452B

ENVIRONMENTAL PROTECTION AGENCY

TECHNICAL ENFORCEMENT SUPPORT
AT
HAZARDOUS WASTE SITES

TES X

CONTRACT NO 68-W9-0007
U.S. EPA WORK ASSIGNMENT #R07057

FINAL

RCRA FACILITY ASSESSMENT REPORT FOR ARMCO, INC. KANSAS CITY, MISSOURI U.S.EPA SS/ID NO. MOD007118029

U.S. EPA REGION VII

METCALF & EDDY
PROJECT NO. 171057.0001.003

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RCRA RECORDS CENTER

EXECUTIVE SUMMARY

A RCRA Facility Assessment (RFA) was conducted at the ARMCO, Inc. Midwestern Steel Division facility (EPA ID NO. MOD007118029) in Kansas City, Missouri by Tetra Tech, Inc., subcontractor to Metcalf & Eddy, Inc., under the TES X Contract for the United States Environmental Protection Agency (U.S. EPA). The assessment was conducted to identify and evaluate Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) for releases or potential releases of hazardous wastes and/or hazardous constituents.

ARMCO began operations in 1888 as the Kansas City Bolt and Nut Company and manufactured products using purchased iron. In the early 1920s, the facility converted operations to the manufacturing of steel products fabricated from melted steel and iron scrap. In October 1991, ARMCO, Inc. announced that the Midwestern Steel Division had been renamed ARMCO's Worldwide Grinding Systems to reflect their production emphasis on grinding media for the international mining industry.

A total of 32 SWMUs and eight AOCs were identified during the facility assessment and are listed below. Of the 32 SWMUs, five are landfills; six are dust storage tanks or transfer stations; one is a landfarm; 10 are acid tanks, cooling water tanks, or ponds; four are waste oil and solvent storage units; and six are hazardous waste storage areas.

LANDFILLS AND WASTE PILES:

- SWMU No. 1 - RCRA Landfill
- SWMU No. 2 - Old Blue River "W" Landfill (LF-2)[1]
- SWMU No. 3 - South of Bar Fab Landfill (LF-3)
- SWMU No. 4 - 1987 Waste Pile
- SWMU No. 5 - Plant Rubble Landfill (LF-1)

DUST STORAGE TANKS AND TRANSFER STATIONS:

- SWMU No. 6 - RCRA Permitted Baghouse Dust Storage Tanks
- SWMU No. 7 - No. 1 Melt Shop Baghouse Dust Tank (TS-1)
- SWMU No. 8 - No. 2 Melt Shop Baghouse Dust Tank (TS-2)
- SWMU No. 9 - No. 1 Melt Shop Canopy Baghouse Dust Conveyor (TS-3)
- SWMU No. 10 - Dust Railcar Loading Area - Bar Joist Building (TS-4)
- SWMU No. 11 - Dust Railcar Loading Area - No. 2 Melt Shop

LANDFARM:

- SWMU No. 12 - AMOCO Landfarm (LT-1)

ACID TANKS AND COOLING WATER TANKS/PONDS

- SWMU No. 13 - Pickle Liquor Tanks (STA-2)
- SWMU No. 14 - Etch Lab Mixing Tank (EN-1)
- SWMU No. 15 - Etch Lab Holding Tank (STA-3)
- SWMU No. 16 - Roll Shop Roll Cleaning Tank (STA-4)
- SWMU No. 17 - Wire Mill Rinsewater Neutralization Tank (STU-5)

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[1] The 21 SWMUs identified by Burns & McDonnell for ARMCO's Post-Closure Permit Application (PCPA) have the ARMCO identification in parentheses after the name.

SWMU No. 18 - Blooming Mill Scale Pit (STU-1)
SWMU No. 19 - Twelve Inch (12") Mill Scale Pit (STU-2)
SWMU No. 20 - Rod Mill Scale Pit (STU-3)
SWMU No. 21 - No.2 Melt Shop Scale Pit (STU-4)
SWMU No. 22 - Mill Ponds (SI-1)

WASTE OILS AND SOLVENTS STORAGE:
SWMU No. 23 - Safety-Kleen Units
SWMU No. 24 - Waste Hydraulic and Lubricating Oil Storage Tanks (STA-1)
SWMU No. 25 - Roll Shop Drum Storage Area
SWMU No. 26 - Rod Mill Drum Storage Area

HAZARDOUS WASTE STORAGE AREAS:
SWMU No. 27 - Bar Joist Building Hazardous Waste Storage Area (CS-1)
SWMU No. 28 - Outside Hazardous Waste Storage Area
SWMU No. 29 - Main Substation PCB Storage Area
SWMU No. 30 - Long Tractor Shed PCB Storage Area (CS-2)
SWMU NO. 31 - Small Tractor Shed PCB Storage Area
SWMU No. 32 - No. 1 Melt Shop PCB Storage Area

AREAS OF CONCERN:
AOC No. 1 - Abandoned Fuel Oil Storage Tank
AOC No. 2 - Underground Storage Tanks
AOC No. 3 - ARMCO Dam/PCB Excavation Area of Blue River
AOC No. 4 - Burner Furnace Area
AOC No. 5 - Outfall No. 006
AOC No. 6 - Outfall No. 042
AOC No. 7 - Backwash Area of Rock Creek
AOC No. 8 - "Owl Gun Club" Shooting Park

Air, soil, soil gas, surface water, and groundwater were the migration pathways investigated as potential release mechanisms.

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1.0 INTRODUCTION

Tetra Tech, Inc., subcontractor to Metcalf & Eddy, Inc. (M&E), a Technical Enforcement Support (TES) Contractor, has been retained by U.S. EPA, Region VII under the TES X Contract to conduct a RCRA Facility Assessment (RFA) at the ARMCO, Inc. Midwestern Division facility in Kansas City, Missouri, pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA), Sections 3004 (u), 3004 (v), and 3008 (h). The RFA is the first step in the three-phase process of the RCRA Facility Corrective Action Program. The three-phase process is: 1) RFA; 2) RCRA Facility Investigation (RFI); and 3) Corrective Measures (CM). The objective of this program is to identify releases or potential releases requiring further investigation.

This report focuses on the first phase of the program, the RFA. The findings and conclusions made during the RFA will determine the need for the subsequent phases of the corrective action program.

The objectives of the RFA are as follows:

- To identify and gather information on releases or potential releases of hazardous waste or hazardous constituents from the facility.

- To evaluate regulated units and Solid Waste Management Units (SWMUs) and other Areas of Concern (AOCs) for releases to all media.

- To make preliminary determinations regarding releases of concern and the need for further actions and interim measures at the facility.

- To screen from further investigation those SWMUs or regulated units that do not pose a threat to human health or the environment.

An RFA is usually conducted in three stages of investigation: a Preliminary Review (PR), a Visual Site Inspection (VSI), and Sampling Visit (SV). In conducting the PR, Tetra Tech obtained and reviewed existing site documents from various regulatory agencies. Documents from regulatory divisions of U.S. EPA Region VII and Missouri Department of Natural Resources (MDNR) were reviewed. Tetra Tech personnel, Jenna Mead and Pamela McKee, accompanied by Katherine Bello, U.S. EPA Region VII RCRA Branch and Frank Dolan, MDNR, conducted the VSI at the ARMCO facility on May 20, 1991. The facility was represented by Charles Fillinger, Senior Mechanical Engineer. The VSI was concluded on May 21, 1991 with only Tetra Tech personnel, including Caryl Olmstead, being accompanied by Mr. Fillinger.

The information gathered during the PR and the VSI stages of the investigation was assessed and presented in the draft Preliminary Assessment (PA) report dated July 15, 1991 delivered to the U.S. EPA and MDNR. The sampling visit stage of the RFA process not performed as it was apparent from the VSI that an RFI would be needed for this facility. Revisions to the draft PA were made based on U.S. EPA/MDNR comments, and this report now represents the final RFA report. Section 2.0 of this report contains background information on the facility and descriptions of the waste products known to have been generated, disposed, or released on site. The environmental setting is described in Section 3.0. The SWMUs

and AOCs identified by Tetra Tech are discussed in detail in Section 4.0. References cited in the text are designated with a unique number corresponding to the references listed in Section 5.0. The report is also supplemented with appendices containing photographs and field notes taken during the VSI. Also located in the appendices is the list of SWMUs and AOCs prepared for the VSI, augmented with comments based on observations from the VSI.

Conclusions and suggested further actions have been separated from the body of the report and are labeled "ENFORCEMENT CONFIDENTIAL".

2.0 SITE BACKGROUND

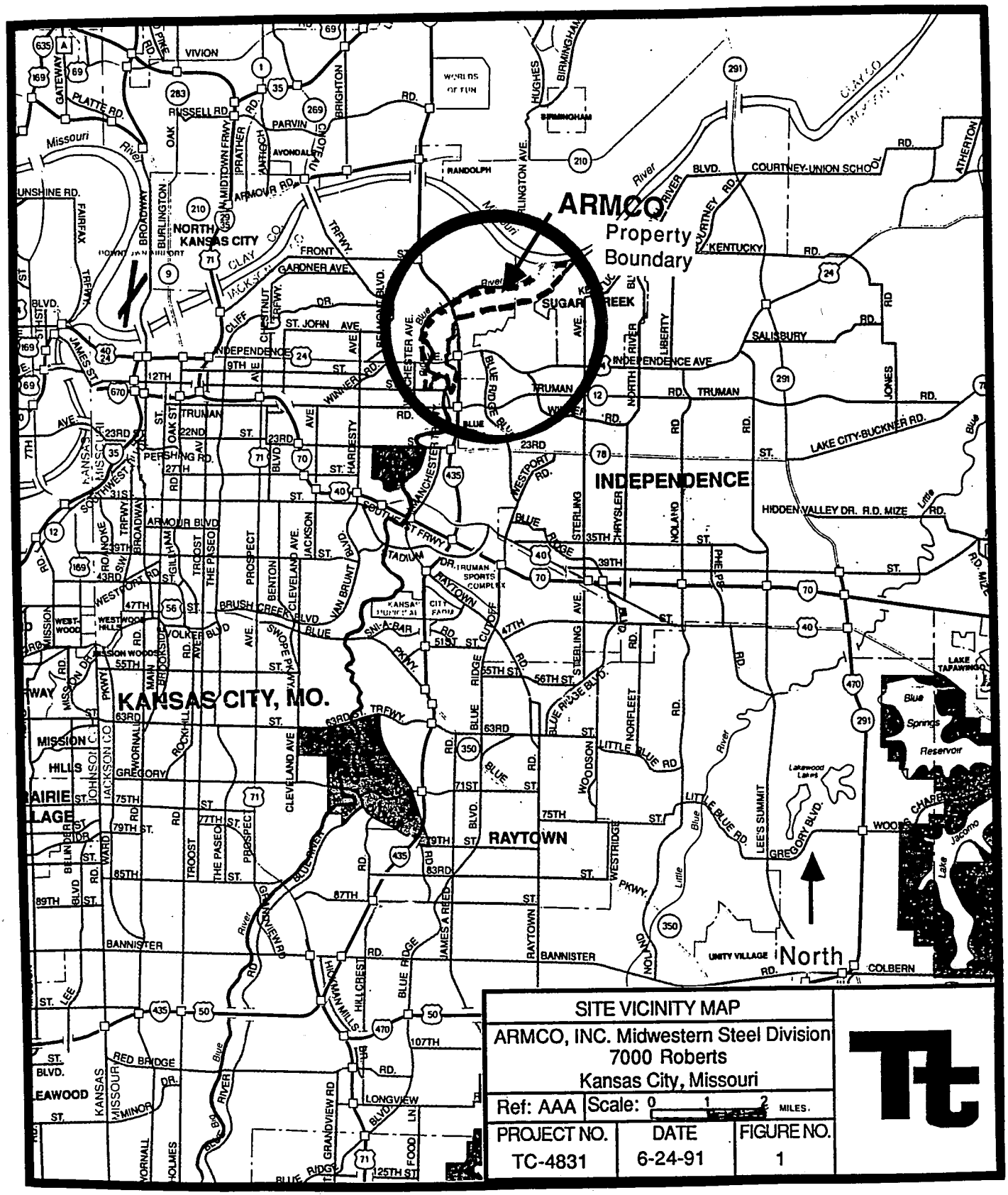
2.1 Facility Identification

U.S. EPA Facility I.D. No.:	MOD007118029
Owner's Name:	ARMCO, Inc. Midwestern Steel Division (Changed to ARMCO's Worldwide Grinding Systems, October 1991) 7000 Roberts Kansas City, Missouri Jackson and Clay Counties
Telephone Number:	(816) 242-5100
Facility Contact:	Charles J. Fillinger, P.E. Senior Mechanical Engineer (816) 242-5848

2.2 Facility Description

The ARMCO, Inc. Midwestern Steel Division facility, formerly the Sheffield Steel Corporation and the Kansas City Bolt and Nut Company, is an approximately 1,000 acre site located along the Blue River in eastern Kansas City, Missouri (Figure 1). The ARMCO property lies within the northern and western halves of Section 31, the northern portion of Section 32, the southwestern quarter of Section 29, and the southern part of Section 30 of Township 50N, Range 32W. It also includes part of the eastern half of Section 36 Township 50N, Range 33W, part of the northeastern quarter of Section 1, Township 49N, Range 33W, and the NW 1/4 Section 6, Township 49N Range 32W in Jackson and Clay Counties, Missouri (Figure 2). The portion of the site in Clay County is a small undeveloped area between the old channel of the Missouri River and the present river channel. The area immediately surrounding ARMCO is industrial; residential areas lie further to the east and west. To the south of the ARMCO property at the former Al Plating facility (1215 Winchester), a Superfund removal action is being performed. The Conservation Chemicals Corporation Superfund site is located across the Blue River from the northern portion of the ARMCO property, and the former AMOCO Sugar Creek Refinery RCRA Enforcement site is on the east side of Rock Creek.

The U.S. EPA ordered aerial photographs of the ARMCO facility for use in preparing this RFA. These photos were received by the U.S. EPA, and sent to the Environmental Monitoring Systems Laboratory (EMSL) in Las Vegas, Nevada for analysis. EMSL's report has not been received and therefore is not incorporated into this RFA.

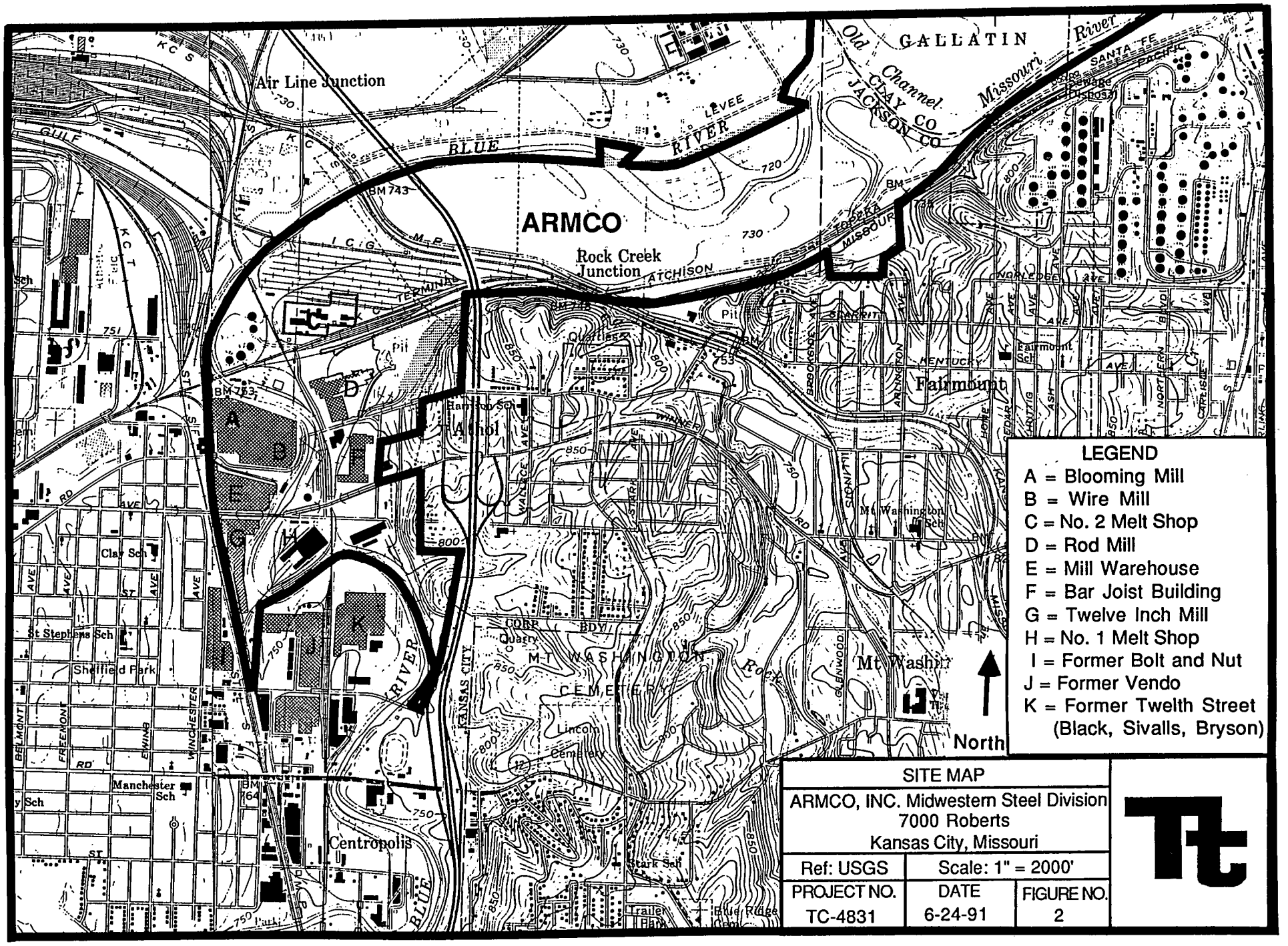


SITE VICINITY MAP

ARMCO, INC. Midwestern Steel Division
7000 Roberts
Kansas City, Missouri

Ref: AAA | Scale: 0 1 2 MILES.

PROJECT NO.	DATE	FIGURE NO.
TC-4831	6-24-91	1



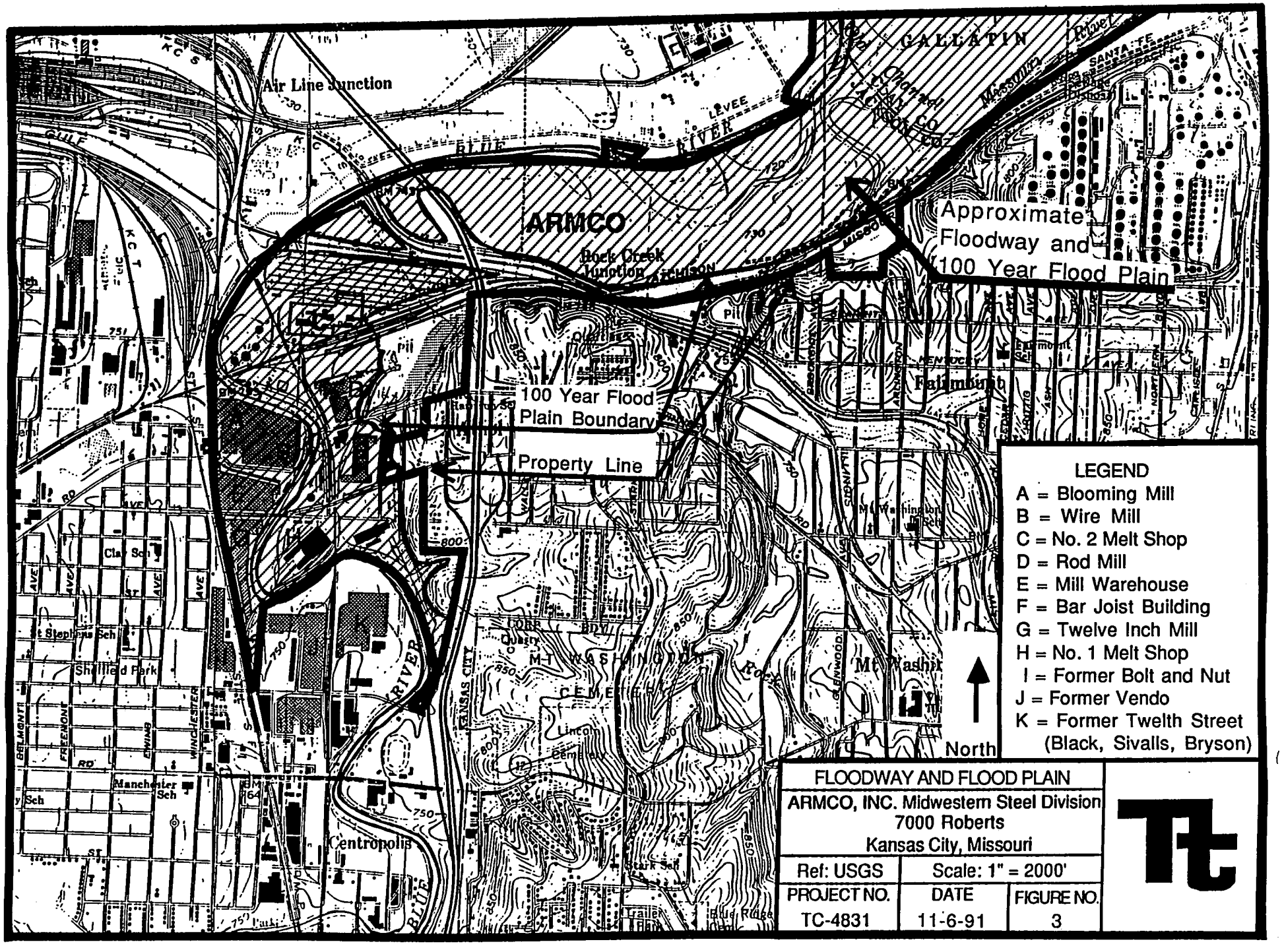
SITE MAP		
ARMCO, INC. Midwestern Steel Division 7000 Roberts Kansas City, Missouri		
Ref: USGS	Scale: 1" = 2000'	
PROJECT NO.	DATE	FIGURE NO.
TC-4831	6-24-91	2

Current facility operations are conducted in the No. 2 Melt Shop, the Grinding Media (Roll) Mill, the Rod Shop, and various other buildings housing general support personnel. Other shops including the Wire Mill, Bar Joist/Long Span Mill, Blooming Mill, and No. 1 Melt Shop are standing idle. Demolition began on the Twelve Inch Rod Mill in August 1991.

