101533

RECORD OF DECISION
MID-ATLANTIC WOOD PRESERVERS SITE

DECLARATION

Site Name and Location

Mid-Atlantic Wood Preservers Site
Harmans, Anne Arundel County, Maryland

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Mid-Atlantic Wood Preservers Site in Harmans, Anne Arundel County, Maryland, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300 (NCP). This decision document explains the factual and legal basis for selecting the remedy for this Site.

The Maryland Department of the Environment (MDE) concurs with the selected remedy. The information supporting this remedial action decision is contained in the administrative record for this Site.

Assessment of the Site

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

Description of the Selected Remedy

The remedial action selected in this document is presented as the permanent remedy for reducing risks associated with human contact with contaminated soils at the Site. This remedy is comprised of the following major components:

- Excavation, stabilization and offsite disposal of "hot spots" of highly contaminated soils (greater than 1,000 mg/kg arsenic) which have been determined to be a principal threat;

- Capping of soils containing arsenic at concentrations greater than 10 mg/kg but less than 1,000 mg/kg with an asphalt/concrete cap;
- Construction of an enlarged roofed drip pad consistent with new wood treating regulations;
- Environmental monitoring to ensure the effectiveness of the remedial action; and
- Implementation of a deed restriction.

Declaration of Statutory Determinations

The selected remedial action is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and it satisfies the statutory preference for remedies that employ treatments that reduce toxicity, mobility or volume as their principal element.

Because hazardous substances, pollutants or contaminants will remain at the Site following remediation, a review of this remedial action will be conducted in accordance with the requirements of section 121(c) of CERCLA, 42 U.S.C. § 9621(c), to ensure that human health and the environment are being protected by the remedial action being implemented.

Edwin B. Erickson
Regional Administrator
EPA Region III

12/31/90
Date

DECISION SUMMARY

I. SITE LOCATION AND DESCRIPTION

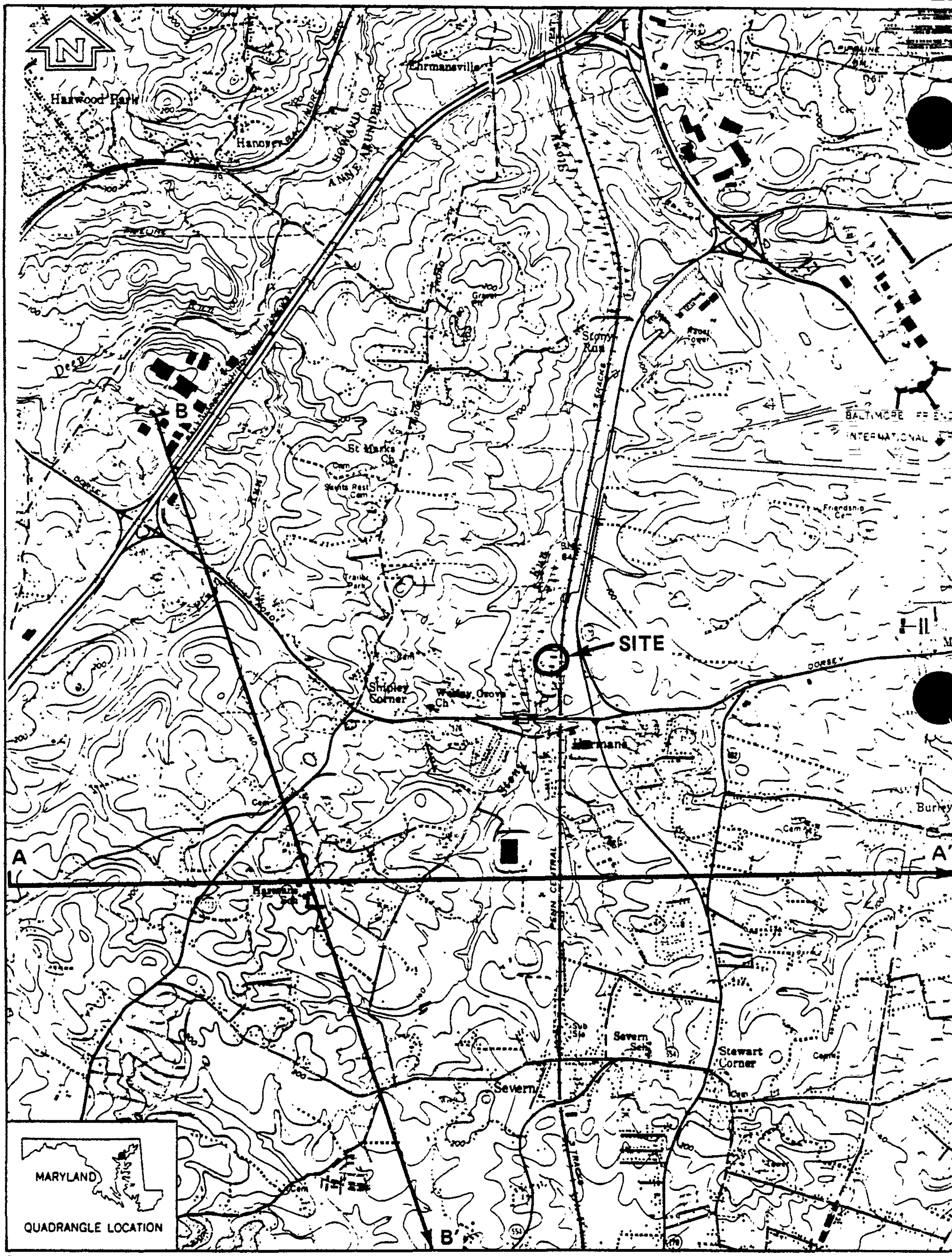
The Mid-Atlantic Wood Preservers Site (Site or MAWP) is located in Harmans, Anne Arundel County, Maryland, approximately 17 miles south of Baltimore. The Site, approximately 3.17 acres, is situated west of the Penn Central Railroad tracks and approximately 1,000 feet north of Maryland Route 176 (Dorsey Road) (see Figure 1).

The Site is owned and operated by Mid-Atlantic Wood Preservers, Inc., and has been used for the pressure treatment of lumber since the facility began operation in 1974. Chromated copper arsenate (CCA) is used as the wood preservative, protecting the wood against weather and insect damage. The Site is divided into two, nearly equal areas--one east (Treatment Yard) and one west (Storage Yard) of Shipley Avenue (Figure 2). Each area is surrounded by a chain link fence and has a gate that is locked when the facility is not operating. The majority of the ground surface is covered by compacted gravel, though about one-quarter of the Treatment Yard is paved.

Actual processing of the wood occurs in the main building on the eastern half of the Site. This building houses both the product storage tanks and a pressure cylinder. A "charge" of wood is placed in the cylinder through an overhead door in the east end of the building. The cylinder is then filled with the CCA from the storage tanks and pressurized. After the proper amount of time, the excess solution is pumped back to the storage tanks, and the charge of wood is moved to a temporary storage area on the drip pad. The drip pad is sloped toward a sump located inside the main building so that drippings from the freshly treated wood can be recycled into the system. After the wood has stopped dripping, it is transferred by forklift to the Storage Yard on the west side of Shipley Avenue.

The Stony Run Creek flows north through a wetland area 600 feet west of the Site, extending approximately 4 miles before discharging into the Patapsco River near Elkridge, Maryland. Low flow in Stony Run restricts it to minor recreational use. The ground surface at Mid-Atlantic Wood Preservers slopes 3-5% to the northwest. Storm water runoff from the Treatment Yard flows to storm drains along Shipley Avenue which discharge into a flood plain approximately 400 feet from Stony Run, while that from the Storage Yard flows toward Stony Run.

The surrounding land use is mixed industrial and residential. Immediately to the south of the Site, east of Shipley Avenue, is a trucking company. To the north of the Site, east of Shipley Avenue, are two warehouse buildings. North of the site, west of Shipley Avenue, is the Edwards property, where an abandoned house, construction rubble, and excavation equipment are found. North of the Edwards property is a vacant lot zoned for industrial use. North of the vacant lot is the Hall residence. There are a few other



SOURCE: U.S.G.S. 7½' Quad., Relay, Md., 19

AR000678

FIGURE 1
LOCATION MAP

Dames & Moore

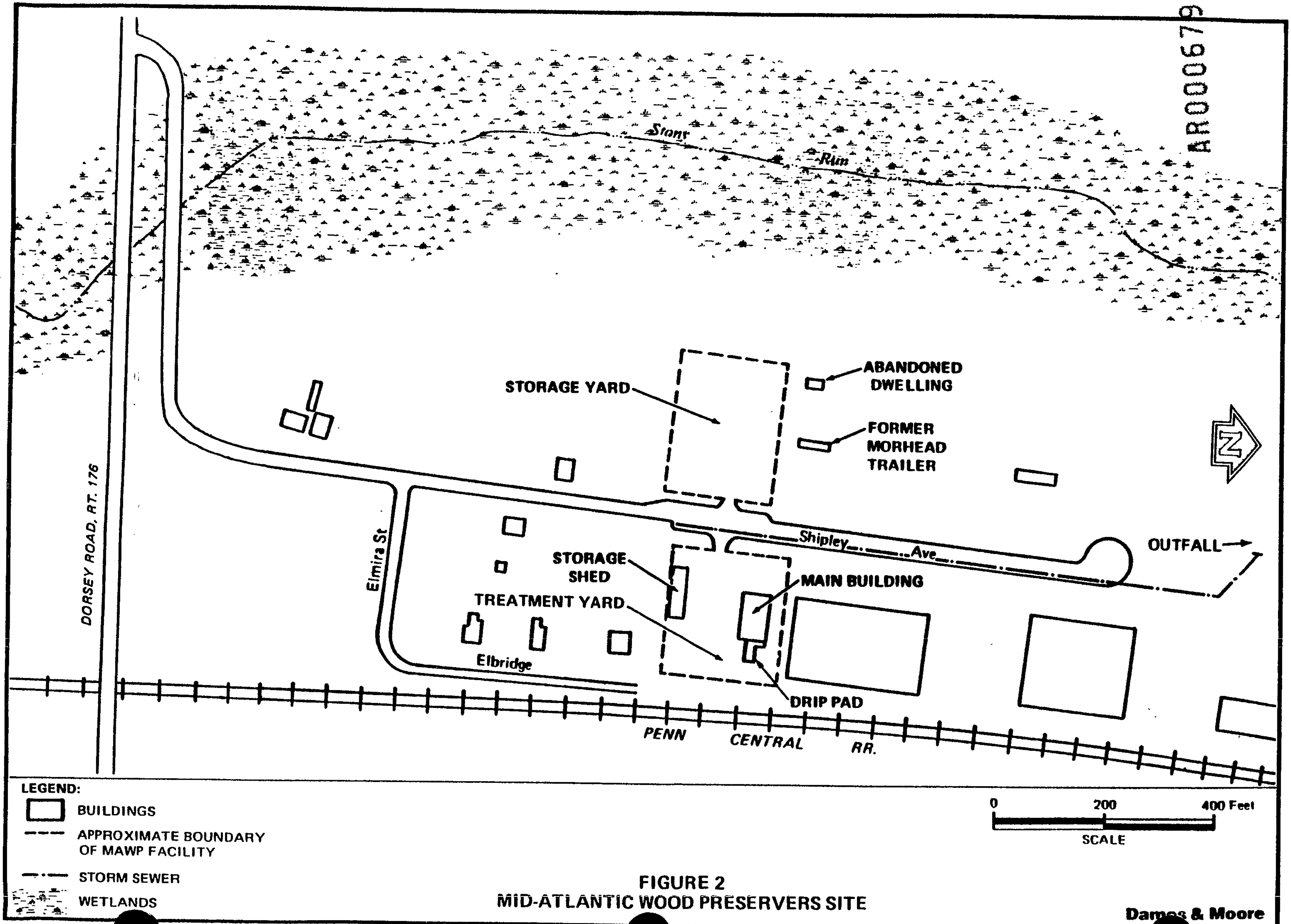


FIGURE 2
MID-ATLANTIC WOOD PRESERVERS SITE

Dames & Moore

AR000679

residences and light industries along Shipley Avenue. The Baltimore Washington International Airport occupies most of the property east of the site, while most of the property west of Stony Run is occupied by Baltimore Commons Industrial Park.

Since the Mid-Atlantic Wood Preservers site is cleared, fenced and paved with either asphalt or crushed stone, vegetation and wildlife on the site is sparse to nonexistent. The surrounding area, however, supports a variety of plant and animal species. Vegetation found near the Site is primarily grasslands, woodlands and forested wetlands. The forested area is typical of Eastern deciduous and pine forests found elsewhere in Maryland. A forested wetland occurs in a belt approximately 1,000 feet wide along Stony Run that provides a good quality habitat for birds and small mammals. One species of special concern has been found in the vicinity of the Site. A population of swamp pink (Helonias bullata), listed as a threatened plant species under the protection of the Endangered Species Act, is located adjacent to Stony Run approximately 4,000 feet downstream of the Site.

Site Geology

The Mid-Atlantic Wood Preservers site is located within the western edge of the Atlantic Coastal Plain Physiographic Province. This Province is characterized by subsurface material consisting of an eastward to southeastward dipping wedge of Cretaceous to Pleistocene age sediments. The sediments generally consist of unconsolidated beds of clay, silt, sand, and gravel. The basal sediments in the Maryland coastal plain are part of the Cretaceous Potomac Group. These sediments have been deposited directly on top of the crystalline rock of the basement complex, and in the area of the Site the sediments are exposed at the surface. The Potomac Group is approximately 500 feet thick at the Site and dips about 1 degree to the southeast.

The Potomac Group can be divided into three formations. From bottom to top these are the Patuxent, the Arundel, and the Patapsco Formations which are approximately 100, 250 and 150 feet thick, respectively. The sediments of all three formations consist of discontinuous beds of clay, silt, sand, and gravel. Although the proportions of these materials differ in the three formations, it is often difficult to define a sharp boundary between formations. The lower Patuxent Formation is composed mainly of coarse channel deposits (sands and gravels). The abundance of fine material (clays, silty clays, and fine sands) increase in the upper Patuxent. The Arundel Formation is a nearly continuous clay layer. The Patapsco Formation is comprised of sands interbedded with clay layers which vary abruptly in thickness and lateral extent.

From a hydrogeologic perspective, the Patuxent and Patapsco Formations are water-bearing formations (aquifers), and the Arundel Formation is considered a confining layer. Minor confining layers may also be present within the two aquifers. The Arundel's effectiveness as a confining unit means that the Patuxent cannot be affected by the Site.

Site geology was characterized by the collection of split spoon samples in 10 well borings within the upper Patapsco Formation. The boring logs reveal that the predominant geologic material beneath the Site is poorly sorted sand with varying amounts of silt and gravel. Discontinuous silty clay and clay/silt lenses are also present. Figure 3 provides a representative cross-section of the Site showing the relationship and relative thickness of the various units. Figure 4 shows the location of the cross section with respect to the Site. These lenses appear to dip toward the southeast as would be expected from the dip of regional formations. The thickness and continuity of the clay appears to become greater toward the western end of the Site.

Site Hydrogeology

The Patapsco Formation contains discontinuous lenses of silty clay, and clay and silt interspersed with the water-bearing sands as were discovered beneath the MAWP site. The saturated portion of the Patapsco aquifer that is above the lenses is referred to here as the shallow or upper portion of the aquifer, while the saturated portion of the Patapsco below the lenses is referred to as the deep or lower portion of the aquifer. Groundwater monitoring wells were installed above and below the Site lenses. The lenses are not continuous beneath the site; therefore, there is probably not a complete separation between the shallow and deep portions of the Patapsco aquifer. The shallow water table at the Site is 8-12 feet below the surface. The groundwater in both the upper and lower aquifer is moving toward the north-northwest. The linear velocity of groundwater in the upper aquifer is estimated at 95-118 ft/yr; in the lower aquifer it is estimated at 34-41 ft/yr.

Soils

Most of the natural soil at the MAWP site has been covered by a compacted gravel pad. The natural soil in the vicinity of the Site is Evesboro loamy sand. The soil has very low available moisture capacity, low natural fertility and is generally well draining. The soil in the wetland area adjacent to Stony Run is Bibb silt loam. In contrast to the Evesboro loamy sand, this soil is poorly drained.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

In August 1978, water in a shallow residential well hydraulically downgradient of the Mid-Atlantic Wood Preservers facility was found to be contaminated. On August 15, 1978, the Anne Arundel County Health Department sampled Richard Morehead's well (located approximately 300 feet northwest of the Treatment Yard), and found it to contain 7,700 ug/l of hexavalent chromium. The Maryland Water Resources Administration (Md. WRA) also tested this well and observed a total chromium concentration of 19,500 ug/l. These levels exceeded the Federal and State drinking water standard of 50 ug/l for chromium. Subsequently, Md. WRA identified MAWP as a user of chromium and a potential source of groundwater contamination.

