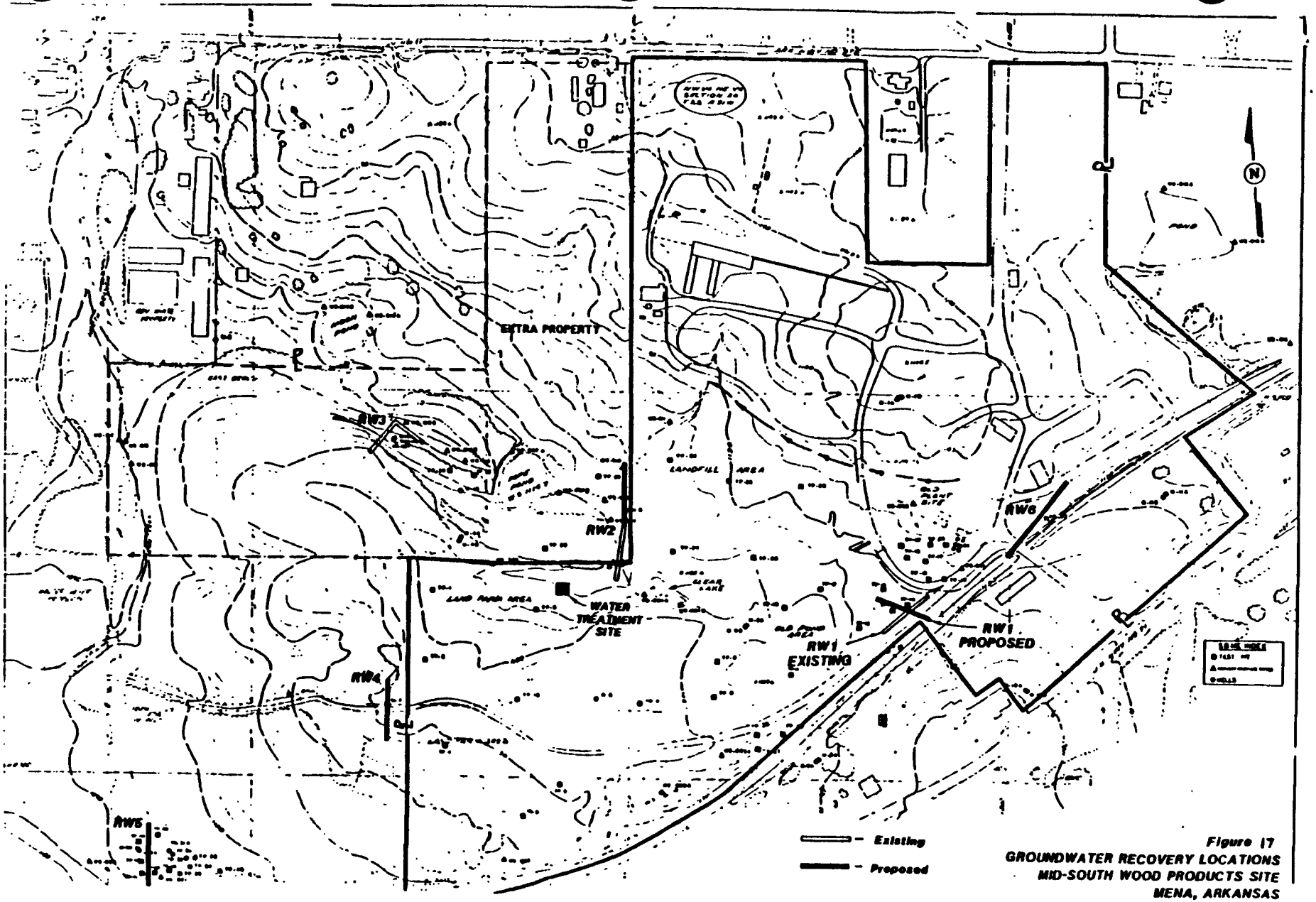

Figure 17
GROUNDWATER RECOVERY LOCATIONS
MID-SOUTH WOOD PRODUCTS SITE
MENA, ARKANSAS

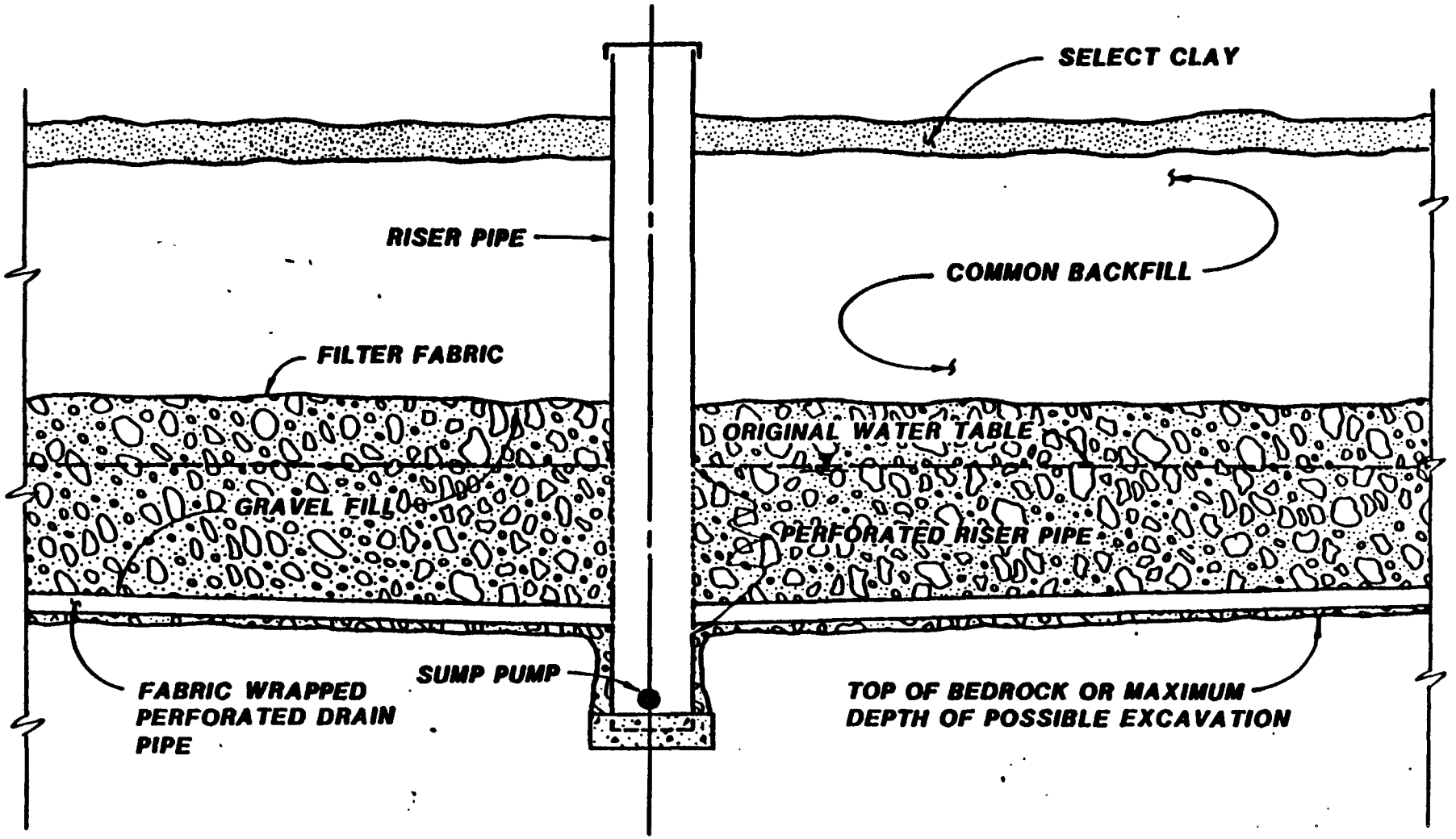

Figure 18
CROSS-SECTION OF PROPOSED
GROUNDWATER RECOVERY SYSTEM

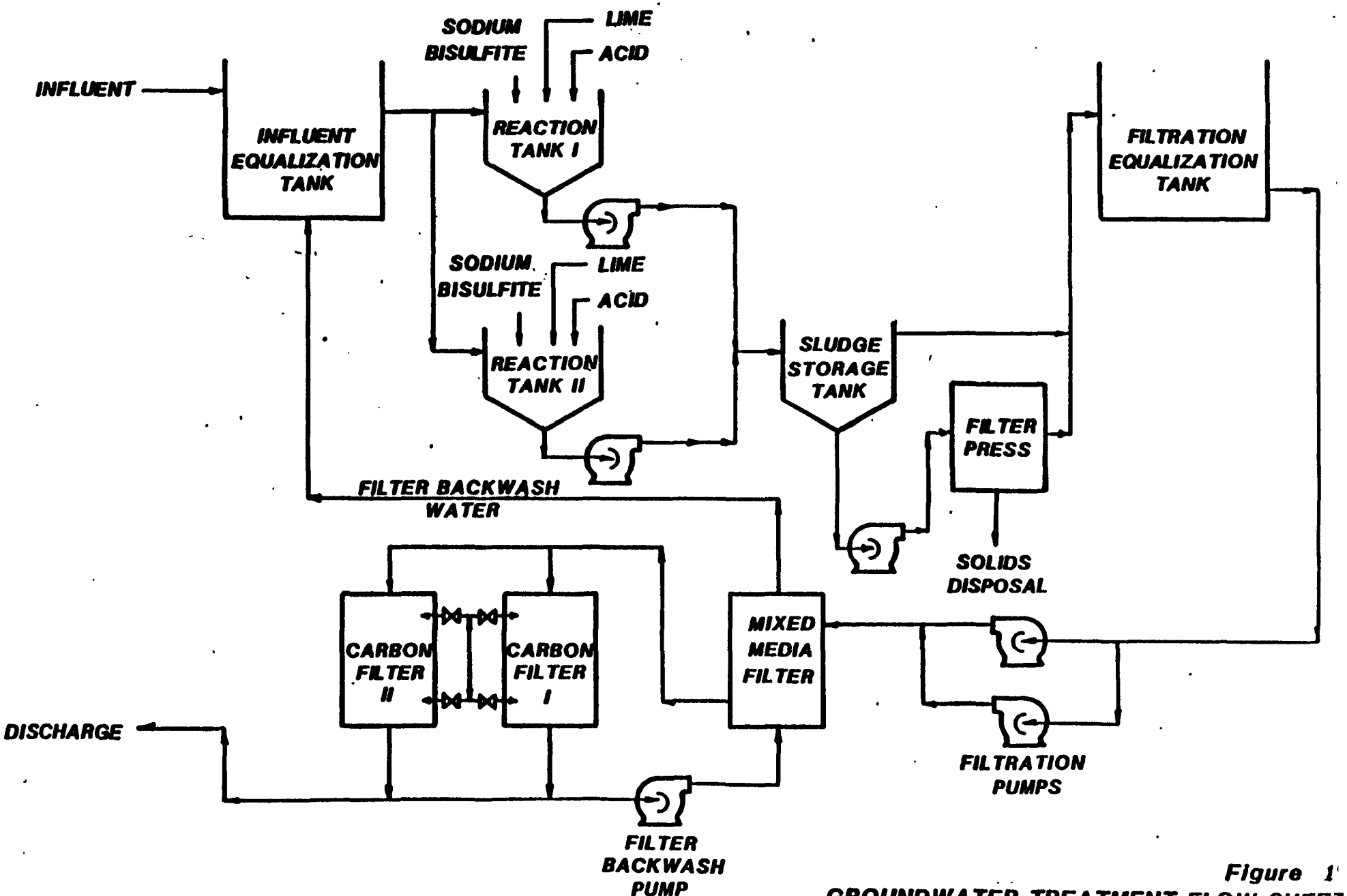

Figure 1
GROUNDWATER TREATMENT FLOW SHEET
MID-SOUTH WOOD PRODUCTS SITE
MENA, ARKANSAS

- Excavation of any contaminated soils offsite to the Northeast;
- Construction of a RCRA-compliant landfill;
- Backfill, grading and seeding of the excavated areas;
- Construction of topsoil-clay cap over the Landfarm area;
- Groundwater monitoring;
- Fencing of site and deed restriction.

Elements of this alternative are identical to the previously described alternatives of excavation, onsite landfill and topsoil-clay cap except for the specific volumes related to each process.

Detailed Evaluation of Costs

This section presents a detailed evaluation of the cost for each of the previously described alternatives. The cost estimates presented are order-of-magnitude level estimates. Examples include estimates from cost-capacity curves and estimates using scale up or scale down factors and/or approximate ratio estimate. It is normally expected that an estimate of this type would be accurate to +50% and -30%. The cost estimates are presented in 1986 dollars.

The feasibility level cost estimates presented have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The actual cost of the project will depend on the final scope of the remedial action as designed by others, the schedule of implementation, actual labor and material costs at the time of bidding, competitive market conditions and other variable factors that may impact the project costs. As a result, the final project costs will vary from the estimates presented herein.

Alternative 1 No Action

No costs associated with this alternative.

Alternative 2 Excavation with Onsite Landfill

Cost

The excavation of contaminated soil from the site is a common item for several of the alternatives. The volume of contaminated soil to be excavated to acceptable cleanup levels were discussed previously. The excavation of 80,000 cubic yards will be required and used for the cost estimates. Table 7 presents the cost elements for this volume. It is also assumed that for a variation in excavated volume, the unit prices will remain constant, (i.e., a 10 percent volume increase will increase cost by 10 percent).

Table 7
COST ESTIMATE FOR EXCAVATION

Cost Element	Construction Cost ($)
1. Excavation and hauling of contaminated soil (80,000 cubic yards)	$413,000
2. Dust control (20 acres)	112,000
Total	$525,000

Table 8
COST ESTIMATE FOR ONSITE LANDFILL

Cost Element	Construction Cost ($)
1. Containment Cell (5.5 acres)	
A. Clear and Grub	$ 7,000
B. Surface Preparation	13,000
Subtotal	$20,000
2. Liner/Leachate Systems	
A. Synthetic Liner	$122,000
B. Sand Cushion	58,000
C. Leachate System	87,000
D. Leachate Collection Box	10,000
E. Geotextile	49,000
F. Traffic Layer	39,000
Subtotal	$365,000
3. Waste Emplacements (80,000 cubic yards)	
A. Placement and Compaction	$712,000
4. Cover System	
A. Earthfill	$118,000
B. Sand Cushion	19,000
C. Synthetic Membrane	208,000
D. Drainage Layer	19,000
E. Geotextile	46,000
F. Vegetative Layer	144,000
G. Perimeter Fence	15,000
Subtotal	$569,000