The slag byproduct of ARMCO's steel production is processed on site into aggregate by the Heckett Division of Harsco. This activity occurs on the central portion of the site, just west of Interstate 435. The Heckett operation was pointed out by Mr. Fillinger as Tetra Tech, MDNR, and the U.S. EPA were driven past this site during the VSI, but was it not viewed in detail. Mr. Fillinger reported that Heckett is also mining the slag from levees ARMCO had built, and processing it for aggregate. The ARMCO levees are no longer needed due to the work done by the Corps of Engineers (COE) on the Blue River channel in the northern portion of the site. A 100-year flood on the Blue River would be contained within this channel.

The southern portion of the site is largely covered with buildings, roads, and railroad tracks. The northern portion is open with landfills, levees (being mined by Heckett), roads, and railroad tracks. At the time of the VSI, some of the railroad tracks were being removed and were to be melted as scrap in the electric arc furnaces (EAF). Part of the northern area is wooded, and there is a possibility that 17 acres along the Blue River near its confluence with the Missouri River may be declared as "wetlands" by the Soil Conservation Service of Jackson County, Missouri (Ref. No. 82). According to the October 1991 Burns & McDonnell Phase I Environmental Assessment report for the South Riverfront Expressway right-of-way through the northern portion of the ARMCO site (Ref. No. 94), most of this property was acquired by ARMCO in the 1950s and 1960s, and was leased to farmers for cropland. The report also states that a clay pigeon shooting park was located on the property near Rock Creek.

The area of the site that lies within the former and present 100 year floodplain of the Blue River is shown in Figure 3. The new 100 year flood plain for most of the northern portion of the ARMCO site is contained within the improved river channel. The southern portion of the site generally lies within the 100 year flood plain. Channelization work by the COE started near the west end of Old Blue River "W" Landfill and has progressed in stages up the Blue River to just west of Interstate 435 (Ref. No. 95). The 100 year flood plain presently includes most of the buildings on the southern portion of the site; however, when the channel improvements are completed, only the No. 1 Melt Shop will fall within the 100 year flood plain. The Federal Emergency Management Agency Floodway map of the area indicates that the No. 1 Melt Shop presently lies within the floodway of the Blue River. There are no levees to protect this portion of the site other than those around the four former dust tanks and one active fuel oil tank at the tank farm. The levees around the former dust storage tanks were built up to an elevation of approximately 752 feet in order to raise them above the 100 year floodplain level.



FLOODWAY AND FLOOD PLAIN		
ARMCO, INC. Midwestern Steel Division 7000 Roberts Kansas City, Missouri		
Ref: USGS	Scale: 1" = 2000'	
PROJECT NO.	DATE	FIGURE NO.
TC-4831	11-6-91	3

According to the COE, flood waters from the Blue River in 1928, 1951, 1958, 1961, 1977, 1984, and 1990 likely had flooded portions of the ARMCO plant. Water elevation data are scarce for the lower reaches of the Blue River. Available elevations for the gauge at 12th Street (just south of ARMCO) indicate that the water was at 753.2 feet in September 1961, 751.1 feet in September 1977, and 752.5 feet in May 1990. In June 1984, water elevations at ARMCO were measured at 744.54 feet at the Wilson Road bridge (southwest of the Rod Mill) and 741.3 feet at the former ARMCO pumphouse (just downstream of the Wilson Road bridge). Ground elevations for the southern portion of the site are generally between 740 and 750 feet. No records indicate that any of the SWMUs in this part of the site have been impacted by flood events.

High water marks at ARMCO were surveyed by the COE after the May 1990 flood as 749.5 feet at Wilson Road bridge; 748.04 feet at the pumphouse, and at 742.86 feet and 742.67 feet at approximately the center of the north side of the Blooming Mill/Wire Mill complex. According to Mr. Fillinger, the flood waters were about one foot deep inside the No. 1 Melt Shop, and approximately 18 inches deep in the Blooming Mill during this flood. Basement flooding also occurred in one of the support buildings (locker rooms) to the south of Highway 24 (Ref. No. 98).

The 1985 Groundwater Monitoring Annual Report (Ref. No. 37) states that monitoring wells "Nos. 5, 6, 7, 8, and 10 were completely submerged during flooding in June, 1984. Water covered the ground at the other wells, but did not over top the casing." This indicates that the northern portion of the site was largely underwater during that flood. Ground elevations for the northern portion of the site are generally between 720 and 730 feet. No other records indicate that this area has been flooded since baghouse dust was placed in the landfills. According to Mr. Fillinger, this area was not flooded in May 1990 (Ref. No. 82).

A 100-year flood on the Missouri River would cause water to back up to the 740 feet elevation, and according to the COE, would flood the northern portion of the site east of Interstate 435. This is regardless of the channelization work done on the Blue River. A 100 year flood has not occurred on the Missouri since the hazardous waste landfills have existed (Ref. No. 95).

2.3 Historical Operations and Waste Streams

The facility has operated under several names during its 104-year history. The facility boundaries have changed during the years also. This section describes historical and current facility operations and lists waste streams that were documented during research of the facility's activities.

2.3.1 Facility History and Operations

The Kansas City Bolt and Nut Company began operations in 1888, manufacturing iron bolts and nuts from purchased iron. In the early 1920s, open hearth furnaces were installed and steel products were manufactured from melted steel and iron scrap. In 1925, the name was changed to the Sheffield Steel Corporation, which became a subsidiary of ARMCO Steel Corporation (now ARMCO, Inc.) in 1930.

As ARMCO Steel and ARMCO, Inc. Midwestern Steel Division, the company thrived, reaching a production peak in the 1970s when they employed approximately 4,500 workers. Changing economic conditions brought a decline in business, and various processes were idled during the 1980s. The Bar Joist Shop was idled in December 1980 followed by the Wire Mill in April 1982. Fastener production had ceased prior to the April 1983 Compliance Evaluation Inspection (CEI). The No. 1 Melt Shop was idled in May 1988 and in December 1988 the Twelve Inch Mill and the Blooming Mill were idled. In December 1989, the Cleaning House (pickling process) was idled. Thus, a number of the SWMUs listed in the records are presently inactive.

Demolition of the Twelve Inch Rod Mill began in August 1991, between the time the Draft PA and the RFA were written. According to plans announced in the July 11, 1991 Kansas City Star, ARMCO will build a heavy industrial business complex to be called the "Sheffield Industrial Park". Phase I of this construction began with the start of demolition of the Twelve Inch Mill in August 1991. Scheduled for future demolition are the Blooming Mill, Wire Mill, and various storage buildings. According to the announcement in the Kansas City Star, plans had not yet been approved for the demolition of the No. 1 Melt Shop and relocation of the Grinding Media (Roll) Mill to the east side of the Blue River. The steel from the demolished buildings will be used as scrap in the furnaces.

On October 13, 1991, ARMCO, Inc. announced in the Kansas City Star that Midwestern Steel Division had been renamed ARMCO's Worldwide Grinding Systems to reflect the shift in operations to production of grinding media for the international mining industry.

Three other SWMUs and one AOC that were mentioned in the records were located at properties that are no longer owned by ARMCO. Two SWMUs are believed to have been located at the former Bolt and Nut Plant (1025 Winchester), and one SWMU was located at Vendo (7400 Eeast 12th). The AOC was located at "Twelfth Street", also known as the former Black, Sivalls, and Bryson property (7500 East 12th). These properties were sold in the late 1980s and are not addressed in this RFA. However, information on the three SWMUs and the AOC is included in this section and in Appendix C (three SWMUs only) in order to provide a historical record of their existence.

The two SWMUs, believed to have been located at the former Bolt and Nut Plant, were an oil quench bath and a two-celled electroplating sludge pond. The electroplating sludge pond was mentioned in the 1982 PCB Inspection Report. The location of this two-celled pond is given as "next to two galvanizing plants". According to Mr. Fillinger (Ref. Nos. 82 and 91), the pond was located just south of the Bolt and Nut Plant on Winchester. The photos of the pond in the PCB Inspection Report showed a fenced area with a fairly large cell, a small dam, and a small second cell. The report stated that the flow from the smaller cell was to the city sewer, and that ARMCO was attempting to have the electroplating sludge delisted as a hazardous waste. On October 18, 1981, the U.S. EPA requested clarification from ARMCO on several hazardous wastes listed on ARMCO's August 18, 1980 "Notice of Hazardous Waste Activity", but not listed on their Part A Permit Application. One of these wastes was for

electroplating waste sludges (F006). ARMCO's December 17, 1981 reply stated that the electroplating waste sludges resulted from zinc plating (segregated basis) on carbon steel and therefore, were one of the exemptions listed in the U.S. EPA's letter of October 18, 1981. ARMCO further stated that these "are the only electroplating operations in the Kansas City Works. No cyanide or cyanide salts are involved in the process." The April 1, 1983 CEI report states that "investigations indicate that the electroplating sludge at the Midwestern Steel Division does not have the characteristics of a hazardous waste" (Ref. No. 26). This area could not be viewed as it is no longer on ARMCO's property; however, a drive-by of the area during the VSI indicated that the pond no longer exists.

Mr. Richard Laux of MDNR Water Pollution (Ref. No. 80) stated that at one time ARMCO had used oil baths to cool the newly formed steel rather than the water baths presently used. When the hot steel was placed in the bath, the oil overflowed into the storm sewers. It is uncertain how long this process continued or whether the oil might have contained PCBs. When asked about this process at the time of the VSI, Mr. Fillinger said that he thought this must have occurred at the former Bolt and Nut Plant on Winchester Road. This building could not be viewed as it is no longer owned by ARMCO. According to a letter from ARMCO to MDNR dated Oct 10, 1986, this property was sold in 1985 to Steve Forsythe, Sheffield Inc. (Ref. No. 42).

At the former Vendo (vending machine production) plant bought by ARMCO in the mid 1970s (Ref No. 77), cyanide apparently was used. The 1987 CEI states that, as a condition of ARMCO's sale of the property formerly occupied by Vendo, ARMCO was required to dispose of nine, 55-gallon drums of cyanide-contaminated waste (mostly pigeon droppings) resulting from plating operations at that site. According to Mr. Fillinger, ARMCO never used the property although they leased part of it to Kansas City Distribution for warehouse space (Ref. No. 97). In a February 1987 letter from ARMCO to MDNR requesting that outfalls No. 043 and 044 be removed from ARMCO's NPDES permit, ARMCO noted that this property had been sold to Duren Slyster (Ref. No. 45).

According to a January 1987 (Ref. No. 44) letter to MDNR, Mr. Slyster also bought the property at 7500 East 12th Street, located just east of Vendo. This property, which ARMCO references as "Twelfth Street", previously was used by ARMCO for the production of steel mesh for road construction (Ref. No. 93). This property, also known as the former Black, Sivalls, and Bryson property, had been the site of permitted outfalls No. 039, 049, and 041. Outfall No. 039 is noted in ARMCO's 1982 Part B Application for the Secure Storage Facility (Ref. No. 17) as having been the source of "oil seepage to the [Blue] river.... This seepage of oil was the subject of a Finding of Violation and Order from EPA against ARMCO issued July 31, 1980...[The] shallow groundwater table was floating a pool of oil acquired from an unknown source and trapped underground. The action taken was to tap this pool and pump it out." This portion of the Part B application is included in Appendix F. No other references were found in the files to problems associated with this outfall.

2.3.2 Waste Streams

The major activity at ARMCO has been the fabrication of steel products from steel and iron scrap. Various cleaning, etching, and painting processes have been associated with this production. The following hazardous waste streams are known to have been stored, generated, disposed, or released at the site as it now exists.

a. The electric arc furnaces generate approximately 30 pounds of dust for every ton of steel produced. Since 1962, the emission control dust has been collected in the baghouse air pollution equipment. Prior to that time it was vented to the atmosphere. The dust is classified as a K061 hazardous waste due to its heavy metals content, particularly lead. June 1982 EP Toxicity analyses on two samples of baghouse dust (Appendix D) that had been placed in the RCRA Landfill indicated maximum concentrations of 190,000 $\mu g/\ell$ lead, 7,890 $\mu g/\ell$ cadmium, 710 $\mu g/\ell$ chromium, 33 $\mu g/\ell$ selenium, 16 $\mu g/\ell$ arsenic, and 1.4 $\mu g/\ell$ mercury.

   Presently, only the two furnaces located in the No. 2 Melt Shop are active. These furnaces were installed in 1976 when the No. 2 Melt Shop was built. Between the early 1950s and May 1988, dust was also generated by four electric arc furnaces in the No. 1 Melt Shop. Prior to the 1950s, open hearth furnaces were used. Between 1962, when the baghouses were installed, and 1965, the dust was disposed in what was likely a low area along the Blue River. This area is now referred to as the South of Bar Fab Landfill (Appendix A, Photo No. 17). From 1965 to 1980, the dust was disposed in an old meander of the Blue River. These two disposal area sites were declared by ARMCO in their 1980 Notification of Hazardous Waste Site. The Old Blue River ("W") landfill (Photo No. 3) is on the Missouri Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites.

   Between 1980 and 1983, the dust was disposed in two trenches along the Blue River (Photo No. 5); these trenches were closed as a RCRA landfill in 1984. A 1,400 yd^3 waste pile was discovered in 1987, and an amended Notification of Hazardous Waste Site was filed by ARMCO. This waste pile was removed in 1988, and no visible evidence remains of its existence (Photo No.4). Between 1983 and 1986, dust generated at the facility was stored in four RCRA permitted storage tanks. Since 1986, the dust has been loaded directly into railcars and shipped to the Horsehead Resource Development Company, Inc. (formerly New Jersey Zinc) recycling facility in Palmerton, Pennsylvania for recovery of the zinc contained in the dust. According to the 1986 CEI, several railcars of dust were shipped to an unnamed zinc recovery facility in Monterey, Mexico, but the expense was prohibitive and shipping to that facility was discontinued.

b. Pickle liquor/sulfuric acid (K062) was used to clean steel rods. Prior to 1981, the spent pickle liquor was transported to Kansas City's Blue River Sewage Treatment Plant where it was used to promote coagulation of the wastewater (Ref. No. 6). In 1981, ARMCO

installed a system for recycling the spent pickle liquor. This system was used until the steel rod cleaning operation closed in December 1989. The spent pickle liquor was stored in an 8,000 gallon rubber-lined steel tank (STA-2) located outside the Cleaning House. The acid was regenerated by cooling the spent liquor in three batches using a 3,000 gallon rubber-lined steel cooling tank; the cooling caused ferrous sulfate to precipitate from the acid. The regenerated acid was returned to the acid-brick lined tubs in the production line (Ref. No. 97). The ferrous sulfate precipitant was used as a flocculant in wastewater treatment plants, and according to the 1985 CEI was not a hazardous waste "per SS261.2 (e) (ii) since it is used as an effective substitute for commercial product". When the recycling system was inoperative, the spent liquor would be shipped to the Blue Side Tannery for use in their wastewater treatment system.

The MDNR Water Pollution files indicate that a number of releases of sulfuric acid occurred during the 1980s; these primarily impacted the Blue River at Outfall 006. The causes of the various releases are not known. According to Mr. Fillinger (Ref. No. 82), some of the problems with the low pH of the water at Outfall 006 were due to poor cleanup of the ferrous sulfate storage area. These crystals had been stored in a pile on the concrete floor of the Cleaning House inside a garage door so that they could easily be loaded by a front-end loader. The spilled ferrous sulfate was not cleaned off the road, and eventually it washed into the storm sewers and out to the Blue River at Outfall 006.

c. Waste hydraulic and lubricating oils are generated by routine equipment maintenance and are also skimmed from wastewater treatment units. Residual amounts of lubricating oils mixed with cooling water may be found in the four scale pit SWMUs. During the VSI, drums of waste oil were stored outside the Roll Mill near STA-4 (Photo No. 13) and outside the Rod Mill near STU-3 (Photo No. 14). It was noted that one of the drums by STU-3 was leaking, and extensive oil staining of the soil was apparent at both locations. The drums at both locations were on wooden pallets, but there was no secondary containment system. The satellite collection area drums stored by the Rod Mill and the Roll Shop are transported to the waste oil storage tanks (STA-1) located by the four baghouse dust storage tanks. The drums of waste oil are stored outside on pallets until their contents are poured through a strainer (Photo No. 21). The oil then flows into one of two former rail tankers located in an earthen pit (Photo No. 22). The soil around the area where the drums are emptied into the strainer is extensively oil stained. Industrial Services Corporation (ISC, formerly Radium) is notified when the tanks are close to being full. ISC transfers the waste oil from the tanks to their truck for shipment to their recycling facility. The drums at the Rod Mill, the Roll Shop, and the waste oil tanks were the only waste oil storage areas noted during the VSI.

d. A solution of hydrochloric acid, sodium hydroxide, and rinsewater is used in the Etch Lab to etch samples of steel for microscopy by

Quality Control. The waste solution is stored in a 350 gallon polyethylene tank inside the Etch Lab (EN-1). When the tank is full, the solution is pumped to a 1,500 gallon fiberglass tank located just outside the Etch Lab (STA-3). The 1,500 gallon tank is emptied into a portable 800 gallon dura-life poly tank located on the back of a flat-bed truck (Photo No. 15), and transported to the mill ponds. There it is added to the ponds to help neutralize the water (Ref. No. 82). Until 1983, rinsewaters from hydrochloric acid wire cleaning operations were also mixed with sulfuric acid from the rod cleaning, and was neutralized with lime in the Wire Mill Rinsewater Neutralization Tank (STU-5). This SWMU became inactive with closure of the Wire Mill.

e. Spent phosphoric acid cleaning solution is stored in a 75 gallon stainless steel tank [Roll Cleaning Tank (STA-4)] at the east end of the Roll Shop. This solution is disposed by pumping it into the portable tank described in Section 2.3.d., then transporting it for disposal in the mill ponds (Ref. No. 82).

f. Petroleum naphtha and "carb cleaning" solvents have been used in Safety Kleen units around the facility. Presently, there are 68 units that contain petroleum naphtha solvent. This number is down from 78 units in 1989, which included one "carb cleaning" unit (Ref. No. 62). The carb cleaning solvent is no longer used (Ref. No. 82). Of the 68 units, 54 have a 20 gallon capacity, seven hold 40 gallons, six hold 10 gallons, and one is a 6-gallon unit.

g. Petroleum refining wastes from the former AMOCO Sugar Creek Refinery were disposed on approximately 10 acres that AMOCO had leased from ARMCO between 1976 and 1979. This area is in the eastern portion of the site between the present channel of Rock Creek, a former channel of Rock Creek, and the old channel of the Missouri River (Photos No. 1 and No. 2). Approximately 30,000 tons of refining waste were spread over the site and disced into the soil during the four years of the landfarm's operation. ARMCO also disposed approximately "1,000 gallons of residues and bottom sediments from cleanout of one fuel oil tank on the site" (Ref. No. 48). Two monitoring wells were installed on the northwestern side of the landfarm in approximately 1981. Mr Fillinger was not aware of any information on the installation or sampling of these wells. In a telephone conversation between Frank Dolan of MDNR and Lewis Sutton of AMOCO on July 3, 1991, MDNR requested that AMOCO provide further information. In October 1991, Mr. Sutton was contacted by the TES X Contractor and given a reference to a Woodward-Clyde Consultants (WCC) project number from a site plan dated November 18, 1980 that showed these two wells. WCC had previously told Mr. Sutton that they could not find any record to indicate that they had done this work (Ref. No. 90). As this site plan and references to the groundwater quality were included in ARMCO's Post-Closure Permit Application (PCPA), it is apparent that ARMCO or their consultant, Burns & McDonnell, had received information on these wells at one time. Mr. Sutton had also been informed of a second WCC project number for the 1987 sampling and analysis of 10 borings from the same area (Ref. No.

92). This project number was located in U.S. EPA files for the AMOCO Sugar Creek Refinery site.

h. Hydrocarbon spillage or leakage from stored product tanks is known to exist in two cases. An above ground fuel oil storage tank located on the east bank of the Blue River just north of Highway 24 has been identified as the source of hydrocarbon contamination found in soil samples collected along the adjacent river bank by the Corps of Engineers (COE). This 840,000 gallon steel tank (background of Photo No. 12) was installed in 1951, and used for storage of No. 6 fuel oil from 1951 to 1962, and No. 2 fuel oil from 1962 to 1982 when it was removed from service. Since 1982, it has not been used. ARMCO's consultant, Remcor, found 1.5 feet of oil-saturated soil and 1.5 inches of free product (Ref. No. 63). Remcor concluded that the contamination occurred due to historic spillage rather than to leakage of the tank. However, all of the soil borings were around the oil loading platform area, so this hypothesis cannot be evaluated. A recovery well, two observation wells, and an observation piezometer have been installed between the tank and the Blue River (Photo No. 12).