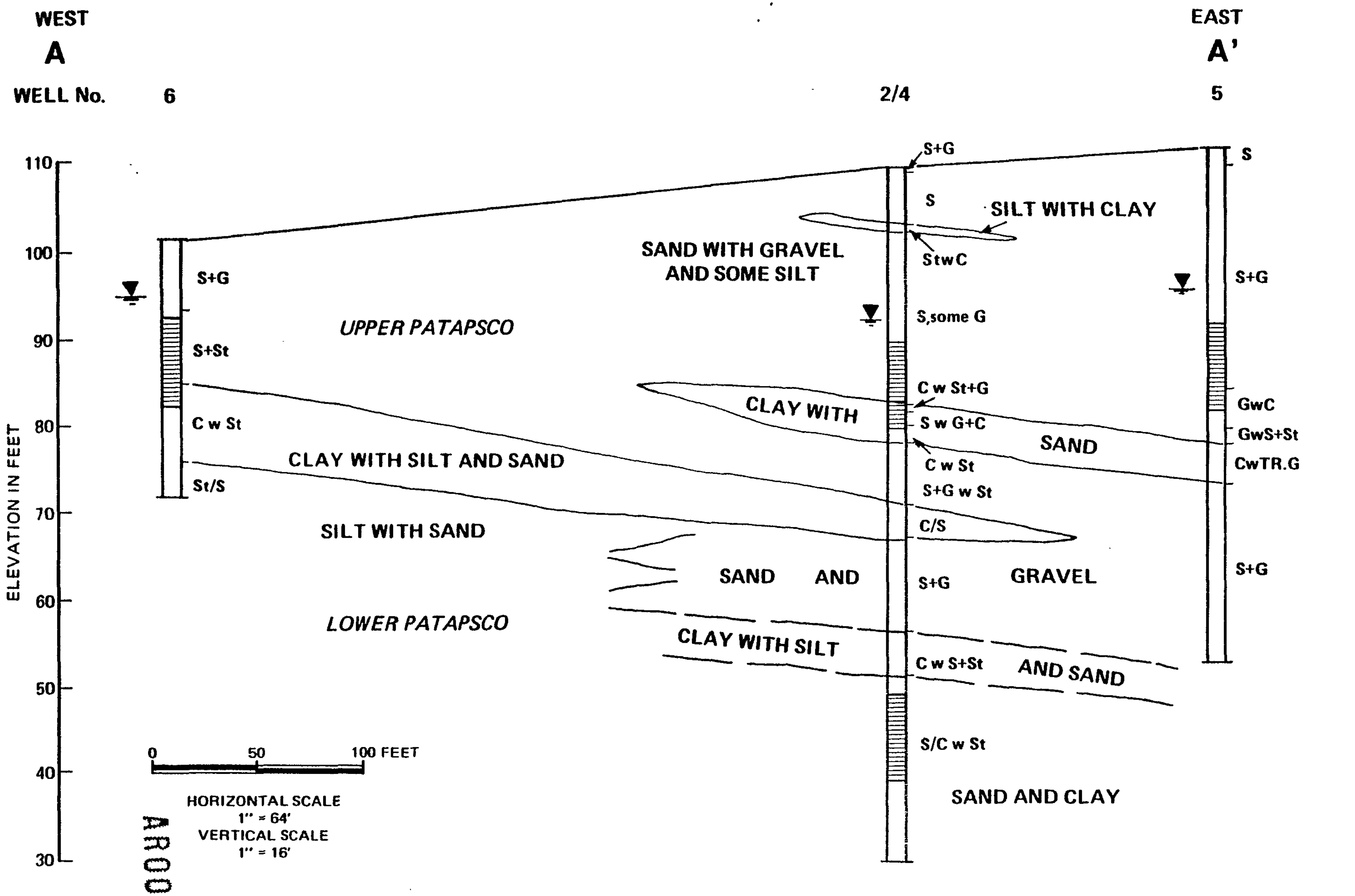


FIGURE 3
SITE GEOLOGIC CROSS SECTION A–A'
PATAPSCO AQU

D & Moore

AR000682

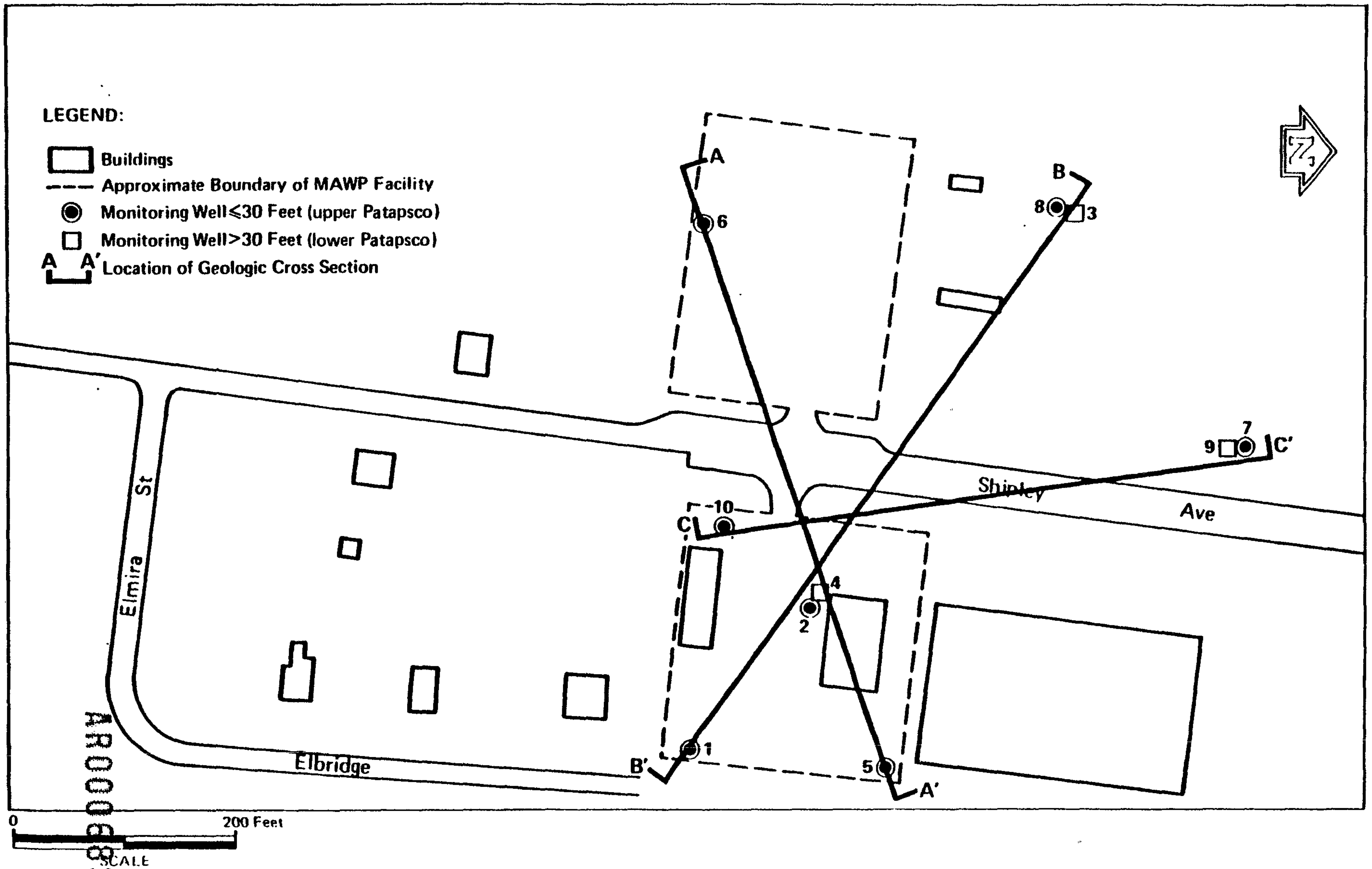


FIGURE 4
BORING LOCATIONS USED TO CONSTRUCT CROSS SECTIONS

Base from Aerial Photo

Dames & Moore

Between October 1978 and January 1979, the Md. WRA performed a more detailed field investigation in the vicinity of Mr. Morehead's well and MAWP in an effort to identify the source of contamination. Md. WRA determined that Mid-Atlantic Wood Preservers had discharged CCA into the soil and that groundwater beneath the facility was contaminated with chromium and arsenic. More specifically, Md. WRA identified an overflow pipe from a tank used for storage of the aqueous chromium, copper, and arsenic wood treating solution as the probable primary source of contamination for the groundwater. The overflow pipe was located at the southwest corner of the main building.

Based on the findings of the investigation Md. WRA issued Administrative Order C-0-79-145, requiring Mid-Atlantic Wood Preservers to develop a plan to remedy the groundwater contamination in the area of the Site. Three amendments to the original order, issued between October 1979 and January 1980, detailed specific remedial measures to be taken and a schedule for such actions to take place. These mandated actions included removal of 26 cubic yards of contaminated soil beneath the overflow pipe; modification of the product storage system to prevent the release of overflows; and installation of a concrete drainage pad designed to collect CCA drippings. In August 1980, MAWP notified the U.S. Environmental Protection Agency (EPA) of its status as a small quantity generator, pursuant to 40 C.F.R. § 261.5, and received an EPA I.D. Number (MDD-064882889) to facilitate the proper disposal of their unreusable process wastes. The facility was inspected by the Maryland Department of Health and Mental Hygiene on November 29, 1980, and was determined to be in compliance with Md. WRA Administrative Order C-0-79-145. During this time period, a private lawsuit regarding contamination of Mr. Morehead's well was filed and settled out of court.

A Site Investigation was performed at the Mid-Atlantic Wood Preservers site by EPA in January 1983. This investigation included collection of environmental samples for organic and inorganic laboratory analysis. Sampling locations included surface waters and sediments in Stony Creek upstream and downstream of the Site, soil borings upgradient and downgradient of the Site, and previously existing Md. WRA groundwater monitoring wells upgradient and downgradient of the Site. The Site Investigation found that although the concentration of arsenic and chromium in the groundwater had declined by nearly one order of magnitude since September 1978, the levels remaining still exceeded drinking water standards. Surface water sampling revealed no evidence of arsenic or chromium pollution in Stony Run; however, copper, which is a component in the wood preserving solution, was detected at 120 ug/l in the downstream aqueous sample. The Site Investigation did not reveal soil contamination (samples taken were from offsite locations).

Based on the analyses of the groundwater monitoring wells, the Mid-Atlantic Wood Preservers Site was proposed for the CERCLA National Priorities List (NPL) in October 1984 and was finalized on the list in May 1986. In July 1986, Mid-Atlantic Wood Preservers, Inc. entered into a Consent Order and Agreement with EPA and MDE to perform a Remedial Investigation and Feasibility Study (RI/FS) at the Site. Mid-Atlantic Wood Preservers, Inc. submitted the final draft of the study in August 1990.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS and Proposed Plan for the Mid-Atlantic Wood Preservers site were released to the public for comment on October 15, 1990. These two documents were made available to the public in both the administrative record and an information repository maintained at the EPA Docket Room in Region III and at the Provinces Library, Severn Square Shopping Center, 2624 Annapolis Road, Route 175, Severn, Maryland, 21144. The notice of availability for these two documents was published in the Maryland Gazette on October 13, 1990, and the Annapolis Capital on October 14th and 15th, 1990. A public comment period on the documents was held from October 15, 1990, to November 14, 1990. In addition, a public meeting was held on November 8, 1990. At this meeting, representatives from EPA and MDE answered questions about the Site and the remedial alternatives under consideration. The comments received during the public comment period, including those expressed verbally at the public meeting, are addressed in the Responsiveness Summary, which is part of this Record of Decision. EPA has thus met the public participation requirements of Sections 113(k)(2)(B) and 117(d) of CERCLA, 42 U.S.C. §§ 9613 (k)(2)(B) and 9617(d).

IV. SCOPE OF RESPONSE ACTION

The principal concerns posed by conditions at the Site are summarized below. The remedial action will address these concerns by treating arsenic-contaminated soils that constitute a principal threat and preventing human exposure to soils which present an unacceptable health risk. In addition, the existing facility will be modified to prevent the introduction of new contamination to site media (i.e., soil and groundwater) and comply with the new requirements regulating wood preserving facilities. This is the only planned response action for this Site.

V. SUMMARY OF SITE CHARACTERISTICS

The contaminants of concern for the Site are chromium and arsenic, which are directly related to the past and present use of chromated copper arsenate for wood preservation by the Mid-Atlantic Wood Preservers facility. Copper is another substance found abundantly in Site soils due to the wood treating operation. Copper is generally not considered a contaminant of concern with respect to human health at the levels detected at the Site. Copper is, however, of special interest because of its potential toxicity to aquatic life.

The relatively large release of CCA solution from the storage tank overflow pipe in the mid-1970's led to chromium and arsenic contamination of the groundwater beneath and downgradient of the Site; however, recent sampling results indicate that there is little residual effect from that release. Arsenic was not detected at any of the ten groundwater sampling locations; chromium was detected in one shallow well at a concentration exceeding the current drinking water standard. All surface soils located in the Treatment Yard and the westernmost third of the Storage Yard have been contaminated with arsenic, and to a lesser degree, chromium. The soil contamination is most likely the result of wood preserving solution leaching from wood which has been removed from the concrete drip pad before it has completely dried.

Soils

Surface (0-0.5') and subsurface (3-3.5' and at the groundwater table) soil samples were collected and analyzed from thirteen onsite locations (Figure 5). The analyses identified concentrations of total chromium (trivalent and hexavalent species), copper and arsenic in surface soils located in the Treatment Yard significantly higher than background concentrations (Table 1). As can be seen from Figures 6-8, the distribution patterns between metals are nearly identical, clearly implicating the CCA solution as the source of contamination. The highest concentrations of contaminants are found in samples taken near the drip pad. One surface soil sample, taken adjacent to the drip pad, contained an arsenic concentration greater than 1,000 mg/kg (Sample SC-9A=1200 mg/kg arsenic).

The analyses of the subsurface samples reveal a sharp reduction in concentrations of these metals at depth. At the 3 to 3.5 foot depth, the metals concentrations begin to approach the concentrations expected in background samples. The only exception is the sample taken adjacent to the northern edge of the drip pad. All soil samples taken deeper than 3.5 feet contained concentrations of chromium, copper and arsenic representative of background levels. The depth to which contamination extends is estimated to average 2 feet in the Treatment Yard and westernmost third of the Storage Yard. The total volume of degraded soils located onsite is estimated to be approximately 5,200 cubic yards in place.

Consideration of the geochemical properties of arsenic, chromium, and copper indicates that the latter two metals are adsorbed by all soil materials, while the first--arsenic--becomes adsorbed preferentially to clay and humic acids. These adsorption characteristics provide the principal explanation for the environmental behavior of these metals in soil at the MAWP site. Vertical migration of the three metals has been impeded by their adsorption to soils underlying the site.