5.	Storm Water Runoff Containment	
	A. Haul and Fill	$1,000
	B. Grading/Compaction	2,000
	C. Ditch and Berm	7,000
	Subtotal	$10,000
6.	Leachate Containment Pond	
	A. Haul and Fill	$ 1,000
	B. Grade/Compaction	1,000
	C. Piping	1,000
	D. Synthetic Liner	11,000
	F. Closure	8,000
	Subtotal	$22,000
7.	Excavation	$525,000
8.	Backfill Excavated Area (20 acres)	
	A. Backfill Material	$565,000
	B. Grading/Compaction	320,000
	C. Seed & Mulch	25,000
	D. Perimeter Fence (2,000 feet)	19,000
	E. Groundwater Well Installation	18,000
	Subtotal	$947,000
9.	General Requirements	
	A. Mobilization Bond & Insurance	126,000
	B. Health and Safety	221,000
	Subtotal	$347,000
10.	Construction Subtotal	$3,517,000
	A. Bid Contingencies	527,000
	B. Scope Contingencies	703,000
	Construction Total	$4,747,000
	C. Permitting and Legal	332,000
	D. Services During Construction	332,000
	Total Implementation Cost	$5,411,000
	E. Engineering Design Cost	475,000
	TOTAL CAPITAL COST	$5,886,000

Table 9
POST CLOSURE ANNUAL COST ESTIMATES
FOR ONSITE LANDFILL

Cost Element	Present Worth ($)
1. Long Term Maintenance	
A. Mowing	$ 15,000
B. Leachate Testing	9,750
C. Leachate Disposal	50,000
D. Annual Inspection	10,000
E. Groundwater Monitoring	42,500
TOTAL	$127,250

Alternative 3 Multi-Layer Cap

Cost

Table 10 presents the cost elements for the multi-layer cap alternative. The cost estimate is based on the operations previously described. Capping costs were based on the cover system as shown on Figure 15. The materials used for the cap were assumed to be hauled from adjacent property. Fencing costs include the construction of fences around the perimeter of the site. Level C protective clothing for all personnel onsite during the construction period (assumed to be 6 months) was used for estimating purposes. Decontamination costs include the necessary equipment and materials needed to decontaminate the personnel and equipment used. Installation of five additional groundwater wells (in addition to the existing groundwater monitoring system) was assumed to meet the needs for groundwater monitoring.

Table 10
COST ESTIMATE FOR
MULTI-LAYER CAP

Cost Element	Construction Costs ($)
1. Excavation and Hauling	$ 66,000
2. Capping (20 acres)	
A. Clay Liner	546,000
B. Sand Drainage Layers	274,000
C. Synthetic Membrane	758,000
D. Topsoil	334,000
E. Seeding	25,000
Subtotal	$1,937,000

3.	Fencing (5,000 LF)	38,000
4.	Groundwater Well Installation (5 wells)	18,000
5.	General Requirements	
	A. Mobilization Bond & Ins.	82,000
	B. Health & Safety	144,000
	Subtotal	$226,000
6.	Construction Subtotal	$2,285,000
	A. Bid Contingencies	343,000
	B. Slope Contingencies	457,000
	Construction Total	$3,085,000
	C. Permitting and Legal	216,000
	D. Services During Construction	216,000
	Total Implementation Cost	$3,517,000
	E. Engineering Design Cost	309,000
	TOTAL CAPITAL COST	$3,826,000

Table 11 presents the post-closure costs which include groundwater sampling and analysis for 5 wells, once per quarter for the first year and once a year thereafter for 30 years, assuming no contamination occurs, maintenance (i.e., soil replacement and erosion repair, fence repair, mowing, and reseeding), and site inspections and security checks. The costs shown for the post-closure elements are present worth values discounted using a rate of 10 percent over a period of 30 years.