The second known case of hydrocarbon leakage was from a seven year old 10,000 gallon underground fiberglass tank used to store unleaded gasoline that was removed in 1987. The tank, which was located by the Blue River southeast of the Wilson Road Bridge, had leaked around the joints and from hairline cracks. The fill material and walls of the excavation were sprayed with Bio-Solve. Apparently no samples were collected to ensure clean closure (Ref. No. 53). ARMCO has replaced an unknown number of underground product storage tanks at their facility with above ground tanks (Ref. No. 82).

A number of small (10 to 50 gallons) oil spills have occurred at the plant and are listed in the U.S. EPA Region VII Incident Notification Report (Appendix F). The ARMCO Part B Application states that the largest known oil spill occurred in January 1971, as the result of improper pumping of oil at the Twelve Inch Mill. No volume of oil is given for this spill into the Blue River (Ref. No. 48). There were no other references in the files of spills or leaks from either underground or above ground product storage tanks. Included in Appendix F is a list of underground and above ground storage tanks at ARMCO which was included in their Part B Application (Ref. No. 17).

i. Trichloroethene (TCE) was used as a solvent prior to the use of Safety Kleen units. Five drums of waste TCE were stored in the Bar Joist Building Hazardous Waste Storage area at the time of the August 25, 1982 CEI (Ref. No. 14). One of these drums was bulging, and a Notice of Violation (NOV) was issued. Four drums were manifested to Solvent Recovery on December 16, 1982 (Ref. No. 18) It is not clear from the records why only four drums were manifested. Manifests included in the CME, indicate that seven drums of TCE

were manifested to Chemical Waste Management's facility in Emelle, Alabama on November 23, 1983 (Ref. No. 49).

j. Drums of waste paint were stored in the Bar Joist Hazardous Waste Storage Area, and drums of an unidentified caustic sludge were stored in an outside area (probably near the tractor sheds, according to Mr. Fillinger) in 1982. The drums were manifested to the Chemical Waste Management facility in Emelle, Alabama in March 1983 (Ref. No. 25).

k. Four drums of PCB oil are stored on site in a fenced area within the small tractor shed. Also stored at that location is a drum labeled as solid PCBs, which Mr. Fillinger believed to be a capacitor. These drums of PCB oil were formerly stored at the Main Substation, but were moved to the tractor shed (located on a hill) so that they would not be within the 100-year flood plain of the Blue River (Figure 3). Six transformers containing PCB oil are stored in the long tractor shed. PCB capacitors were at one time stored in the No. 1 Melt Shop, where there was a large bank of these capacitors in use. According to Mr. Fillinger, 45 PCB transformers and nine PCB capacitors were in use at various locations around the site as of the end of 1990 (Ref. No. 84). PCB capacitors are presently disposed by placing them in a steel barrel and sending them off site for proper disposal. PCB transformers are drained on site by Unison Transformer Service of Ashtabula, Ohio. The PCB oil and transformer carcasses are transported off site for proper disposal. It is also possible that PCB oil was formerly used in the oil quench baths located at the former Bolt and Nut Plant.

l. Drums of waste 1,1,1-trichloroethane (TCA) were received from ARMCO's Union Wire Rope (UWR) facility and disposed by mixing with fuel oil and burning in the boiler furnaces. ARMCO stopped this procedure upon receipt of the December 21, 1982 Complaint and Compliance Order (Ref. Nos. 19 and 22). It is uncertain how long ARMCO had been engaging in the burning of waste TCA mixed with fuel oil or where the waste TCA was added to the fuel oil. The furnace boilers were viewed during the VSI, and personnel there believed that the TCA must have been added at the tank farm as there is no other access to the fuel oil. Neither Mr. Fillinger nor the boiler room personnel were aware that TCA had ever been burned at ARMCO (Ref. No. 82).

TCA was also used at ARMCO as a solvent in the past. According to the 1983 CEI, TCA was no longer used by the Midwestern Steel Division, nor was it being received from UWR (Ref. No. 26). Two 85-gallon drums of TCA were manifested to the Chemical Waste Management facility in Emelle, Alabama in November 1983 (Ref. No. 49).

m. A clay pigeon shooting park was located on the northern portion of the site near where Rock Creek meets the southern property line (Ref. No. 94). Lead shot would have contaminated the surface soils in this area. It is not known how long this shooting park was in

operation. Aerial photographs clearly show the trap houses to have been in existence in 1955 and 1964, though 1944 and 1974 photographs do not show these structures.

2.4 Regulatory Compliance History

The following is a list of significant regulatory compliance events for the ARMCO facility. This list was compiled from a review of the documents listed in Section 5.0. Due to the large number of documents for this site, only those of major importance are referenced.

June 8, 1979	ARMCO received NPDES Permit No. MO-0004952 (Ref. No. 2).
August 18, 1980	ARMCO submitted Notification of Hazardous Waste Activity to the U.S. EPA. Non-specific source hazardous wastes F001 (spent solvents), F006 (electroplating sludges), F017, and F018 (paint residues and sludge wastes) and specific source hazardous wastes K061 (baghouse dust) and K062 (spent pickle liquor waste) were identified (Ref. No. 3).
November 19, 1980	U.S. EPA received ARMCO's Part A Hazardous Waste Permit Application in which only the K061 hazardous waste was identified. The dust was reported to be stored in a waste pile (Ref. No. 5).
June 5, 1981	ARMCO filed CERCLA Notification of Hazardous Waste Site for the Old Blue River ("W") and South of Bar Fab Landfills (Ref. No. 7).
July 1981	Four monitoring wells were installed by Layne-Western, Inc. for compliance with RCRA regulations (Ref. No. 48).
October 19, 1981	U.S. EPA requested clarification regarding a discrepancy of wastes listed on the Part A and the Notification of Hazardous Waste Activity (Ref. No. 8).
October 26-27, 1981	MDNR inspected ARMCO and found that baghouse dust was being landfilled (Ref. No. 10). [Numerous discussions took place over the next two years as to whether this was a landfill or a waste pile.]
December 17, 1981	ARMCO's response to the October 19, 1981 request indicated that the F001, F017, and F018 wastes were no longer being generated; the F006 waste was exempt, and the K062 waste was being recycled (Ref. No. 9). The F001 was reported to be from a cleaning process that was no longer operating,

	though a small quantity was still being used in a process coating. The F017 and F018 were from the cleanup of the former Bar Joist/Long Span painting operation.
January 21, 1982	MDNR notified the U.S. EPA that a recent inspection at ARMCO found that the K061 waste was being landfilled and that MDNR planned to call for ARMCO's Part B Application (Ref. No. 10).
April 8, 1982	U.S. EPA formally requested the submittal of ARMCO's Part B Hazardous Waste Permit Application due by October 6, 1982 (Ref. No. 11).
May 11-12, 1982	U.S. EPA PCB and RCRA inspections of ARMCO (Ref. No. 12).
June 2, 1982	MDNR collected two samples of baghouse dust and two samples of slag at ARMCO. These samples were submitted for EP Toxicity Metals analyses. Subsequent analyses (Appendix D) indicated that the slag was nonhazardous; the dust failed EP Toxicity criteria for lead and cadmium (Ref. No. 13).
August 23, 1982	PEDCO Environmental performed site inspection of the groundwater monitoring system at ARMCO. The report completed in September stated that the monitoring program was not in compliance (Ref. No. 16).
August 25, 1982	Compliance Evaluation Inspection (CEI) of ARMCO by U.S. EPA. A Notice of Violation was issued for 13 areas of non-compliance. 1) Expanding Landfill without revised Part A. 2) Storing waste caustic trichloroethylene (TCE) without Interim Status. 3) No determination made on paint waste. 4) No waste analysis plan. 5) No personnel training plan on record. 6) No internal communication or alarm system for caustic storage area. 7) Copy of returned manifest not available. 8) Closure Plan does not cover solvent or caustic area. 9) No post-closure plan for landfill. 10) No cost estimate for post-closure plan of landfill. 11) Open containers of waste caustic. 12) Operating records (dates and contents of containers) not properly maintained. 13) Deformed containers (bulging TCE drum) (Ref. No. 14).

October 1982	ARMCO's consultant, Burns & McDonnell, installed four additional monitoring wells. The locations for wells 5, 6, and 7 were selected to monitor downgradient of waste piles where ARMCO planned to store baghouse dust. Well No. 8 was to be the upgradient well (Ref. No. 23).
October 22, 1982	ARMCO filed their Part B Permit Application and submitted Closure and Post-Closure Plans for the RCRA landfill. ARMCO proposed closing the existing landfill and storing baghouse dust in both waste piles and converted oil storage tanks (Ref. No. 17). The Part B was later revised to eliminate the proposal for dust storage in waste piles (Ref. No. 27).
December 21, 1982	Complaint, Compliance Order, and Notice of Opportunity for Hearing issued for eight items regarding the storage of hazardous waste on site, the burning of waste 1,1,1-trichloroethane (TCA), and deficiencies in the groundwater monitoring program. [The burning of waste TCA at ARMCO was determined during an inspection of ARMCO's Union Wire Rope Facility on August 27, 1982 (Ref. No. 19).]
	A Letter of Warning was issued to ARMCO for deficiencies in their records and plans (Ref. No. 20).
January 20, 1983	ARMCO's response to the Compliance Order states that waste TCE had been manifested to Solvent Recovery Corporation on December 16, 1982 and burning of TCA had ceased. ARMCO decided to treat the waste paints and caustics as hazardous waste without conducting analyses (Ref. No. 22).
January 26, 1983	ARMCO began storing baghouse dust in converted fuel oil tank #5; the other three tanks went into service later (Ref. No. 48).
March 18, 1983	ARMCO notified U.S. EPA that waste paints and caustics had been shipped to Chemical Waste Management's landfill in Emelle, Alabama (Ref. No. 25).
March 1983	Monitoring well No. 9 was installed by Burns & McDonnell to be downgradient of the western portion of the RCRA landfill (Ref. No. 48).
April 1, 1983	Compliance Evaluation Inspection (CEI) of ARMCO was performed by U.S. EPA (Ref. No. 26).

June 8, 1983	PEDCO performed an inspection and evaluation of the revised groundwater monitoring program and determined that the system was still not in compliance. They recommended that an additional well be installed (Ref. No. 49).
September 22, 1983	Well X (a 2" piezometer) was located near the Rock Creek tunnel and added to the monitoring program. This piezometer had been installed in 1976 when borings were done in conjunction with the Rock Creek railroad line and tunnel (Ref. No. 28). Subsequent monitoring of the water level in this area found that the gradient was being affected by dewatering at the tunnel.
April 14, 1984	Monitoring well No. 10 was installed by Burns & McDonnell to be upgradient of the RCRA landfill and not be affected by the dewatering at the Rock Creek railroad tunnel (Ref. No. 48).
April 24, 1984	U.S. EPA notified ARMCO of its tentative decision to issue RCRA permit (Ref. No. 30).
April 30, 1984	U.S. EPA CEI of ARMCO. A Notice of Violation (NOV) was issued for a leaking filter box and accumulation of dust (Ref. No. 31).
July 10, 1984	Public Hearing for ARMCO RCRA permit (Ref. No. 32).
September 10, 1984	Closure activities were completed on the RCRA landfill (Ref. No. 34).
September 26, 1984	RCRA permit issued. Effective dates - October 26, 1984 through October 26, 1991 (Ref. No. 35).
February 21, 1985	U.S. EPA CEI of ARMCO. An NOV was issued for leaking dust and for erosion of the landfill cover (Ref. No. 36).
March 7, 1985	Letter of Warning issued to ARMCO requesting that ARMCO submit a groundwater assessment plan for the hazardous waste landfill within 15 days (Ref. No. 38).
March 25, 1985	Burns & McDonnell submitted Groundwater Assessment Plan for ARMCO (Ref. No. 39).
July 22, 1985	Under contract to the U.S. EPA, PRC's subcontractor, GCA, submitted a review of Burns & McDonnell's Groundwater Assessment Plan. The Ground-

	water Assessment plan was determined to be inadequate (Ref. No. 40).
March 26, 1986	U.S. EPA requested Part B Post-Closure Permit Application for the baghouse dust landfill (Ref. No. 46).
May 6, 1986	MDNR performed CEI of ARMCO; no violations were noted (Ref. No. 41).
February 18, 1987	MDNR performed CEI of ARMCO; no violations were noted (Ref. No. 43).
February 26, 1987	U.S. EPA issued Letter of Warning (LOW) to ARMCO to submit a Part B Post-Closure Permit Application within 150 days of receipt of the LOW. ARMCO had previously contested the requirement that they file for this permit (Ref. No. 46).
April 13, 1987	ARMCO amended CERCLA Notification of Hazardous Waste Site to include a 1,400 yd^3 waste pile (Ref. No. 47).
July 23, 1987	ARMCO submitted Part B Post-Closure Permit Application for hazardous waste landfill (Ref. No. 48).
September 21, 1987	MDNR completed Comprehensive Groundwater Monitoring Evaluation (CME) report on ARMCO. Deficiencies were noted in the characterization of the site geology and hydrogeology, as well as in the construction of the monitoring wells and the technical adequacy of the monitoring well network (Ref. No. 49).
October 16, 1987	MDNR notified ARMCO that their Post-Closure Permit Application had been deemed to be complete (Ref. No. 50).
November 17, 1987	ARMCO responded to MDNR regarding the deficiencies noted in the CME (Ref. No. 52).
December 2, 1987	MDNR CEI of ARMCO. Several unsatisfactory features dealing with failure to perform required inspections and failure to maintain proper documentation were listed (Ref. No. 54).
December 15, 1987	MDNR issued an NOV that required ARMCO to submit site-specific hydraulic data to characterize the homogeneity of the aquifer (Ref. No. 64).

January 13, 1988	ARMCO submitted a Proposed Corrective Action Plan to MDNR to address deficiencies in the hydraulic data as referred to in the December 15, 1987 NOV from MDNR. ARMCO proposed installing clustered piezometers and obtaining additional geological and hydrological data (Ref. No. 64).
February 11, 1988	MDNR approved ARMCO's Proposed Corrective Action Plan (Ref. No. 64).
February 16, 1988	ARMCO notified the City of Kansas City, Missouri of the excavation of a leaking underground storage tank near the Wilson Avenue [Road] Bridge over the Blue River (Ref. No. 53).
February 18, 1988	MDNR notified ARMCO of unsatisfactory features from the December 2, 1987 CEI. ARMCO was requested to submit documentation of compliance with recommendations by March 23, 1988. MDNR also requested ARMCO to provide the inspection report for Tank #5 when available. This tank was to have been emptied and inspected by February 1, 1988, but ARMCO was not able to meet that date (Ref. No. 54).
March 7-10, 1988	Four piezometers were installed at the RCRA landfill as part of the Corrective Action Plan (Ref. No. 57).
May 26, 1988	ARMCO notified MDNR of the disturbance of the South of Bar Fab landfill cover. Portions of the earthen landfill cover were apparently removed by the COE during rechannelization work on the Blue River between 1984 and 1986 (Ref. No. 56).
July 1988	ARMCO submitted the Geohydrologic Corrective Action report for the Emission Control Dust landfill work that was performed in March and April (Ref. No. 57).
July 25, 1988	MDNR agreed to allow ARMCO to substitute site-specific parameters of dissolved lead, dissolved chromium, and dissolved cadmium for the RCRA Compliance monitoring parameters of pH, specific conductance, total organic carbon, and total organic halogens. This agreement was made due to "false positives" readings that had caused ARMCO to enter assessment monitoring (Ref. No. 64).

November 2, 1988	ARMCO notified U.S. EPA that the 1,400 yd^3 waste pile had been removed and shipped to a recycling facility (Ref. No. 59).
November 14, 1988	Missouri Division of Geology and Land Survey (DGLS) completed their review of the corrective action measures performed at ARMCO. DGLS deemed the monitoring well network adequate (Ref. No. 64).
December 13, 1988	Remcor completed the concrete cap on South of Bar Fab landfill (Ref. No. 60).
February 24, 1989	MDNR informed ARMCO that the COE had traced hydrocarbon contamination in the Blue River to an abandoned fuel oil storage tank on ARMCO's property (Ref. No. 61).
March 30, 1989	MDNR CEI of ARMCO. Tank #5 had not been emptied of baghouse dust due to problems with the method the contractor was using to empty the tank. Tank #3 was also past due for cleaning and inspection. A barren area was noted on the RCRA landfill (Ref. No. 62).
June 1989	Remcor completed the Site Investigation Report for the oil storage tank area. The report confirmed hydrocarbon contamination between the fuel storage tank and the Blue River (Ref. No. 63).
December 5, 1989	MDNR completed the Operation and Maintenance Inspection report on the ARMCO RCRA landfill monitoring network. The report stated that additional permeability and gradient data needed to be obtained for the present network to be adequate. In addition, if assessment monitoring became necessary, additional site-specific geology and hydrogeological data would be necessary along with the installation of deep monitoring wells. The field sampling procedures used by Burns & McDonnell were found to be acceptable, though the documentation was inadequate (Ref. No. 64).
December 8, 1989	MDNR approved the Remcor remedial action work plan to install a recovery well at the abandoned oil storage tank area (Ref. No. 65).
December 11-14, 1989	A recovery well and two observation wells were installed at ARMCO's abandoned oil storage tank area (Ref. No. 83).

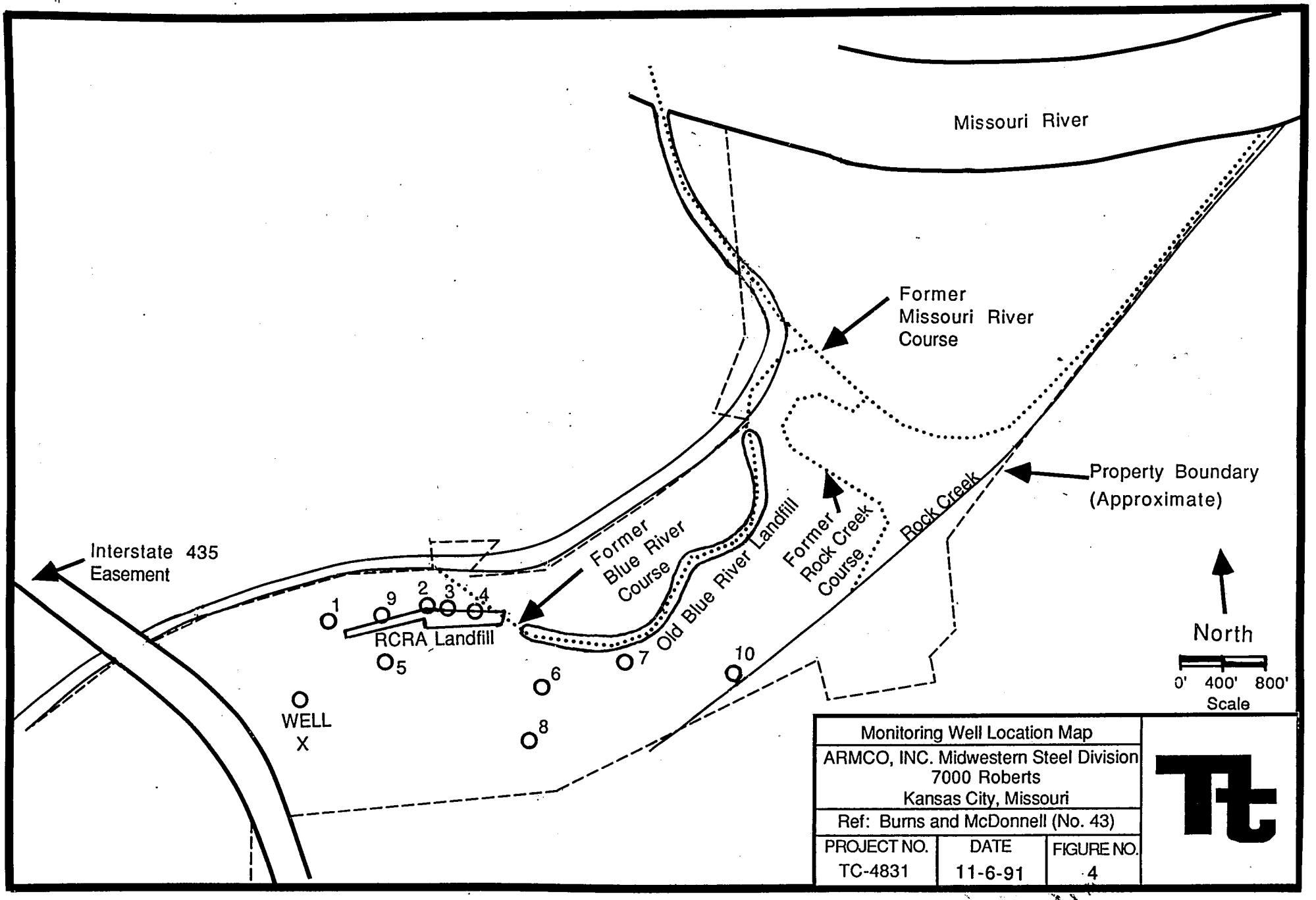
February 1991	Pumping of the recovery well began at the abandoned oil storage tank area (Ref. No. 82).
February 5, 1991	A meeting was held between ARMCO and other interested parties on routing the South Riverfront Expressway through the northern portion of the ARMCO property. One possible route is between the mill ponds and the RCRA landfill (Ref. No. 72).
March 18, 1991	Inspection by MDNR of ARMCO to verify closure of baghouse dust Tanks 3 and 5. At the time of the inspection, Tank 2 was empty and ready to be cleaned, and Tank 1 was being emptied (Ref. No. 74).
May 20-21, 1991	U.S.EPA, MDNR, and Tetra Tech, Inc. perform Visual Site Inspection (VSI) of ARMCO.