On May 24, 1990, EPA collected additional surface soil samples from five locations on the MAWP site (Figure 9). This sampling event was undertaken to determine the concentration of hexavalent chromium relative to the total chromium concentration. The samples were analyzed for hexavalent and total chromium, and arsenic (Table 2). All five samples contained less than 1 mg/kg of hexavalent chromium. Total chromium results ranged from 23.2 mg/kg in the eastern portion of the Storage Yard to 570 mg/kg in the Treatment Yard near the drip pad. Arsenic results ranged from 10.8 mg/kg in the eastern portion of the storage yard to 633 mg/kg in the treatment yard near the drip

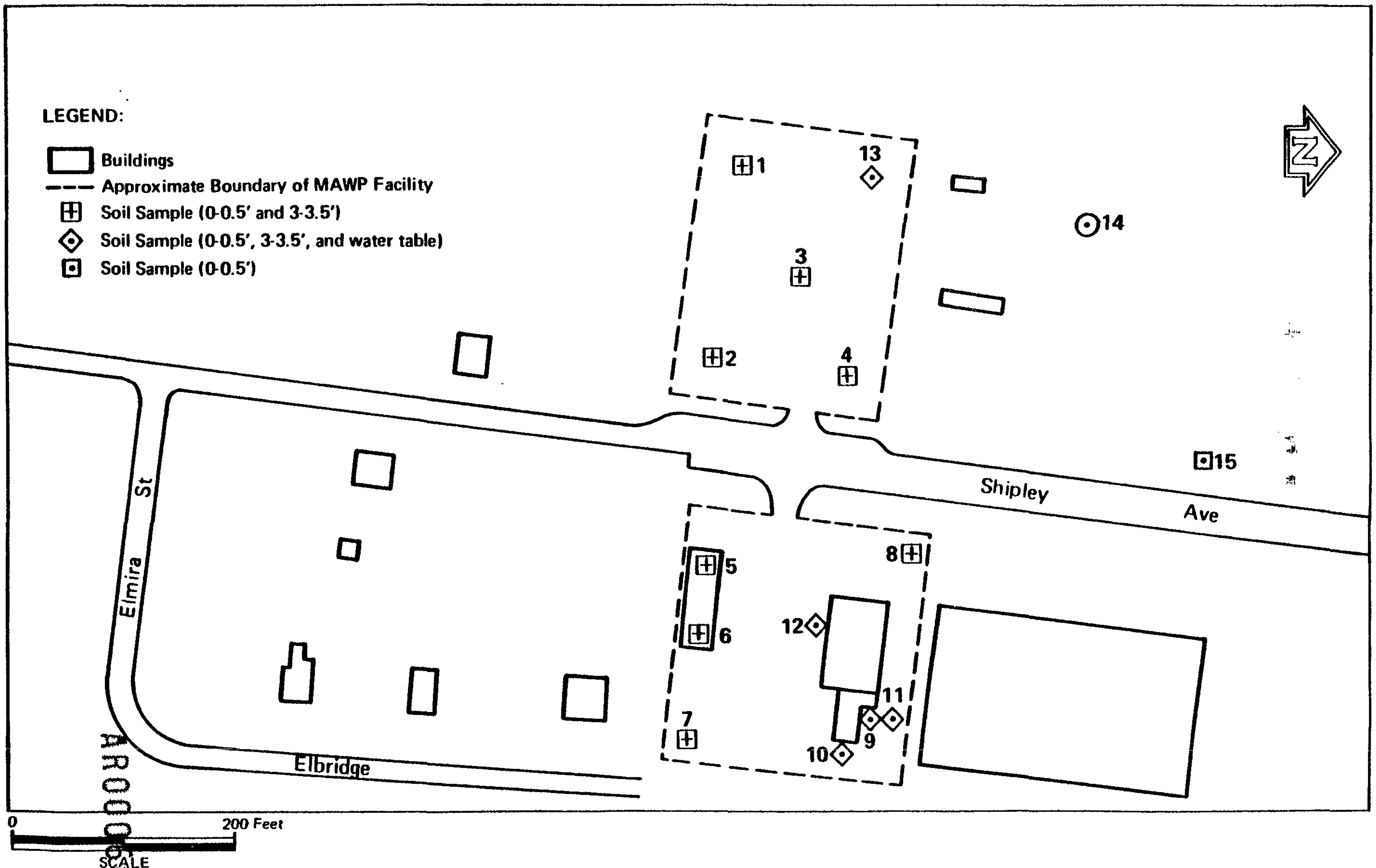


FIGURE 5
SOIL SAMPLING LOCATIONS

Base from Aerial Photo

Dames & Moore

Table 1

Concentrations of Chromium, Copper, and Arsenic in Soil Samples Mid-Atlantic Wood Preservers January 1989

Sample	Depth (ft.)	Chromium (mg/kg)	Copper (mg/kg)	Arsenic (mg/kg)
SC-1A	0-0.5	198	104	96
SC-1B	3-3.5	BDL	BDL	BDL
SC-2A	0-0.5	60	BDL	3.3
SC-2B	3-3.5	5.1	BDL	BDL
SC-3A	0-0.5	9.7	BDL	BDL
SC-3B	3-3.5	3.6	BDL	BDL
SC-4A	0-0.5	9.6	BDL	3.2
SC-4B	3-3.5	5.3	BDL	BDL
SC-5A	0-0.5	201	129	30
SC-5B	3-3.5	10	6.8	5.5
SC-6A	0-0.5	70	49	18
SC-6B	3-3.5	8.7	BDL	6.7
SC-7A	0-0.5	62	53	61
SC-7B	3-3.5	7.4	BDL	BDL
SC-8A	0-0.5	377	348	223
SC-8B	3-3.5	28	23	14
SC-9A	0-0.5	865	1,280	1,200*
SC-9B	3-3.5	82	19	133
SC-10A	0-0.5	346	362	403
SC-10B	3-3.5	4.6	BDL	BDL

Table 1 (con't)

Concentrations of Chromium, Copper, and Arsenic in Soil Samples Mid-Atlantic Wood Preservers January 1989

Sample	Depth (ft.)	Chromium (mg/kg)	Copper (mg/kg)	Arsenic (mg/kg)
SC-11A	0-0.5	277	216	251
SC-11B	3-3.5	5.2	BDL	BDL
SC-12A	0-0.5	252	351	204
SC-12B	3-3.5	6.9	BDL	27
SC-13A	0-0.5	293	185	242
SC-13B	3-3.5	4.5	BDL	BDL
Detection Limits		2	5	2

Acid digestion technique used for sample analysis.
BDL - Below detection limit.
* - Single location identified above 1,000 mg/kg arsenic. Soils containing greater than 1,000 mg/kg arsenic have been determined to be a principal threat.

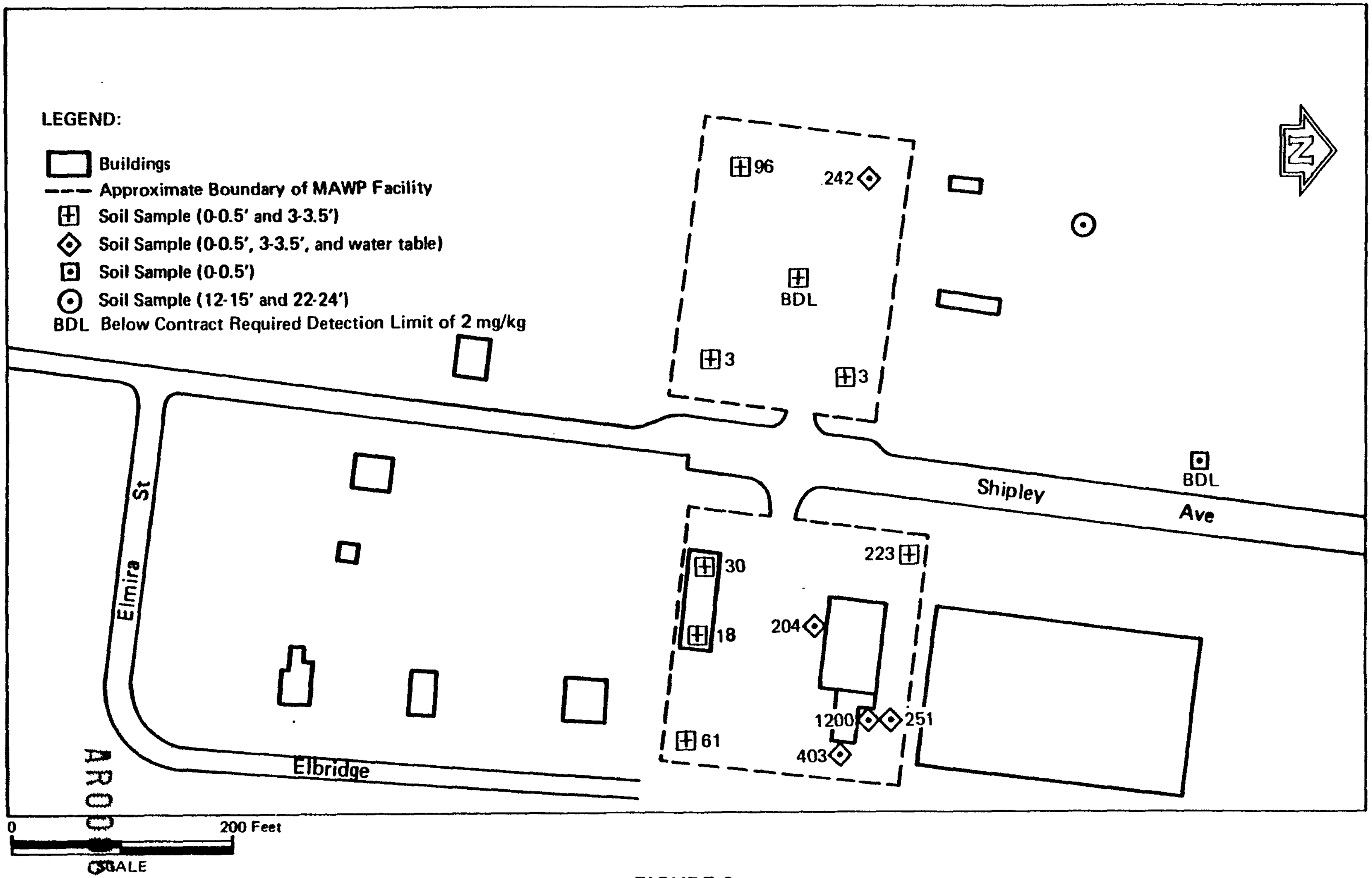


FIGURE 6
CONCENTRATION OF ARSENIC IN SOIL (Mg/Kg), 0-0.5′

Base fro ial Photo

& Moore

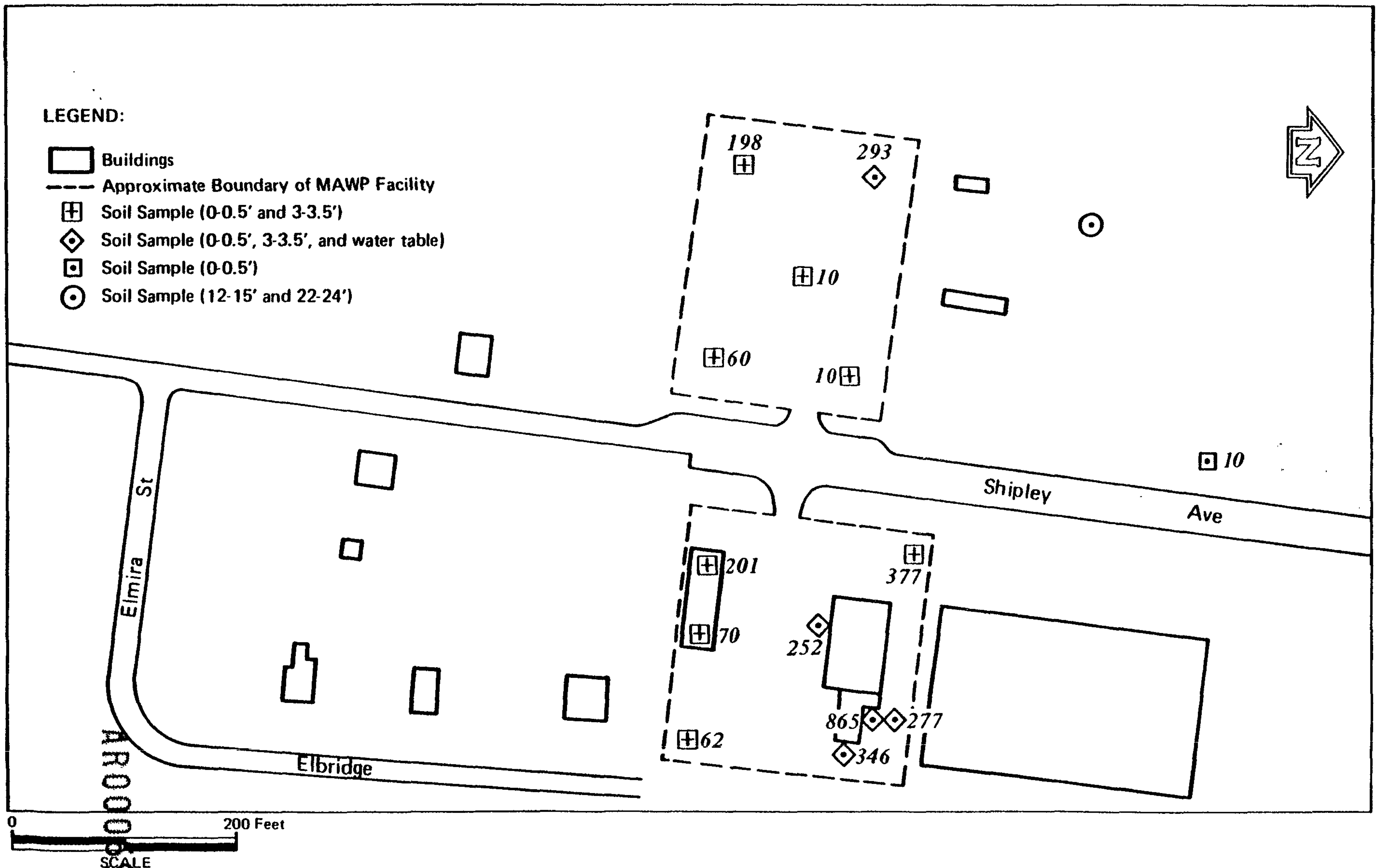


FIGURE 7
CONCENTRATION OF CHROMIUM IN SOIL (Mg/Kg), 0-0.5'

Base from Aerial Photo

Dames & Moore

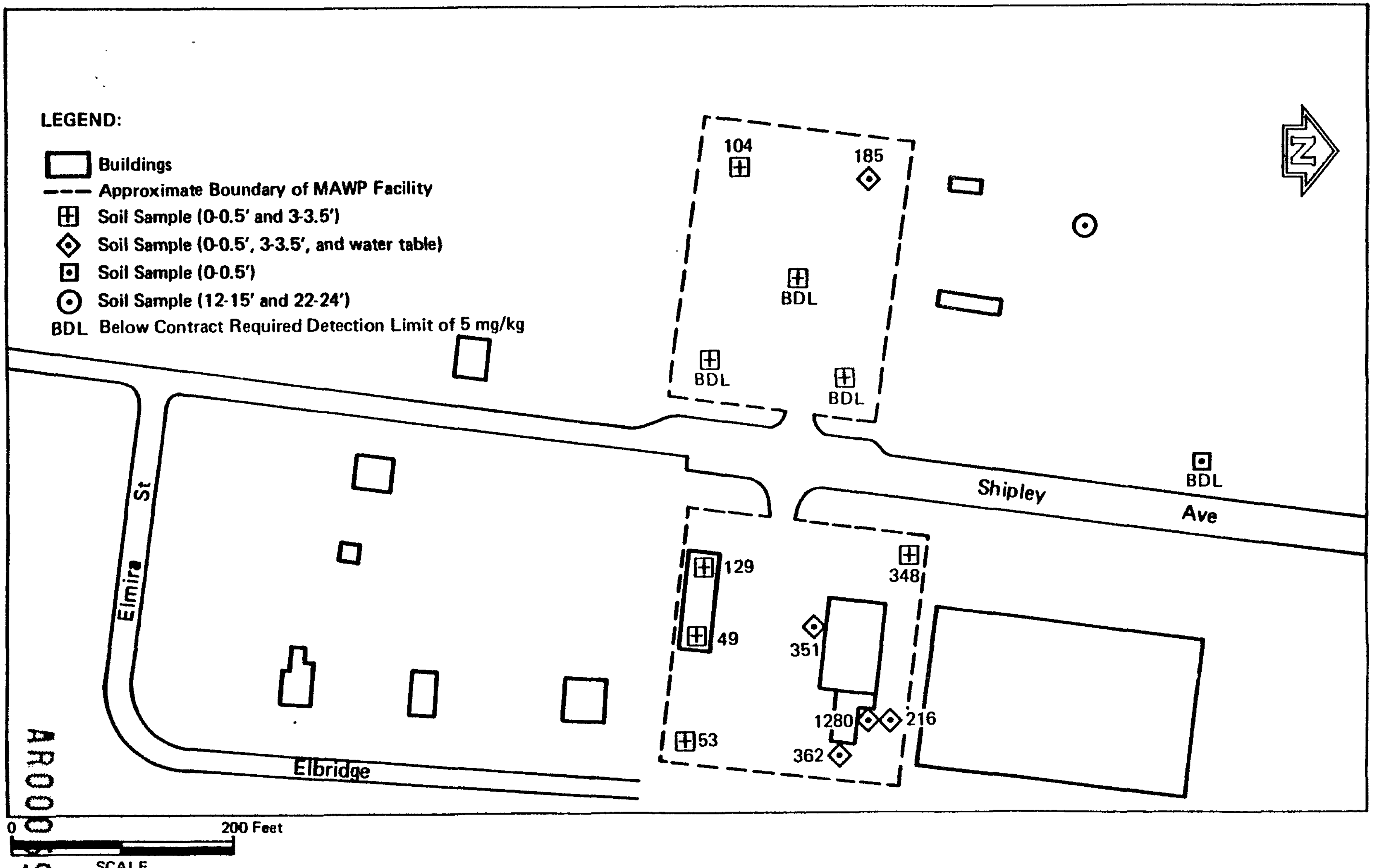
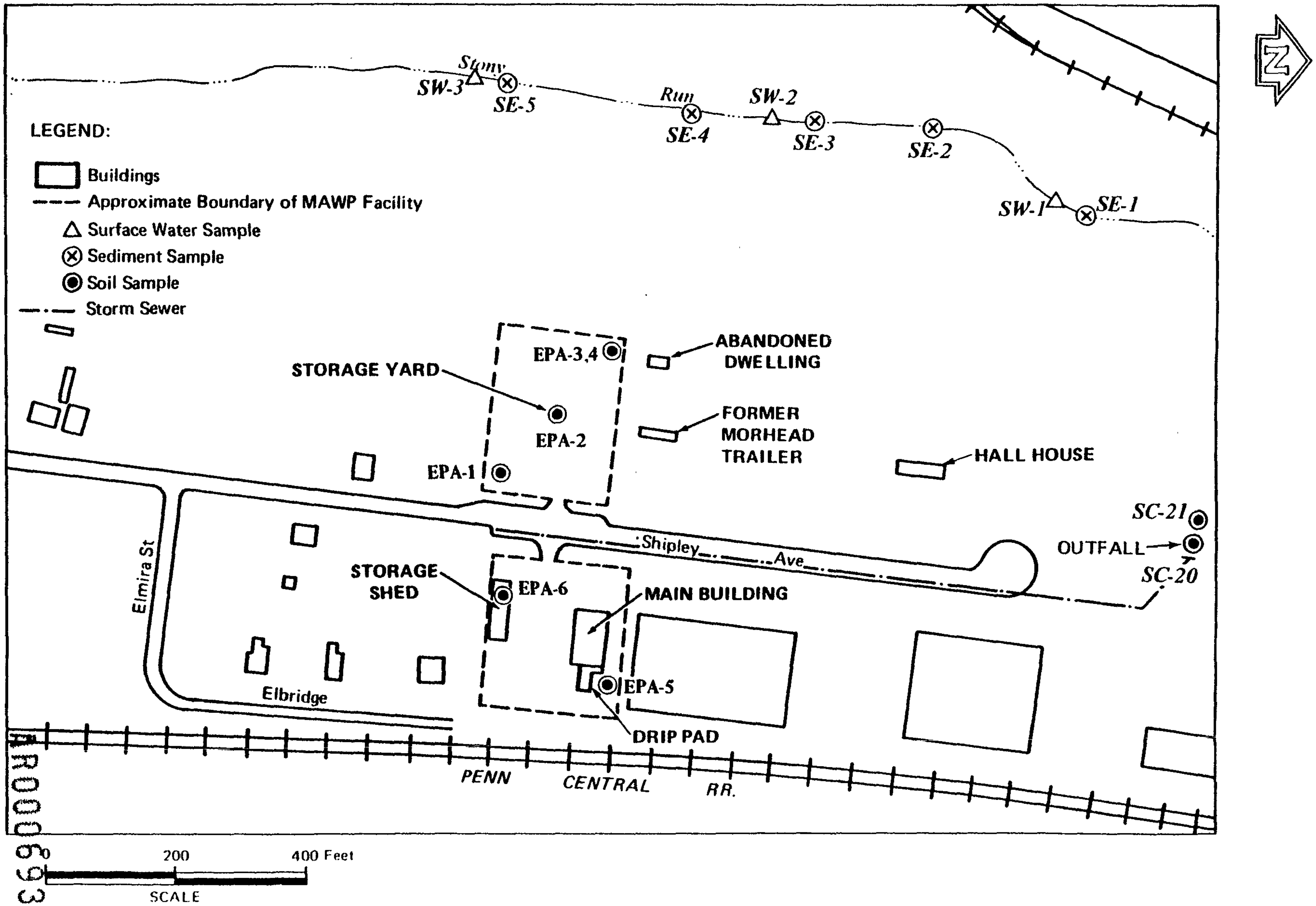