Table 11
POST-CLOSURE COST ESTIMATE
FOR MULTI-LAYER CAP

	Cost Element	Present Worth ($)
1.	Groundwater Monitoring	$ 42,500
2.	Maintenance	20,740
3.	Site Inspections & Security	20,000
	TOTAL PRESENT WORTH	$ 83,240

Alternative 4 Topsoil-Clay Cap

Cost

Table 12 presents the cost elements for this alternative. Annual post-closure costs are the same as Table 11.

Table 12
COST ESTIMATE FOR
TOPSOIL-CLAY CAP

	Cost Element	Construction Costs ($)
1.	Excavation and Hauling	$ 66,000
2.	Capping (20 acres)	
	A. Clay Liner	546,000
	B. Sand Drainage Layers	274,000
	C. Topsoil	334,000
	D. Seeding	25,000
	Subtotal	$1,179,000
3.	Fencing (5000 LF)	38,000
4.	Groundwater Monitoring Well Installation	18,000
5.	General Requirements	
	A. Mobilization Bond and Insurance	52,000
	B. Health and Safety	91,000
	Subtotal	$ 143,000
6.	Construction Subtotal	$1,444,000
	A. Bid Contingencies	217,000
	B. Scope Contingencies	289,000
	Construction Total	$1,950,000
	C. Permitting and Legal	137,000
	D. Service During Construction	137,000
	Total Implementation Cost	$2,224,000
	E. Engineering Design Cost	195,000
	TOTAL CAPITAL COST	$2,419,000

Alternative 5 Soil Treatment

Costs

The cost of this alternative has not been evaluated because the consultants for Hines Lumber Co. did not furnish any costs of chemical requirements for the pilot demonstration project on leaching and biotreatment of organic contaminants in soil. Estimates were made for screening purposes in the Feasibility Study Report. A range of $4,000,000 to $8,000,000 was estimated for the treatment of an estimated 80,000 cubic yards of contaminated soil (plus excavation costs).

Alternative 6 Groundwater Recovery and Treatment

Costs

Table 13 presents the costs for the groundwater recovery system of six french-drains and a central water treatment system. The treatment system is sized for 30 gpm and the contaminant concentrations as previously described. These parameters need to be accurately tested prior to design and implementation of this alternative. Table 14 presents the present worth post closure costs for this alternative. Costs for oil/sludge disposal are based on assumptions for recovery percentages of, 90% for the first year and 10% each year thereafter for ten years.

Table 13
COST ESTIMATE FOR
GROUNDWATER RECOVERY AND TREATMENT

	Cost Element	Construction Cost ($)
1.	French drains and pumps (6 each)	$ 209,000
2.	Pipeline (12,000 LF)	60,000
3.	Power Connection	20,000
4.	Controls	15,000
5.	Metal Removal System	
	A. Tanks and reactors	110,000
	B. Filter press	15,000
	C. Chemical feed system	55,000
	Subtotal	$180,000
6.	Mixed Media Filter	20,000
7.	GAC Carbon Columns	200,000
8.	Pumps and Piping	20,000

9.	Electrical and Controls	30,000
10.	Building and Equipment Installation	100,000
11.	Perimeter Fence (5000 LF)	38,000
12.	General Requirements	
	A. Mobilization Bond & Insurance	36,000
	B. Health & Safety	62,000
	Subtotal	$98,000
	A. Bid Contingencies	149,000
	B. Scope Contingencies	198,000
	Construction Total	$1,337,000
	C. Permitting and Legal	94,000
	D. Service During Construction	94,000
	Total Implementation Cost	$1,525,000
	E. Engineering Design Cost	138,000
	TOTAL CAPITAL COST	$1,663,000

Table 14
ANNUAL OPERATING COST
GROUNDWATER RECOVERY AND TREATMENT

	Cost Element	Present Worth ($)
1.	Carbon replacement	$ 950,000
2.	Chemical Cost	19,000
3.	Sludge/Oil Disposal	94,000
4.	Electricity	142,000
5.	Manpower	283,000
6.	Chemical Analyses	377,000
	TOTAL	$1,865,000

Alternative 7 Combined Excavation/Capping

Cost

Table 15 presents the cost elements and associated construction costs for this alternative. The cost estimates were based on the construction procedures and dimensions described in this section for the excavation and landfilling of 40,750 cubic yards of contaminated soil and rock from the Old Pond, Small Old Pond and the CCA Plant area, and topsoil-clay capping of 12 acres of site area. Approximately 5,000 cubic yards of contaminated soil from the various drainage pathways will be excavated and placed under the cap.

These costs include the backfilling/grading and seeding of the excavated area without the necessity for a complete cover system. Level C protective clothing for all personnel during construction (assumed to be 9 months) was used for estimating purposes. Decontamination costs include the required equipment and materials needed to effectively decontaminate the personnel and construction equipment used. Groundwater monitoring wells are proposed for the excavated and capped area.

Table 16 presents the post-closure costs for the excavation/landfill capping alternative. The costs include maintenance (soil replacement and erosion repair, fence repair and reseeding), leachate removal, including disposal, and site inspection and security checks. The post-closure costs are present worth values discounted using a rate of 10 percent over a period of 30 years.

Table 15
COST FOR COMBINED EXCAVATION/CAPPING

Cost Element	Construction Cost ($)
1. Containment Cell (3 acres)	
A. Clear & Grub	$ 4,000
B. Surface Preparation	7,000
Subtotal	$ 11,000
2. Liner/Leachate Systems	
A. Synthetic Liner	67,000
B. Sand Cushion	32,000
C. Leachate System	47,000
D. Leachate Collection Box	6,000
E. Geotextile	27,000
F. Traffic Layer	16,000
Subtotal	$195,000
3. Waste Emplacement (45,750 cubic yards)	
A. Placement and Compaction	$407,000

4. Cover System for Containment Cell	
A. Earthfill	$ 65,000
B. Sand Cushion	10,000
C. Synthetic Membrane	114,000
D. Drainage Layer	10,000
E. Geotextile	25,000
F. Vegetative Layer	79,000
G. Perimeter Fence (500 LF)	4,000
Subtotal	$307,000
5. Stormwater Runoff Containment	
A. Haul & Fill	1,000
B. Grading/Compaction	1,000
C. Ditch & Basin	7,000
Subtotal	$ 9,000
6. Leachate Containment Pond	
A. Haul & Fill	1,000
B. Grade/Compaction	1,000
C. Piping	1,000
D. Synthetic Liner	7,000
E. Closure	5,000
Subtotal	$ 15,000
7. Excavation (45,750 cubic yards)	$ 300,000
8. Backfill Excavated Area (45,750 cubic yards)	
A. Backfill Material	$ 323,000
B. Grading and Compaction	183,000
C. Seed & Mulch	15,000
Subtotal	$ 521,000
9. Cap (12 acres)	
A. Clay Liner	$ 328,000
B. Drainage Layer	164,000
C. Topsoil	201,000
D. Seeding	15,000
Subtotal	$ 708,000
10. Perimeter Fence (5,000 LF)	$ 38,000
11. Groundwater Monitoring Wells	$ 18,000
12. General Requirements	
A. Mobilization Bond & Insurance	$ 101,000
B. Health & Safety	$ 177,000
Subtotal	$ 278,000

13. Construction Subtotal	$2,807,000
A. Bid Contingencies	421,000
B. Scope Contingencies	561,000
Construction Total	$3,789,000
C. Permitting and Legal	$ 265,000
D. Service During Construction	265,000
Total Implementation Cost	$4,319,000
E. Engineering Design Cost	379,000
TOTAL CAPITAL COST	$4,698,000

Table 16
POST CLOSURE ANNUAL COSTS ESTIMATES FOR
COMBINED EXCAVATION/CAPPING

Cost Element	Present Worth ($)
1. Landfill O&M	
A. Mowing	$ 8,500
B. Leachate Testing	9,750
C. Leachate Disposal	27,500
D. Annual Inspection	10,000
Subtotal	$55,750
2. Cap O&M	
A. Groundwater Monitoring	42,500
B. Maintenance	12,500
C. Inspection	12,000
Subtotal	$67,000
TOTAL PRESENT WORTH	$122,750

Alternative 8 Excavation with Offsite Landfill

While this alternative was screened from detailed excavations, it will be used for comparison. A more detailed cost estimate was developed for this alternative to provide for a more accurate comparison of costs. This estimate is presented in Table 17.

Table 17
COST ESTIMATE FOR EXCAVATION WITH
OFFSITE LANDFILL DISPOSAL

Cost Element	Construction Cost ($)
1. Contaminated Soil Removal	
A. Excavation	$ 209,000
B. Loading & Prep. Trucks	120,000
Subtotal	$ 329,000
2. Transportation (450 miles)	
A. Haul (12 CY Trucks)	9,600,000
B. Dept. of Transportation Manifest Charges	20,000
Subtotal	$ 9,620,000
3. Offsite Landfill	8,000,000
4. Backfill Excavated Area	
A. Import Backfill Material	565,000
B. Grading/Compaction	320,000
C. Seeding	25,000
D. Groundwater Well Installation	18,000
Subtotal	$ 928,000
5.* General Requirements	
A. Mobilization Bonds and Insurance	50,000
* B. Health and Safety	88,000
Subtotal	$ 138,000
6. Construction Subtotal	$19,015,000
A. Bid Contingencies	2,852,000
B. Scope Contingencies	3,803,000
Construction Total	$25,670,000
C. Permitting and Legal	1,797,000
* D. Service During Construction	102,000
Total Implementation Cost	$27,569,000
* E. Engineering Design Cost	814,000
TOTAL CAPITAL COST	$28,383,000

*Excluding Transportation and Disposal Costs

Community Relations

Public interest in the Mid-South Wood Products site during the initial phases of the project was minimal. The interest in the site increased moderately upon completion of the feasibility study. The two-week public notice period began on April 14, 1986. This was followed by a public comment period which began on April 28, 1986, and ended on May 19, 1986. On May 8, 1986, a public meeting was held in Mena, Arkansas. Approximately 50 people attended the meeting to express their concern about the potential for EPA's plans for remedial action resulting in the closure of the wood treatment facility now actively operating at the site. Response to the comments received during the comment period and public meeting are outlined in the "Community Relations Responsiveness Summary" attached to this Enforcement Decision Document.