2.5 Onsite Investigations

The majority of onsite investigations performed at the ARMCO facility have dealt with the RCRA landfill and surrounding monitoring wells (Figure 4). MDNR prepared a Comprehensive Groundwater Monitoring Evaluation (CME) report in 1987 (Ref. No. 49) and an Operations and Maintenance (O&M) report for this area in 1989 (Ref. No. 64).

Remcor completed a report in June 1989 on their investigations of contamination at the abandoned fuel oil tank (Ref. No. 63). A report on the installation of the recovery well and two observation wells was to be completed by June 28, 1991 (Ref. No. 83); however, as of July 8, 1991 when the Draft PA was written, Mr. Fillinger had not received that report (Ref. No. 86). Mr. Fillinger has now received a draft copy of that report, and stated (Ref. No. 91) that the report recommended discontinuing pumping at the recovery well as no oil was being recovered. The presumption was that all of the oil had been recovered.

Two monitoring wells existed at the AMOCO Landfarm site. Lewis Sutton of AMOCO believed they were installed in 1981, but was not able to locate any information on the installation of these wells or any further investigations at this site (Ref. No. 85) due to the transfer of records from the former Sugar Creek refinery site to their Chicago office. A site plan in Appendix L of the PCPA shows the locations of these two wells and three soil borings. This site plan is by Woodward-Clyde Consultants (WCC) for Project No. K80-73 and is dated November 18, 1980. Mr. Sutton of AMOCO was informed of this WCC project number by the TES X Contractor on October 17, 1991 and stated that he would contact WCC for additional information (Ref. No. 90). An additional WCC report was located in the U.S. EPA files for the AMOCO Sugar Creek Refinery that included a figure showing borings sampled in 1987 from the AMOCO Landfarm at ARMCO. Mr. Sutton was informed on October 23, 1991 of the WCC Project Number 11C093-16. These two



Monitoring Well Location Map		
ARMCO, INC. Midwestern Steel Division 7000 Roberts Kansas City, Missouri		
Ref: Burns and McDonnell (No. 43)		
PROJECT NO. TC-4831	DATE 11-6-91	FIGURE NO. 4

figures and the analytical data for the 1987 borings are included in Appendix E to this report.

The COE has analyzed sediments dredged from the Blue River, and commissioned Law Engineering to perform a study of boring samples from the Blue River (Ref. No. 55). This report was reviewed by the TES X Contractor at the TSCA Office of U.S. EPA Region VII. PCB contamination was found in the Blue River just upstream of the ARMCO (Sheffield) dam.

3.0 ENVIRONMENTAL SETTING

3.1 Climate

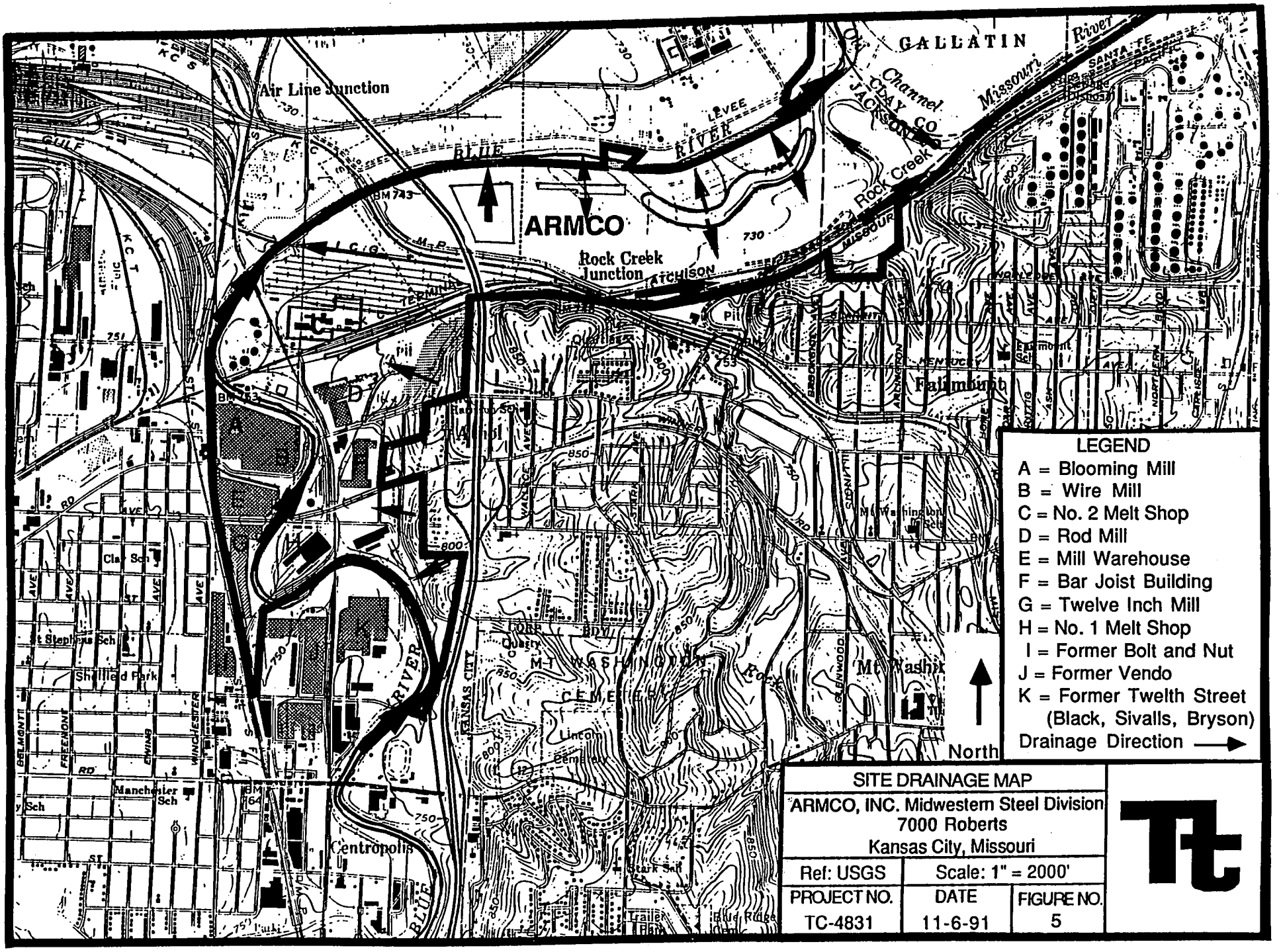
The average annual precipitation in Jackson County, Missouri is approximately 36 inches. Seventy percent (approximately 25 inches) of this precipitation occurs between April and September.

The average daily winter temperature is 33°F, with an average daily minimum temperature of 24°F. The annual snowfall is approximately 22 inches. The summers are long and hot, with an average temperature of 78°F and a daily maximum average of 88°F. The prevailing wind is from the south (Ref. No. 33).

3.2 Site Drainage

The southern portion of the site drains primarily to storm sewers or by sheet flow to the Blue River. According to Mr. Fillinger, all of the stormwater in the process area drains to NPDES permitted outfalls, and so no revisions to the NPDES Permit for stormwater are needed. The northern portion of the site primarily drains to the Blue River, Rock Creek, or to the Missouri River. Figure 5 shows the general drainage patterns of this 1000 acre site. Detailed information on the drainage pattern is not available from ARMCO. Due to the size of the facility, detailed observation of the drainage during the VSI was not possible.

The Blue River is a Class P (permanent flow) stream. In the ARMCO area, it is designated for livestock and wildlife watering, protection of warm water aquatic life, human health fish consumption, boating and canoeing, and for industrial uses (Ref. No. 73). According to unpublished information on the Blue River basin provided by MDNR for this RFA (Ref. No. 96), the Blue River is an urban stream in its middle and lower reaches, and bisects areas that have been heavily developed by both industrial and residential concerns. Historically, it has been heavily contaminated by point and nonpoint sources. Due to the recreational potential that the river has for the Kansas City area, the Clean Water Commission has designated the Blue River a "metropolitan no-discharge stream" for all but the lower four miles (where ARMCO is located). According to the MDNR report, ARMCO is the only discharger to the lower Blue River, and their permits are currently under review. Stricter limits on discharge are expected to be imposed. Discharges from Kansas City, the Blue River Sewage Treatment Plant, and Mobay Chemical Company have been



SITE DRAINAGE MAP		
ARMCO, INC. Midwestern Steel Division 7000 Roberts Kansas City, Missouri		
Ref: USGS	Scale: 1" = 2000'	
PROJECT NO. TC-4831	DATE 11-6-91	FIGURE NO. 5

moved from the Blue River to the Missouri River. Discharging to the Blue River further upstream (near the confluence of Indian Creek with the Blue River) is the Department of Energy's Allied-Signal facility [formerly Bendix Plant (Superfund site)]. Bendix discharged cooling water and stormwater. PCBs also had been released by Bendix, which have contaminated fish and sediments. The presence of PCBs and chlordane (banned in April 1988) are considered the most significant nonpoint source problems in the Blue River basin.

3.3 Geology

The bedrock underlying the site is a medium hard, clayey shale of the Pennsylvanian Pleasanton Group. This unit is considered to serve as an aquitard for the overlying Missouri River alluvium at the site. The Pennsylvanian rocks exposed and in the subsurface in Jackson County are composed of limestones and shales with sandstone and siltstone stringers. The strata dip gently to the west-northwest at approximately 10 to 20 feet/mile.

The Pennsylvanian rocks in Jackson County were exposed and eroded for millions of years. During Pleistocene times, glacial meltwaters carried large amounts of sediment down the Missouri River, where it was deposited in the flood plain. Winds picked up and winnowed out the fine silts from the flood plain. These windborne silts were deposited as loess, and are especially thick along the bluffs adjacent to the Missouri River. Subsequent erosion and deposition have resulted in additional alluvium deposits along the Blue and Missouri Rivers.

Generally, the portion of the property north of the Kansas City Southern (KCS) Railroad tracks is on Missouri River alluvium, and the part of the property south of the KCS railroad tracks is on Blue River alluvium. Alluvium from the Blue River overlies the Missouri River alluvium along the Blue River's present and past channels in the north part of the property/facility. Until the late 1950s or early 1960s the Missouri River flowed further west than its present channel. This old channel marks the Jackson-Clay county line. Extensive work has been done on the site, rechanneling the Missouri and the Blue Rivers and Rock Creek. The Blue River formerly flowed to the present Missouri River Channel via the southern part of the old Missouri Channel. According to the COE (Ref. No. 95), ARMCO built a dam (low-water crossing) across this channel and forced the Blue River to flow up the northern portion of this channel. These former and present channels are shown in Figure 4.

The Soil Survey of Jackson County shows that natural soils of the Parkville, Haynie, Zook, Gilliam, and Leta types have developed along portions of the Missouri River alluvium in the northern portion of the ARMCO property. These soil types are generally silty clays and loams. The southern portion is simply designated as urban land, meaning that over 85 percent of the area is covered with buildings, asphalt, pavement, or other impervious materials (Ref. No. 33).

Borings and drill logs have identified three units in the alluvium around the RCRA landfill in the northern portion of the site. These are an upper unit from 3 to 14 feet thick, composed of a medium-stiff to stiff silty clay; a middle unit typically 16 to 32 feet thick of loose to medium dense, interbedded and interfingered silty sands, clayey silts, and silts; and a lower unit approximately 30 feet thick of loose to medium dense, medium grained, clean sand with minor clay and gravel lenses. As is typical of fluvial deposits, these units tend to be lenticular and laterally discontinuous.

In the RCRA landfill area, the upper unit may be missing as it was reported to have been used as borrow material to provide the clay liner of the large mill cooling ponds (Ref. No. 52). An apparent discrepancy exists over this, however, as the Post-Closure Permit Application and notes from a meeting between ARMCO and the U.S. EPA dated September 28, 1982 (Ref. No. 15) both state that the RCRA landfill was constructed above the natural grade on soil that had been placed there following excavation for the No. 2 Melt Shop. Over the years much of the site, particularly the southern portion, has been built above the natural flood plain with slag, mill scale, and silt fill materials. Drill logs for the 1988 installation of four piezometers around the RCRA landfill show the fill to range from 2.5 feet to the southeast of the landfill, to 4.5 feet immediately northwest of the landfill (Ref. No. 57). Well logs from the abandoned oil tank remediation site indicate that the fill is up to 17 feet deep along the Blue River (Ref. No. 83).

3.4 Hydrogeology

Sources for the groundwater in the northern portion of the site include precipitation on the flood plain, flow from the Pennsylvanian bedrock subcropping in the alluvium, and flow from the Missouri River into the alluvium. This last source would generally be confined to periods of high flow of the Missouri, and could result in a temporary reversal of the groundwater flow direction.

In the northern portion of the site, groundwater is found at depths of less than 20 feet. The natural groundwater flow direction should generally be toward the Missouri River to the north. This flow direction however, has been affected by the continuous dewatering of the Rock Creek Railroad tunnel southeast of the mill cooling ponds (south of the RCRA landfill). A letter from Burns & McDonnell to the U.S. EPA reports that approximately 250 gallons per minute are pumped during dewatering (Ref. No. 29). The various reports on the hydrogeology of the RCRA landfill area are not in agreement regarding the hydraulic gradients and the relative importance of the dewatering. The latest report, the Operations and Maintenance (O&M) Inspection report from December 1989, discounted the importance of the dewatering and considered the Missouri River to be the most important factor affecting the groundwater flow. This is based on the fact that the water levels in the monitoring wells drop when the river level drops. An influence from the Blue River was noted in the wells immediately adjacent to the Blue River, whereas previous reports discounted any influence from the Blue River. The O&M report noted a

vertical hydraulic gradient to be present that was greater than the horizontal gradient. In addition, the vertical gradient changed, as observed by water level readings that indicated slightly upward and downward gradients. The change in the vertical gradient could be attributed to many different hydrologic conditions affecting the groundwater system, such as precipitation events, changes in the Missouri River and Blue River elevations, and dewatering of the Rock Creek railroad tunnel. The importance of the observed vertical gradient indicates two components of groundwater flow are present. Previous ARMCO studies had stated that the flow was simply horizontal and the direction was towards the Missouri River. The O&M report also notes that "the characterization of the aquifer, geology, hydrology, and potential for plume movement as portrayed by ARMCO is not sufficient for assessment monitoring". The lack of site-specific detail regarding the hydrogeologic system underlying the site leaves major gaps in developing a conceptual model of the groundwater system.

The poor understanding of the hydrology of the northern site reflects the complexity of the geology, and the uncertainty of how the man-made features such as the landfills and the mill cooling ponds influence the groundwater flow. In addition to the interfingered and interbedded fluvial deposits of the Missouri River and overlying Blue River deposits, there are former Missouri and Blue rivers channels, and even an old channel from the ancestral Kansas River (Ref. No. 64), which probably influence the groundwater flow. The mill cooling ponds have a ponding effect on the local water levels. The pumping from the adjacent Rock Creek railroad tunnel could potentially encourage seepage of water from the ponds into the groundwater.

The Remcor site investigation for the abandoned fuel oil storage tank area found the groundwater flow direction in the southern portion of the site to be toward the Blue River; depths to water ranged from 10 to 14 feet (Ref. No. 63). The Remcor study also showed the water table to be in fill rather than in the naturally occurring soils. The increased development of the southern portion of the site would increase the runoff and decrease the infiltration from precipitation. This may have contributed to the flooding that occurred at this part of the site in May 1990. At that time, the Wilson Road bridge was almost completely underwater. According to COE records, the water level in May 1990 was at an elevation of 749.5 feet at the Wilson Road Bridge. The ground elevation at this portion of the site is approximately 740 feet. Most of the southern portion of the site is at ground elevations of 740 to 750 feet. According to Mr. Fillinger, there was approximately one foot of water in the No. 1 Melt Shop, and 18 inches of water in the Blooming Mill during this flood.

3.5 Wells Within a Half-Mile Radius of the Facility

Based on MDNR records, the Post-Closure Permit Application (PCPA) identified five wells in the RCRA landfill area. The wells were all in Township 50 N, Range 32 West of Jackson County, Missouri. Two wells in Section 32 were reportedly owned by the K.C. Quarries Company. Two wells (each approximately 100 feet deep) were reported to be owned by ARMCO in

the SE 1/4 of the SE 1/4 of Section 30. One well (approximately 400 feet deep) in the NE 1/4 of the NW 1/4 of Section 31 was reported to be owned by the J.D. Judd Company.

In a letter dated February 15, 1983 to the U.S. EPA regarding comments on the Part B Application, ARMCO listed the same wells, and stated that none of the wells could be located. The two wells owned by K.C. Quarries were believed to have been destroyed during expansion of the quarry. The two wells owned by Sheffield Steel (ARMCO) could not be located, nor could any records of the wells. ARMCO was unable to locate the J.D. Judd Company.

Information was requested from MDNR for wells within one-half mile of the ARMCO property line in May 1991. The MDNR records do not list any wells within one-half mile of the facility.

4.0 SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN

The following is a discussion of the SWMUs grouped by types; this is followed by the list of AOCs. The locations of these SWMUs and AOCs (where known) are shown in Figure 6; these units are also listed in Table 1. The 21 SWMUs identified for ARMCO's 1987 Post-Closure Permit Application (PCPA) have the identifier assigned by Burns & McDonnell following the SWMU name. These identifiers are also used in Figure 6.

TES X's Conclusions and Recommendations for each SWMU and AOC identified have been separated from the body of this report. They are presented as an attachment to this report and are labeled "**ENFORCEMENT CONFIDENTIAL**".

4.1 Landfills and Waste Pile

Four landfills and one waste pile at the ARMCO facility have been identified as SWMUs.

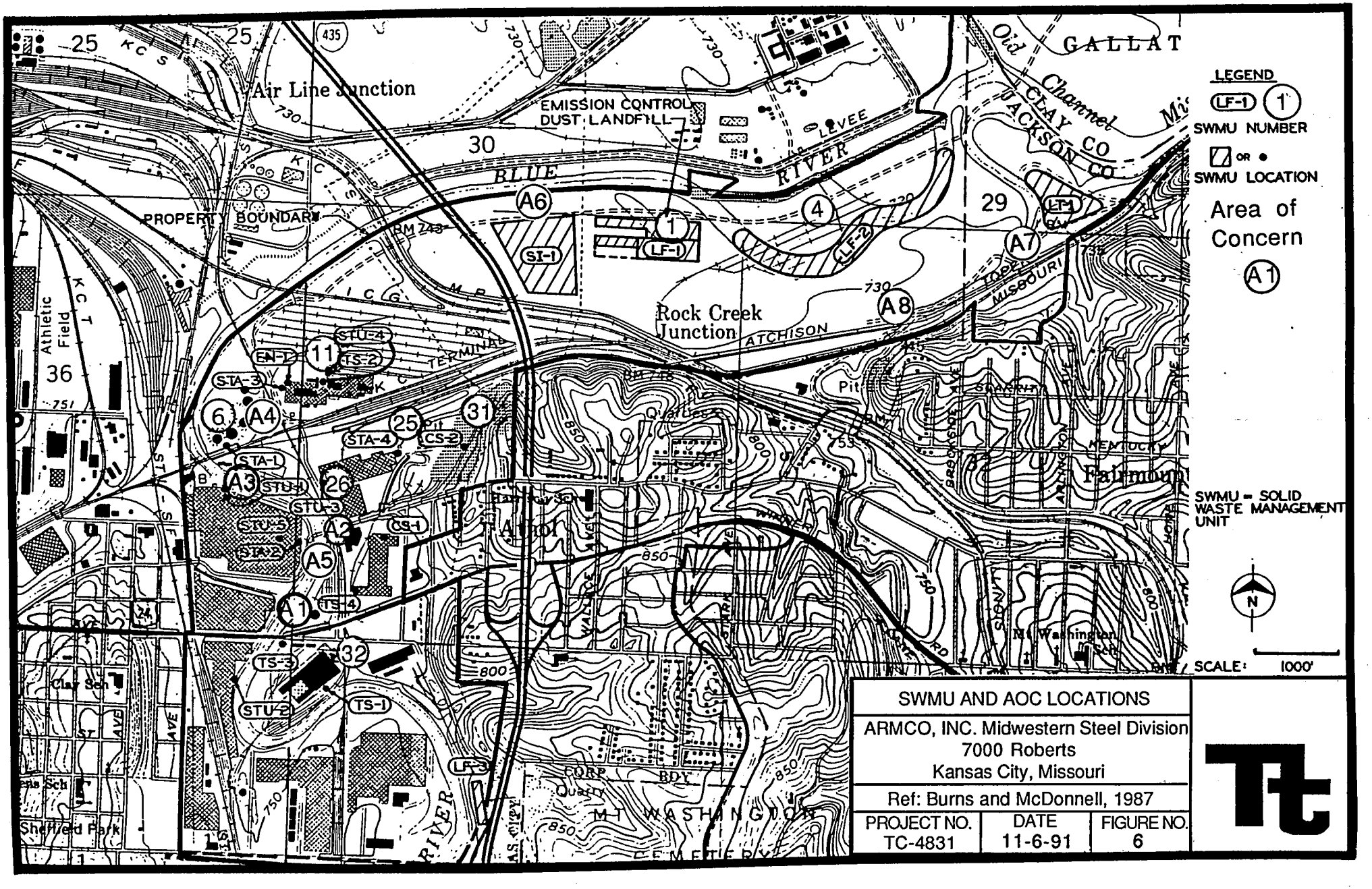
4.1.1 SWMU No. 1 - RCRA Landfill

A. Unit Description

According to the PCPA, this landfill was in use from July 1980 to January 25, 1983, and was certified by Burns & McDonnell as closed on September 19, 1984 (Ref. No. 48). The two trenches composing this landfill are approximately 1,300 feet long and 650 feet long, and are approximately 10 feet deep and 50 feet wide. Together they contain approximately 36,000 yd^3 of baghouse dust. The landfill cover is planted with crown vetch, which appeared to be in good condition at the time of the VSI (Photo No. 5).