FIGURE 8
CONCENTRATION OF COPPER IN SOIL (Mg/Kg), 0-0.5'

Base fro[...]erial Photo

Dames & Moore

AR000[...]92



AR000693

FIGURE 9
SURFACE WATER, SEDIMENT, AND
SOIL SAMPLING LOCATIONS

Dames & Moore

Table 2

Analytical Results for Onsite Soil Sampling
Mid-Atlantic Wood Preservers
May 1990

Sample	Depth (ft.)	Hexavalent Chromium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Arsenic (mg/kg)
EPA-1	0-0.5	0.40	23.2	NA	10.8
EPA-2	0-0.5	0.40	56.6	NA	13.0
EPA-3	0-0.5	0.50	127.6	NA	199.2
EPA-4	0-0.5	0.70	157.2	NA	20.3
EPA-5	0-0.5	0.62	570.0	NA	633.3
EPA-6	0-0.5	0.58	106.1	NA	93.3

NA - Not analyzed.

pad. This is meaningful because trivalent chromium (chromium III) is far less toxic (200X) than hexavalent chromium (chromium VI) with respect to noncarcinogenic health hazards and is not a suspected carcinogen. Chromium VI is a potential human carcinogen through the inhalation exposure route. Arsenic is a potential carcinogen through the ingestion and inhalation route. Human exposure to contaminated soils can occur through both the inhalation and inadvertent ingestion route considering current site conditions.

Groundwater

Ten groundwater monitoring wells were installed and sampled during the Remedial Investigation (Figure 10). Seven of the monitoring wells were screened in the upper Patapsco aquifer (above the discontinuous clay lenses) and three wells were screened in the lower Patapsco. The monitoring wells were sampled during February and March 1989 and the analyses were performed on unfiltered water samples (Table 3). Four of the monitoring wells (Nos. 2, 3, 4, and 8) were analyzed for the Target Compound List (TCL) and the Total Analyte List (TAL). The other six monitoring wells were analyzed for arsenic, copper and chromium only.

Chromium concentrations were found not to exceed current federal or state drinking water standards (50 ug/l[1]) at eight of the monitoring well locations; however, analyses of groundwater extracted from monitoring well Nos. 1 and 8 identified elevated levels of chromium (62 and 151 ug/l, respectively). The high concentration of aluminum that was also detected in well No. 8 suggested that the well may have been improperly developed prior to sample collection. Aluminum is relatively insoluble in water and is frequently used as an indicator of unusually high levels of particulates in unfiltered samples. The presence of particulates in a water sample extracted from a newly installed well yield analytical results that are biased high. The water sample extracted from monitoring well No. 1 was not analyzed for aluminum.

Monitoring well Nos. 1 and 8 were resampled using both filtered and unfiltered methods to determine if the previous sampling results were representative of water quality in the upper aquifer. A comparison of filtered versus unfiltered samples at well Nos. 1 and 8 showed dissimilar results. At well No. 1, the chromium concentration in the filtered sample was below detection, while the unfiltered sample was 88 ug/l chromium. This result indicates that the chromium present is likely adsorbed onto particulates and not dissolved in the water. Only dissolved metals would be expected to be found in a developed residential well. However, at well No. 8, the filtered and unfiltered analyses are virtually identical, with 68 and 69 ug/l of chromium detected, respectively. Therefore, at well No. 8 the

[1]Based on the most recent scientific information documenting the toxicity of chromium, EPA has proposed that the Maximum Contaminant Level (MCL or "drinking water standard") for chromium in drinking water be increased from 50 to 100 ug/l. The Final Rule is pending.

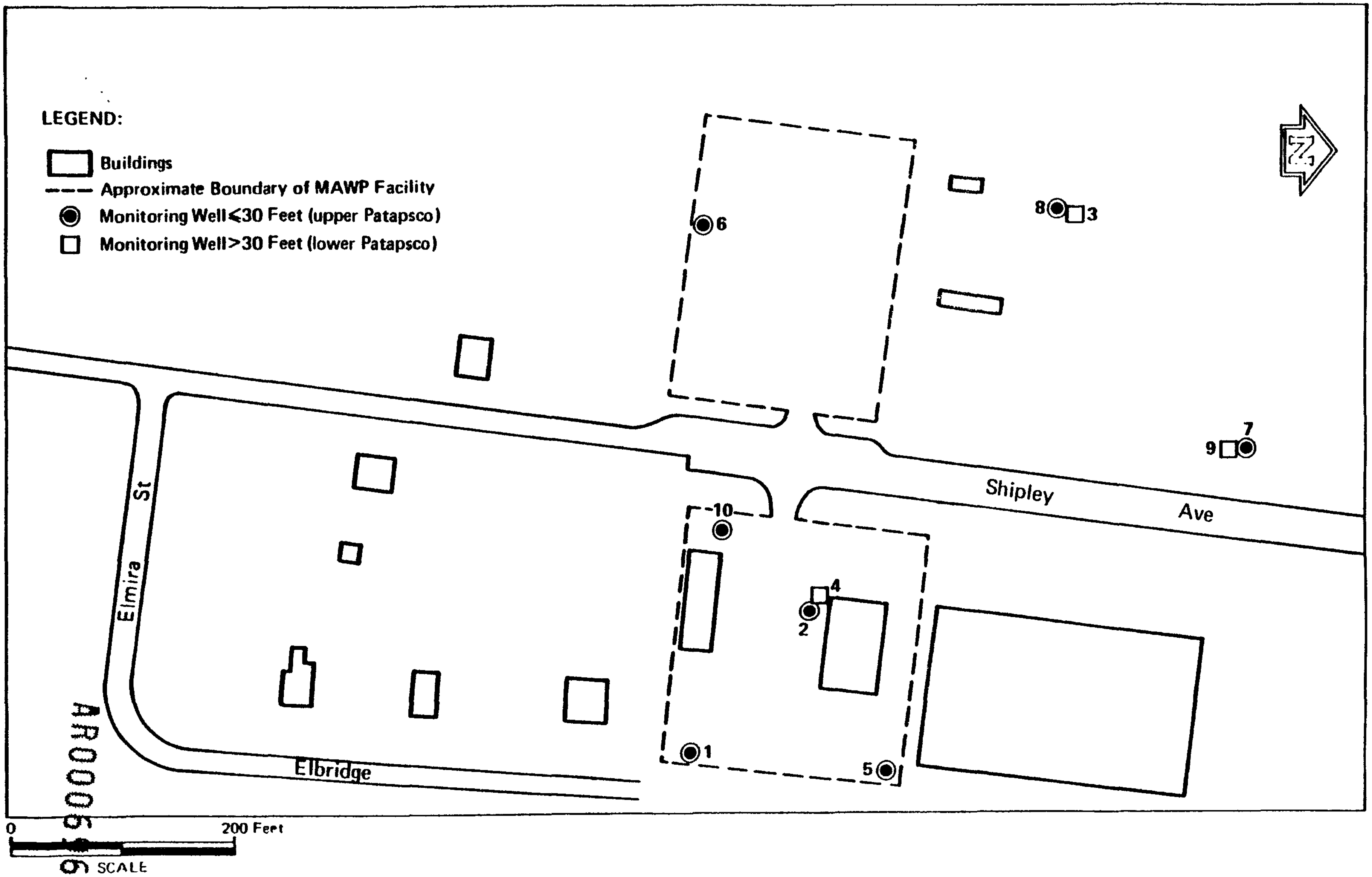


FIGURE 10
MONITORING W[illegible] LOCATIONS

B3se fro[illegible]ial Photo

Da[illegible] & Moore

Table 3

Concentrations of Chromium, Copper, Arsenic, and Aluminum in Groundwater Samples

Mid-Atlantic Wood Preservers

Monitoring Well	Date	Chromium	Copper	Arsenic	Aluminum
DETECTION LIMITS		10 ug/l	25 ug/l	10 ug/l	200 ug/l
UNFILTERED SAMPLES					
GW-1	02-27-89	62	76	BDL	NA
GW-1	05-04-89	88	63	BDL	NA
GW-2	02-28-89	37	BDL	BDL	4,060
GW-3	02-28-89	BDL	26	BDL	259
GW-4	02-28-89	16	BDL	BDL	1,150
GW-5	02-27-89	BDL	BDL	BDL	NA
GW-6	02-27-89	39	BDL	BDL	NA
GW-7	02-27-89	27	BDL	BDL	NA
GW-8	02-28-89	151	39	BDL	11,000
GW-8	05-04-89	69	BDL	BDL	NA
GW-9	02-27-89	BDL	BDL	BDL	NA
GW-10	03-01-89	21	25	BDL	NA

FILTERED SAMPLES

GW-1	05-04-89	BDL	BDL	BDL	NA
GW-8	05-04-89	68	BDL	BDL	NA

Notes: BDL = Below Detection Limit.
NA - Not Analyzed

chromium present is dissolved in the groundwater. Dissolved metals that are present in groundwater extracted at a residential well would be available to receptors at the well.

Well No. 8 was installed in the shallow portion of the aquifer and is hydraulically downgradient of the Site. However, chromium was not detected in the adjacent well No. 3, which was installed in the deeper portion of the aquifer. Comparison of chromium levels in the other two shallow and deep well pairs also shows chromium levels to be higher in the shallow portion of the aquifer. This differentiation between the shallow and deeper portion of the aquifer indicates that the clay lenses may be restricting the vertical migration of the groundwater.

The Federal and State drinking water standard for arsenic is 50 ug/l; EPA has proposed that 1,300 ug/l be promulgated as the drinking water standard for copper (final rule pending). Arsenic was not identified above the detection limit (10 ug/l) and copper was not detected above 76 ug/l in any of the ten monitoring wells, nor were any of the TCL/TAL substances identified above background concentrations. Therefore, chromium is the only contaminant of concern in the groundwater.

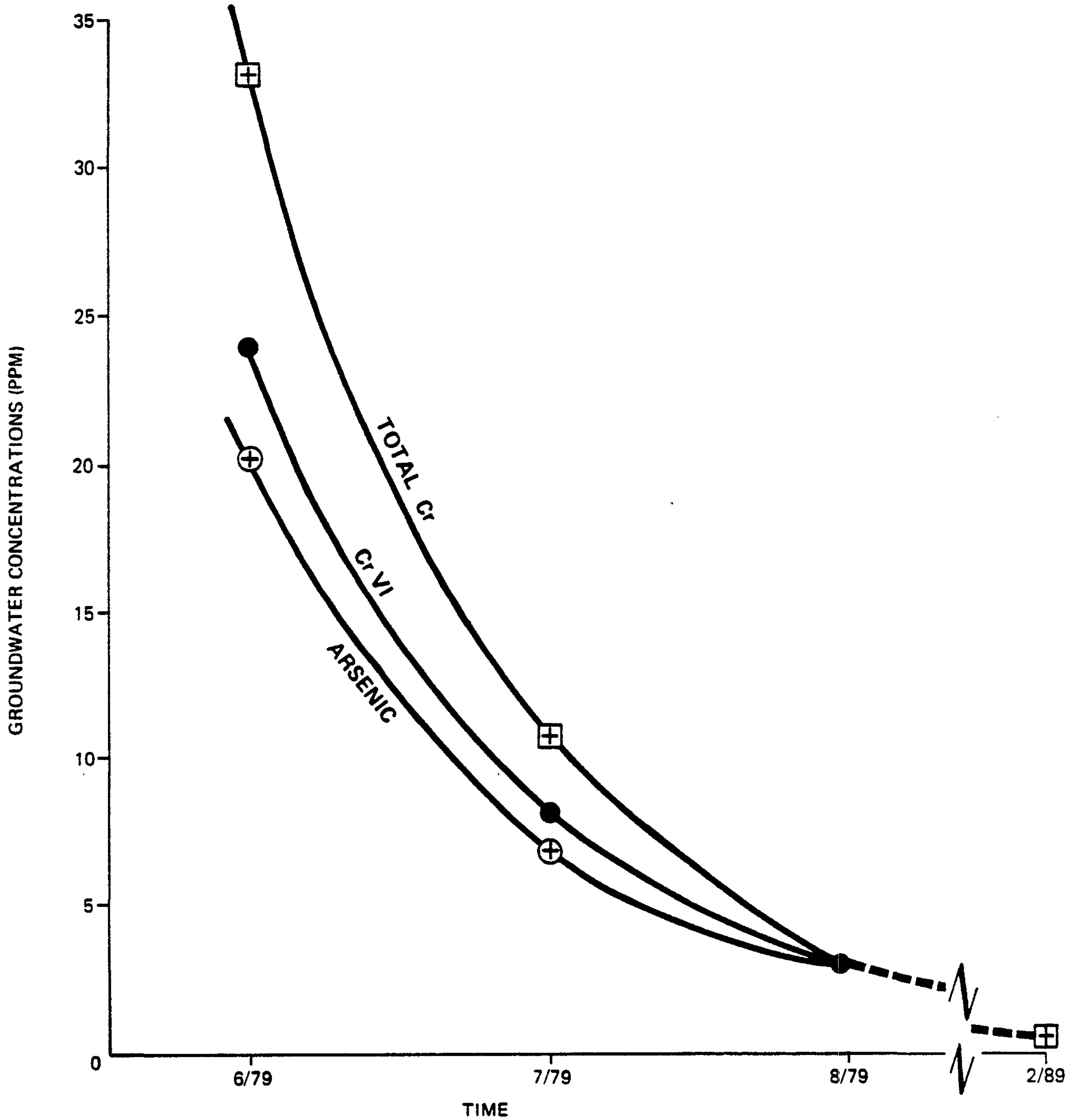
Analysis of the current metals concentrations compared to past results indicate that the concentrations of arsenic and chromium have been steadily decreasing in the shallow aquifer below, and down-gradient of, the MAWP site. This phenomenon is illustrated in Figure 11 in which arsenic and chromium concentrations, measured in MD WRA well No. 6 and its replacement, Dames & Moore well pair Nos. 2 and 4, are plotted over time. The shape of the curves suggest a logarithmic drop in the concentration of metals during the 11-year period. A model (solute transport in groundwater) generated in an effort to predict the effectiveness of natural attenuation on the chromium concentration in the groundwater suggests that levels should recede to below 50 ug/l within three months, assuming that no additional chromium migrates into the aquifer.