Consistency With Other Environmental Laws

As specified in the EPA policy on compliance with environmental statutes other than CERCLA, the alternatives were developed to correspond to one or more of the following categories:

1. Alternatives specifying offsite storage, destruction, treatment, or secure disposal of hazardous substances at a facility approved under Resource Conservation Conservation and Recovery Act (RCRA). Such a facility must also be in compliance with all other applicable EPA standards (i.e., Clean Water Act, Clean Air Act, Toxic Substances Control Act).

2. Alternatives that attain all applicable or relevant Federal public health and environmental standards, guidance, and advisories.

3. Alternatives that exceed all applicable or relevant Federal public health and environmental standards, guidance, and advisories.

4. Alternatives that meet the CERCLA goals of preventing or minimizing present or future migration of hazardous substances and protect human health and the environment, but do not attain the applicable or relevant standards (this category may include an alternative that closely approaches the level of protection provided by the applicable or relevant standards).

5. No action.

The following alternatives for the Mid-South site correspond to the above categories. The alternatives corresponding to categories 1 and 3 failed to meet the screening criteria and were not evaluated in detail but are presented for comparison purposes only.

Alternative	Category
No Action	5
Topsoil-Clay Cap	2
Multi-Layer Cap	2
Soil Treatment	3
Onsite Landfill	2
Offsite Landfill	1
Combined Excavation/Capping	2
Groundwater Recovery/Treatment	2
Onsite Incineration	3

It is EPA's policy to select a remedial action that attains or exceeds applicable or relevant and appropriate Federal environments and public health requirements. Other Federal criteria and advisories, and State standards may be used, with adjustments for site specific circumstances.

In the absence of cleanup standards, as defined by regulations or health advsories, a risk assessment should derive the concentration of contaminants that represent an excess lifetime cancer risk that falls within a target range of 1x10-4 to 1x10-8 using 1x10-6 as a point of departure.

Standards have not been established for known or suspected carcinogens such as polynuclear aromatic hydrocarbons (PAHs) which have been identified as the primary contaminants providing the "driving force" for cleanup action at the site. Therefore, EPA's Carcinogen Assessment Group in Washington, D.C., has developed a model which has been used to calculate excess lifetime cancer risks for these contaminants.

Based on the use of this model to develop action levels, EPA would be eliminating any direct contact with these contaminated soils. This approach is consistent with the intent of Superfund to meet applicable or relevant Federal regulations.

Compliance with Section 121 of SARA

Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), states that any Record of Decisions signed within 30 days of enactment fo SARA must comply to the maximum extent practicable with §121 of CERCLA (§121(g)).

The selected remedy for the Mid-South site includes a RCRA compliant cap, solidification of heavily contaminated wastes, groundwater recovery and treatment, and extensive groundwater monitoring. In the process of selecting the remedial alternative, a number of remedies were examined if accordance with the National Contingency Plan, 40 CFR 300.68, and either screened of retained for final evaluation under 40 CFR 300.68(h).

The following examines the rationale used in screening remedial alternatives for the site under the NCP, 40 CFR 300.68, and whether this method resulted in the selection of an appropriate remedy meeting the intent of §121 of CERCLA to the maximum extent practicable.

Biological Treatment

As viable treatment alternatives, biotreatment has not been shown to be effective treatment technology for the wastes onsite and the probability of failure of this remedy, resulting from wastes not amenable to such treatments, is high. The potential responsible parties conducted studies on various forms of biological treatment; however, the results of the work were inconclusive.

In light of the lack of data to support the engineering practicability of biological treatment and the risk of failure of this remedy, the promulgation of §121 would not necessitate additional scrutiny of this alternative.

Excavation with Onsite or Offsite Incineration

These alternatives were not selected as the site remedy under 40 CFR 300.68(i). Both would provides permanent remedies for the site.

Offsite incineration is comparable to onsite incineration, but would create added risks of exposure while the wastes were being transported and require an extended treatment period.

Onsite incineration is a proven technology which would permanently destroy the organic constituents of the wastes and therefore reduce the toxicity and mobility of the contaminants. However, considering that method used for disposal of wastes at the site included mixing contaminants with clean soil (effectively increasing the waste volume), the remaining ash would still have considerable volume and may remain a hazardous waste since metals contamination (i.e., arsenic and chromium) exists at the site. Additionally, incineration of the 80,000 cubic yards of wastes would require a considerable treatment period. During this period there would be a significant increase in potontial for adverse health effects from human exposure to the excavated wastes and possible accidental disruption of the incineration leading to an increase in the risk of hazardous emmisions.

Furthermore, it is possible that the ash resulting from this form of treatment could not be delisted and would have to be disposed of as a hazardous waste. Therefore, incineration as a treatment alternative for this site would not be a required alternative under §121 of CERCLA.

Excavation and Offsite Disposal in a Permitted RCRA Facility

This alternative was not selected as the site remedy under 40 CFR 300.68(i). Under §121(b)(1), the offsite transport and disposal of hazardous materials without [permanent] treatment technologies should be the least favorable alternative remedeal action where practicable treatment technologios are available. This remedy is therefore unacceptible where other alternatives are available.

RCRA Compliant Clay Cap

A RCRA compliant cap with stabilization of heavily contaminated soils, groundwater recovery and treatment, and an extended monitoring program was the selected remedy under 40 CFR 300.68(i). The contaminants will remain onsite, and therefore under §121(c) the remedy will have to be reviewed "no less often than every 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented".

Wastes onsite will be stabilized and consolidated with lesser contaminated soils then capped. This will effectively reduce the mobility of the wastes and reduced the relative toxicity resulting from direct contact.

A cap would greatly reduce infiltration from rainwater minimizing offsite migration of the contamination. The groundwater recovery and treatment operations will further reduce the possibility of migration of contaminants into the offsite shallow groundwater. Extensive monitoring associated with the selected remedy would illuminate problems enabling corrective action to be taken expediantly.

The remedial investigation for the site did not indicate offsite migration (based on present site boundaries). Endangerment was associated with the potential for a release and direct contact with the wastes. All applicable or relevant and appropriate standards, requirements, criteria, or limitations shall be complied with as required for a remedy in which wastes remain onsite under §121(d).

Permanent remedies for the site were screened during the selection process outlined in the NCP 40 USC 300.68. However, since the permanant remedies for the site do not meet the requiraments of §121(b), advent of the new law does not necessitate reevaluating the remedy selection in order to comply with the congressional intent of selecting permanent remedies when it is practicable.

A capping remedy with stabilization of heavily contaminated soils, groundwater recovery and treatment, and extensive groundwater monitoring complies to the maximum extent practicable with §121 of CERCLA and therefore is an appropriuate remedy for selection within the 30 day period following enactment of SARA as required in §121(g).

Remedy

Section 300.68(i) of the NCP states that "the appropriate extent of remedy shall be determined by the lead agency's selection of a cost effective remedial alternative that effectively mitigates and minimizes threats to and provides adequate protection of public health and the environment." To this end EPA has negotiated a remedy with the potential responsible parties (PRPs) which includes EPA's Groundwater Recovery/ Treatment Alternative in combination with a remedial action plan that will be summarized below.

As stated previously, upon conclusion of the feasibility study, EPA approached the PRPs offering them an opportunity to conduct remedial action at the site. The parties expressed an interest in conducting the remedial work. Negotiations relative to an appropriate remedy have been ongoing since June 1986.

EPA's position was that there were several areas of concern namely, the continued migration of contaminated groundwater from the site; the continued migration of contaminated soils form the site due to surface water runoff; the continued contamination of groundwater from the heavily contaminated areas including the Old Plant, Small Old Pond, CCA Plant and Old Pond areas; and the direct contact hazard posed by the site on the workers at the wood treatment facility.

EPA's recommended remedial action included a combination of Alternative 6 (Groundwater Recovery/Treatment) and Alternative 7 (Combined Excavation/ Capping).

These alternatives would include:

- Excavation of the heavily contaminated areas comprising the Old Plant, Small Old Pond, CCA Plant, and Old Pond.
- Placement of these wastes in an onsite RCRA landfill.
- Backfill, grade, and seed excavated areas.
- Excavation of contaminated soils located along several drainage pathways and consolidate with contaminated soil in the Landfarm area.
- Construction of a RCRA top-soil clay cap over the landfarm area.
- Completion of the groundwater recovery and treatment system.
- Installation of a groundwater monitoring system to monitor the effectiveness of the remedy.
- Runoff control at the CCA Plant.
- Fencing of the site and deed restrictions.