B. Waste Characteristics

Results of EP Toxicity analyses on the two samples of baghouse dust analyzed in June 1982 (Ref. No. 13) showed elevated lead (160,000 and 190,000 $\mu g/\ell$), chromium (380 and 710 $\mu g/\ell$), and cadmium (6,250



SWMU AND AOC LOCATIONS		
ARMCO, INC. Midwestern Steel Division 7000 Roberts Kansas City, Missouri		
Ref: Burns and McDonnell, 1987		
PROJECT NO. TC-4831	DATE 11-6-91	FIGURE NO. 6

Table 1: Potential Contamination of SWMUs and AOCs at ARMCO, Inc. Midwestern Steel Division

No.	Abbreviated Name of Solid Waste Management Units Or Area of Concern	Contaminant of Concern	Likelihood of Release Media of Concern					Level of Contamination	Recommended Further Action
			Air	SW	GW	SG	Soil		
1	RCRA Landfill	Baghouse Dust (Pb, Cr, Cd)	Low	Low	Med	N/A	Med	Low	See Section 6.0
2	Old Blue River "W" Landfill (LF-2)	Baghouse Dust (Pb, Cr, Cd)	Low	Low	Med	N/A	Med	Unknown	See Section 6.0
3	South of Bar Fab Landfill (LF-3)	Baghouse Dust (Pb, Cr, Cd)	Med	High	Med	N/A	High	Unknown	See Section 6.0
4	1987 Waste Pile	Baghouse Dust (Pb, Cr, Cd)	High	High	Low	N/A	High	Unknown	See Section 6.0
5	Plant Rubble Landfill (LF-1)	(Non-hazardous)	Low	Low	Low	Low	Low	Unknown	See Section 6.0
6	RCRA Permitted Dust Storage Tanks	Baghouse Dust (Pb, Cr, Cd)	Med	Med	Low	N/A	Med	Unknown	See Section 6.0
7	No. 1 Melt Shop Dust Tank (TS-1)	Baghouse Dust (Pb, Cr, Cd)	Med	Med	Low	N/A	Med	Unknown	See Section 6.0
8	No. 2 Melt Shop Dust Tank (TS-2)	Baghouse Dust (Pb, Cr, Cd)	High	Med	Low	N/A	Med	Unknown	See Section 6.0
9	No. 1 Melt Shop Dust Conveyor (TS-3)	Baghouse Dust (Pb, Cr, Cd)	Med	Low	Low	N/A	Low	Unknown	See Section 6.0
10	Dust Railcar Area - Bar Joist Bldg (TS-4)	Baghouse Dust (Pb, Cr, Cd)	Low	Low	Low	N/A	Low	Unknown	See Section 6.0
11	Dust Railcar Area - No. 2 Melt Shop	Baghouse Dust (Pb, Cr, Cd)	Low	Low	Low	N/A	Low	Unknown	See Section 6.0
12	AMOCO Landfarm (LT-1)	Petroleum Waste	High	High	High	High	High	Unknown	See Section 6.0
13	Pickle Liquor Tanks (STA-2)	Sulfuric Acid (Metals)	Low	Low	Med	Low	Med	Unknown	See Section 6.0
14	Etch Lab Mixing Tank (EN-1)	HCl Acid, Sodium Hydroxide	Low	Low	Low	Low	Low	Unknown	See Section 6.0
15	Etch Lab Holding Tank (STA-3)	HCl Acid, Sodium Hydroxide	Low	Low	Low	Low	Low	Unknown	See Section 6.0
16	Roll Shop Roll Cleaning Tank (STA-4)	Phosphoric Acid	Low	Low	Low	Low	Low	Unknown	See Section 6.0
17	Wire Mill Rinse. Neutral. Tank (STU-5)	Hydrochloric Acid	Low	Low	Med	Low	Med	Unknown	See Section 6.0
18	Blooming Mill Scale Pit (STU-1)	Lubricating Oil, Mill Scale	Low	Low	Low	Low	Low	Unknown	See Section 6.0
19	Twelve Inch Mill Scale Pit (STU-2)	Lubricating Oil, Mill Scale	Low	Low	Low	Low	Low	Unknown	See Section 6.0
20	Rod Mill Scale Pit (STU-3)	Lubricating Oil, Mill Scale	Low	Low	Low	Low	Low	Unknown	See Section 6.0
21	No. 2 Melt Shop Scale Pit (STU-4)	Lubricating Oil, Mill Scale	Low	Low	Low	Low	Low	Unknown	See Section 6.0
22	Mill Ponds (SI-1)	Oil/Grease/Solvent	Low	Med	Med	Med	Med	Medium	See Section 6.0
23	Safety Kleen Units (68 units)	Solvents	Low	Low	Low	Low	Low	Unknown	See Section 6.0
24	Waste Oil Storage (STA-1)	Waste Oil	High	High	High	High	High	Unknown	See Section 6.0
25	Roll Shop Drum Storage	Waste Oil	High	High	High	High	High	Unknown	See Section 6.0
26	Rod Mill Drum Storage	Waste Oil	High	High	High	High	High	Unknown	See Section 6.0
27	Bar Joist Bldg H.W. Storage (CS-1)	TCE, Paint Sludge	Low	Low	Low	Low	Low	Unknown	See Section 6.0
28	Outside H. W. Storage	Caustic Sludge	Low	Low	Low	N/A	Low	Unknown	See Section 6.0
29	Main Substation PCB Storage	PCBs	Low	Low	Low	N/A	Low	Unknown	See Section 6.0
30	Long Tractor Shed PCB Storage (CS-2)	PCBs	Low	Low	Low	N/A	Low	Unknown	See Section 6.0
31	Small Tractor Shed PCB Storage	PCBs	Low	Low	Low	N/A	Low	Unknown	See Section 6.0
32	No. 1 Melt Shop PCB Storage	PCBs	Low	Low	Low	N/A	Low	Unknown	See Section 6.0

Table 1: Potential Contamination of SWMUs and AOCs at ARMCO, Inc. Midwestern Steel Division (Continued)

No.	Area of Concern	Contaminant of Concern	Likelihood of Release Media of Concern					Level of Contamination	Recommended Further Action
			Air	SW	GW	SG	Soil		
A1	Abandoned Fuel Oil Tank	No. 2 and No. 6 Fuel Oil	Med	High	High	High	High	High	See Section 6.0
A2	Underground Storage Tanks	Gasoline	Low	Low	High	High	High	Unknown	See Section 6.0
A3	ARMCO Dam/PCB Excavation Area	PCBs	Low	Med	Low	N/A	Med	Unknown	See Section 6.0
A4	Boiler Furnace Area	TCA	Low	Low	Low	Low	Med	Unknown	See Section 6.0
A5	Outfall 006	Acids and Metals	Low	Med	Low	Low	Med	Unknown	See Section 6.0
A6	Outfall 042	Oil and Grease, Acids	Low	High	Med	Low	Med	Unknown	See Section 6.0
A7	Backwash of Rock Creek	Debris	Low	Med	Low	Low	Low	Unknown	See Section 6.0
A8	"Owl Gun Club" Shooting Park	Lead Shot	N/A	Low	Low	N/A	Med	Unknown	See Section 6.0

Notes:
(Burns and McDonnell SWMU identification from Post-Closure Permit Application)

LF = Landfill
TS = Transfer Station
LT = Landfarm
STA = Storage Tank, Above Ground
EN = Elementary Neutralization Unit
STU = Storage Tank, Underground
SI = Surface Impoundment
CS = Container Storage

SW = Surface Water
GW = Groundwater
N/A = Not Applicable
SG = Soil Gas

and 7,890 μg/ℓ). Also detected, though below EP Toxicity maximum concentrations for defining the material as a RCRA hazardous waste, were selenium (23 and 33 μg/ℓ), arsenic (8 and 16 μg/ℓ) and mercury (1.4 μg/ℓ detected in only one sample). Though not a TCLP metal, the baghouse dust is also high in zinc (averaging 17 to 21 percent). In recent years, the dust has been shipped off site for recovery of the zinc content.

Between 1981 and 1988, 11 groundwater monitoring wells (Figure 5) and four piezometers were installed in the area surrounding this landfill. The large number of monitoring wells is related to the hydrologic problems with this site, the poor construction techniques used in the monitoring wells installed in the early 1980s, and the installation of several wells in anticipation of storing baghouse dust in waste piles. Results from groundwater monitoring for selected analyses are presented in Appendix D.

ARMCO went into assessment monitoring from detection monitoring several times in the mid 1980s, but returned to detection status when no evidence of contamination was found in the follow-up sampling. Therefore, MDNR and ARMCO agreed in 1987 to begin monitoring site-specific levels of dissolved lead, dissolved cadmium, and dissolved chromium rather than the RCRA required parameters of pH, specific conductance, total organic carbon, and total organic halogens (Ref. No. 64). Groundwater monitoring presently occurs semi-annually, and no contamination of the groundwater has been found.

As part of the December 21, 1982 Complaint and Compliance Order, ARMCO was ordered to perform analyses for fluoride, nitrate (as N), endrin, lindane, methoxychlor, toxaphene, 2,4-D, 2,4,5-TP (silvex), radium, gross alpha, gross beta, turbidity, coliform bacteria, iron, manganese, phenols, sodium sulfate, pH, specific conductance, total organic carbon, and total halogens. In 1983, wells 3 and 6 exceeded the MCL for gross alpha particles. In 1984, wells 2, 6, and 9 exceeded the MCL for gross alpha particles; and wells 2, 3, and 9 exceeded the MCL for radium (Appendix D). There is no information in the files to indicate that any action was taken to follow-up on these high radiation values or to determine a source for this contamination.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release from this landfill would be leaching heavy metals into the soil and groundwater. The Blue River channel is maintained by the COE so erosion by the river is not a major concern; however, if this area were to flood or the river changed course, contamination of the surface water could occur. If the landfill cap were allowed to erode, contamination of the air could occur via wind-blown particulates.

4.1.2 SWMU No. 2 - Old Blue River "W" Landfill (LF-2)

A. Unit Description

According to the PCPA, this landfill was in use from 1965 to 1980, and covers approximately 15 acres. The landfill is an old channel of the Blue River, and contains approximately 185,000 yd^3 of baghouse dust mixed with "general plant and office trash". The landfill was capped and seeded in 1980. The cap appeared to be in good condition at the time of the VSI. Presumably, the non-baghouse waste is non-hazardous. ARMCO reported this landfill to the U.S. EPA in 1980. In 1984, it was placed on the Missouri Department of Natural Resource (MDNR) list of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri. No Superfund clean up has been initiated, or planned, for this site. This landfill is covered with grass and appeared to be in good condition at the time of the VSI (Photo No. 3).

B. Waste Characteristics

This landfill contains baghouse dust. Analyses on the baghouse dust from the RCRA Landfill prior to closure showed it to contain elevated levels of lead, chromium, and cadmium (Ref. No. 13). No samples have been collected of the baghouse dust from this landfill but it would be expected to be similar in composition to that sampled from the RCRA Landfill.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release from this landfill would be of heavy metals into the soil and groundwater. The Blue River channel is maintained by the COE so erosion by the river is not a major concern, though some erosion of the Blue River channel has occurred (Ref. No. 95). If this area were to flood, as it did in 1984, or the river were to change course, contamination of the surface water could occur. If the landfill cap were allowed to erode, contamination of the air could occur via wind-blown particulates.

4.1.3 SWMU No. 3 - South of Bar Fab Landfill (LF-3)

According to the PCPA, this landfill was in use from 1962 to 1965, and covers approximately five acres. It is located on a narrow strip of land bordered by the Blue River on the west and Interstate 435 on the east. A portion of the landfill along the Blue River is on property now owned by the City of Kansas City, Missouri. The landfill contains approximately 35,000 yd^3 of baghouse dust mixed with "general plant and office trash". ARMCO reported this landfill along with the "W" Landfill, but it is seldom mentioned in the U.S. EPA or MDNR files, and was not added to the list of Confirmed Abandoned or Uncontrolled Hazardous Waste Sites in Missouri.

In May 1988, ARMCO became aware that the cover of this landfill had been disturbed, and notified MDNR about the possibility of a release (Ref. No. 56). It is believed that the landfill was exposed sometime between 1984 and 1986 when the COE was performing channelization work along the Blue River. In December 1988, ARMCO and the City of Kansas City installed a concrete cap (Photo No. 15) on the west side of the landfill along the river. A drainage culvert on the east side of the landfill was also capped.

B. Waste Characteristics

This landfill contains baghouse dust. No samples have been collected of the baghouse dust from this landfill; however, it should be similar in composition to the dust samples collected from the No. 1 Melt Shop. (The No. 2 Melt Shop was built in the mid-1970s, after this landfill was closed). EP Toxicity analyses from 1982 and 1983 of dust samples from the No. 1 Melt Shop are shown in Appendix D. The sample analyzed on February 2, 1982 contained 26,000 $\mu g/\ell$ lead, 12,400 $\mu g/\ell$ cadmium, 5 $\mu g/\ell$ arsenic, 30 $\mu g/\ell$ barium, 20 $\mu g/\ell$ chromium, 2 $\mu g/\ell$ mercury, 10 $\mu g/\ell$ selenium, and 30 $\mu g/\ell$ silver. The sample analyzed on June 15, 1983 contained 112,000 $\mu g/\ell$ lead, 6,800 $\mu g/\ell$ cadmium, and, 30 $\mu g/\ell$ chromium (other metals concentrations were not reported for the 1983 analysis).

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release from this landfill would be of heavy metals into the soil, groundwater and the Blue River. Contamination of the surface water could occur by flow of contaminated groundwater into the adjacent Blue River, or by contaminated sediments entering the river through erosion of the landfill. As the baghouse dust in this landfill was apparently exposed for three to five years, erosion of the landfill may have contaminated the nearby river sediments with heavy metals. Predating the presumed exposure of this landfill, the COE analyzed sediments dredged from the Blue River near the Wilson Road bridge. Their analyses indicated that heavy metals "exceed allowable limits" (Ref. No. 4). No additional information was located concerning whether the COE excavated this area of the river.

4.1.4 SWMU No. 4 - 1987 Waste Pile

In April 1987, ARMCO amended their 1981 Notification of Hazardous Waste Site to add a waste pile of approximately 1,400 yd^3 of baghouse dust that they had discovered near the Old Blue River "W" Landfill. According to a letter from ARMCO to MDNR dated November 2, 1988, it was removed (Photo No. 4) and shipped to the recycling facility for zinc recovery. It is not known how long this waste pile was present or why it was not discovered until 1987.

B. Waste Characteristics

This waste pile contained baghouse dust. Analyses on the baghouse dust from the RCRA Landfill prior to closure showed it to contain elevated levels of lead, chromium, and cadmium (Ref. No. 13). No sampling was performed by ARMCO to confirm that no contamination remained when this waste pile was removed.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release from this former waste pile would have been of heavy metals into the air, surface water, soil, and groundwater. If heavy metals remain in the soil due to inadequate clean up of this waste pile, contamination of the air, soil, and groundwater could continue after removal of the bulk of the waste pile.

4.1.5 SWMU No. 5 - Plant Rubble Landfill (LF-1)

A. Unit Description

According to the PCPA, this landfill contains "non-putrescible rubble from Plant operations". It is located next to the RCRA landfill and has been in use since 1980. As of 1987, this landfill contained approximately 86,000 yd^3 of material and was described as being 1,350 feet long, 185 feet wide, and 15 feet deep.

B. Waste Characteristics

This landfill is still in use and, according to Mr. Fillinger, contains only earth, rock, and similar materials. Inspection of the landfill area during the VSI found wood, plastic, cloth, and scrap metal present on the surface (Photo No. 6). Thus, the contents of this landfill are in question.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release from this landfill is unknown as its contents are in question. Releases could affect the soil, soil gas, and groundwater.

4.2 Dust Storage Tanks and Transfer Stations

Six SWMUs were identified at the ARMCO facility where baghouse dust has been stored in tanks or transferred.

4.2.1 SWMU No. 6 - RCRA Permitted Baghouse Dust Storage Tanks

A. Unit Description

From 1983 until 1986, four of the five fuel oil storage tanks located at the tank farm were converted for storage of baghouse dust. One tank (Tank No. 4) continued to be used for fuel oil storage and never contained baghouse dust. As part of the permitting process, the levees surrounding these tanks were raised to approximately 752 feet to protect them from the 100 year flood level. Dust was stored in Tank Nos. 1, 2, 3, and 5 from January 1983 (when the RCRA Landfill stopped receiving the baghouse dust) until July 15, 1986 (when the baghouse dust began being shipped off site for zinc recovery). Each of the four dust tanks is 100 feet in diameter; three are 40 feet high, and the fourth is 30 feet high. The tanks have a combined storage capacity of 40,000 yds^3. Tanks 2, 3, and 5 were filled, and Tank 1 was partially filled when the May 1986 Compliance Evaluation Inspection (CEI) was performed. The tanks had never been emptied prior to being emptied for closure.

The dust from the No. 2 Melt Shop and most of the dust from the No. 1 Melt Shop was stored in the tanks. Prior to 1985, some of the dust from the No. 1 Melt Shop was pelletized and reintroduced into the furnaces. The dust was transported to the storage tanks from the Melt Shop storage tanks by truck. Pneumatic lines were installed on three of the tanks, and a screw conveyer (later replaced by a pneumatic line) was installed on the fourth (Tank #5) to transfer the dust from the trucks into the tanks. Several minor (<2 yds^3) dust spills occurred during the years that these tanks were being filled, and NOVs were issued for these violations. According to the 1985, 1986, and 1987 CEIs, these spills (which occurred on April 30, 1984, February 21, 1985, March 6, 1986, and March 26, 1987) were cleaned up in accordance with ARMCO's contingency plan. The spilled dust was reported to have been returned to the Electric Arc Furnace (EAF). The March 26, 1987 spill (Ref. No. 54) occurred around Tanks 1 and 2. The contaminated material was removed and replaced with slag gravel. No mention is made of the disposition of the "contaminated material", which was presumably soil or gravel fill and may not have been appropriate to reintroduce into the EAF.

Removal of the dust from the tanks began in 1987. Originally, the dust was trucked to the Bar Joist Building where it was loaded onto the railcars for shipment to the Horsehead zinc recovery facility in Palmerton, Pennsylvania. Later, the dust from the storage tanks was trucked to the railcar loading area at the No. 2 Melt Shop.

As of March 18, 1991, when Mr. Frank Dolan of MDNR visited the site, Tanks 3 and 5 had been emptied and cleaned; Tank 2 was empty and ready to be cleaned; and Tank 1 was in the process of being emptied. This tank had been emptied by the time of the VSI on May 20, 1991.

At the time of the VSI (Photo No. 20), ARMCO was considering the possibility of keeping one tank permitted for dust storage, converting one tank back to fuel oil storage, and using the other two tanks as scrap in the electric arc furnaces.

B. Waste Characteristics

Analyses of the baghouse dust from the RCRA Landfill prior to closure showed it to contain elevated levels of lead, chromium, and cadmium (Ref. No. 13). The files reviewed for this RFA did not mention any analyses on the dust stored in these tanks, however it should be similar to that which was landfilled, as well as the dust samples analyzed from the two melt shops (Appendix D).

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release of the baghouse dust from this unit would mainly be to the air during transfer operations. A potential also exists for contamination of the soil and surface water by heavy metals from dust that might be released during dust transfer.

4.2.2 SWMU No. 7 - No. 1 Melt Shop Baghouse Dust Tanks (TS-1)

A. Unit Description

According to the PCPA, this was a transfer station for baghouse dust located on the east side of the melt shop, and had been in use since 1962. The No. 1 Melt Shop closed in May 1988, consequently, this SWMU is no longer in use. The transfer station consisted of two steel tanks, each about 10 feet in diameter and 25.5 feet high that had a combined storage capacity of 86 yd^3. At the time of the 1983 CEI, the baghouse dust from this melt shop was being pelletized and reintroduced into the electric arc furnaces. The 1985 CEI states that all of the dust from the No. 1 Melt Shop was being pelletized. This procedure, designed to enrich the zinc content, adversely affected the quality of the steel and was discontinued prior to the 1986 CEI. It is likely that pelletization of the dust did not continue as long as three years, as suggested by the CEI reports, since, according to a file memo, it was to be an experimental process beginning in October 1982 and was to involve the dust from only one of the four furnaces in the No. 1 Melt Shop (Ref. No. 15). By 1986, storage of the No. 1 Melt Shop baghouse dust in the RCRA permitted tanks (SWMU No. 6) had begun. Dust from these tanks was later sent to the railcar loading area at the Bar Joist Building (SWMU No. 10) for recycling. The dust tanks comprising this SWMU have been certified as clean by ARMCO's contractor, Remcor, but there is no indication in the files that any samples were collected to verify that no contamination remained in or around this SWMU.