Surface Water and Sediments

Stony Run is not currently being impacted by the Mid-Atlantic Wood Preservers site. Three surface water samples and five sediment samples were collected from Stony Run (Figure 9). All of the collected samples were analyzed for chromium, copper and arsenic (Table 4). These metals were not detected in any surface water samples. Copper and chromium were detected in sediment samples at concentrations within the normal range expected as background for this area. Copper concentrations ranged from below detection (5 mg/kg) to 45 mg/kg and chromium ranged from 4.3 to 20 mg/kg. Arsenic was not detected in any sediment samples.

Soils Near Storm Sewer Outfall

Surface water runoff from the Treatment Yard flows to a storm drain that runs northward beneath Shipley Avenue. The storm water is released from an outfall into a flood plain approximately 400 feet



PRE-1989 DATA SOURCE: Vroblesky, 1979

Chromium MCL is 0.05 ppm
Arsenic MCL is 0.05 ppm

AR000699

FIGURE 11
DECREASE IN METAL CONCENTRATIONS IN THE VICINITY OF MD WRA WELL No. 6

Dames & Moore

Table 4

Concentrations of Chromium, Copper, and Arsenic in Stony Run
Mid-Atlantic Wood Preservers
December 1988

Surface Water*

Sample	Chromium	Copper	Arsenic
Detection Limits	10 ug/l	25 ug/l	10 ug/l
SW-1	BDL	BDL	BDL
SW-2	BDL	BDL	BDL
SW-3	BDL	BDL	BDL

Sediments**

Sample	Chromium	Copper	Arsenic
Detection Limits	2 mg/kg	5 mg/kg	2 mg/kg
SE-1	9.5	10	BDL
SE-2	4.3	BDL	BDL
SE-3	10	14	BDL
SE-4	16	22	BDL
SE-5	20	45	BDL

* Surface water samples were unfiltered.
** Acid digestion technique used for sample analysis.
BDL - Below detection limit.

Table 5

Analytical Results for Soil Near Storm Sewer Outfall
Mid-Atlantic Wood Preservers
March 1990

Sample	Depth (ft.)	Hexavalent Chromium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Arsenic (mg/kg)
SC-20A	0-0.5	NA	59.7	21.3	15.6
SC-20B	3-3.5	NA	54.4	47.8	37.1
SC-21A	0-0.5	NA	40.0	27.3	27.5
SC-21B	3-3.5	NA	15.2	15.1	BDL
Detection Limits			5	4	2

BDL - Below detection limit
NA - Not analyzed

AR000701

east of Stony Run.Four soil samples were collected from two locations near the storm sewer outfall on March 12, 1990. At each location, a sample was collected at the surface (0-0.5 feet) and at depth (3-3.5 feet). The sampling locations were at the mouth of the outfall and at a spot approximately 33 feet downgradient of the outfall in the flood plain (Figure 9). The samples were analyzed for arsenic, total chromium and copper. The analytical results are presented in Table 5. Comparing these results to the local mean background concentrations presented in Table 6, chromium and copper appear to be present at background concentrations. Arsenic concentrations in three of the four samples collected appear elevated over the expected background concentration, but within the range of naturally occurring soils.

VI. SUMMARY OF SITE RISKS

A primary component of the remedial investigation is the public health and environmental risk assessment. In this instance, the risk assessment defined the potential and actual risks to human health and the environment resulting from the presence of hazardous substances at the Site.

To determine whether there is an actual exposure or a potential for exposure at this Site with respect to surface soils and groundwater, the most likely pathways of contaminant release and transport, and the human and environmental activity patterns in the area were considered. A complete exposure pathway has three components:

1. a source of contamination that can be released into the environment;
2. a route of contamination; and
3. an exposure or contact point for humans or the environment (plants and animals).

Potential sources of contamination were determined to be:

1. onsite surface soils;
2. upper-Patapsco groundwater (lower Patapsco has not been impacted); and
3. surface soil near storm sewer outfall.

The contaminants of concern are arsenic and chromium in the surface soils and chromium in the groundwater. Potentially exposed human and environmental receptors are:

1. onsite and neighboring workers through incidental ingestion of soil (e.g., hand-to-mouth contact) and inhalation of fugitive dust;

2. children and adolescents through incidental ingestion of soil (e.g., while playing near the storm sewer outfall); and

3. local residents and workers through ingestion of groundwater.

Table 6

Ranges and Averages of Metals in Uncontaminated Soils
Mid-Atlantic Wood Preservers

Chemical	Regional Mean[1] Concentration (mg/kg)	Local Mean[2] Concentration (mg/kg)	Range of[3] Concentrations (mg/kg)	Comments
Arsenic	7.4	6.1	1-50	Usually 10 mg/kg or less
Chromium	52	63	1-1000	
Copper	22	33	2-100	

1 - Mean of concentrations for soils collected throughout the eastern United States (USGS, 1984).

2 - Mean of three soil samples collected from Maryland counties surrounding MAWP (USGS, 1981). Used for comparison to MAWP soils data.

3 - Brown and Associates (1983)

There are currently no drinking water wells located in the upper-Patapsco formation in the proximity of the Site; therefore the groundwater is not currently available for use. Potable water is provided by the Anne Arundel County public water supply. Because there is no current exposure to groundwater, the calculated risks posed by groundwater ingestion apply only to potential future usage and are not risks currently posed by present site conditions.

To calculate the risk to public health, certain exposure estimates were made based on human activity patterns.

The dust inhalation rate was set 2.45 m^3/hr for a 70-kg adult. The ambient dust concentration is assumed to be completely derived from onsite soils. The concentration of arsenic and hexavalent chromium in the surface soil represents the concentration of the contaminants in the dust. The absorption fraction was specified as 100%.

The incidental ingestion rate of soil by onsite and neighboring workers was set at 100 mg/day for a 70-kg adult. The absorption fraction was specified as 100%.

Common to both evaluated scenarios for workers, the exposure frequencies were 5 days a week, 48 weeks per year for 40 years. A lifetime was considered to be 70 years. Present and future site use scenerios were industrial.

The incidental ingestion rate of offsite soil by children playing near the storm sewer was set at 100 mg/day. The absorption fraction was specified as 100%. The exposure frequency for an 8-12 year old, 31-kg child was once a week, 39 weeks per year for 4 years. The exposure frequency for a 13-18 year old, 56-kg adolescent was once a week for 13 weeks per year for 6 years.

The ingestion rate of groundwater by local residents was set at 2 liters/day for a 70-kg adult. The absorption fraction was specified as 100%. The exposure duration was assumed to be 70 years out of a 70-year lifetime.

Toxicity Assessment Summary

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals (Table 7). CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at the intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Table 7

Toxicity Parameters for Contaminants of Concern
Mid-Atlantic Wood Preservers

Compound	PF_o $(mg/kg/day)^{-1}$	PF_i $(mg/kg/day)^{-1}$	RfD_o (mg/kg/day)	RfD_i mg/kg/day)
Arsenic	1.75[a]	50[b]	--	--
Chromium (VI)	--	41[b]	(5×10^{-3})[b]	--
Chromium (III)	--	--	1.0[b]	--
Copper	--	--	(3.7×10^{-2})[c]	(1×10^{-2})[c]
Manganese	--	--	0.22[c]	--

PF_o - Potency Factor for oral exposure, carcinogenic effects.

PF_i - Potency Factor for inhalation exposure, carcinogenic effects.

RfD_o - Reference Dose for oral exposure, noncarcinogenic effects.

RfD_i - Reference Dose for inhalation exposure, noncarcinogenic effects.

[a]Value derived from unit risk value (IRIS, 1989) using drinking water exposure scenario of ingestion of 2 liters/day by 70-kilogram adult. The unit risk value has recently been withdrawn by USEPA and is being revised. It is still used here for lack of another value.

[b]Source: (IRIS, 1989).

[c]Source: Public Health Risk Evaluation Database (USEPA, 1988).

AR000705

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects (Table 7). RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated soil) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

Risk Characterization Summary

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-5}$ or 1E-5). An excess lifetime cancer risk of $1x10^{-5}$ indicates that as a plausible upper bound, an individual has a one in one hundred thousand chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site. The summary of total potential carcinogenic risks (Table 8) shows that the potential carcinogenic risk at this Site is dominated by incidental ingestion of onsite surface soils by workers. The incidental ingestion of contaminated surface soils and inhalation of dust generated from those soils present a potential carcinogenic risk of $5.3x10^{-4}$ and $4.0x10^{-5}$, respectively. The combined risk to workers from both the incidental ingestion and inhalation exposure routes is $5.7x10^{-4}$, meaning that approximately one additional person out of 2,000 exposed is at risk of developing cancer. The calculated carcinogenic risk presented by exposure of children to offsite soils near the storm sewer outfall is $1.2x10^{-6}$ (approximately one additional person out of 875,000).

The potential for health effects resulting from exposure to noncarcinogenic compounds is estimated by comparing an estimated daily dose presented by site conditions to the reference dose (i.e., the dose at which no adverse impacts would be expected). If this ratio exceeds 1.0, there is a potential health risk associated with exposure to that particular chemical. These ratios can be added for exposures to multiple contaminants. The sum, known as a Hazard Index, is not a mathematical prediction of the severity of toxic effects, but rather a numerical indicator of the transition from acceptable to unacceptable levels. Table 9 presents a summary of the total potential Hazard Indices for the exposure scenarios previously discussed. None of the total Hazard Indices exceeds 1.0 for the exposure scenarios described in the Remedial Investigation. Thus, there is no cause of concern for noncarcinogenic risk to human health at the Mid-Atlantic Wood Preservers Site. Although the concentration of chromium in the groundwater exceeds the current regulatory standard, the risk assessment determined that consumption of the water would not present an unacceptable health hazard (HI = 0.89).

Table 8

Summary of Total Potential Carcinogenic Risk

Media	Scenario	Risk
Onsite Surface Soil/Dust* (workers)	Incidental Ingestion	5.3×10^{-4}
	Inhalation	4.0×10^{-5}
Soils Near Storm Sewer** (children)	Incidental Ingestion	1.2×10^{-6}
Groundwater (residents)	Ingestion	None

* Onsite soil/dust risks were calculated using the upper bound confidence limits (95th percentile) derived from the treatment yard.

** Offsite soil risks were calculated using the highest pollutant concentrations detected during sampling.

Note: Chromium is not a known or suspected carcinogen through the oral ingestion exposure route.

AR000707

Table 9

Summary of Total Potential Non-Carcinogenic Hazard Indices

Media	Scenario	Hazard Index
Onsite Surface Soil/Dust* (workers)	Incidental Ingestion	.016047
	Inhalation	.000567
Soil Near Storm Sewer** (children)	Incidental Ingestion	.0002988
Groundwater (residents)	Ingestion	.89

* Onsite soil/dust hazards were calculated using the upper bound limits for the treatment yard.

** Offsite soil hazards were calculated using the highest pollutant concentrations detected during sampling.

If the Hazard Index exceeds 1.0, there is a potential health hazard associated with exposure to the medium.

AR000708

The range within which EPA manages carcinogenic risk is 10^{-4} to 10^{-6}. Arsenic is a natural constituent of all soils and is commonly found at levels exceeding 10^{-6} risk. To achieve a 10^{-6} risk, the arsenic concentration in the soil would have to be reduced to 1.1 ppm for worker exposure onsite and 3.8 ppm for children living offsite who may be exposed to storm sewer soils by incidental ingestion. However, these levels are below local mean arsenic background concentration (approximately 6.1 mg/kg) in naturally occurring soils. EPA and MDE have determined that preventing exposure to onsite contaminated soil exceeding 10 mg/kg of arsenic at the Mid-Atlantic Wood Preservers site would reduce the excess lifetime cancer risk to less than 10^{-5}. This remediation target would reduce the probability of developing cancer as a result of exposure to the contaminants in the soil from one in 2,000 to less than one additional person in 100,000. The concentration of hexavalent chromium in soils associated with a 10^{-6} risk is 2.0 mg/kg (trivalent chromium is not a suspected carcinogen). The highest observed hexavalent chromium concentration in onsite soils was 0.7 mg/kg; hence, the presence of chromium in onsite soils does not drive the remedial action. Because there are no federal or state "cleanup" standards for contamination in soil, these targets (10 mg/kg arsenic and 2.0 mg/kg hexavalent chromium) were established for this Site as part of the risk assessment conducted during the RI/FS.

One soil sample taken adjacent to the drip pad contained an arsenic concentration greater than 1,000 mg/kg, which presents a carcinogenic risk above $1x10^{-3}$ (one in 1,000). Any soils containing 1,000 mg/kg arsenic or greater were determined to be a principal threat at the site because exposure would lead to a carcinogenic risk two orders of magnitude greater than levels that allow for unrestricted use. The objective of the remedial alternatives developed for this Site was to reduce direct contact exposure to an acceptable level, as well as to ensure that the migration of chromium and arsenic into the groundwater is minimized.

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

VII. DESCRIPTION OF ALTERNATIVES

Six remedial alternatives (including No Action) were developed as possible response actions to provide an appropriate level of protection to human health and the environment.

Alternative 1: No Action - Monitoring Only

Capital Cost:	**0**[2]
Annual Operating and Maintenance (O&M) Costs:	**$ 4,000**
Present Worth :	**$45,000**
Months to Implement:	**None**

AR000709

[2] All costs and implementation times referenced in this record of decision are estimates.

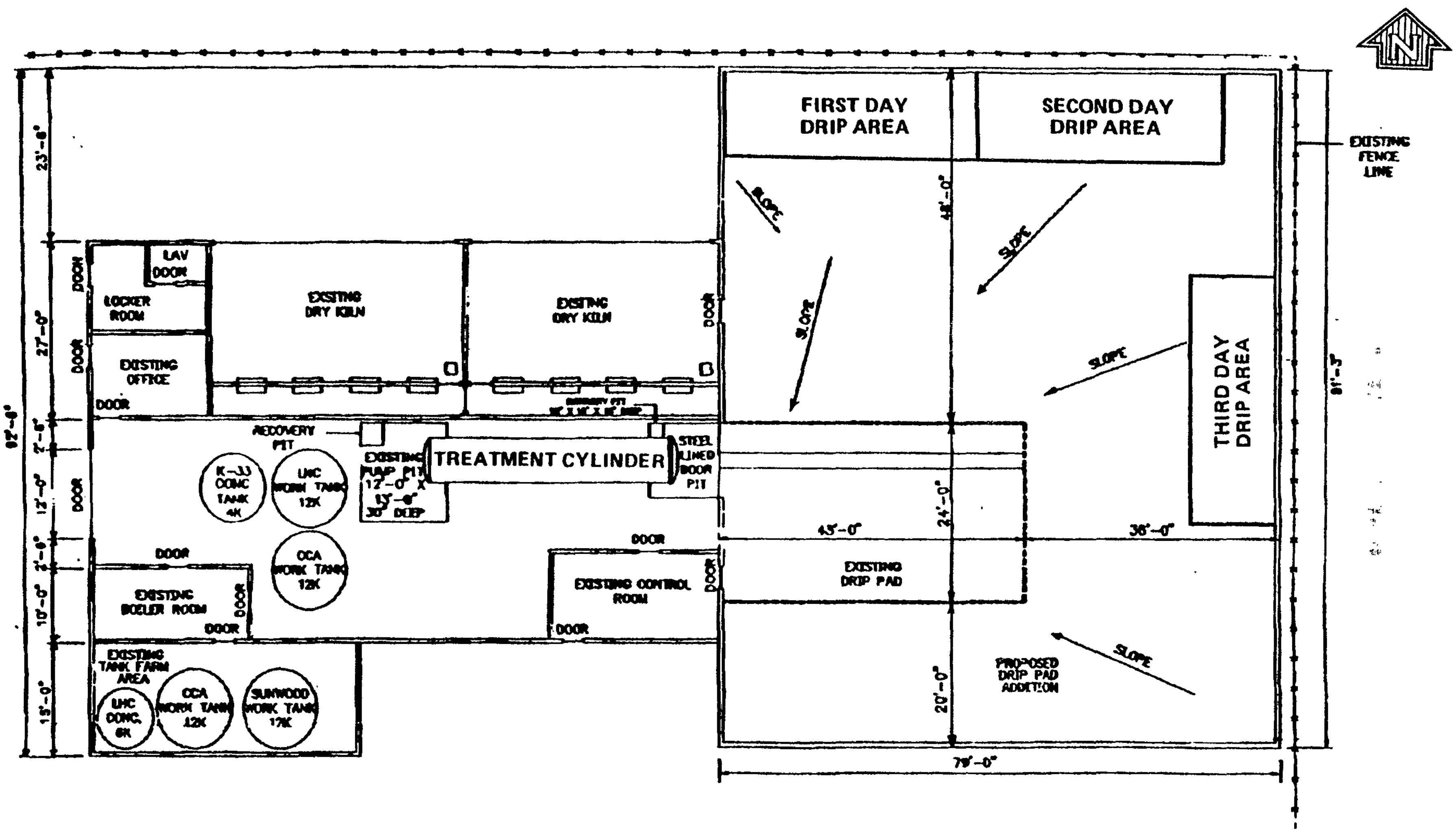
Section 300.430(e)(6) of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), 55 Fed. Reg. 8,849 (March 8, 1990) (to be codified at 40 C.F.R. § 300.430(e)(6)), requires that EPA consider a "No Action" alternative for each and every site to establish a baseline for comparison to alternatives that do require action. This alternative involves taking no action at the Site to remove, remediate or contain the contaminated soils, nor modify the existing facility. Under the "No Action" scenario, periodic air, surface water and groundwater monitoring would be conducted throughout the area. A review would be conducted every five years as required under Section 121(c) of CERCLA, 42 U.S.C. § 9621(c). This alternative does not result in the reduction of any risks associated with the Site.