After several negotiating sessions, EPA received a proposal from the PRPs which was derived from a combination of the EPA's recommended remedial action technologies discussed above.

The proposal calls for the following activities:

- Excavation of all onsite and offsite contaminated soils, with the exception of those existing in the Old Pond area, and consolidation of the soils in the North Landfarm area.
- The contaminated soils consolidated in the North Landfarm would be graded and covered with a RCRA top-soil clay cap.

- Stabilization of any free oil, liquid, or sludge found in the heavily contaminated areas of the Small Old Pond and Old Plant area (Stabilized waste from the Small Old Pond will be consolidated with materials in the North Landfarm).

- Field investigation into the Old Pond area to locate any free oils, liquids or sludges. Insitu stabilization of these materials.

- The Old Pond area would be covered with a RCRA top-soil clay cap.

- Installation of a groundwater monitoring system to monitor the effectiveness of the remedy.

- Backfill, grade and seed (or gravel cover) all excavated areas.

- Remedial action at the CCA Plant (To be proposed by Mid-South Wood Products of Mena, Inc. but will be as effective, or more, than EPA's recommended action).

- Fencing and deed restrictions.

- Completion of EPA's Alternative 6, Groundwater Recovery/Treatment, with the exception of the inorganics treatment system. Any groundwater found to be contaminated with inorganics would be treated by the activated carbon system then used as makeup water for the CCA treatment process.

As part of this remedy the potential responsible parties will have to perform bench studies during the remedial design and provide EPA with results that support the use of stabilization as part of this remedy. If stabilization proves ineffective, an alternative approach will be required for those heavily contaminated materials for which stabilization has been proposed.

Cleanup Criteria

As stated above, EPA's Feasibility Study Report developed cleanup criteria for arsenic (3 ppm) and chromium (10 ppm) based on the mean value of these contaminants found in background samples. On the other hand, the action level for carcinogenic PAHs was derived from the EPA's Carcinogenic Assessment Group lifetime cancer risk model. EPA selected a 1x10-6 concentration for total carcinogenic PAHs (300 ppb) and entered into negotiations with this platform.

The cleanup criteria resulting from PRP negotiations called for an action level for arsenic and chromium to be set at any concentration that exceeds the range of background concentrations (i.e., arsenic > 5.6 ppm and chromium > 19.4 ppm). The cleanup requirements for total carcinogenic PAH compounds (benzo (a) pyrene, benzo (a) anthracene, benzo (b) Fluoranthene, benzo (k) fluoranthene, and chrysene) will be set at a lifetime cancer risk of 1x10-5 (3 ppm).

The remedial action plan has been thoroughly reviewed by EPA and each of the technologies incorporated into this proposal appear applicable for a specific function as part of the overall remedial objectives to protect human health and the environment at the site.

EPA policy regarding selection of a remedy that attains or exceeds applicable or relevant and appropriate Federal environmental and public health requirements appear to be satisfied by the negotiated remedy summarized above. This remedy will be constructed to meet the design standards for a RCRA topsoil clay cap. Additionally, any free liquids, oils, or sludges will be excavated from the site and solidified prior to consolidation and capping, to comply with the free liquid land disposal ban. Also, it is anticipated that the excavation, consolidation and capping activities can be completed prior to November 8, 1988, the effective date of the ban on land disposal of solvents.

The recommended alternative will also include a groundwater monitoring program to determine if future conditions warrant additional remedial action.

Costs of Remedy

The estimated capital cost of the remedy is approximately $3.5 million for soil containment and groundwater recovery and treatment. These costs are based on estimates provided by the PRPs in their proposal.

Operations and Maintenance

Post-closure operations and maintenance (O & M) costs have been estimated at an annual cost of $153,500 or a present worth cost (based on 30 years at a 10% discount rate) of $1,404,500. The O & M activities include, but are not necessarily limited to, groundwater monitoring, maintenance, site inspection and security, carbon regeneration, sludge and oil disposal from the groundwater recovery system, electricity, and sampling and analysis.

Schedule

The schedule for the remedial design and construction of the selected remedy for Mid-South is currently dependent upon reauthorization of Superfund and the successful negotiation of a Consent Decree. Assuming Superfund funds are available the design phase will begin once the Consent Decree is signed. The design phase should take approximately 6 to 8 months to complete.

The balance of the remedial action will begin as soon as the remedial design is completed and approved by EPA. This phase of construction is estimated to take 6 to 8 months to complete.

Attachment 1

COMMUNITY RELATIONS RESPONSIVENESS SUMMARY
ON PREFERRED REMEDIAL ALTERNATIVE
MID-SOUTH WOOD PRODUCTS, MENA, ARKANSAS

This community relations responsiveness summary is divided into the following sections

I. Overview - This section discusses EPA's preferred alternative for remedial action, and likely public reaction to this alternative.

II. Background on Community Involvement and Concerns - This section provides a brief history of site background and community interest and concerns raised during remedial planning activities at the Mid-South site.

III. Summary of Major Comments Received During the Public Comment Period and the EPA Responses to Comments

I. OVERVIEW

An assessment of possible hazards posed to public health or the environment was completed in May 1985. This assessment evaluated the land use of the site; the types, location, and toxicity of the contaminants found at the site, and the potential exposure and risk associated with these contaminants. Results of the study indicated that remedial action is required to reduce the potential for public and environmental exposure through:

- ingestion of contaminated soils;
- direct contact with contaminated soils;
- drinking contaminated groundwater;
- drinking contaminated surface water;
- inhaling contaminated dust.

In the presentation for the public meeting at the end of the Feasibility Study (FS), the Environmental Protection Agency (EPA) discussed the remedial alternatives which were examined in the FS, for addressing the contamination at the site, as follows:

1.	No Action	Est. Cost: $ - 0 -
2.	Excavation and Onsite Landfill	Est. Cost: $ 5.6 Million
3.	Top Soil-Clay Cap	Est. Cost: $ 2.4 Million
4.	Multi-Layered Cap	Est. Cost: $ 3.8 Million
5.	Leaching and Biological Treatment	Est. Cost: $ 4 to 8 Million
6.	Excavation and Backfill with Offsite Landfill Disposal	Est. Cost: $ 28.4 Million
7.	Groundwater Recovery and Treatment	Est. Cost: $ 1.6 Million
8.	Combined Excavation/Capping	Est. Cost: $ 4.7 Million

EPA's recommended remedial action included a combination of Alternative 6 (Groundwater Recovery/Treatment) and Alternative 7 (Combined Excavation/Capping). These alternatives would include:

- Excavation of the heavily contaminated areas comprising the Old Plant, Small Old Pond, CCA Plant and Old Pond.
- Placement of these wastes in an onsite RCRA landfill.
- Backfill, grade, and seed excavated areas.
- Excavation of contaminated soils located along several drainage pathways and consolidate with contaminated soil in the Landfarm area.

- Construction of a RCRA top-soil clay cap over the landfarm area.

- Completion of the groundwater recovery and treatment system.

- Installation of a groundwater monitoring system to monitor the effectiveness of the remedy.

- Runoff control at the CCA Plant.

- Fencing of the site and deed restrictions.

Subsequent to several negotiating sessions with the potential responsible parties (PRPs), Edward Hines Lumber Co., Inc., and Mid-South Wood Products of Mena, Inc., EPA received a proposal from the PRPs for a remedial action which was derived from a combination of the EPA's recommended remedial action technologies listed above. This proposal, in' addition to specific requirements made by EPA, has been accepted as EPA s preferred remedial action.

The proposal combines the following activities:

- o Excavation of all onsite contaminated soils, with the exception of those existing in the Old Pond area, and consolidation of the soils in the North Landfarm area.

- o Stabilization of any free oil, liquid, or sludge found in the heavily contaminated areas of the Small Old Pond and Old Plant area (Stabilized waste from the Small Old Pond and Old Plant area will be consolidated with materials in the North Landfarm).

- o The contaminated soils consolidated in the North Landfarm would be graded and covered with RCRA topsoil clay cap.

- o Field investigation into the Old Pond area to locate any free oils, liquids or sludges. Insitue stabilization of these materials.

- o The Old Pond area would be covered with a RCRA topsoil clay cap.

- o Installation of a groundwater monitoring system to monitor the effectiveness of the remedy.

- o Backfill, grade and seed (or gravel cover) all excavated areas.

- o Remedial action at the CCA Plant (to be proposed by Mid-South Wood Products of Mena, Inc., but will be as effective, or more, than EPA's recommended action).

- o Fencing and deed restrictions.

- o Completion of EPA's Alternative No. 6, Groundwater Recovery/ Treatment, with the exception of the inorganics treatment system.

- Any groundwater found to be contaminated with inorganics would be treated by the activated carbon system and then used as makeup water for the CCA treatment process.

As part of this remedy, the potential responsible parties will have to perform bench studies during the remedial design and provide EPA with results that support the use of stabilization as part of this remedy. If stabilization proves ineffective, an alternative approach will be required for those heavily contaminated materials for which stabilization has been proposed.

Additionally, since wastes will be left onsite, the remedial action will be reviewed every five years to assure that the remedy is still protecting public health and the environment.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Site Background

The Mid-South Wood Products site is a 57-acre wood treating facility located in western Arkansas, approximately 0.5 miles southwest of the City of Mena. The site was operated as a pentachlorophenol (PCP) and creosote wood treating facility from the late 1930s to 1977, when a new wood treating facility, using a chromated copper arsenate (CCA) process, was built adjacent to the old site. The CCA facility is currently being operated by Mid-South Wood Products of Mena, Inc.