B. Waste Characteristics

EP Toxicity analyses from 1982 and 1983 of dust samples from the No. 1 Melt Shop performed by ARMCO are shown in Appendix D. The sample analyzed on February 2, 1982 contained 26,000 µg/ℓ lead, 12,400 µg/ℓ cadmium, 5 µg/ℓ arsenic, 30 µg/ℓ barium, 20 µg/ℓ chromium, 2 µg/ℓ mercury, 10 µg/ℓ selenium, and 30 µg/ℓ silver. The sample analyzed on June 15, 1983 contained 112,000 µg/ℓ lead, 6,800 µg/ℓ cadmium, and 30 µg/ℓ chromium.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release of the baghouse dust would have been mainly to the air during dust transfer operations when this SWMU was in use. A potential also exists for contamination of the surface soil and water by heavy metals from dust that might have been released during dust transfer or failures of the No. 1 Melt Shop baghouse. If significant dust releases occurred, and contaminated the soil with heavy metals, the groundwater could also be affected. The first electric furnaces were installed at ARMCO in the early 1950s and the baghouse was installed on The No. 1 Melt Shop in approximately 1962, thus the K061 dust was vented to the atmosphere for a number of years. The EMSL report on the aerial photos might prove useful in determining whether an area of contamination exists on the site due to this dust settling.

4.2.3 SWMU No. 8 - No. 2 Melt Shop Baghouse Dust Tank (TS-2)

A. Unit Description

According to the PCPA, this is a transfer station for the baghouse dust and is located at the northwest corner of the No. 2 Melt Shop Scrap Yard. It began operations in 1977, and consists of a steel tank 12 feet in diameter and 17.33 feet high, having a capacity of 50 yds^3. The dust is emptied from the baghouse dust bags by a combination of sonic horns and reverse air and flows into a hopper under the bag. The 10 dust bags are emptied in rotation, with one being emptied approximately every 20 minutes. Occasionally, a failure of this system occurs, and the dust is released to the atmosphere. Such a failure occurred on the second day of the VSI. A large, billowing cloud of reddish dust was released for approximately two minutes. According to Mr. Fillinger, ARMCO is permitted by the Kansas City Code to have emissions between 20 and 60 percent opacity for up to six minutes. He reported that they had two violations in 1991 (Ref. No. 86). Information concerning ARMCO's permitted emissions levels and past violations was requested from the City of Kansas City Air Pollution Department. According to Mike Manning of the Kansas City Air Quality Department (Ref. No. 88), the only air permit that ARMCO has is for an arcerator refiner that is a secondary refining process after the electric arc furnace. Mr. Manning said that the No. 2 Melt Shop had been built prior to establishment of Kansas City's permitting process. Mr. Manning stated that no air monitoring was being performed at ARMCO by the city; the

closest air monitoring station is at the Kansas City Fire Academy (approximately five miles to the northwest).

Normally, the dust is transferred from the hopper under the dust bag to the storage tank by a screw conveyor. The storage tank (also known as the "Day Tank") is emptied daily into a railcar below (Photo No. 16) for shipment to the recycling facility. The air is evacuated from the railcar as it is filled, and an air return line carries the evacuated air and any associated dust back to the Day Tank. A small baghouse on the Day Tank traps the dust and allows the air to escape from the tank. According to Mr. Fillinger, approximately 60,000 pounds of baghouse dust are generated each day, and typically fills approximately 10 railcars per month. The railcars are shipped out at a rate of approximately two or three per week.

B. Waste Characteristics

EP Toxicity analyses from 1982 and 1983 of dust samples from the No. 2 Melt Shop performed by ARMCO are shown in Appendix D. The sample analyzed on February 2, 1982 contained 28,400 $\mu g/\ell$ lead, 1,140 $\mu g/\ell$ cadmium, 5 $\mu g/\ell$ arsenic, 80 $\mu g/\ell$ barium, 20 $\mu g/\ell$ chromium, 4.3 $\mu g/\ell$ mercury, 8 $\mu g/\ell$ selenium, and 30 $\mu g/\ell$ silver. The sample analyzed on June 15, 1983 contained 117,000 $\mu g/\ell$ lead, 20 $\mu g/\ell$ cadmium, and 200 $\mu g/\ell$ chromium. ARMCO's analysis of the No. 2 Melt Shop baghouse dust in March 1990 using the Toxicity Characteristic Leaching Procedure (TCLP) indicated that it contained 123 mg/l (123,000 $\mu g/\ell$) of lead. This is far above the TCLP maximum allowable contaminant concentration of 5 mg/l to define this as a RCRA characteristic waste. The cadmium content of 0.029 mg/l and the chromium content of <0.25 mg/l were under the RCRA characteristic concentration of 1.0 mg/l and 5.0 mg/l for the respective metals.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release of the baghouse dust to the air was observed. Potential also exists for contamination of the soil and surface water by heavy metals from dust that might be released during dust transfer, or from baghouse dust failures. Contamination of the soil by heavy metals could result in contamination of the groundwater.

4.2.4 SWMU No. 9 - No. 1 Melt Shop Canopy Baghouse Dust Conveyor (TS-3)

A. Unit Description

According to the PCPA, this was a steel screw conveyor (12 inches in diameter and 65 feet long) that transferred baghouse dust from the No. 1 Melt Shop Dust Storage Tank to a container truck parked beneath the tank. This SWMU was in use from 1977 until May 1988, when operations ceased at the No. 1 Melt Shop. ARMCO's contractor Remcor certified "clean closure" (Remcor terminology) of this SWMU on November 13, 1990; however, there was no indication in the files that samples were collected to ensure that no contamination remained at this location. This screw conveyor had been removed prior to the VSI.

B. Waste Characteristics

EP Toxicity analyses from 1982 and 1983 of dust samples from the No. 1 Melt Shop are shown in Appendix D. The sample analyzed on February 2, 1982 contained 26,000 $\mu g/\ell$ lead, 12,400 $\mu g/\ell$ cadmium, 5 $\mu g/\ell$ arsenic, 30 $\mu g/\ell$ barium, 20 $\mu g/\ell$ chromium, 2 $\mu g/\ell$ mercury, 10 $\mu g/\ell$ selenium, and 30 $\mu g/\ell$ silver. The sample analyzed on June 15, 1983 contained 112,000 $\mu g/\ell$ lead, 6,800 $\mu g/\ell$ cadmium, and, 30 $\mu g/\ell$ chromium.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release of the baghouse dust would be to the air, and for contamination of the soil and surface water by heavy metals from dust that might be released during dust transfer. Contamination of the soil by heavy metals could result in contamination of the groundwater.

4.2.5 SWMU No. 10 - Dust Railcar Loading Area - Bar Joist Building (TS-4)

A. Unit Description

According to the PCPA, this area is located in the southwest corner of the Bar Joist/Longspan Complex, and had been in use since 1986. The PCPA describes this area as a "steel building, paved track area approximately 31 feet wide and 98 feet long". The quantity of dust present is described as being "approximately 100 cubic yards in railcar". This description appears to refer to the railcar itself while being filled with the baghouse dust. This SWMU is no longer in use. It was a central railcar loading area when dust was being generated in both the No. 1 and No. 2 Melt Shops. With closure of the No.1 Melt Shop in May 1988, the railcar loading area was moved to the No. 2 Melt Shop. There is no record of any clean up for this area.

B. Waste Characteristics

The baghouse dust transferred at this location should have been similar in composition to the dust analyzed for the RCRA Landfill

prior to closure and from the No. 1 and No. 2 Melt Shops (Appendix D).

C. Migration Pathways, Evaluation or Release and Exposure Potential

A potential for release of the baghouse dust would have been to the air when this SWMU was active. A potential also exists for contamination of the surface soil and water by heavy metals from dust that might have been released during dust transfer. Contamination of the soil by heavy metals could result in contamination of the groundwater.

4.2.6 SWMU No. 11 - Dust Railcar Loading Area - No. 2 Melt Shop

A. Unit Description

This SWMU has been in use since 1988. Prior to that time, the dust from the two separate melt shops was transported to the centrally located Bar Joist Building railcar loading area (SWMU No. 10). The No. 2 Melt Shop railcar loading area (Photo No. 18) consists of a dedicated railcar located under the No. 2 Melt Shop Dust Storage Tank on the northwest side of the baghouses for the No. 2 Melt Shop. A conduit from the hopper lines up with the openings on the top of the railcar. The conduit is sealed over the railcar opening and the storage tank is emptied. The air is evacuated from the railcar as it is filled, and an air return line carries the evacuated air and any associated dust back to the Day Tank. A small baghouse on the Day Tank traps the dust and allows the air to escape from the tank. According to Mr. Fillinger, approximately 60,000 pounds of baghouse dust are generated each day, and typically fills approximately 10 railcars per month. The railcars are shipped out at a rate of approximately two or three per week.

B. Waste Characteristics

Analysis of the No. 2 Melt Shop baghouse dust by ARMCO personnel in March 1990 using the Toxicity Characteristic Leaching Procedure (TCLP) indicated that it contained 123 mg/l (123,000 $\mu g/\ell$) of lead, far above the TCLP maximum allowable contaminant concentration of 5 mg/l to define this as a RCRA characteristic waste. The cadmium content of 0.029 mg/l and the chromium content of <0.25 mg/l were under the RCRA characteristic concentration of 1.0 mg/l and 5.0 mg/l for the respective metals. Previous analyses of the dust from the No. 2 Melt Shop are located in Appendix D. These analyses indicate that the dust has had cadmium concentrations above the maximum for defining this as a RCRA hazardous waste by the EP Toxicity method.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The potential for release of the baghouse dust would be to the air, and for contamination of the soil and surface water by heavy metals from dust that might be released during dust transfer. Contamina-

tion of the soil by heavy metals could result in contamination of the groundwater.

4.3 Landfarm

One landfarm was identified at the ARMCO facility.

4.3.1 SWMU No. 12 - AMOCO Landfarm (LT-1)

A. Unit Description

This site is located on the eastern portion of ARMCO's property, near the Missouri River. AMOCO Oil Company leased this land from ARMCO and from 1976 to 1979, spreading approximately 30,000 tons of petroleum refining waste over the ground. In a letter from AMOCO to ARMCO dated July 15, 1986, AMOCO "took responsibility for any actions needed because of placement by us of materials" at this site. AMOCO stated that they would be contacting ARMCO to arrange for AMOCO's consultant to perform a site investigation "to characterize the site, so that appropriate cleanup and closure plans can be developed" (Ref. No. 48). Two monitoring wells in poor condition (OWA-5 and OWA-6) were noted during the VSI. Mr. Fillinger was not aware of any information on the installation or sampling of these wells (Ref. No. 82).

During a telephone conversation between Frank Dolan of MDNR and Lewis Sutton of AMOCO, on July 3, 1991, MDNR requested that AMOCO provide further information on this landfarm. On October 17, 1991, TES X informed Mr. Sutton of a Woodward-Clyde Consultants (WCC) project number from a site plan dated November 18, 1980 that showed these two wells, as well as three soil borings. WCC had previously told Mr. Sutton that they could not find any record to indicate that they had done this work (Ref. No. 90), nor had Mr. Sutton been successful on locating information on these wells due to the transfer of records from the former Sugar Creek refinery to Amoco's Chicago office. On October 23, 1991, Mr. Sutton was notified of a second WCC project number (11C093-16) for sampling and analysis of 10 borings in 1987 from the landfarm (Ref. No. 92). This project number was located in U.S. EPA files for the AMOCO Sugar Creek Refinery site. Both figures and the 1987 data are included in Appendix E.

B. Waste Characteristics

The petroleum waste on this site is now considered hazardous waste, though it was not classified as such at the time the landfarm (Photos No. 1 and 2) was in use. Mr. Alan Hancock of the U.S. EPA RCRA Enforcement Group, who is working on the AMOCO Sugar Creek Site, states that this site is not covered by the Enforcement Action against AMOCO. He was unaware that this site existed, and stated that as far as he knows no work is being done by the Enforcement Group to ensure cleanup of this site (Ref. No. 79). Mr. Lewis Sutton of AMOCO, is attempting to locate information on these wells

at the request of MDNR. He believes that the wells were installed in 1981, this is supported by the site plan dated November 18, 1980 located in the PCPA, but has not been able to determine who installed the wells. Mr. Sutton cannot provide any record of these wells having ever been sampled (Ref. No. 85).

The 1987 PCPA does not include actual data on the landfarm; however, references are made to the results of shallow (0 to 1 foot) soil borings and to the quality of the groundwater in the area (presumably ascertained by way of the two monitoring wells). On pages IX-31 and 32, the PCPA states "groundwater chemical analyses showed that the landfarm's water quality generally complied with groundwater recharge standards specified by MDNR. Chemical constituent levels slightly exceeded groundwater recharge standards for chemical oxygen demand, total dissolved solids, odor, and phenols. No heavy metals exceeded the recharge standards with the exception of the initial set of samples from Well 6. The initial set exceeded the standards only for zinc and arsenic." In reference to the three borings, the PCPA states that the "soil borings showed low levels of chemical constituents using MDNR's Toxicant Extraction Procedure. All analyses indicated that sludges and soil were not hazardous by characteristic."

The soil borings data from 1987 (Appendix E) indicates that oil and grease (O&G) and total petroleum fuel hydrocarbons (TPFH) were detected in the deepest samples analyzed (up to 13 feet). Also of interest are the high concentrations of lead and chromium (and some mercury) detected in shallow (typically less than 3 feet) samples. It is unknown whether these metals are associated with the petroleum waste, slag that may have been used as fill, or represent fallout of airborne dust.

C. Migration Pathways, Evaluation of Release and Exposure Potential

Contamination at this site could affect the soil, soil gas, groundwater, and surface water.

4.4 Acid Tanks and Cooling Water Tanks/Ponds

Five acid tanks, four cooling water tanks, and the mill cooling pond were identified as SWMUs.

4.4.1 SWMU No. 13 - Pickle Liquor Tanks (STA-2)

A. Unit Description

Pickle liquor consisted of sulfuric acid used to clean iron oxide from the steel rods. According to the 1985 CEI, at that time, less than 1,700 tons/month were being cleaned for customers who did not have their own pickling facilities. This was in contrast to 20,000 tons/month of wire rod cleaned prior to 1980 when ARMCO manufactured nails, fence, and wire products. Between 1981 and 1989 when the Cleaning House ceased operation, the pickle liquor was rejuvenated

on site to allow continued use. The 8,000 gallon rubber-lined steel tank of spent pickle liquor was transferred in batches to a 3,000 gallon rubber-lined steel cooling tank. Cooling to 34° F caused ferrous sulfate to precipitate out, thereby rejuvenating the solution. The ferrous sulfate that precipitated out of the solution was sold as product (a flocculant), and according to the 1985 CEI was not a hazardous waste per SS261.2 (e) (ii) as "it is used as an effective substitute for commercial products". The rejuvenated pickle liquor was then transferred back to the acid-brick lined tubs of the production line (Ref. No. 97).

According to a letter from ARMCO's attorneys to MDNR dated February 9, 1981, the spent pickle liquor was at that time being used by the City of Kansas City, Missouri to promote coagulation in its Blue River Sewage Treatment Plant (Ref. No. 6). The 1982 PCB Inspection Report mentioned that "some of the treated acid rinsewater goes to an area at Union Wire Rope and is aerated, then discharged into the Blue Valley Sewage Treatment Facility". The 1982 PCB inspection report also noted that sulfuric acid waste had been manifested to Chain of Rocks at 10450 River View Drive in St. Louis, Missouri. The 1986 RCRA CEI mentioned that in the event pickle liquor was not able to be regenerated due to the system being inoperative, it would be sent to the Blueside Tannery for use in their wastewater treatment facility. The report did not indicate how often this might have happened. According to Mr. Fillinger, pickle liquor was also disposed at the Conservation Chemicals Corporation (Superfund site) lagoons (Ref. No. 91). The 1987 CEI states that no pickle liquor had been sent off site since February 18, 1987. Mr. Fillinger did not know whether the tanks had been emptied following the shut-down of this operation in 1989.

NPDES permitted Outfall 006 (refer to AOC No. 5) is located on the Blue River near this treatment facility, and on several occasions was impacted by sulfuric acid spills that had been neutralized with lime or soda ash. This affected the pH levels monitored for the outfall. Consequently, ARMCO was cited repeatedly by MDNR for noncompliance for the pH level of the water from this outfall. According to Mr. Fillinger (Ref. No. 82), some of the problems with the low pH of the water at Outfall 006 was due to poor cleanup of the ferrous sulfate storage area. These crystals had been stored in a pile on the concrete floor of the Cleaning House inside a garage door so that they could easily be loaded by a front-end loader. Spilled ferrous sulfate would eventually be washed into the storm sewer and impact the pH at Outfall 006. At the time of the April 1, 1983 CEI, approximately three cubic yards were stored in this manner (Ref. No. 26). The 1987 CEI stated that approximately 40,000 pounds of ferrous sulfate were generated every six to eight weeks (Ref. No. 54).

The most severe spill mentioned in the MDNR files occurred on September 27, 1987, when between "1,000 and 10,000 pounds" of sulfuric acid was released when a line in a rod cleaning facility ruptured. The U.S. EPA was notified and dispatched the Technical

Assistance Team (TAT) from Ecology and Environment (E&E). ARMCO was attempting to neutralize the acid, but the pH was still approximately 2.0 when E&E tested the water at Outfall 006 (Ref. No. 51). Improvements of the procedures and installation of curbing around this area had apparently rectified most of the problems with this outfall prior to the shut-down of these operations.

B. Waste Characteristics

The pickle liquor is composed of sulfuric acid. Spent pickle liquor would also contain metals.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The releases from these tanks impacted the surface water, and may have affected the groundwater and the soil. It is unknown if this solution contained metals at the time of the release.

4.4.2 SWMU No. 14 - Etch Lab Mixing Tank (EN-1)

A. Unit Description

According to the PCPA and verified during the VSI, this is a 350 gallon polyethylene tank located inside the Etch Lab. No secondary containment surrounded this tank, though Mr. Fillinger stated that an outer containment tank had been ordered (Ref. No. 82). The tank has been in use since 1977 and contains "hydrochloric acid, sodium hydroxide, [and] rinsewater". The spent acid is pumped from this tank to the Etch Lab Holding Tank.

B. Waste Characteristics

This tank contains hydrochloric acid, sodium hydroxide and water.

C. Migration Pathways, Evaluation of Release and Exposure Potential

A release from this tank would impact the surface water, groundwater, and soil since a release would probably flow out the nearby door onto the ground due to the lack of a secondary containment system. Once the secondary containment system is installed, the release potential from this SWMU will be greatly reduced.

4.4.3 SWMU No. 15 - Etch Lab Holding Tank (STA-3)

A. Unit Description

According to the PCPA, this is a 1,500 gallon fiberglass tank located above ground, outside, on the west side of the Etch Lab. It has been in use since 1977, and contains "neutralized etch solutions consisting of hydrochloric acid, sodium hydroxide, and rinsewater". The acid from this tank is transferred to a 800 gallon dura-life poly tank located on the back of a truck (Photo No. 15), and trucked to the Mill Ponds, where it is used to help neutralize the cooling

water (Ref. No. 82). This SWMU was noted to be very discolored during the VSI (Photo 20).

B. Waste Characteristics

This tank contains hydrochloric acid, sodium hydroxide, and water.

C. Migration Pathways, Evaluation of Release and Exposure Potential

Were the tank tower to collapse so that this tank fell outside the concrete berm, a release could impact the surface water, groundwater, and soil. Except for solution which could splash, a directly downward release would be contained by the concrete berm.

4.4.4 SWMU No. 16 - Roll Shop Roll Cleaning Tank (STA-4)

A. Unit Description

According to the PCPA, this is a 75 gallon stainless steel process tank for roll cleaning located at the east end of the Roll Shop. It has been in use since 1983 and contains "spent phosphoric acid cleaning solution". The spent acid is transferred to the portable tank described above and trucked to the Mill Ponds. There it is used to help neutralize the cooling water (Ref. No. 82).

B. Waste Characteristics

This tank contains phosphoric acid cleaning solution.

C. Migration Pathways, Evaluation of Release and Exposure Potential

A release from this tank could impact the surface water, groundwater, and soil as it would probably flow out the nearby door due to lack of secondary containment. No evidence of past releases was observed during the VSI and the tank appeared to be in good condition.

4.4.5 SWMU No. 17 - Wire Mill Rinsewater Neutralization Tank (STU-5)

A. Unit Description

According to the PCPA, this is an approximately 10,000 gallon concrete underground storage tank located northwest of Rod Cleaning. The tank was in use from an unknown date until 1983, and contained "rinsewaters from hydrochloric acid wire cleaning operations, rinsewater from sulfuric acid rod cleaning and lime for pH neutralization". This open-air tank caught most of the sulfuric acid from the 1988 spill and is where the lime was added to neutralize that spill (Ref. No. 82). Overflow from this tank goes to Outfall 006. This tank has not been cleaned, and was seen to contain liquid and trash during the VSI (Photo No. 11).

B. Waste Characteristics

This tank is not longer used, but has not been cleaned. When in use, it contained water, sulfuric acid, and hydrochloric acid. According to Mr. Fillinger (Ref. No. 86), the liquid in this tank was tested after the 1988 spill and found to contain groundwater. He said the tank had been drained but kept filling up. Therefore, it is likely that either this tank or the pipe coming from the cleaning house to the tank is cracked.

C. Migration Pathways, Evaluation of Release and Exposure Potential

A release from this tank could impact the surface water through Outfall 006, the groundwater, and the soil. As this tank or the fill pipe is apparently cracked, it is possible that the groundwater has been impacted by leakage from acids stored in this tank.