Alternative 2: Cover Contaminated Soil Areas In The Treatment Yard With Gravel, Cover Contaminated Soil Areas In The Storage Yard With Geotextile And Gravel, Construct And Roof An Enlarged Drip Pad, Allow Natural Attenuation Of Groundwater Contamination, Conduct Long-Term Maintenance and Monitoring, And Implement Deed Restriction

Capital Cost:	**$189,000**
Annual O&M Cost:	**$ 11,500**
Present Worth:	**$318,400**
Months to Implement:	**3**

This alternative involves enlarging the existing drip pad from 24x43 feet to about 79x91 feet and covering the entire pad with a roof (Figure 12). The expansion of the concrete drip pad would, in effect, contain the most contaminated soil area (adjacent to existing pad) with a low-permeability cap. This cap would significantly reduce the potential leaching of contaminants, the generation of airborne dust and human contact with contaminated soils beneath the pad. The dripped chemicals and limited precipitation on the pad would be collected in a properly lined sump pit and recycled. Contaminated soils (exceeding 10 mg/kg arsenic) on the remainder of the Site would be covered with a compacted and graded gravel layer to reduce the generation of contaminated dust and human contact with degraded soils. The identified areas exhibiting contamination in excess of the above-mentioned level include the western third of the Storage Yard and all unpaved areas in the Treatment Yard. Because the western end of the Storage Yard is underlain by soft soils, a layer of geotextile would be placed on the ground surface prior to gravel placement to reinforce the layer of gravel and minimize damage from vehicular traffic and natural causes.

A model (solute transport in groundwater) generated in an effort to predict the effectiveness of natural attenuation on the chromium concentration in the groundwater suggests that levels should recede to below 50 ug/l within three months of construction completion. This model assumes that no additional chromium migrates into the aquifer. Although construction of an enlarged, roofed drip pad and modification of the facility's standard operating procedures consistent with the new wood treatment regulations (55 Fed. Reg. 50,450 (December 6, 1990)) should eliminate the release of any new contamination into the soils,



AR000711

FIGURE 12
PROPOSED DRIP PAD EXPANSION
IN RELATION TO MAIN BUILDING

SOURCE: Mid-Atlantic Wood Preservers

Dames & Moore

the installation of a compacted gravel cover will continue to allow some chromium currently in the soil to leach from soils exposed to rainfall.

Periodic air, surface water and groundwater monitoring would be conducted to gauge the effectiveness of the remedy. A deed restriction would be implemented to ensure that containment components would not be compromised by future use of the property.

Alternative 3: Pave Contaminated Soil Areas With Asphalt/Concrete, Construct And Roof An Enlarged Drip Pad, Allow Natural Attenuation Of Groundwater Contamination, Conduct Long-Term Maintenance and Monitoring, And Implement Deed Restriction

Capital Cost:	**$239,000**
Annual O&M Cost:	**$ 6,500**
Present Worth:	**$312,200**
Months to Implement:	**3**

Alternative 3 is similar to Alternative 2 with respect to source control (enlarging and roofing the drip pad). Therefore, reference should be made to Alternative 2 for the description of these actions. This alternative differs from Alternative 2 in the containment action for the remaining contaminated soils. An asphalt/concrete cap would be placed over those portions of the Treatment Yard that would not be covered by the treatment plant, enlarged drip pad, or currently paved parking area. Contaminated soil areas in the Storage Yard would also be paved with an asphalt/concrete cap. Any contaminated soils that m[illegible] have eroded outside the perimeter of the facility, to be determined during pre-design activities, will be consolidated under the cap. Paving material will be selected during the remedial design. Figure 13 presents the locations of the areas of the different actions.

The construction of an asphalt/concrete cap over the contaminated soils would prevent direct contact with, and inhalation of, potentially harmful dust generated from those soils; provide a durable cover that would resist deterioration due to vehicular traffic; prevent upward migration of contaminants from the underlying gravel and soils; and reduce downward leaching of contaminants from the soils to the groundwater. In addition to a long-term maintenance plan, periodic air, surface water and groundwater monitoring would be conducted to gauge the effectiveness of the remedy. A deed restriction would be implemented to ensure that containment components would not be compromised by future use of the property.

Alternative 3A:

Capital Cost:	**$ 249,400**
Annual O&M Cost:	**$ 6,500**
Present Worth:	**$ 322,600**
Months to Implement	**3-6**

This is a hybrid alternative that was developed by incorporating provision for treatment of "hot spots," areas containing greater than 1,000 mg/kg arsenic which are determined to be a principal threat at

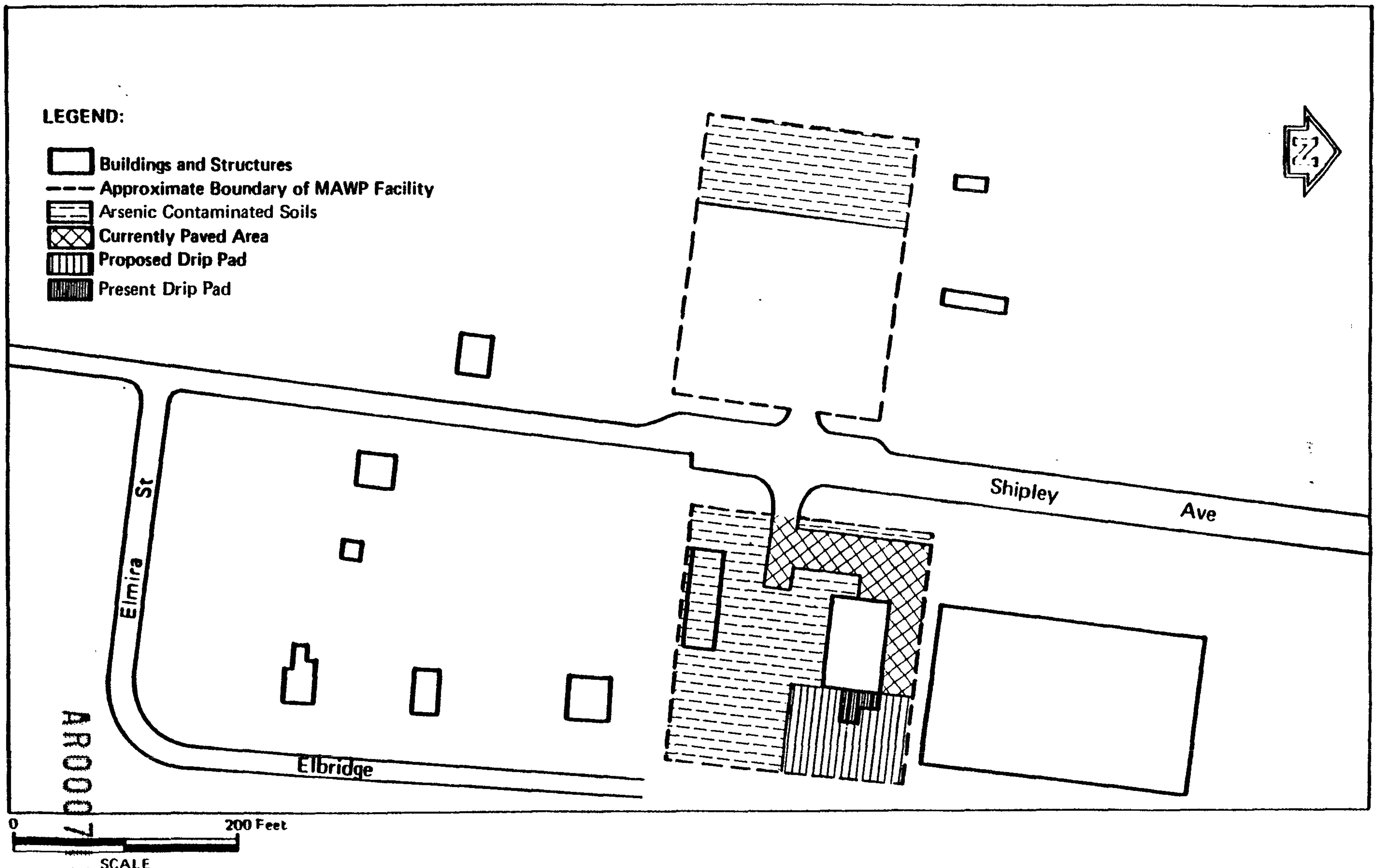


FIGURE 13
SELECTED REMEDIAL ACTION FOR IMPLEMENTATION

Base from Aerial Photo

Dames & Moore

this Site, into Alternative 3. This modification involves excavation, stabilization and offsite disposal of any soils containing greater than 1,000 mg/kg arsenic. All other provisions of Alternative 3, described above, would remain unchanged (soils containing greater than 10 mg/kg but less than 1,000 mg/kg arsenic would be contained in place).

It is difficult to estimate the volume of soils likely to contain greater than 1,000 mg/kg arsenic because the remedial investigation only identified one location exceeding that level (directly adjacent to the existing drip pad). A conservative estimate assumes that soils to a depth of one foot and within a two yard perimeter of the drip pad contain concentrations of arsenic in excess of 1,000 mg/kg. Excavation of such soils around the 30-yard perimeter would yield approximately 20 cubic yards of highly contaminated soil. These soils would be stabilized by blending with portland cement, water and a proprietary chemical used to chemically bind the contaminants and subsequently disposed at an approved offsite location. Alternative 3A would achieve substantial risk reduction and meet the preference for treatment of principal threats through stabilization of the highly concentrated areas and by providing for the effective containment of other soils that will remain on site.

Alternative 4: Excavate Contaminated Soils, Treat Excavated Soils Via Stabilization and Dispose In An Offsite RCRA Landfill, Replace Excavated Soils With Clean Fill, Construct And Roof An Enlarged Drip Pad, Allow Natural Attenuation Of Groundwater Contamination, And Conduct Long-Term Maintenance and Monitoring

Capital Cost:	**$2,700,000**
Annual O&M Cost:	**$ 5,000**
Present Worth:	**$2,750,000**
Months to Implement	**6-12**

This alternative involves demolition and removal of the present drip pad, the excavation and removal of the uppermost 2 feet of soils (approximately 5,200 cubic yards) in the contaminated areas, disposal of those soils in an offsite RCRA landfill, and construction of a new roofed drip pad similar to that described in Alternative 2. The excavated soils would have to be stabilized prior to disposal in a permitted hazardous waste landfill to comply with land disposal restrictions. The pad would be broken up and steam cleaned to remove any residual CCA. The concrete debris would then be sampled and disposed of appropriately. Because soil directly beneath the existing drip pad has not been analyzed, it would also be sampled and handled appropriately (offsite disposal if contaminated or remain in place if not). The excavated material would be replaced by clean backfill. Periodic air, surface water and groundwater monitoring would be conducted to gauge the effectiveness of the remedy.

Alternative 5: Excavate Contaminated Soils, Treat Excavated Soils Onsite Via Stabilization, Replace Treated Soils, Regrade Site, Construct And Roof An Enlarged Drip Pad, Cover Treated Soils With Clean Fill And Gravel, Allow Natural Attenuation Of Groundwater Contamination, And Conduct Long-Term Maintenance and Monitoring

Capital Cost:	**$ 943,900**
Annual O&M Cost:	**$ 12,200**
Present Worth:	**$1,080,000**
Months to Implement:	**6-12**

This alternative is similar to Alternative 4 with respect to demolition and removal of the existing drip pad and the excavation of contaminated soils; however, the excavated soils would be treated onsite using a stabilization process. The stabilization process would result in a volume increase in the range of 30 to 50 percent. A suitable onsite location for long-term storage/disposal of treated soils would be selected during the remedial design phase. In compliance with RCRA land disposal requirements, a low permeability liner would be installed to underlie the stabilized soils and a hydraulic barrier, less permeable than the liner would be constructed over the disposal area. A new, roofed drip pad would be constructed similar to that described in Alternative 2 (Figure 12). A deed restriction would be implemented to ensure that the integrity of the disposal area would not be compromised by future use of the property. Periodic air, surface water and groundwater monitoring would be conducted to gauge the effectiveness of the remedy.

Costs associated with liner and cap installation are not included in the cost estimate.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The following nine criteria were used in the evaluation of the remedial action alternatives for the Mid-Atlantic Wood Preservers Site:

Threshold Criteria

1) Overall protection of human health and the environment; and

2) Compliance with applicable or relevant and appropriate requirements.

Primary Balancing Criteria

3) Long-term effectiveness and permanence;

4) Reduction of toxicity, mobility or volume through treatment;

5) Short-term effectiveness;

6) Implementability; and

7) Cost.

Modifying Criteria

8) State/support agency acceptance; and

9) Community acceptance.

A brief description of each of these criteria is provided in Table 10.

Table 10

NINE EVALUATION CRITERIA

1. Overall Protection of Human Health and the Environment: Addresses whether the remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

2. Compliance with ARARs: Refers to whether or not a remedy will meet all Applicable or Relevant and Appropriate Requirements (ARARs) of federal and state environmental statutes and/or provides grounds for invoking a waiver. It also addresses whether or not the remedy complies with advisories, criteria and guidance that EPA and MDE have agreed to follow.

3. Long-Term Effectiveness and Permanence: The ability of the remedy to maintain reliable protection of human health and the environment over time once the "clean-up" goals have been met.

4. Reduction of Toxicity, Mobility or Volume Through Treatment: Relates to the anticipated performance of the treatment technologies with respect to these criteria.

5. Short-Term Effectiveness: Refers to the period of time needed to achieve protection, and any adverse impacts on human health and the environment that may be posed during the construction and implementation, until "clean-up" goals are achieved.

6. Implementability: The technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. Cost: The following costs are evaluated: estimated capital, operation and maintenance, and net present worth.

8. State Acceptance: This indicates whether, based on its review of the RI/FS and the Proposed Plan, the State concurs with, opposes or has no comment regarding the preferred alternative.

9. Community Acceptance: This indicates whether, based on its review of the RI/FS and Proposed Plan, the community concurs with, opposes or has no comment on the previously identified preferred alternative. Community comments and the Agency's responses have been included in the Responsiveness Summary.

Overall Protection of Human Health and the Environment

All of the alternatives, with the exception of the "no action" alternative, would provide adequate protection of human health and the environment by eliminating, reducing or controlling risk through treatment or engineering controls. Alternative 3 (paving) would provide a stable low-permeability barrier over the contaminated surface soil (exceeding 10 mg/kg arsenic), thus reducing the risks from inadvertent ingestion and inhalation of fugitive dust and the potential for migration of contaminants to groundwater. Alternative 3A (treatment of "hot spots", paving) would couple excavation and stabilization of highly contaminated soils to the provisions incorporated in Alternative 3. Since arsenic and chromium III are naturally bound to soil particles, excavation and stabilization of soils (Alternative 5) would be only marginally more effective at immobilizing the contaminants. Alternative 4 (stabilization, offsite landfilling) also provides a high level of overall protection. Alternative 3 would provide greater reliability and permanence in preventing human exposure than Alternative 2 (gravel cover). Construction of the enlarged drip pad is expected to result in the gradual decline of chromium concentrations in the groundwater to below the MCL by natural attenuation in the aquifer. The "no action" alternative is not protective of human health and the environment, since it would allow exposure to arsenic concentrations which could result in carcinogenic risks above EPA's acceptable risk range (i.e., 10^{-4} to 10^{-6}). Therefore, this alternative is not discussed further in this comparative analysis as an option for this site.

Compliance with ARARs

All alternatives, with exception of Alternatives 1 and 2, would meet their respective applicable or relevant and appropriate requirements of federal and state environmental laws (ARARs). Chromated copper arsenate was listed as a RCRA hazardous waste on November 15, 1990; therefore, RCRA landfill closure requirements and land disposal restrictions are applicable. By controlling the source of contamination, natural attenuation modeling suggests that chromium concentrations should recede to below 50 ug/l chromium within three months of construction completion. Paving the relevant areas (Alternative 3) and implementation of a long-term groundwater monitoring plan would meet RCRA closure requirements. The excavation alternatives would meet land disposal restrictions through stabilization of soils and placement in an EPA-approved facility. The enlarged, roofed drip pad included in all the action alternatives is consistent with the new regulations for wood treating facilities.

Alternative 3A (treatment of "hot spots", paving), Alternative 3 (paving), Alternative 4 (stabilization, offsite landfilling), and Alternative 5 (onsite stabilization), would comply with their respective ARARs.