During early operations, waste products from wood treating were stored in two old pond areas onsite. In 1978, when the onsite waste ponds were closed, the pond liquid and sludge materials were pumped onto adjacent land to the west (landfarm areas) and mixed with the existing soils. Some of the mixture was placed back in the ponds.

The site has been under investigation since 1976, when it was reported that Rock Creek and the Mountain Fork River suffered a fish kill 8-1/2 miles downstream. Subsequent to the fish kill, state and federal agencies began testing for the presence of chemicals in the groundwater, surface water, and soil. Low levels of PCP, arsenic, and chromium were found in some groundwater and surface soil samples. In 1982, the site was placed on the National Priorities List (NPL) for hazardous waste sites remedial action under the U.S. Environmental Protection Agency Superfund Program.

Major Concerns and Issues

City and county officials, agency staff, and local residents indicate that concern about the site is for the most part focused in the immediate vicinity of the site. Concern is also primarily related to economics in the area which would be greatly affected, should the Mid-South Wood Products facility be shut down. Although Mena and Hatfield residents are generally aware of the site, remedial action is not seen as a community-wide issue in either city.

Most carcinogens do not have a simple concentration promulgated as a standard. Therefore, EPA must select a cleanup level relative to a desired excess lifetime cancer risk level. When assessing an appropriate risk level for a particular site, to serve as the basis for remedial action, EPA uses 1x10-4 to 1x10-7 as the target range and 1x10-6 as a point of departure.

In the Feasibility Study Report EPA derived an action level to limit human exposure to contaminated soils. This derived value is based upon extrapolations from animal toxicity experiments to human health effects in order to estimate a reasonable level of risk for the contaminants present onsite. The FS Report uses a 1 x 10-6 excess lifetime cancer risk as its action level. However, a 1x10-5 risk level can be considered for use as the cleanup criteria based no the conditions inherent to the site.

EPA's Carcinogen Assessment Group has a desired model which is used to calculate excess lifetime cancer risks. EPA acknowledges the fact that their may be uncertainties inherent in the calculation of these risk values. These uncertainties may act to either increase or decrease risk, depending on the source of the uncertainty. The uncertanties were taken into account when the Endangerment Assessment was prepared for the Mid-South site. In assessing all available information EPA established a cleanup level for the Mid-South site that is unlikely to result in a public health or environmental problems.

8) HINES LUMBER COMPANY

The FS proposes to apply the risk level for BaP to the aggregate of the 5 carcinogenic PAHs, being, in addition to BaP, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene. To date, BaP is the only carcinogenic PAH for which the toxicological data have been adequate, in the judgment of EPA, to allow the agency to derive a quantitative criterion. The quality of scientific data for the remaining four carcinogenic PAHs has been deemed as inadequate to promulgate official agency criteria. Nevertheless, there is sufficient data to determine that these compounds are, for the most part, substantially less potent carcinogens than BaP.

For example a recent review by the EPA Environmental Criteria and Assessment Office showed that benzo(b)fluoranthene was about 10% as potent as BaP, and chrysene was about 1% as potent. (EPA 1982 Errata: PAH Ambient Water Quality Criterion for the Protection of Human Health, page 24).

A reasonable approach for the Mid-South site would be to accept the fact that BaP is the most potent of the 5 carcinogenic PAHs, that chrysene is the least potent and to establish a separate cleanup criterion for BaP. In the particular situation at the Mena site, using a 10-5 risk level, this would mean 3 ppm for BaP, and 30 ppm for the total of the 5 carcinogenic PAH.

EPA RESPONSE:

EPA acknowledges that benzo(a) pyrene may be the most potent carcinogen of the PAH family of compounds. However, as indicated in the above comments, there is a lack of promulgated regulations pertaining to the remaining four carcinogenic PAHs. In light of this fact, the Agency is reluctant to consider your recommendation and is more inclined to adopt an action level that assures adequate protection of public health and the environment.

9) HINES LUMBER COMPANY

The estimates of contaminated yardage associated with the various areas on the Mid-South property are shown in numbers that indicate a far higher degree of precision and accuracy than is warranted. These estimates should be expressed in round numbers with the likely upper and lower range. A more reliable estimate will be developed during the preparation of the remedial action plan and engineering specifications.

EPA RESPONSE:

The Feasibility Study may not present an upper and lower range; however, the excavation volumes are presented as estimates (e.g., 80,000 cubic yards for the Excavation and Offsite Disposal alternative).

10) HINES LUMBER COMPANY

According to the FS, a soil-clay cap is calculated to reduce infiltration by "over 70 percent" as compared with the present conditions at the site (FS page 5-17). For a combination of synthetic membrane and soil-clay cap, the reduction in infiltration is estimated to be greater than 90 percent (FS page 5-15). Unfortunately, no substantiation is provided to allow a review of these two infiltration estimates. However, it is clear that both values are far too low, probably by at least 4 orders of magnitude, i.e. 10,000. In other words, the reduction in infiltration achieved by a cap installed in accordance with the specifications outlined in the FS (FS page 5-11), over the present situation, is almost certainly greater than 99% under either the synthetic membrane or soil-clay cap option.

There are two major factors responsible for the reduction of infiltration:

a. The low permeability (10-7 cm/sec) of the final engineered cap as compared with the present situation, which consists of unconsolidated native soils with a permeability estimated at between 10-4 and 10-5 cm/sec The engineered cap would thus have a permeability at least 100 times less than the present situation; and

b. The FS stipulates that the cap must be graded with positive slopes of between 3 and 5% at the top and less than 20% on the sides. The permeability values used above refer to a static situation where water would be ponded on the soil. Under that condition, a 10-7 cm/sec would allow the water to penetrate the cap at the rate of about one inch per year. However, because of the positive slopes of the cap, there will be no situation

whereby water could remain ponded on the surface of the cap. The slopes of the cap are designed to cause all water to promptly run off. It is conservatively estimated that the fact that the water will not be able to penetrate the cap at even the one inch per year rate implied by the static permeability test, will further reduce the potential infiltration by at least another two orders of magnitude, i.e., 99%.

EPA RESPONSE:

The Feasibility Study is not a design document. This report was developed based upon the results of the site investigations and it presents the development and evaluation of remedial action alternatives that could be implemented to eliminate or minimize the threat to public health and the environment. If capping is a part of the remedy selected for the site, then a more precise infiltration rate will be calculated as part of the Remedial Design.

11) HINES LUMBER COMPANY

According to the FS, both the engineered soil-clay cap (page 5-17) and the combination synthetic membrane and soil-clay cap offer similar improvements over the present situation, i.e. a reduction of infiltration because of the very low permeability (10-7 cm/sec) of the sloped final cover. The difference between the two materials in effectively reducing infiltration, i.e. 70% for the soil-clay compared to 90% for the synthetic liner is not explained, and, as discussed above does not appear to be justified. In any case, the clay and the synthetic membrane will achieve a similar reduction. It is likely that the synthetic membrane will be both more costly and shorter lived than the clay which is a natural material, less susceptible to failure and far easier tc repair, should that be required.

EPA RESPONSE:

The 70% and 90% figures were determined by EPA's contractor. These values were based upon their experience with the actual operation of such structures as opposed to a theoretical derivation.

The synthetic membrane liner is a proven technology. If adequate operation and maintenance is provided, then it should provide greater protection from infiltration than the top-soil clay cap alternative.

12) HINES LUMBER COMPANY

The advantages, if any of Alternative 3, Multi-Layer cap over Alternative 2, Topsoil-Clay cap, are not documented in the FS. It is unlikely that a convincing demonstration can be made of incremental reductions in risk commensurate with the $1.4 million additional cost for the synthetic membrane.

13) HINES LUMBER COMPANY

By the same token, the FS does not demonstrate the additional advantages, if any, of Alternative 6, Combined Excavation/Capping as compared with Alternative 2, Topsoil-Clay cap. The additional cost would be $2.2 million.

EPA RESPONSE:

The Feasibility Study does in fact compare the alternatives in Chapter 6, entitled "Comparative Evaluation of Alternatives."

WRITTEN COMMENTS PROVIDED TO EPA DURING THE PUBLIC MEETINGS (MAY 8, 1986)

EPA's response follows each question, comment, or concern raised in each written statement or group of similar statements.

The major issues of concern that were raised during the public meeting and provided in written statements to EPA during the meeting are summarized below:

(1) Alderman, Position #2, Waldron, Arkansas, Mr. Butch Johnston

"Many people in this area are dependent on Mid-South in Mena for their jobs ... When considering alternatives to the problem at the Old Mid-South location please don't jeopardize the jobs currently provided..."

(2) Resident of Waldron, Arkansas, Ms. Regina Oliver

"When considering a solution for the cleanup at the old Mid-South, please help keep the current Mid-South facility in operation".

(3) Resident of Waldron, Arkansas, Ms. Sherry Johnston

"... any solution that inhibits the operations at the current Mid-south location would create a long reaching economical problem in this area".

(4) Resident of Waldron, Arkansas, Mr. L. J. Watkins

"... your consideration of a remedial altaernative that will allow the continued day-to-day operation of Mid-South Wood Products, Inc. and that will minimize its economic and financial impact upon all of as involved is expected and will be greatly appreciated".