4.4.6 SWMU No. 18 - Blooming Mill Scale Pit (STU-1)

A. Unit Description

According to the PCPA, this is an approximately 95,000 gallon steel and concrete underground storage tank located at the north side of the Blooming Mill Building. This open-air tank was actively used between 1955 and December 1988. In December 1988, the Blooming Mill was idled. The Blooming Mill Scale Pit contained "recirculated cooling water from [the] mill water system, mill scale, [and] residual lubricating oil" (Ref. No. 48). This inactive SWMU had not been emptied and cleaned at the time of the VSI (Photo No. 10).

B. Waste Characteristics

This tank contains residual lubricating oil, mill scale, and water. According to Mr. Fillinger (Ref. No. 91) the mill scale settles out, and is eventually cleaned out with a "clam shell" [dredge] that is located on a railcar. The ferric oxide mill scale (the same as the mill scale dredged from the two mill cooling ponds) is sold to the cement industry to increase the iron content of the cement.

C. Migration Pathways, Evaluation of Release and Exposure Potential

A release from this tank or the water lines that carried this cooling water to and from the mill ponds could have impacted the groundwater, soil, and soil gas. The visible portion of the tank appeared to be in good condition during the VSI, and no evidence of past release was observed.

4.4.7 SWMU No. 19 - Twelve Inch Mill Scale Pit (STU-2)

A. Unit Description

According to the PCPA, this is an approximately 27,600 gallon concrete underground storage tank located at the east side of the

Twelve Inch Mill Complex. This open-air tank was actively used between 1948 and December 1988. In December 1988, the Twelve Inch Mill was idled. It contained "recirculated cooling water from [the] millwater system, mill scale, [and] residual lubricating oil". Demolition of this building began in August 1991. According to Mr. Fillinger (Ref. No. 93), this SWMU had been emptied and power washed as per recommendations of the State of Missouri. The wash water was hauled to the mill ponds for disposal (Ref. No. 97). ARMCO plans to fill this concrete pit with dirt rather than demolish it.

B. Waste Characteristics

This tank (Photo No. 19) formerly contained residual lubricating oil, mill scale, and water. The ferric oxide mill scale settled out from the cooling water, and was periodically dredged from the pit and sold to the cement industry to increase the iron content of the cement (Ref. No. 91).

C. Migration Pathways, Evaluation of Release and Exposure Potential

A release from this tank or the water lines that carried this cooling water to and from the mill ponds could have impacted the groundwater, soil, and soil gas. The visible portion of the tank appeared to be in good condition during the VSI, and no evidence of past release was observed.

4.4.8 SWMU No. 20 - Rod Mill Scale Pit (STU-3)

A. Unit Description

According to the PCPA, this is an approximately 42,100 gallon steel and concrete underground storage tank located at the west end of the Rod Mill Complex. This open-air tank has been in use since 1957, and contains "recirculated cooling water from [the] millwater system, mill scale, [and] residual lubricating oil".

B. Waste Characteristics

This tank contains residual lubricating oil, mill scale, and water. The ferric oxide mill scale is dredged from the pit and is sold as product (Ref. No. 91).

C. Migration Pathways, Evaluation of Release and Exposure Potential

A release from this tank or the water lines that carry this cooling water to and from the mill ponds could impact the groundwater, soil, and soil gas. The visible portion of the tank appeared to be in good condition during the VSI, and no evidence of past release was observed.

4.4.9 SWMU No. 21 - No. 2 Melt Shop Scale Pit (STU-4)

A. Unit Description

According to the PCPA, this is an approximately 171,100 gallon steel and concrete underground storage tank located at the northeast corner of the 19" Mill Building. This open-air tank has been in use since 1977, and contains "recirculated cooling water from [the] millwater system, mill scale, [and] residual lubricating oil".

B. Waste Characteristics

This tank contains residual lubricating oil, mill scale, and water. The ferric oxide mill scale is dredged from the pit and is sold as product (Ref. No. 91).

C. Migration Pathways, Evaluation of Release and Exposure Potential

A release from this tank or the water lines that carry this cooling water to and from the mill ponds could impact the groundwater, soil, and soil gas. The visible portion of the tank appeared to be in good condition during the VSI, and no evidence of past release was observed.

4.4.10 SWMU No. 22 - Mill Ponds (SI-1)

A. Unit Description

These two, very large, clay-lined ponds were constructed in 1976, and contain mill water used for cooling. The ponding allows for sedimentation of fine mill scale composed primarily of ferric oxide. According to Mr. Fillinger, the West Pond was cleaned out in 1988 by draining the water and using a dragline to remove the mill scale. The East Pond has never been cleaned. The ferric oxide mill scale is sold as product to the cement industry where it is used to increase the iron content of the cement. The ponds are irregular polygons approximately seven feet deep, 900 feet long and between 250 and 540 feet wide. An oil skimmer located on each of the ponds near the overflow outlet skims the surface oil. This oil is disposed in the waste oil storage tanks. At the time of the VSI, the skimmer on the West Pond was not working, and an extensive oil sheen was noted on the water flowing into the overflow outlet. The observed portion of the Mill Ponds appeared to be in good condition and no evidence of past releases was observed.

B. Waste Characteristics

Analyses of the mill pond sludge from the West Pond in 1984 showed it to contain traces of methylene chloride, methyl ethyl ketone, carbon disulfide, bis (2-ethylhexyl) phthalate, acetone, phenol, and oil and grease. Oil and grease were found in concentrations of 4.7 to 9.9 percent (Ref. No. 48). Had the concentration of oil and grease been 10 percent, this sludge would have been classified as a

Missouri hazardous waste. Analysis of two sludge samples from the West Pond (Pond No. 2 or Pond "B"), when it was cleaned in October 1988, indicated oil and grease concentrations of 4.7 and 5.8 percent (Ref. No. 58). PEDCO's 1983 "Review of Revised Groundwater Monitoring Program" mentions "the Pond reportedly was used for the disposal of pickling liquor prior to its conversion to a mill water pond". According to Mr. Fillinger (Ref. No. 91), these ponds were not used for disposal of the pickle liquor, the pickle liquor had been disposed in lagoons at the Conservation Chemicals Corporation (Superfund site) facility across the Blue River from ARMCO.

The overflow from the mill ponds enters NPDES permitted Outfall 042 and flows to the Blue River. According to a letter from ARMCO to MDNR dated July 7, 1990, treated groundwater should be added to the list of sources for this outfall. A letter from MDNR dated December 20, 1990 agreed to the addition of groundwater *pretreated* through an oil-water separator prior to entry into the treatment facility for this outfall. This treated groundwater is the water pumped to the ponds from the recovery well at the abandoned fuel oil tank remediation site to the mill ponds (Ref. No. 82). It is not pretreated through an oil separator prior to entry into the mill pond; it is instead treated through the oil skimmer in the mill ponds.

C. Migration Pathways, Evaluation of Release and Exposure Potential

A release of water from the mill ponds could impact the surface water, groundwater, and the soil.

4.5 Waste Oil and Solvents

Four SWMUs were documented for this category. There are presently 68 Safety-Kleen units on site, but only one was viewed, and was considered to be a representative unit. In addition to the waste oil storage tanks and associated drum storage area, two other drum storage areas were observed.

4.5.1 SWMU No. 23 - Safety-Kleen Units

A. Unit Description

According to the 1988 RCRA Compliance Evaluation Inspection, there were 78 of these units located around the plant; 54 of the units contain 30 gallons each of solvent, while the others range in size from 6 gallons to 250 gallons. The 1989 CEI reported that the Safety-Kleen units generated approximately 9,500 pounds per month of spent petroleum naphtha solvent (D001) and approximately 45 pounds per month of spent carb cleaning solvent (D001/F005). At the time of the VSI, there were 68 units on site; 54 of these have a capacity of 20 gallons, seven hold 40 gallons, six hold 10 gallons, and one is a 6 gallon unit. Used solvents are collected for recycling by Safety Kleen. According to Mr. Fillinger, on May 2, 1991, 2,240 pounds (27 containers) were manifested (Ref. No. 82). During the

first quarter of 1991, 24,118 pounds of solvent were manifested to Safety Kleen (Ref. No. 84).

B. Waste Characteristics

All of the present units contain petroleum naphtha solvent and are classified as D001 due to their characteristic of ignitability. Under the toxicity rule, they are also classified as D018 (benzene) and D039 (tetrachloroethylene). One unit formerly located at the ARMCO facility contained "carb cleaning solvent" (Ref. No. 62).

C. Migration Pathways, Evaluation of Release and Exposure Potential

These units are located inside the buildings. Assuming that they are all located on uncracked concrete floors, any release could be cleaned up prior to becoming a threat to the soil, surface water or groundwater. A release of the naphtha solvent could impact the air.

4.5.2 SWMU No. 24 - Waste Hydraulic and Lubricating Oil Storage Tanks (STA-1)

A. Unit description

The Post-Closure Permit Application states that waste oil is stored in two, 28,000-gallon above ground storage tanks. However, Mr. Fillinger thinks that the tanks' capacity might be 20,000 gallons combined; this appeared to be the case during the VSI (Ref. No. 84). The two former railroad tank cars used to store the waste oil are located in an earthen pit near the baghouse dust storage tanks (Photo No. 22). The waste oil is generated by routine equipment maintenance and skimmed from wastewater treatment units and brought to this outdoor area in drums. The drums are stored on pallets, but there is no form of secondary containment to protect the ground. The waste oil is poured from the drums through a strainer, and flows into the tanks. Apparently there is significant potential for spills during this operation as the soil is extensively stained around the strainer (Photo No. 21).

When the tanks are almost full, Industrial Service Corporation (ISC) of Kansas City (formerly Radium Petroleum) is notified and they schedule pick-up of the waste oil for recycling. According to the 1988 CEI, 19,400 gallons of waste oil were generated between April 1986 and November 1987. At that time, the waste oil was being collected by Radium Petroleum Company for shipment to their waste oil recovery facility.

B. Waste Characteristics

This SWMU contains waste hydraulic and lubricating fluids. The oil is sampled and tested prior to recycling by ISC.

C. Migration Pathways, Evaluation of Release and Exposure Potential

Spillage during the transfer of the waste oil to the tanks as evidenced by the extensively stained soils, has affected the soil. This spillage could also affect the surface water, soil gas, and the groundwater at this location. These media would also be affected by a release from the storage tanks.

4.5.3 SWMU No. 25 - Roll Shop Drum Storage Area

A. Unit Description

This is a storage area for drums of waste oil, Swarf (grindings from carbide rolls), and worn or broken carbide tooling. At the time of the VSI, six drums were stored on pallets at this location at the northeast end of the Roll Shop near the Roll Cleaning Tank (STA-4). The soil around these drums was extensively stained (Photo No. 13). This area is approximately 10 feet by 10 feet; no fences or other markings define this storage area.

B. Waste Characteristics

This SWMU contains waste oil and drums of carbide grindings and tools that are sold as product. According to Mr. Fillinger, the carbide grindings are nonhazardous (Ref. No. 82).

C. Migration Pathways, Evaluation of Release and Exposure Potential

Spillage of the waste oil, as evidenced by the extensively stained soils, has affected the soil. This spillage could also affect the soil gas and groundwater. Some effect to the surface water may occur during storm events.

4.5.4 SWMU No. 26 - Rod Mill Drum Storage Area

A. Unit Description

This is a storage area for waste oil drums located at the southwest end of the Rod Mill. This outside storage area is located along the building just east of the Rod Mill Scale Pit (STU-3). During the VSI on May 20, 1991, approximately two dozen drums of mixed trash and waste oil were stored in this area (Photo No. 14). Many of the drums were open, and at least one was leaking. The soil was extensively stained. This area is approximately 15 feet wide and 40 feet long; no fences or other markings define this storage area.

B. Waste Characteristics

This SWMU contains drums of waste oil mixed with trash.

C. Migration Pathways, Evaluation of Release and Exposure Potential

Spillage of the waste oil, as evidenced by the extensively stained soils, has affected the soil. This spillage could also affect the soil gas and groundwater. Some effect to the surface water may occur during storm events.

4.6 Hazardous Waste Storage Areas

Six hazardous waste storage areas were identified at the ARMCO facility.

4.6.1 SWMU No. 27 - Bar Joist Building Hazardous Waste Storage Area (CS-1)

A. Unit Description

According to the PCPA, this drum storage area was located at the north end of the Bar Joist Building from 1982 to 1984. According to the 1982 PCB Inspection Report, at that time (May 1982) there were 105, 55-gallon drums of paint sludge and five, 55-gallon drums of waste trichloroethylene (TCE) stored on pallets. The August 1982 CEI also mentions the five drums of TCE, 31 barrels of caustic sludge, and an unspecified number of other drums (probably waste paint) that were not considered by ARMCO to contain hazardous waste. According to the April 1, 1983 CEI, there were no hazardous wastes stored in this area. At that time, there were 32 empty drums stored in the Bar Joist Building for use in the event they were ever needed. According to the 1987 Post-Closure Permit Application, nine drums (contents not given) were stored there less than 90 days in 1987.

During the May 20, 1991 VSI, no drums were stored in this area, and no noticeable signs of leakage were present in the immediate SWMU area. Some oil staining of the dirt floor elsewhere in the Bar Joist Building was apparent, but it may have been leakage from trucks or other heavy equipment and not be related to hazardous waste storage at the SWMU.

B. Waste Characteristics

Drums of waste paint and caustic sludge (not characterized as to whether they were hazardous), and drums of trichloroethylene (TCE) were stored in this area. It is also possible that the two drums of waste 1,1,1-trichloroethane (TCA) manifested in November 1983 to the Chemical Waste Management facility in Emelle, Alabama (Ref. No. 49) had been stored at this location prior to shipment.

C. Migration Pathways, Evaluation of Release and Exposure Potential

As much of this building has a dirt floor, any release of hazardous waste in this area could have affected the soil, soil gas, and possibly the groundwater.

4.6.2 SWMU No. 28 - Outside Hazardous Waste Storage Area

A. Unit Description

The August 1982 CEI mentions an outside storage area of approximately 130 drums of caustic sludge and liquids, the location of which was not identified. A handwritten note in the U.S. EPA files regarding the Settlement Conference held with ARMCO on January 14, 1983, refers to "caustic waste - drums on hill", and may be an indication of the location of this storage area. The 1982 CEI also mentioned that 48 of these drums were open, apparently for separation of the liquid fraction into closed drums. The report stated that the drums had been stored there for more than 90 days, and were to be moved to an inside storage area.

The location of this SWMU could not be determined during the VSI. Mr. Fillinger believed the "hill" referred to in the notes must be the hill where the two tractor sheds are located; however, there were no obvious signs of the location.

B. Waste Characteristics

Drums of caustic sludge and liquids of unspecified origin were stored in this area.

C. Migration Pathways, Evaluation of Release and Exposure Potential

Any release in this area could have affected the soil, soil gas, and possibly the groundwater. The surface water could have been affected during storm events.

4.6.3 SWMU No. 29 - Main Substation PCB Storage Area

A. Unit Description

According to the 1982 PCB Inspection Report, a PCB storage-for-disposal area was located at the main substation containing some empty drums, and two drums containing PCB (oil) for topping transformers. The PCB Inspection Report also refers to a discussion on spill cleanup procedures with two ARMCO employees, and mentions "the only [PCB] spill they had was in 1960". No information was given as to the location or quantity of this spill. The PCB report also mentions that a list of the PCB hydraulic systems had been compiled in 1976, and that these had been switched to non-PCB fluids. A handwritten note in the MDNR files mentioned that in September 1978, barrels of Pydraul (PCB based hydraulic fluid) were observed on ARMCO property during the Blue River Survey. No location or number of drums was given (Ref. No. 1). According to the 1982 PCB report, items contaminated with PCBs were disposed at CECOS International (52 Aber Road, Williamsburg, Ohio), and at Environmental International (912 Scott, Kansas City, Kansas). According to Mr. Fillinger, since 1990, PCB contaminated items were disposed at Tipton Environmental Technology in Tipton, Missouri

(Ref. No. 84). PCB transformers are drained on site by Unison Transformer Service of Ashtabula, Ohio. Mr. Fillinger, who was not aware of the procedures used in draining the transformers, contacted the electrician who oversees this operation. Mr. Fillinger then reported that plastic is put on the ground and drip containers are placed under the hose connections. The transformer oil is then pumped into a tanker truck (Ref. No. 99). The PCB oil and transformer carcasses are transported off site for disposal; PCB capacitors are drummed and also transported off site for disposal.

The PCB drums are no longer stored in the main substation area as it is in the 100 year flood plain of the Blue River. Five drums of used non-PCB transformer oil were noted during the VSI on May 21, 1991. These drums were placed on shelves approximately four feet above the building floor. This area of ARMCO was flooded in May 1990, but according to Mr. Fillinger, flood waters did not enter this storage area.

B. Waste Characteristics

Oil containing PCBs were stored in this area in the past. Presently non-PCB oil (product) is stored in this SWMU.

C. Migration Pathways, Evaluation of Release and Exposure Potential

This is an inside area with concrete floors that appeared to be in good condition; therefore, it is likely that a release could have been cleaned up without causing harm to the environment. However, this area is in the 100 year flood plain for the Blue River. In the event that flood waters had entered this building, and the PCB oil was released, then contamination of the surface water and soil could have occurred.

4.6.4 SWMU No. 30 - Long Tractor Shed PCB Storage Area (CS-2)

A. Unit Description

The 1982 PCB Report states that four transformers containing PCB-oil were stored in the tractor shed. The 1987 Post-Closure Permit Application states that this area has been in use since 1983 for storage of waste PCBs, capacitors and transformers pending disposal.

Six transformers were stored here on May 20, 1991 during the VSI. The transformers were stored within a concrete berm that was approximately two feet high. Also stored in this shed were approximately two dozen drums on pallets above a dirt floor. Many of these drums were empty, and others contained roofing tar or degreaser concentrate (a product, not a waste). According to the 1982 PCB inspection, 20 open drums of alkaline cleaner were stored during that time.

B. Waste Characteristics

Transformers containing PCBs are stored in this area. Drums of products such as roofing tar, degreaser concentrate, and (previously) alkaline cleaner have also been stored in this tractor shed.

C. Migration Pathways, Evaluation of Release and Exposure Potential

It is unknown when the containment berm was constructed, but any release in this area that predated the construction of the berm could have affected the soil, soil gas, and groundwater. Any release from the PCB transformers after storage within the containment berm could probably be cleaned up prior to becoming a threat to the environment. Any release from drums stored on the dirt floor area of the shed could affect the soil, soil gas, and possibly the groundwater, depending on what was released.

4.6.5 SWMU No. 31 - Small Tractor Shed PCB Storage Area

A. Unit Description

This was a fenced area inside the small tractor shed. During the VSI, four drums identified as liquid PCBs, one drum labeled solid PCBs (which Mr. Fillinger believed to contain a capacitor), and one drum labeled as flush (solvent) were present. The drums are stored in metal containment pans having approximately three inch sides and are on a concrete floor; however, the rest of the shed has a dirt floor. Neither the storage area nor the tractor shed were locked during the May 21, 1991 VSI.

B. Waste Characteristics

Drums containing PCB oil, "solid PCBs" (believed to be a PCB capacitor) and solvent flush are stored in this area. It is not known how long the PCB oil and solvent flush have been stored at this location, or when the solvent flush was generated.

C. Migration Pathways, Evaluation of Release and Exposure Potential

A release in this area that was not contained in either the containment pans or on the concrete could affect the soil, soil gas, and groundwater. The solvent flush could also affect the air in the event of a release.

4.6.6 SWMU No. 32 - No. 1 Melt Shop PCB Storage Area

A. Unit Description

This concrete area of the No. 1 Melt Shop held 59 capacitors containing PCB-oil according to the 1982 PCB Inspection. A "large bank" of PCB capacitors was also reported to be in service at this location.

According to Mr. Fillinger, all PCB capacitors have been removed from the No. 1 Melt Shop. Mr. Fillinger also stated that at the end

of 1990, there were still nine PCB capacitors and 45 PCB transformers in use at various locations around the ARMCO plant (Ref. No. 84).

B. Waste Characteristics

Capacitors containing PCB oil were formerly stored in this area.

C. Migration Pathways, Evaluation of Release and Exposure Potential

This is a concrete area, so it is unlikely that any releases would have affected the environment. However, if extensive cracks existed in the concrete at the time of a release, soil and groundwater could have been affected.

4.7 Areas of Concern

Eight Areas of Concern (AOC) were identified at the ARMCO facility.

4.7.1 AOC No. 1 - Abandoned Fuel Oil Storage Tank

A. Unit Description

According to a letter from MDNR to ARMCO dated February 24, 1989, the COE was working along the Blue River between the ARMCO Dam/PCB excavation and Truman Road in October 1988 when they saw an oil sheen on the river. This was traced to an abandoned fuel oil storage tank on ARMCO property. The storage tank was in service from 1951 to 1982, containing No. 6 fuel oil until 1962, and No. 2 fuel oil after that date. Analyses performed for the COE indicated the hydrocarbon contamination to be mostly No. 6 fuel oil; no PCBs were found in these samples. Further investigation by the COE and by ARMCO's contractor, Remcor, indicated that the area around this tank was indeed contaminated with hydrocarbons (Table 2). According to the Remcor Preliminary Site Investigation of June 1989, 1.5 feet of oil saturated soil was encountered at one test boring location (Figure 7). Remcor also determined there to be approximately 1.5 inches of free product floating on the groundwater at this site. Remcor suggested "historic spillage of petroleum products" as the origin of the contamination. The vertical and horizontal extent of the contamination was not defined by the Remcor study. MDNR records include a letter from Mr. Greg Schoen of MDNR's Laboratory Services Program (LSP) to Mr. Charles Fillinger of ARMCO dated December 8, 1989, approving the work plan for hydrocarbon removal at the site. The letter also states that pumping and recovery data should be sent to the MDNR Regional Office in Independence, Missouri. According to Mr. Dan Jones of the COE (Ref. No. 76), the COE is planning to clean up the area along the river; however, Mr. Fillinger was not aware of any plans by the COE to do so.