Long-Term Effectiveness and Permanence

All of the action alternatives incorporate construction of an enlarged, roofed drip pad which should be very effective in preventing future releases of chromated copper arsenate solution to the environment. Alternative 4 (stabilization, offsite landfilling) would have the highest long-term effectiveness because all degraded soils would be removed from the Site and disposed of in an offsite landfill. Alternative 3A (treatment of "hot spots," paving) is a hybrid of Alternatives 3 and 4. Soils presenting a principal threat (soils containing greater than 1,000 mg/kg arsenic) would be removed, stabilized and disposed of in an offsite landfill and exposure to remaining degraded soils would be eliminated by containing the contaminated soils onsite under a permanent asphalt/concrete cap. The deed restriction will guarantee the permanence of the remedy by ensuring that the property is utilized in a manner consistent with the containment remedial objective. Alternative 3 (paving) would eliminate exposure through containment only and ensure permanance by implementation of a deed restriction. Alternative 5 (onsite stabilization) would also be effective in eliminating long-term risks by binding contaminants within the soil and then storing this material in an appropriate manner. Alternative 2 (gravel cover) would require an extensive long-term maintenance program to maintain adequate performance.

Reduction of Toxicity, Mobility, or Volume of the Contaminants Through Treatment

Alternatives 4 (stabilization, offsite landfilling) and 5 (onsite stabilization) would treat the soils to reduce the toxicity, mobility or volume of the contaminants. Alternative 3A (treatment of "hot spots," paving) would treat soils determined to present a principal threat. Stabilization would reduce the mobility of the contaminants, although the volume of the stabilized soil would increase 30 to 50 percent and toxicity would be unchanged. Alternative 3 (paving) would also reduce the mobility of Site contaminants by virtually eliminating dust generation and vertical infiltration of precipitation through the degraded soil, although this reduction would still be less than that achieved by the treatment technologies. Alternative 2 (gravel cover) would also reduce dust generation and direct contact with contaminated soils through placement of clean gravel over the degraded soils but it would do little to prevent the vertical migration of precipitation. A more stringent air monitoring program would be required to ensure that dust generated is not contaminated.

Short-Term Effectiveness

Current Site conditions pose a long-term risk to onsite and nearby workers, but the short-term risk is low. Capping the Site (Alternatives 2 and 3) would reduce exposures by inadvertent ingestion and inhalation and could be implemented in appropriately three months. Excavation of "hot spots" and containing the remaining degraded soils onsite (Alternative 3A) could be implemented within 3 to 6 months. Complete excavation, stabilization and off-or-onsite placement (Alternatives 4 and 5) would take between 6 and 12 months to complete

Because stabilization involves soil excavation and handling, some increased risk from exposure to dust exists, although dust-control procedures would minimize these risks. Excavation of less volume (Alternative 3A) would present less short-term risk.

Implementability

All action alternatives would be technically feasible to implement. Services, equipment, trained personnel and supplies are readily available. No difficulties are anticipated for Alternative 3. An adequate gravel cover (Alternative 2) may prove difficult to maintain due to vehicular traffic. Long-term air monitoring associated with the gravel cover alternative would be extensive because contaminated and uncontaminated soils would be indistinguishable by visual inspection. The excavation and transport of contaminated soils (approximately 5,200 cubic yards associated with Alternative 4 or 20 cubic yards associated with Alternative 3A) would require extra care during handling activities; the smaller volume associated with Alternative 3A makes this alternative less burdensome in this regard. Alternative 5 (onsite stabilization) would be the most difficult to design and construct because of the earthmoving that would be required and the increased volume associated with the treated material. In addition, identification of an acceptable onsite location for construction of the disposal unit may be problematic due to a relatively high water table.

Cost

CERCLA requires selection of a cost-effective remedy (not merely the lowest cost) that protects human health and the environment and meets other requirements of the statute. Project cost includes all construction, monitoring and maintenance costs incurred over the life of the project. An analysis of the present worth value of these costs has been completed for each alternative described in this Record of Decision, and is summarized in Table 11. Capital costs include those expenditures necessary to implement a remedial action. Annual monitoring and maintenance costs are included in the present worth cost. The cost, in order of most to least, is Alternative Nos. 4, 5, 3A, 2 and 3.

Community Acceptance

The Proposed Plan was released to solicit public comment regarding the proposed remedial alternatives on October 15, 1990. At that time a 30-day comment period was opened. A public meeting on the Proposed Plan was held November 8, 1990, in Hanover, Maryland. Comments raised at the public meeting and received during the comment period are summarized in the Responsiveness Summary which is included in this Record of Decision. In general, the public did not object to any of the remedial alternatives.

Table 11

Cost-Comparative Analysis
Mid-Atlantic Wood Preservers

	Capital Cost	Annual O&M Cost[a]	Present Worth Cost[b]
Alternative 1	$ 0	$ 4,000	$ 45,000
Alternative 2	189,000	11,500	318,000
Alternative 3	239,000	6,500	312,000
Alternative 3A	249,400[c]	6,500	322,400
Alternative 4	2,700,000	5,000	2,750,000
Alternative 5[d]	944,000	12,200	1,080,000

[a] The costs associated with long term surface water and sediment sampling are not included in this cost summary.

[b] A discount factor of 8 percent per year was assumed with annual costs incurred for 30 years.

[c] The costs associated with the treatment of highly contaminated soils are based on the unit costs developed for Alternative 4. Since significantly smaller volumes of soil will be handled under Alternative 3A, the unit cost will likely be substantially higher.

[d] Costs associated with liner and cap installation are not included in this cost estimate.

State Acceptance

The State of Maryland has concurred with the selected Remedial Action for this site.

IX. THE SELECTED REMEDY

After consideration of the requirements of CERCLA and an evaluation of the alternatives and public comments, EPA has determined, in consultation with the State of Maryland, that Alternative 3A is the most appropriate remedy for the Mid-Atlantic Wood Preservers Site.

Highly concentrated areas of contaminated soil (greater than 1,000 mg/kg arsenic) will be excavated, stabilized and disposed of offsite in a permitted RCRA disposal facility. Soils containing greater than 10 mg/kg but less than 1,000 mg/kg arsenic will be contained in place.

The existing concrete drip pad will be expanded to approximately 79x91 feet and roofed (see Figure 12). The enlarged drip pad will be designed to provide adequate area where freshly treated wood can drip for at least 72 hours prior to its removal and will be in compliance with new RCRA regulations for wood treatment facilities. The curbed drip pad will be sloped such that drippings and incidental rainfall can be collected in a sump pit and recycled into the treatment system. Runoff water from the roof will be directed away from the drip pad. The expansion of the concrete drip pad will contain remaining underlying degraded soils in place, significantly reducing the potential leaching of contaminants, the generation of airborne dust, and human contact with contaminated soils beneath the pad.

An asphalt/concrete cap will be placed over those portions of the Treatment Yard that will not be covered by the treatment plant, enlarged drip pad, or currently paved parking area. Contaminated soil areas in the Storage Yard (exceeding 10 mg/kg arsenic) will also be paved with an asphalt/concrete cap. Any contaminated soils that may have eroded outside the perimeter of the facility, to be determined during pre-design activities, will be consolidated under the cap. The paving material will be selected during the remedial design. Figure 13 represents the locations of the areas of the different actions.

The construction of an asphalt/concrete cap over the contaminated soils will prevent direct contact with, and inhalation of, potentially harmful dust generated from those soils, provide a durable cover that will resist deterioration due to vehicular traffic, prevent upward migration of contaminants from the underlying gravel and soils, and reduce the potential for leaching of contaminants from the soils to the groundwater. In addition to the development and implementation of a long-term maintenance plan, periodic air, surface water, sediments and groundwater monitoring will be conducted to gauge the effectiveness of the remedy. It is anticipated that monitoring frequencies, to be determined during the remedial design, will decrease with time should conditions warrant; however, the long-term maintenance plan shall remain unchanged. A deed restriction will be executed to ensure that the containment components are not compromised by future use of the property.

Because hazardous substances, pollutants or contaminants will remain at the site following remediation, a review of this remedial action, including site inspection reports and air, groundwater and surface water data, will be conducted no less often than each five years after the initiation of this alternative as required under Section 121(c) of CERCLA, 42 U.S.C. § 9621(c).

The goal of this remedial action is to provide treatment of soils determined to be a principal threat and prevent human contact with soils containing greater than 10 mg/kg arsenic, thereby reducing risk to within EPA guidelines. The additional carcinogenic risk associated with no action at this Site is approximately 5.7×10^{-4}, after implementation of the selected remedy, carcinogenic risk will be less than 1.0×10^{-5}. The construction of an enlarged, roofed drip pad and modification of standard operating procedures consistent with the new wood treatment regulations is required to reduce the potential for future releases of chromated copper arsenate to the environment. If, prior to construction of the enlarged roofed drip pad, it is determined that the site will not be used as a wood treatment facility the area will be capped with an asphalt/concrete cap after removal and treatment of soil which is determined to present a principal threat (this will reduce the cost of the remedy).

The cost summary for the selected alternative is shown in Table 12. It should be recognized that minor changes to the selected alternative may be made during the remedial design. These changes in general will reflect the usual modification resulting from the engineering process and will not reduce the effectiveness of the selected remedy.

X. STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA, 42 U.S.C. § 9621, establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for a site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity or mobility of hazardous wastes as their principle element. The following sections discuss how the selected remedy for this Site meets these statutory requirements.

Protection of Human Health and the Environment

By treating the principal threat; preventing human contact with degraded soils; constructing an enlarged, roofed drip pad; and modifying the standard operating procedures utilized at the existing facility, the selected remedy is protective of human health and the environment. The baseline risk assessment determined that current site

Table 12

Estimated Cost Summary for Selected Remedy
Mid-Atlantic Wood Preservers
Capital Cost

Cost Item	Quantity	Unit Price	Cost (1990 $)
A. Removal of Contaminated Soils:			
- Excavation and Loading of Contaminated Soils	20 c.y.	8/c.y.	200
- Hauling, Stabalization, and Disposal at a RCRA Landfill (swell 1.35 for soil)	27 c.y.	328/c.y.	8,900
- Backfill Excavated Area	20 c.y.	20/c.y.	400
B. Site Preparation:			
- New Drip Pad and Graveling Areas	4 c.d.	3,200/c.d.	12,800
C. New Drip Pad:			
- Concrete Slab	6,200 s.f.	6.0/s.f.	37,200
- Roof	7,210 s.f.	9.0/s.f.	64,900
D. Asphalt Cover:			
1. Treatment Yard			
Gravel	83 c.y.	10/c.y.	800
Placement	5,000 s.y.	1.44/s.y.	7,200
Bituminous Paving			
- 4" thick	4,000 s.y.	9.0/s.y.	36,000
- 2" thick	1,000 s.y.	6.0/s.y.	6,000
2. Storage Yard:			
Geotextile	1,933 s.y.	1.4/s.y.	2,700
Gravel	215 c.y.	10/c.y.	2,200
Placement	1,933 s.y.	2.9/s.y.	5,600
Bituminous Paving (3" thick)	1,933 s.y.	8.0 s.y.	15,500
		Subtotal:	200,400
E. Construction Contingencies (10 Percent)			20,000
F. Design, Engineering, and Construction Management			29,000
		Total Capital Costs:	$249,400

AR000723

Abbreviations: c.y. = Cubic yard; c.d. = Crew day; s.f. = Square foot; s.y. = Square yard

Table 12 (con't)

Estimated Cost Summary for Selected Remedy
Mid-Atlantic Wood Preservers

Operation and Maintenance

Cost Item	Annual Cost (1990 $/Year)	Present[a] Worth Cost (1990 $)
Drip Pad	$1,000	$11,300
Paved Areas	1,500	16,900
Groundwater Monitoring	1,500	16,900
Air Monitoring	2,500	28,100
Total	$6,500	$73,200

[a] Annual cost incurred for 30 years. Discount of 8 percent assumed.

Note: Quantities and materials to be determined during the remedial design. Specifics used for cost estimation only.

conditions present an unacceptable carcinogenic risk ($5.7x10^{-4}$). The Hazard Indices were below 1.0, indicating no non-carcinogenic health hazard. After implementation of the selected remedy, the carcinogenic risk will be reduced to less than $1.0x10^{-5}$, which is representative of background conditions. There are no increased short-term risks or cross-media impacts (e.g., release of contaminants in the soil into the groundwater) associated with the selected remedy. Air, surface water and groundwater monitoring will be utilized to confirm the effectiveness of the action taken.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will attain all location, action and chemical-specific applicable or relevant and appropriate requirements for the Site. The major federal and state ARARs pertaining to the selected alternative are summarized below.

Action-Specific ARARs

A) Hazardous Substances

State of Maryland requirements contained in COMAR 26.13.01-26.13.10 pertaining to excavation, handling and disposal of arsenic contaminated soils [applicable].

Resource Conservation and Recovery Act (RCRA), Subtitle C requirements for closure and post closure (40 C.F.R. Part 264, Subpart G) [applicable]. Action must comply with closure and post closure requirements because degraded soils will be left onsite. The asphalt/concrete cap and long-term groundwater monitoring will be developed, installed and maintained in compliance with the aforementioned regulations.

RCRA Land Disposal Restrictions pertaining to hazardous or hazardous characteristic wastes (40 C.F.R. Part 268) [applicable]. Soils that are excavated for offsite disposal must receive pretreatment prior to final land disposal. Land disposal restrictions do not apply to consolidation of soils within a contaminated area.

Wood Preserving; Identification and Listing of Hazardous Waste; Final Rule; 55 Fed. Reg. 50,450 (December 6, 1990) (to be codified at 40 C.F.R. Part 260) [applicable]. Drip pad construction and soil handling shall be in compliance with recently promulgated regulations concerning wood preserving facilities and materials handling.

Transportation and disposal standards (40 C.F.R. Parts 262-265) [applicable]. Any shipment of contaminated soils offsite must comply with aforementioned regulation.

B) OSHA

Occupational Safety and Health Administration (OSHA) requirements for workers at remedial action sites 29 C.F.R. Part 1910 [applicable]

C) Air

State of Maryland requirements contained in COMAR 26.11 Sections .01, .02, .03, .05, .06 and .15 pertaining to emmisions of arsenic and chromium contaminated particulates [relevant and appropriate]. Sufficient air monitoring must be undertaken to ensure that dust generated during construction activities is in compliance with established regulations.

D) Well Construction

State of Maryland requirements contained in COMAR 26.04.04[3] [applicable]. Installation and abandonment of monitoring wells must be in compliance with aforementioned regulations.

State of Maryland requirements contained in COMAR 26.05.01 pertaining to the selection of well drillers [applicable].

E) Storm Water Management

State of Maryland requirements contained in COMAR 26.09.02 pertaining to storm water management [applicable]. Remedial action must be designed in compliance with the aforementioned regulations.

F) Erosion and Sediment Control

State of Maryland requirements contained in COMAR 26.09.01 pertaining to the control of erosion and sedimentation [applicable]. An erosion and sediment control plan must be developed and implemented during construction activities.

Chemical-Specific ARARs

A) Groundwater

a) Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs) contained in 40 C.F.R. Parts 141 and 143 [relevant and appropriate].

b) State of Maryland requirements contained in COMAR 26.04.01 pertaining to drinking water quality standards [relevant and appropriate].

Remedial action must prevent the release of new pollutants into the ground and reduce potential leaching of those contaminants into the groundwater to achieve and maintain water quality that meets federal and state drinking water standards. Natural attenuation, coupled with the facility modifications identified in the selected remedy, should result in ground water quality meeting federal and state drinking water quality standards within three months of construction completion.

---

[3] The substantive requirements of these sections will be complied with. However, in accordance with Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), permits are not required for onsite activities.

B) Surface Water

a) Federal Ambient Water Quality Criteria [relevant and appropriate].

b) State of Maryland requirements contained in COMAR 26.08.01 through 26.08.04 pertaining to water pollution regulations [relavant and appropriate].

Surface water runoff may not cause or contribute to the excursion of federal or state surface water quality criteria in Stony Run.

Other criteria, advisories or guidance to be considered for this remedial action (TBC's)

Federal Executive Order 11988, Floodplain Management, 40 C.F.R. Part 6, Appendix A. Action must avoid adverse effects, minimize potential harm and restore and preserve natural beneficial value.

Federal Executive Order 11990, Protection of Wetlands, 40 C.F.R. Part 6, Appendix A. Action must minimize destruction, loss or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands. The erosion and sedimentation plan must consider potential impacts of storm water runoff into wetlands associated with Stony Creek.

Cost-Effectiveness

The selected remedy is cost-effective because it has been determined to provide overall effectiveness proportional to its costs (Net Present Worth being $322,000). The selected alternative is the least costly remedy which will effectively provide for treatment of the prinicipal threat and achieve the remedial objectives for the Mid-Atlantic Wood Preservers site.

Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable (MEP).

EPA and MDE have determined that the selected remedy (Alternative 3A) represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the Mid-Atlantic Wood Preservers Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA and MDE have determined that this selected remedy represents the best balance of the nine evaluation criteria and the statutory preference for treatment as a principal element.