(5) President and Chief Executive Officer, First National Bank, Mena, Arkansas , Mr. Bert Hensley
"In considering an alternative to this problem, I would hope that you could find a remedy which would not affect the normal business of the company or the employee job secruity. A change would tremendously affect our community and its economy."

(6) Written statement signed by approximately 346 residents provided by Mr. Phillip Clay, attorney for Mid-South Wood Products, Inc.

"Please consider when choosing a remedial alternative, to this problem, a solution that will not interrupt the normal business of Mid-South so that jobs will not be temporarily or permanently lost."

EPA RESPONSE:

It is not the intent of EPA to close the current facility. What we are interested in is taking remedial action primarily in the inactive areas which exist around the present treatment facility. There are two potentially responsible parties, Mid-South Wood Products, Inc. and Edward Hines Lumber Co., who share potential liability and cost of any such cleanups.

With respect to the active facility, there are certain remedial measures which must be taken to address the problem of storm water runoff. We believe that there are contaminants migrating from the current facility and contributing to an existing groundwater contamination and surface water runoff problem.

(7) Resident of Mena, Mr. David Stewman

"I own four acres bordered on three sites by Mid-South and I have never been contacted by the EPA. Why?"

"My property has a well about 75 feet from Mid-South property. Has it been tested? If not why?"

"If work is done on Mid-South property by the EPA or their contractor(s) will the EPA be responsible if my property is adversely affected? If not why?"

"Does the EPA have the name(s) af anyone who has been harmed by the Edward Hines Lumber Co. or Mid-South operation?"

EPA RESPONSE:

° Mr. Stewman was never contacted because there was never a need to contact him. The Mid-South site does not pose as a threat of contamination to Mr. Stewman's property since it is located to the northeast or upgradient of areas of contamination found during the site investigation.

° No, Mr. Stewman's property has never been sampled. Sampling was done onsite that indicates no contamination in areas adjacent to his property.

° Yes, EPA is responsible for work done by its contractors. Also, the Potential Responsible Parties are responsible for work performed by their contractors.

° EPA has no names of individuals who have been harmed by the site other than the problems associated with those properties to the northwest of the site which were eventually provided with alternate water supplies. (See page 2 of the Responsiveness Summary)

CONCERNS RAISED DURING THE PUBLIC MEETING (MAY 8, 1986)
The major issues of concern that were raised during the public meeting are summarized below:

° Will the Mid-South facility be closed as a result of this action?

° The people are not against cleaning up the environment; however, they are worried about losing the jobs provided by Mid-South, and the potential economic impacts on the City of Mena and Mr. Jim Huff (President of Mid-South).

° Who will pay for the remedy?

° How will the cleanup affect the surrounding property?

° What has the study cost?

° Why is Mid-South responsible for something it had nothing to do with?

° What happens after the public meeting?

EPA RESPONSE (presented in the same order as indicated above):

° It is not the intent of EPA to put Mid-South out of business. It is our intent, however, to take those actions deemed necessary to protect public health and the environment.

° The apportionment of cost for any remedy that may be selected for the site will have to be worked out between the two Potential Responsible Parties, Mid-South Wood Products, Inc., and Hines Lumber Company.

° Any remedial alternative that is selected, with the exception of the No Action Alternative, will include the excavation of contaminated soils located to the southwest of the site in an isolated, non residential, area. During any remedial activities sufficient measures will be taken to insure that there is no negative impact on adjoining properties.

The level of concern about the site was higher in the 1970s than it is today. However, there is still concern about the groundwater and harmful dust. As stated previously, however, the biggest concern is economics in the area.

Activities to Elicit Input and Address Concerns

The Arkansas Department of Pollution Control and Ecology (ADPC&E) is the lead state agency for hazardous waste issues in Arkansas. The ADPC&E became involved at the site in 1976 during its investigation of the fish kill in Mountain Fork. ADPC&E was again involved in 1978. The ADPC&E established requirements to be met, including dismantling of an illegal valve used for discharging holding pond liquids into a tributary of Rock Creek and development of a "closed system" for waste management. Between 1978 and 1984, the ADPC&E conducted a series of onsite inspections, tested soil and water samples, and worked with the USEPA and site owners in identifying addditional investigative activities to be conducted.

Subsequent to each of the formal studies conducted by the EPA, the Remedial Investigation and the Feasibility Study, copies of the documents outlining these studies were placed in strategically located repositories for review and comments from the public. A public comment period was held at the end of the Feasibility Study, from April 28, 1986, through May 19, 1986. During this public comment period, a public meeting was held on May 8, 1986, to explain results of the Feasibility Study and to hear comments on the remedial alternatives.

III. SUMMARY OF PUBLIC COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

CONCERNS RAISED DURING THE PUBLIC COMMENT PERIOD
(April 28 - May 19, 1986)

The following summarizes the major issues raised in written statements provided to EPA during the public comment period.

EPA's response follows each comment or group of similar comments.

1) HINES LUMBER COMPANY

It is most important that all discussion and diagramatic representations that pertain to the present configuration and alignment of the site boundaries be checked to ensure that they accurately reflect the property acquired by the Edward Hines Lumber Company ("Hines"). For example, figure 1 - 2 gives the false impression that Pope Pond and Moon Springs are offsite locations, whereas they are both within the present boundaries of the site.

EPA RESPONSE:

EPA acknowledges the comment and will make every effort to represent the site in its present configuration and alignment of property boundaries in any future EPA documents.

2) HINES LUMBER COMPANY

Since Hines took title to the former Pope and Moon properties, no location has been identified where there is contamination that has been transported via the groundwater route. Neither the Remedial Investigation (RI) nor the sampling by B & F Engineering, consultants for Hines, has detected any groundwater contamination beyond Moon Spring, a location which is on property owned and controlled by the Potentially Responsible Parties (PRPs). The only location beyond the present property boundaries where some contamination has been detected is a small area near the railroad tracks to the southwest of the site. That contamination was transported by a surface flow as the result of an inadvertent release from the former pond (RI page 8.0-8). That pond, along with all other former impoundments has since been closed.

EPA RESPONSE:

At the request of Mr. Pope, ADPC&E obtained water samples in November, 1980, from the Pope's well and sediment samples from near Pope Pond. The results of these test were reported as:

Results of Analyses*

	Water Kitchen Faucet	Water Pump House	Soil West of Mid-South	Soil Pope Pond	Soil Drainage from Mid-South
PCP	0.036 ppb	0.063 ppb	118 ppb	232 ppb	1335 ppm
Arsenic	14 ppb	< 5 ppb	1086 ppb	115 ppb	-
Chromium	8 ppb	< 5 ppb	60 ppb	46 ppb	-

* ppb - parts per billion; ppm - parts per million

Subsequent to receiving these results, the Popes connected to City of Mena water system.

In February, 1981, the U.S. EPA sent a two-man team to the site. Water samples were taken by the team from the Pope, Hilton, McMellon, and Melrose wells (Figure 2.2-2). With the exception of the Hilton well which had a PCP concentration of 10 ppb, chrome, arsenic, and PCP were not detected. About the same time, the Arkansas Health Department obtained water samples from Pope Pond, Moon Spring (west of the Pope property) and Frost, Hilton, and Melrose wells. The results of analysis on these water samples are:

	Pope Pond	Moon Spring	Frost Well	Hilton Well	Melrose Well
PCP	47 ppb	1,400 ppb	Trace	Trace	Trace
Arsenic	37 ppb	5 ppb	< 5 ppb	< 5 ppb	< 5 ppb
Chromium	85 ppb	< 5 ppb	< 5 ppb	< 5 ppb	< 5 ppb

In 1984 several private wells along Hghway 375 were sampled by EPA; however no groundwater contamination was found (RI, page 2.0-6).

Regardless of the comments made by Hines there is a significant groundwater contamination problem onsite. Furthermore, field investigations referenced above do indicate that groundwater contamination has been found beyond Moon Spring. In light of this fact, EPA developed a groundwater remediation strategy which is addressed, as proposed by alternative 7, in the Feasibility Study Report.

In reference to the statement concerning contamination found offsite along the railroad tracks to the southwest of the site. The Remedial Investigation Report identifies groundwater and surface water routes to the southwest from the highly contaminated areas onsite. Therefore, the past release may not be the sole contributor to contamination in this area.

3) HINES LUMBER COMPANY

The Feasibility Study ("FS") should give more recognition to the crucial fact that the hydrogeology at the site makes it highly unlikely that contaminants could migrate off the site via the groundwater. The FS confirms that ". . . the soils onsite have low hydraulic conductivities and limited capacities to transmit water." (FS page 1-12 and RI page 8.0-11). With the purchase of adjoining downgradient properties by Hines, the sole identified groundwater pathway, represented by the fault/fracture zone, has been contained totally onsite. Any groundwater in the fracture zone is now recovered and treated by an engineered system that has been operating since October 1985. Furthermore, as mentioned in the FS, voluntary action by Hines "... has effectively removed all known downgradient groundwater usage ..." (FS page 115).

EPA RESPONSE:

The statement "... the soils onsite have low hydraulic conductivities and limited capacities to transmit water" is a correct statement; however, the surface soils should not be used to describe the potential for ground water migration at the Mid-South site. The Remedial Investigation indicates "The residual soils in the valley area are up to 6 feet thick and average 2 to 3 feet thick in most areas" (RI, page 5.0-11); however, the primary water bearing zone is found at a depth of 10 - 30 feet beneath the surface in the fractured rock regime (RI, page 7.0-16). The primary impact of surface soil on groundwater flow is with respect to recharge of the water bearing zone.