Although the selected remedy does not offer the degree of permanence either Alternative 4 or 5 (100% excavation, treatment and on-or-offsite disposal) would offer, the excavation, treatment and offsite disposal of only those soils determined to present a principal threat, coupled with an asphalt/concrete cap on the remaining degraded soils to prevent human contact, does offer a very high degree of long-term effectiveness and permanence . The cap will be inspected and maintained to ensure long-term effectiveness and a deed restriction will be implemented to ensure permanence. The stabilization treatment technology will not reduce the volume or toxicity of the waste material; however, it will reduce the mobility of arsenic from the most highly contaminated soils (arsenic is not very mobile). Due to the small volume of soils to be excavated, the selected remedy poses little increased short-term threat to site workers or nearby residents. Alternative 3 and 3A are the easiest of the protective alternatives to implement, and offer the greatest reduction in risk in proportion to cost. The selected remedy (Alternative 3A) meets the statutory requirement to utilize permanent solutions and treatment technologies to the maximum extent possible.

Preference for Treatment as a Principal Element

The selected remedy does satisfy the statutory preference for treatment as a principal element. As stated in the preamble of the NCP, EPA expects that treatment will be the preferred means by which principal threats posed by a site will be addressed. The preamble characterizes principal threats as "waste that cannot be reliably controlled in place, such as liquids, highly mobile materials (e.g., solvents), and high concentrations of toxic compounds (e.g., several orders of magnitude above levels that allow for unrestricted use and unlimited exposure)" (55 Fed. Reg. 8,703 (March 8, 1990)). The waste material found at this Site is neither liquid nor highly mobile; however, a hot spot of highly concentrated arsenic in surface soils has been identified adjacent to the drip pad. The selected remedy includes a provision for the excavation, stabilization and offsite disposal of soils containing greater than 1,000 mg/kg arsenic, which have been determined to be a principal threat. Soils containing greater than 10 mg/kg but less than 1,000 mg/kg arsenic can be reliably controlled in place, do not present a principal threat and will, accordingly, be contained in place. The selected remedy is consistent with program expectations to treat principal threats and use engineering controls for wastes that can be reliably controlled in place. EPA and MDE have therefore determined that onsite containment, coupled with treatment of hot spots, is an appropriate remedial action.

XI. SIGNIFICANT CHANGES

The Proposed Plan was released for public comment in October 1990. The Proposed Plan identified Alternative 3, containment only, as the preferred alternative. In consultation with EPA headquarters, it was determined that Alternative 3, coupled with the excavation, stabilization and offsite disposal (a component of Alternative 4) of hot spots only, represents a better balance of the nine evaluation criteria and satisfies the statutory preference for treatment of principal threats. This hybrid alternative is designated as Alternative 3A.

Alternative 3A offers a reduction in mobility through treatment and increased long-term effectiveness and permanence by eliminating the most highly contaminated wastes. The limited excavation entailed will not reduce the short-term effectiveness or implementability as would the large scale excavation and treatment alternatives (Alternatives 4 and 5). The additional cost associated with the selected remedy is estimated at less than 10% above the costs associated with Alternative 3.

RESPONSIVENESS SUMMARY
FOR THE
MID-ATLANTIC WOOD PRESERVERS SUPERFUND SITE
ANNE ARUNDEL COUNTY, MARYLAND

December 1990

RESPONSIVENESS SUMMARY
FOR THE
MID-ATLANTIC WOOD PRESERVERS SUPERFUND SITE
ANNE ARUNDEL COUNTY, MARYLAND

TABLE OF CONTENTS

RESPONSIVENESS SUMMARY
FOR THE PROPOSED REMEDIAL ACTION AT THE
MID-ATLANTIC WOOD PRESERVERS SUPERFUND SITE
ANNE ARUNDEL COUNTY, MARYLAND

I. INTRODUCTION

In accordance with the U.S. Environmental Protection Agency's (EPA) community relations policy and guidance, the EPA Region III office held a public comment period from October 15, 1990 through November 14, 1990, to obtain comments on the Proposed Remedial Action Plan for Mid-Atlantic Wood Preservers Superfund Site in Anne Arundel County, Maryland. The remedial action addresses onsite arsenic-contaminated soils and modification of the existing facility to prevent any future release of chromated copper arsenate wood treating solution. On November 8, 1990, EPA and the Maryland Department of the Environment (MDE) held a public meeting to obtain public comments on the remedial investigation (RI), feasibility study (FS) and the proposed remedy. Approximately 30 people attended the public meeting. Site information repositories contain the RI/FS report, Proposed Plan and other relevant documents. EPA maintained contact with local officials and citizens throughout the remedy selection process.

At the time of the public comment period, EPA's recommended alternative addressed soil and groundwater contamination by proposing to pave contaminated soils areas with asphalt or concrete; construct an enlarged, roofed drip pad in compliance with new RCRA regulations; allow natural attenuation of groundwater contamination; conduct long-term air and groundwater monitoring; and implement deed restrictions. The selected remedy, Alternative 3A, adds a provision for the excavation, stabilization and offsite disposal of highly contaminated soils (containing greater than 1,000 mg/kg arsenic).

The selected alternative involves enlarging the existing drip pad to approximately 79 x 91 feet and covering the entire pad with a roof. Prior to expanding the drip pad, soils containing greater than 1,000 mg/kg arsenic must be delineated, excavated, stabilized and disposed offsite. The excavated area will then be backfilled with clean fill. The expansion of the concrete drip pad would, in effect, contain the remaining contaminated soils area with a low-permeability cap. This cap would reduce the potential leaching of contaminants, the generation of airborne dust and human contact with contaminated soils beneath the pad. The dripped chemicals and limited precipitation on the pad would be collected in a properly lined sump pit and recycled.

An asphalt or concrete cap would be placed on the remaining portions of the treatment yard which would not be covered by the treatment plant, enlarged drip pad, or currently paved parking area. Contaminated soil areas in the storage yard would also be paved with an asphalt/concrete cap. Any contaminated soils that may have eroded outside the perimeter of the facility would be consolidated under the cap.

In addition to a long-term maintenance plan, periodic air and groundwater monitoring would be conducted to gauge the effectiveness of the remedy. Deed restrictions would be implemented to ensure that the containment components of the remedy would not be compromised by future use of the property.

All comments received during the public meeting and in writing are documented and summarized in this Responsiveness Summary. Section II presents a summary of questions and comments expressed by the public at the November 8 public meeting. Section III then contains a summary of written comments received during the comment period. All questions and comments are grouped into general categories, according to subject matter. Each question or comment is followed by EPA's response.

II. PUBLIC MEETING COMMENTS

A. Storm Water Runoff

Several attendees expressed concern over the potential impact of the increased volume of storm water runoff that will be generated as a result of paving large portions of the Site. It was stated that the area already has flooding problems, partially due to storm water runoff from the Baltimore-Washington International (BWI) airport, and that extensive land development is expected over the next several years.

EPA Response: The selected remedy will result in the paving of approximately two acres. EPA will notify and cooperate with the Anne Arundel County Department of Public Works prior to initiating the paving activities to ensure compliance with any local storm water management requirements.

A resident, referring to the fact that storm water runoff from the eastern parcel flows to a storm drain located on Shipley Avenue, asked if the storm drains were used to discharge the contaminants.

EPA Response: No; however, some exposed surface soils can be transported (eroded) by storm water runoff into the drains. Sampling of surface soils near the storm sewer identified arsenic concentrations above background. Implementation of the selected remedy will prevent the continued erosion of degraded soils.

An attendee recommended that concrete be installed on the entire property and concrete retention basins be constructed to hold all site runoff.

EPA Response: All drippings will be collected on the expanded, roofed drip pad. Only wood that has been allowed to dry for a minimum of 72 hours will be removed from the drip pad. Therefore, surface runoff from the long-term storage areas will not be contaminated and mandatory collection is not justified.

B. Drip Pad

A resident asked where the drippings go.

EPA Response: The drippings land on the concrete drip pad. Any liquid that falls on the drip pad drains back into the building where it is recycled back into the process.

A resident asked if the drippings go back into the building.

EPA Response: Yes. Drippings that land on the drip pad flow back into the building and into a sump pit. It is pumped out of the pit and recycled back into the storage tank.

The producer of the copper chromated solution recommends that the wood be allowed to dry for 48 to 72 hours before it is removed from the drip pad to prevent potential leaching of solution constituents from the freshly treated wood. Currently, based on the company's maximum production capability during a 72 hour period, there is not enough space to keep the treated wood on the drip pad long enough. The selected remedial action includes the construction of an enlarged roofed drip pad that will be large enough to safely handle the peak volume. The roof will minimize the volume of precipitation falling on the pad.

One attendee noted that the wood treating operation requires that all liquids that drip off the wood be collected in a sump pit. He wanted to know the capacity of the storage tank that receives this excess solution.

EPA Response: There are two tanks; 12,000 and 10,000 gallons, respectively.

A resident asked EPA what will happen if one of the storage tank springs a leak.

EPA Response: The interior of the building is basically a containment system capable of managing leakage.

A resident asked what would be placed around the drip pad to contain the drippings.

EPA Response: A curb will be placed around the drip pad to make sure that nothing flows off of it. The modified drip pad, with a roof, a curb and a swale, will be constructed in compliance with the new regulations governing drip pads at wood preserving facilities.

An attendee asked if the curb will be high enough to prevent overflow in cases of extreme flood and wind conditions.

EPA Response: Yes. These types of details will be defined during the remedial design phase. The regulations require that the pad be capable of handling a 24-hour, 25-year storm event.

A commenter asked what would happen to the Site should Mid-Atlantic Wood Preservers file for bankruptcy.

EPA Response: EPA would likely access the Superfund to implement the selected remedy. Principal threats would be excavated, treated and disposed of offsite and soils containing greater than 10 mg/kg but less than 1,000 mg/kg arsenic would be contained in place. The long-term maintenance and monitoring would remain unchanged. The appropriateness of enforcement action would also be evaluated. The remedy would not likely include, under these circumstances, expansion of the drip pad.

C. Deed Restriction

A resident asked whose deed would be restricted and whether the restriction will be legally enforceable.

EPA Response: Mr. Liedman's, the owner of the facility. The property records will contain a document restricting use of the property in a manner consistent with the selected remedy.

D. Long-term Monitoring

A resident wondered who would be doing the long-term monitoring.

EPA Response: Assuming a settlement is reached, the owner will hire an environmental consultant to perform the long-term monitoring with EPA and MDE performing oversight. There will be a long-term monitoring and maintenance plan approved by EPA and the owner will have to implement that plan.

A review of this remedial action, including site inspection reports and air, groundwater and surface water data, will be conducted no less often than each five years after the initiation of this alternative as required under Section 121(c) of CERCLA, 42 U.S.C. § 9621(c).

A resident asked why EPA couldn't perform the long-term monitoring.

EPA Response: The statute obligates EPA to give the responsible party the opportunity to conduct the long-term monitoring. However, EPA is also charged with the responsibility of ensuring that the work is being undertaken in compliance with the terms and conditions of the resultant consent decree and the Record of Decision.

A resident wanted to know how long the deed restriction and long-term monitoring will be in effect.

EPA Response: The long-term monitoring will be in effect as long as it is appropriate. The deed restriction would be attached indefinitely.

E. Community Awareness

A resident asked if it was possible to hold a meeting to discuss the remedial designs.

EPA Response: An informal meeting to discuss the designs once they are complete will be scheduled into the Community Relations Plan.

The site was finalized on the NPL in 1986; a resident asked why the remedy selection process took so long.

The process requires that we evaluate the universe of possibilities for remediating the site. First, we have to identify and evaluate any potential risks, not just those that were identified in the Site Investigation which led to the Site being listed on the NPL. Then each possible means of reducing the risk presented to human health and the environment is evaluated using the nine criteria identified in the NCP.

A resident asked who is paying for the cost of performing the site evaluation.

EPA Response: CERCLA establishes several categories of persons potentially responsible for response costs incurred by EPA. In this instance, Mid-Atlantic Wood Preservers, Inc. is a potentially responsible party and may be required to reimburse EPA for its response costs. MAWP has, pursuant to a consent order with EPA and MDE, financed and performed the RI/FS.

Some attendees expressed concern that they were insufficiently informed about the site activities.

EPA Response: The community relations plan will be rescoped to ensure that it meets the informational needs of the community.

F. RI Approach/Findings

A resident asked if the community is using "County Water".

EPA Response: Yes. Everyone in the area is linked to the Anne Arundel County public water supply. In addition to public water, Mr. Hall maintains a private well which is screened at approximately 60 feet and used by Mr. Hall for lawn watering. Samples taken by MDE have revealed no contamination.

An attendee asked if sediment and water samples were taken from Stony Run.

EPA Response: Yes. And they were all within the normal background ranges.

An attendee asked what is the depth of soil contamination.

EPA Response: The contamination is confined to the surface. Soils were sampled at 0-0.5 feet, 3-3.5 feet and at the groundwater table. All elevated concentrations, with one exception, were found in the 0-0.5 feet range. Every sample taken deeper than 3-3.5 feet was at background concentrations. One sample that was taken adjacent to the current drip pad, 3-3.5 feet, had a level of arsenic that was greater than 10 mg/kg arsenic.

An attendee asked if off-site soil samples were taken.

EPA Response: Soil samples were taken from a single location on Mr. Edward's property and a single location on Mr. McLean's property, both topographically downgradient of the Site, revealing concentrations at background levels. Pre-design activities will include sampling around the perimeter of the facility to identify any degraded soil that may have eroded outside the facility.

A resident asked how far downstream the Stony Run discharges into the Patapsco River.

EPA Response: Four miles.

An attendee asked if EPA was satisfied with ten wells.

EPA Response: Yes. Especially given the size of the facility (~3 acres). Ten wells give EPA a high degree of confidence that any groundwater quality problem would have been identified if it was present.

An attendee asked if the groundwater was tested for pollutants other than arsenic and chromium.

EPA Response: Four of the ten wells were screened for the full Total Analyte List, and Target Compound List, in addition to cyanide and the pH level. The remaining six wells were sampled for chromium, copper, arsenic and the pH level.

A resident asked if EPA selected Alternative Three because it provided maximum protection to the community from exposure to site contaminants.

EPA Response: Alternative three meets the defined remedial objectives, and it balances favorably against the other alternatives with respect to the nine evaluation criteria.

III. WRITTEN COMMENTS

The United States Department of the Interior (DOI) noted that although onsite soils contamination is not a significant pathway to its trust resources, there remains a possibility that storm water runoff and degraded groundwater could potentially impact the waters and sediments of Stony Run and create a pathway to DOI's trust resources [migratory birds, anadromous fish, and the swamp pink (Helonias bullata)]. DOI stated that their concerns would be adequately addressed if the selected remedy included provisions for monitoring the surface water and sediment.

EPA Response: Surface water and sediment sampling results evaluated during the remedial investigation suggest that Stony Run is not currently being impacted by conditions at the Mid-Atlantic Wood Preservers Site. Further, the selected remedy is expected to improve the water quality of storm runoff by preventing new releases of chromated copper arsenate and erosion of existing degraded surface soils. However, given the historical data indicating that Stony Run has been impacted in the past and that storm water runoff will continue to be discharged into the Stony Run flood plain, a provision requiring long-term surface water and sediment monitoring has been included as part of the selected remedy.

The United States Fish and Wildlife Service (Service) questioned the accuracy of EPA's assertion that the unvegetated, chain-link fence enclosed wood preserving facility does not provide habitat to wildlife. The Service stated that transient use by migratory birds is available and does occur.

EPA Response: It is accepted that transient use by migratory birds may actually occur; however, EPA agrees with DOI that onsite soils contamination is not currently a significant exposure pathway to wildlife. The implementation of the selected remedy will further reduce the potential impact of site soils on wildlife.

The U.S. Fish and Wildlife Service wrote that the statement about offsite sediment not being degraded is premature. The Service strongly supports offsite sediment sampling.

EPA Response: A provision for surface water and sediment monitoring has been included as part of the selected remedy. In addition, soil sampling around the perimeter of the facility will be undertaken to confirm that degraded soils have not eroded offsite.

State of Maryland

DEPARTMENT OF THE ENVIRONMENT

2500 Broening Highway, Baltimore, Maryland 21224
Area Code 301 • 631- 3304

William Donald Schaefer
Governor

Robert Perciasepe
[redacted]
Secretary

December 28, 1990

Mr. Thomas C. Voltaggio
Acting Division Director (3HW00)
Hazardous Waste Management Division
U.S. Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, PA 19107

Dear Mr. Voltaggio:

The Hazardous and Solid Waste Management Administration (HSWMA) has completed its review of the Record of Decision for the Mid-Atlantic Wood Preservers Site. HSWMA concurs with EPA's selected remedy, alternative 3-A which involves excavation, stabilization and off-site disposal of any soils containing greater than 1,000 mg/kg arsenic. Soils containing greater than 10 mg/kg but less than 1,000 mg/kg arsenic would be contained in place. This will require paving contaminated soil areas with asphalt/concrete, constructing a roof and enlarging the drip pad, conducting long-term monitoring, and implementing deed restrictions.

We look forward to continuing our cooperative relationship with EPA on this project as we implement remediation at this site.

Sincerely,

Richard W. Collins
Acting Director
Hazardous and Solid Waste
Management Administration

RWC:klj

AR000740

cc: Mr. James Pittman
Mr. Frank Henderson
Mr. Thomas Andrews