Furthermore, the groundwater migration pathway along the fault/fracture zone is not the "sole" groundwater pathway as indicated in the Hines comment EPA found potential groundwater migration pathways to exist to the south - southwest along the railroad tracks and to the east from the CCA plant.

4) HINES LUMBER COMPANY

The statement "the proposed float or liquid level controlled pump switches are not being used and the liquid levels in the trenches are not being kept below the lateral collector pipe inverts" (FS page 3-22) is not correct. Also, the oils & sludges are removed from the wells.

The statement "free oils and sludge from the existing french drains were found to quickly clog the activated carbon system during the demonstration project" is not correct. There was a problem with silt from the wells clogging the cloth filter ahead of the activated carbon system during the first few weeks of operation. A second filter has been added in parallel and this is no longer a problem.

EPA RESPONSE:

The statement made in the Feasibility Study Report is based upon an inspection of the existing groundwater recovery system which was conducted in November 1985. At the time of the inspection the groundwater recovery system was not operating correctly.

5) HINES LUMBER COMPANY

Concentrations of heavy metals in the native soils of the Caddo Basin, Ouachita Mountain region, in the general vicinity of Mena, have been inadequately characterized in the RI. As a consequence neither the Endangerment Assessment ("EA") nor the FS give sufficient attention to the fact that relatively high concentrations of chromium (Cr) and arsenic (As) are present in the native soils around the Mid-South site. The RI report documented the fact that Cr levels as high as 18.4 ppm and 19.4 ppm, and As levels of up to 5.6 ppm were measured in the background samples collected 3 inches beneath the surface (RI page 7.0-22). However, the EA and FS derive a median value for Cr of 11.4 ppm and for As, 3 ppm (FS table 2-1 and page 3-10).

The use of median or average values to represent background (uncontaminated) levels, and certainly their extrapolation into target levels for cleanup, is inappropriate. As is evident from the limited data, natural background levels for these metals considerably exceed the median values. Furthermore, total metal concentrations should be considered only for the hazard associated with the ingestion of wind-blown dusts, i.e. surface soils (whereas background samples were collected 3 inches below the surface). For considering the potential risk to groundwater off the property, the relevant unit of measure should be the concentration of leachable Cr and As, as determined by the EPA stipulated EP toxicity test.

Figures 2-1 and 2-2 which show As and Cr levels in the soil are seriously misleading for several reasons:

a. they are based on the use of median values for background concentrations in the native soils and do not take into account the variation in these naturally-occurring concentrations; and

b. they are based on samples collected at depths on the site that were different from the depths used offsite.

For the above reasons, only the areas of higher concentrations than background should be considered as posing an incremental risk, and therefore as candidate areas for remedial action. Concentrations of As and Cr that fall within the range of natural background should not be considered as posing a significant additional risk to human health or the environment.

EPA RESPONSE:

The use of an average background concentration for arsenic and chromium for cleanup criteria may be inappropriate due to the small number of background samples collected and the wide range of results. Therefore, EPA will consider using an action level of any concentration above the range of background concentrations found during the remedial investigation (i.e., arsenic > 5.6 ppm and chromium > 19.4 ppm).

Regarding soil collection procedures, surface-soil samples are collected by extracting soil from the 0 - 3 inch depth, not at a depth of 3 inches beneath the surface of the siol, as indicated in your comment.

In response to the comment suggesting that the EP Toxicity procedure be used for "considering the potential risk to groundwater...", the EP Toxicity procedure was not developed to aid in the development of cleanup standards. This is an extraction procedure which is used to characterize wastes (with the understanding that any waste material that does not exhibit the characteristic is not necesarily non-hazardous.

Based upon a comparison of the areal distribution of soils contaminated with arsenic to those contaminated with total PAHs at a concentration greater than 300 ppb (soil cleanup criteria described in the FS Report) the above recommendation would not significantly affect the total surface area which would require excavation under any given remedial alternative. Furthermore, preliminary calculations indicate that increasing the cleanup criteria for arsenic to 5.6 ppm would not significantly affect the amount of soil requiring excavation.

6) HINES LUMBER COMPANY

The FS report states that "... organic carcinogens [PAH group] are not present in natural soils, therefore the 10-6 increased cancer risk level will be applied to the carcinogenic PAH's." (page 3-10).

The premise that the carcinogenic Polynuclear Aromatic Hyrdocarbons (PAHs) do not occur in natural soils is not correct. In fact, the situation is exactly the opposite, as has been thoroughly documented. For example, a recent EPA report has the following introduction with regard to benzo(a) pyrene (BaP), the most potent carcinogenic member of the PAH family of compounds:

> "The ubiquitous presence of BaP in the environment has been documented in U.S. EPA (1980)... Human exposure occurs primarily through ingestion of food, followed by inhalation and the consumption of water. From the data presently available, it should be assumed that a large prtion, if not all, of the human population will be exposed to BaP in their daily activities."

(U.S. EPA 1982. Errata: PAH Ambient Water Quality Criterion for the Protection of Human Health.) PAHs are products of combustion, and are therefore present in the environment as a result of vehicle emissions, agricultural burning, forest fires, wood stove smoke, cigarette smoke, to mention just a few sources. PAHs identical to those found in creosote, are also common in asphalt used for highway paving, roofing tars, tire rubber, and municipal sewage sludge and effluent from treatment plants.

Because the PAHs are typically released in the form of particulate matter in the atmosphere, and because they absorb very effectively to soil, they will tend to be found in the upper layers of surface soils. One reason that these PAHs were not detected in the few background soil samples that were analyzed may lie in the fact that the samples were collected under the top 3 inches, whereas the PAHs would tend to concentrate at or near the surface of the soil. In fact, according to the EA (page 218), significantly higher levels of BaP were found offsite than onsite, namely up to 1,700 ppb as compared to only trace. The level confirmed by this one PAH compound offsite is 600% higher than the cleanup criterion proposed in the FS for the combined total of 5 PAHs.

EPA RESPONSE:

The statement in the Feasibility Study "... organic carcinogens (PAH group) are not present in natural soil." is a correct statement in the context in which it is presented. The Feasibility Study does not infer that PAHs do not or may not occur naturally in the environment. What it does indicate is that background samples were collected and analyzed and no PAHs were found in these samples. Furthermore, as indicated in the above comment by Hines, the Endangerment Assessment does reference an offsite location where benzo (a) pyrene (the most potent carcinogen member of the PAH family) was found at a level of 1700 ppb which is, as stated above, 600% higher than the cleanup criterion proposed in the Feasibility Study for total PAHs. However, it should also be pointed out that the location of this extremely high level of contamination was in the area offsite, to the southwest of the site, which is considered contaminated and is thought to receive surface and ground water drainage from the site. Additionally, the soil sample (representative of the

1,700 ppb benzo(a)pyrene) was collected at a depth of 1.3 feet below the surface; therefore, any inference that the presence of benzo(a)pyrene is naturally occuring, based upon comments presented by Hines, would be difficult to substantiate. This area is considered contaminated and is included in all remedial alternatives outlined in the Feasibility Study.

7) HINES LUMBER COMPANY

The risk level that is proposed in the FS for the carcinogenic PAHs, namely 1x10-6 is excessively conservative for the particular situation encountered at the Mena site and a 1x10-5 risk level would be more reasonable based on the facts documented in the EA report, in particular:

a. There is essentially no risk to the community from potential exposure to contaminated drinking water, because the town and all of the proximate downgradient dwellings are served by a municipal utility system that draws on a surface reservoir upstream of the site. The EA states "... there are no nearby domestic groundwater users". (page 3-6);

b. The principal risk pathway identified in the EA is exposure to windblown dust, however, despite the fact that far higher levels of BaP, the most potent carcinogen, were found offsite as compared to onsite (EA page 2-18) no evaluation was made of the background risk associated with BaP and similar PAH compounds; and

c. The assumption made in the EA that 100% of the contaminant present on the soil would be biologically available and the estimated rate of ingestion by humans, are extremely conservative (EA page 5-25).

In a recently proposed regulation on the subject of the appropriate risk level at a particular site that should serve as the basis for a remedial action, EPA outlined a framework for determining the level of risk to be permitted post cleanup. (U.S. EPA Hazardous Waste Management System; Land Disposal Restrictions; Proposed Rule. Federal Register, January 14, 1986, pages 1602-1766. Refer to page 1635.)
Applying the procedure proposed by EPA in conjunction with the site-specific conditions prevailing at the Mid-South site and the facts described in the EA, it seems reasonable to base the cleanup criteria for the protection of human health in Mena on a 1x10-5 risk level.

EPA RESPONSE:

The Endangerment Assessment was designed to address two scenarios, industrial and residential. The industrial scenario essentially leaves the site in its current state and workers are exposed to contaminated surface waters and surface soils through ingestion, inhalation of dusts, or dermal contact with soil or water on a daily basis. The other scenario is represented as a "worst case" scenario and it assumes that the site is developed for residential use and residents would be exposed through ingestion of groundwater, surface soils, subsurface soils or sediments, or by dermal contact with groundwater, surface water, surface soils or sediments.