At the time of the VSI, a six-inch recovery well, two observation wells, and an observation piezometer had been installed at this site (Photo No. 12). According to Mr. Fillinger, the wells had been installed approximately one year ago, and the recovery well had been pumping since February 1991. According to boring logs and construc-

Table 2: Armco Soil Sample Results from Abandoned Fuel Tank Site (AOC No. 1)

Boring	Depth (feet)	O/G (1) (ug/g)	EP Tox Chromium (mg/l)	EP Tox Lead (mg/l)	pH Soil (su)
TB-1A	0.0-0.8	7,700			
TB-1B	8.0-9.0	63			
TB-1B	10.0-11.0	2,300	<0.1	0.1	10.35
TB-1B	13.0-15.0	95			
TB-1B	18.5-19.0	53			
TB-28	3.0-4.0	200			
TB-2D	10.0-11.0	100	<0.1	0.4	9.95
TB-4	4.0-5.0	140			
TB-5	4.0-5.0	<50	<0.1	<0.1	8.35
TB-5	6.0-7.0	110			
TB-5	11.0-12.0	100			
TB-6	0.5-1.5	75			
TB-6	5.0-6.0	<50	<0.1	0.1	7.90
TB-6	7.0-8.0	100/88 (2)			
TB-6	9.0-10.0	480			
TB-7	1.0-2.0	77			
TB-7	4.0-5.0	370	<0.1	0.1	8.20
TB-7	7.0-8.0	78			
TB-8	1.0-2.0	530			
TB-8	4.0-6.0	4,000	<0.1	<0.1	7.30
TB-8	9.0-10.0	<50			
TB-8	11.0-12.0	<50			
TB-9	1.0-2.0	4,300	<0.1	0.3	10.50
TB-9	7.0-8.0	<50			
TB-9	10.0-11.0	280			
TB-10	1.0-2.0	<50	<0.1	<0.1	10.00
TB-10	3.0-4.0	110			
TB-10	5.0-6.0	<50/<50			
TB-10	7.0-8.0	<50			
TB-11A	4.5-5.0	170			
TB-11B	3.0-4.5	110			
TB-12	6.0-9.0	2,500			
TP-1	Surface		<0.1	<0.1	6.00

(1) O/G = Oil/Grease
(2) #/# = Sample analyzed in duplicate

(Ref. No. 63)

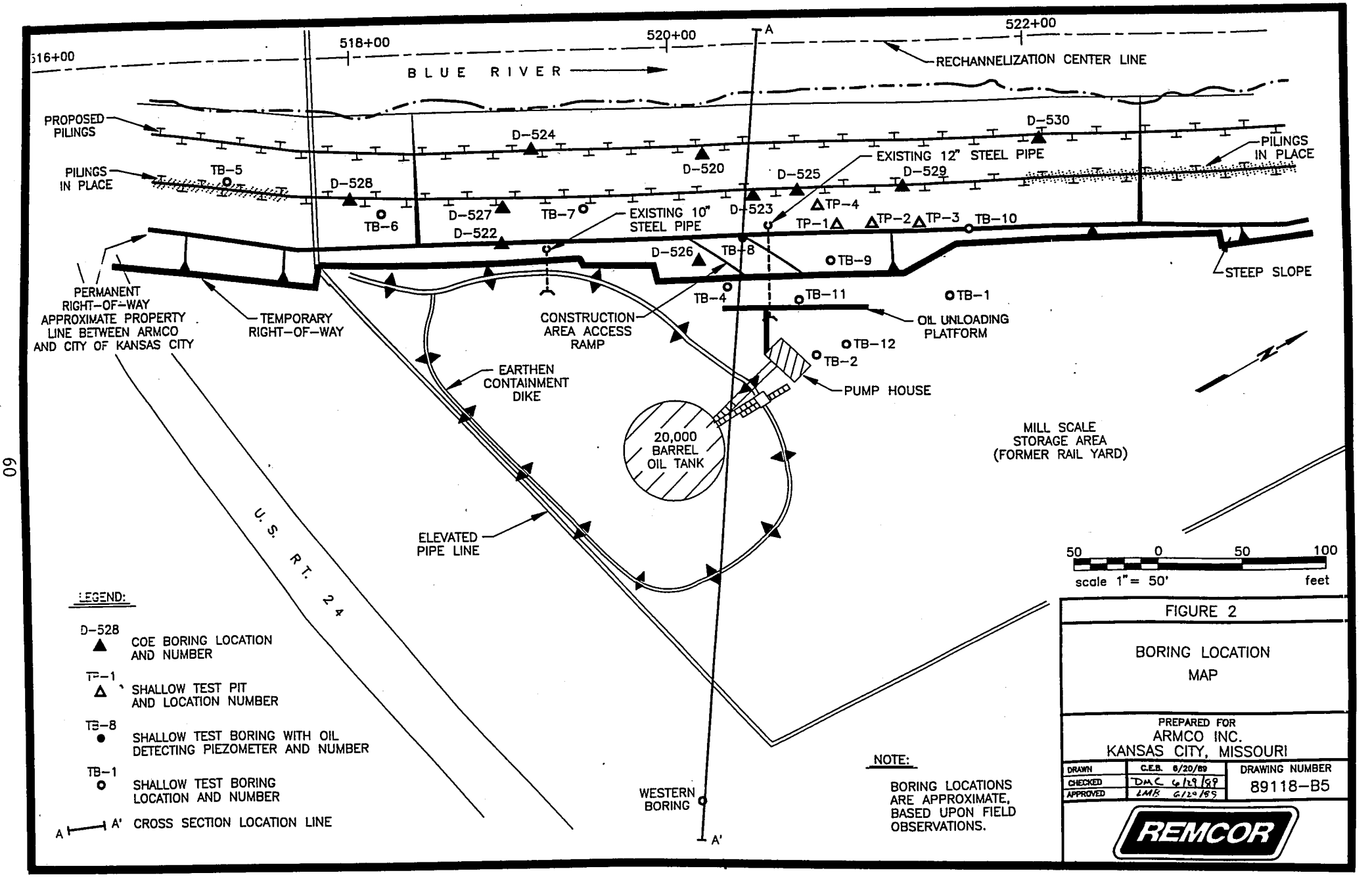


Figure 7: Boring Location Map for AOC No. 1
Abandoned Fuel Oil Storage Tank Area (Ref. No. 63).

tion diagrams, the two observation wells are 22 feet deep and the recovery well is 18 feet deep. The wells were drilled in December 1989, and have 10 foot 0.020 slot PVC screens set at the bottoms of the wells. The piezometer is constructed so that a second casing sits within the first, and is filled only by water from the bottom of the screened interval. In theory, if there is a distinct hydrocarbon layer floating on top of the water, then it would not enter this second casing, thus a difference in water levels in the two casings would indicate the thickness of the hydrocarbon layer.

Groundwater is approximately 12 feet below the surface. According to Mr. Fillinger, ARMCO did not believe any oil was being removed by this well as the quarterly groundwater level measurements taken at the downgradient piezometer had not shown any oil to be present. Without further information, the validity of this statement cannot be evaluated; however, if the oil was being pumped out, it might very well not be found as a distinct floating layer in the downgradient piezometer. In addition, if the hydrocarbon layer was thin, then the difference in water levels might not be evident due to the potential error in measuring water levels. Mr. Fillinger said that these wells had not been sampled for hydrocarbon analysis; also, pumping would continue until the Fall of 1991. At that time, ARMCO, the COE, the City of Kansas City, and MDNR would evaluate the project, and possibly end remediation. Mr. Fillinger received a draft copy of the Remcor report on the remediation work at this site between the time the draft PA and the RFA were written. Mr. Fillinger stated that the report recommends that pumping cease as no oil is presently being recovered (Ref. No. 91). It is not known whether this assumption is based solely on water level readings in the unsegregated (water and oil) portion of the piezometer versus the water level in the supposedly segregated (water only) portion of the piezometer.

B. Waste Characteristics

No. 6 fuel oil and No. 2 fuel oil were previously stored in this tank.

C. Migration Pathways, Evaluation of Release and Exposure Potential

Contamination is known to exist at this site that has affected the soil, surface water, and the groundwater. Soil gas may have been generated by the hydrocarbon contamination.

4.7.2 AOC No. 2 - Underground Storage Tanks

A. Unit Description

According to Mr. Jim Harris (Ref. No. 77), MDNR Water Pollution Control records indicate that three underground storage tanks were recorded for ARMCO. Tank 1 was a 10,000 gallon gasoline tank; Tank 2, a 10,000 gallon lube oil tank; and Tank 3, a 10,000 gallon hydraulic fuel tank ("Mobil Gear 6-34 Pyrogard D Invert Emulsion"). MDNR records indicate that ARMCO notified them on February 22, 1988 that use of the gasoline tank was discontinued in 1987 and the tank

had been removed. Mr. Harris stated that another letter from ARMCO dated December 23, 1988 notified MDNR that Tanks 2 and 3 had been removed on December 19, 1988. A third letter from ARMCO dated November 6, 1989 stated that two, 550 gallon tanks had been closed as of December 1, 1988. MDNR had not been notified of the existence of the two 550 gallon tanks, and their contents were unknown. The MDNR LSP had no record of any releases from these tanks (Ref. No. 78). No records of soil sampling at the time of the removal were found.

During discussions with Mr. Fillinger during the VSI, he stated all underground storage tanks have been removed at the ARMCO facility. Where product storage is still needed, the USTs were replaced with above ground tanks. ARMCO apparently had more USTs than were registered with MDNR. It is not known how many of the former USTs were for product storage; however, Appendix F of ARMCO's Part B Permit Application (Ref. No. 17) lists a number of buried and above ground product storage tanks. The buried tanks on this list include three tanks at the No. 2 Melt Shop (10,000 lube oil, 10,000 gallon hydraulic oil, and 2,000 gallon diesel fuel), two tanks at the Twelve Inch Mill (4,230 and 2,538 gallon heating oil tanks), and two at the Ice House (10,000 gallon leaded gasoline, and 10,000 gallon unleaded gasoline). Other buried tanks listed are at the Hot Shop (10,000 gallon bulk lube oil), Viking Building (2,000 gallon boiler fuel oil), Bar Fab (10,000 gallon heating oil), Locomotive Shop (11,000 gallon diesel fuel), Bar Joist (20,000 gallon heating oil), No. 1 Melt Shop Lab (4,230 gallon boiler fuel oil), Electric Shop (2,000 gallon boiler fuel oil). Also listed were one buried 10,000 gallon tank of boiler fuel oil at Vendo and a 2,000 gallon gasoline tank at the "Twelth Street" site (the former Black, Sivalls, and Bryson property). Tanks at the Viking Building, Bar Fab, No. 1 Melt Shop Lab, Electric Shop, Vendo, and the Twelth Street sites were empty at the time the list was compiled. This complete list and additional portions of Appendix F from the Part B Application are included in Appendix F of this report.

In a letter dated February 16, 1988 to the City of Kansas City, ARMCO stated that joints in the supply line and hairline cracks in the fiberglass of a seven year old 10,000 gallon unleaded gasoline tank had leaked. The excavation pit resulting from the 10,000 gallon gasoline tank removal was sprayed with Bio-Solve, and backfilled with clean sand and crushed limestone. No mention was made of samples being collected and analyzed to assure that no soil or groundwater contamination had occurred. According to Mr. Fillinger, a leaded gasoline storage tank was removed from the same location at the same time (these would probably be the two tanks identified as being at the Ice House in the Part B Application). The 10,000 gallon lube oil and hydraulic fluid tanks were removed from the north side of the No. 2 Melt Shop to the west of the No.2 Melt Shop Scale Pit (STU-4). Apparently no samples were collected for analysis to verify that no contamination had occurred or remained at any of the UST removal sites.

B. Waste Characteristics

Gasoline (leaded and unleaded), diesel fuel, heating oil, boiler fuel oil, lubricating fluid, and hydraulic fluid are known to have previously been stored in USTs at ARMCO.

C. Migration Pathways, Evaluation of Release and Exposure Potential

Hydrocarbon contamination may have affected the soil, soil gas, and the groundwater in the area where the leaking 10,000 gallon unleaded gasoline UST was removed. It is also possible that these media were affected in the other areas where USTs were removed as no samples were collected to assure that no other leaks had occurred, that may have caused contamination around these tanks.

4.7.3 AOC No. 3 - ARMCO Dam/PCB Excavation Area

A. Unit Description

This area is located along the Blue River, adjacent to ARMCO, approximately one-half mile downstream of Independence Avenue. It extends from the ARMCO Dam (also known as the Sheffield Dam) approximately 200 feet upstream. PCB contaminated sediments were discovered in sediments dredged from this area in the 1980s (Ref. No. 4). In 1988, Law Environmental did a series of borings in the river to determine the extent of the PCB contamination (Ref. No. 55). This area was later excavated by the COE (Ref. No. 76). The U.S. EPA was advised of the contaminated sediments, and their subsequent removal by the COE. The U.S. EPA files did not indicate that removal of these sediments was ordered or overseen by the U.S. EPA. No source for the PCB contamination was determined. A handwritten note in the MDNR file also mentioned that in February 1976, PCBs (approximately 200 ppm) were found in Blue River sediments "downstream of the Sheffield Dam (ARMCO's most downstream head dam)" (Ref. No. 1).

B. Waste Characteristics

PCBs were found in Blue River sediments by the COE. No record was found in the U.S. EPA or MDNR files of any soil samples being collected on the ARMCO property adjacent to this section of the river. Therefore, it is unknown whether improper management of PCB oils by ARMCO might have led to the contamination of the river sediments. It is also unknown whether the 1960 PCB spill mentioned in the 1982 PCB inspection report might have impacted this area.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The Blue River sediments are known to have been contaminated with PCBs at this location. It is possible that the ARMCO property adjacent to the river could also be contaminated by PCBs, either from onsite releases or from contaminated sediment being deposited

during flooding. PCBs could also be present in the groundwater due to infiltration from the river.

4.7.4 AOC No. 4 - Boiler Furnace Area

A. Unit Description

According to the December 1982 "Complaint, Compliance Order and Notice of Opportunity for Hearing" (Ref. No. 19) an inspection of Union Wire Rope (UWR) on August 27, 1982 found that UWR was sending approximately 50 gallons per month of waste 1,1,1-trichloroethane (TCA) to ARMCO to be burned in the boiler furnace. When ARMCO met with the U.S. EPA for the Settlement Conference on January 14, 1983, they stated that this practice had been halted. The April 1, 1983 CEI states that waste TCA was no longer being received from Union Wire Rope. The report also states that "the boiler furnace was fed with No. 6 oil when waste oil and solvents were mixed with the fuel oil. The hopper used for dumping in waste oil had no roof, and some water could get in the system even if valves were closed." At the time, the area was described as containing about fifty 55-gallon drums; however, none were identified as hazardous waste.

It is believed that the waste TCA was introduced to the fuel oil at the fuel oil storage tank farm. This probably occurred at Tank 4 as the other tanks were being converted to baghouse dust storage at about this time. No visible evidence remains of this activity, and neither Mr. Fillinger nor the present boiler operators were aware of this former practice. The boiler operator stated that the waste TCA must have been added at the tank farm as there is no other place where it could have been added to the fuel.

B. Waste Characteristics

Waste 1,1,1-Trichloroethane (TCA) from the Union Wire Rope facility was mixed with No. 6 fuel oil and burned in the boiler furnace.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The soil, soil gas, groundwater, surface water, and air could have been affected by TCA spilled during the transfer from drums to the hopper for mixing with the fuel oil.

4.7.5 AOC No. 5 - Outfall 006

A. Unit Description

According to the 1988 Modification to the NPDES Permit, this outfall contains treated wastewater from wiremill cleaning and coating processes. ARMCO stated in 1986, and again in a letter dated March 29, 1989, that this outfall does not contain treated wastewater but only "storm water, groundwater, steam condensate, and winter discharge of City water for freeze protection". ARMCO was cited repeatedly by MDNR for noncompliance for the pH level of the water

from this outfall. Several spills of sulfuric acid subsequently neutralized with lime or soda ash impacted the pH levels on the water at this outfall. The most severe spill mentioned in the MDNR files occurred on September 27, 1987, when between "1,000 and 10,000 pounds" of sulfuric acid spilled when a line in a rod cleaning facility ruptured. These two numbers represent vastly different quantities and it is unknown which may be correct. According to U.S. EPA's "Incident Notification Report" 80,000 gallons were spilled. The U.S. EPA was notified and dispatched the Technical Assistance Team (TAT) from Ecology and Environment (E&E). ARMCO was attempting to neutralize the acid, but the pH was still approximately 2.0 when E&E tested the water at Outfall 006.

ARMCO was placed under an Abatement Order by MDNR for these chronic violations in 1988. MDNR records contain letters from ARMCO stating that improvements have been made to eliminate the problems with this outfall. Improvements of the procedures and installation of curbing around this area apparently rectified most of the problems with this outfall prior to the shut-down of these operations in 1989. According to Mr. Fillinger (Ref. No. 82), some of the problems with the low pH of the water at Outfall 006 was due to poor cleanup of the ferrous sulfate storage area. These crystals had been stored in a pile on the concrete floor of the Cleaning House inside a garage door so that they could easily be loaded by a front-end loader. Spilled ferrous sulfate eventually washed into the storm sewer and impacted the pH at this outfall. At the time of the April 1, 1983 CEI, approximately three cubic yards were stored in this manner (Ref. No. 26). The 1987 CEI stated that approximately 40,000 pounds of ferrous sulfate were generated every six to eight weeks (Ref. No. 54). This outfall has been relocated further upstream of the Sheffield Dam so that it would not be underwater during high water events; occasionally, this had been the circumstance that prevented the outfall from being sampled in the past (Ref. No. 82).

B. Waste Characteristics

The NPDES Permit in effect from January 12, 1990 to January 11, 1995, revised on December 28, 1990 (Ref. No. 71), states that Outfall 006 consists of "no treatment/storm water runoff/cooling water/steam condensate/freeze protection". Effluent limitations are placed on Total Suspended Solids and temperature. Previously, the water at this outfall has contained sulfuric acid from spills. It is unknown whether the sulfuric acid was "spent" pickle liquor when it was spilled. If so, it also would have contained metals. Ferrous sulfate also would have been washed off the pavement and into the river at this outfall.

C. Migration Pathways, Evaluation of Release and Exposure Potential

Surface water contamination by sulfuric acid and possibly metals occurred during various spills at the Cleaning House which impacted the Blue River through this outfall. Contamination of the sediments by metals around, and especially downstream of, this outfall also

could have occurred if significant quantities of metals were released. The sulfuric acid would have affected the pH of the sediments around the outfall. Were contamination of the soils to be severe, then contamination of the groundwater could occur.

4.7.6 AOC No. 6 - Outfall 042

A. Unit Description

According to the 1988 Modification to the NPDES Permit, this outfall consists of "blowdown from [the] central settling pond for recirculation of hot steel mill wastewater". The NPDES Permit in effect from January 12, 1990 to January 11, 1995, revised on December 28, 1990 (Ref. No. 71), simply states that Outfall 042 is from the settling pond. Effluent limitations are placed on the amounts of Total Suspended Solids, Oil and Grease, Total Lead, and Total Zinc. According to a letter from ARMCO to MDNR dated July 7, 1990, groundwater treated through an oil/water separator should be added to the list of sources for this outfall. MDNR LSP records (Ref. No. 81) contain a letter from MDNR dated December 20, 1990, agreeing to the addition of treated groundwater in this outfall.

This outfall receives overflow from the two mill ponds. The water normally goes though an oil skimmer by the overflow for each pond; however, the skimmer on Pond No. 1 was not operating during the VSI. The correspondence regarding the "treated groundwater" was rather confusing, and could be misinterpreted. The letter from MDNR to ARMCO dated December 20, 1989, states: "It is understood that groundwater will be pretreated via an oil/water separator prior to discharge to the #042 treatment facility...". According to Mr. Fillinger (Ref. No. 82), the groundwater is not treated prior to entry into the mill ponds (presumably the "#042 treatment facility"); it is treated through the oil skimmer in the mill ponds.

B. Waste Characteristics

The water at this outfall consists of overflow from the mill ponds. The NPDES permit lists oil and grease, lead, and zinc among the parameters which ARMCO is to monitor at this outfall. Analyses of the mill pond sludge in 1984 indicated oil and grease concentrations of 4.7 to 9.9 percent (Ref. No. 48). Had the concentration of oil and grease been 10 percent, this sludge would have been classified as a Missouri hazardous waste. Analysis of two sludge samples from Pond No. 2 (Pond "B") when it was cleaned in October 1988, indicated oil and grease concentrations of 4.7 and 5.8 percent (Ref. No. 58). The 1984 analyses also indicated the presence of trace amounts of methylene chloride, methyl ethyl ketone, carbon disulfide, bis (2-ethylhexyl) phthalate, acetone, and phenol. Since these compounds are present in the sludge removed from the mill ponds, they may also be present in the overflow water released from these ponds.

C. Migration Pathways, Evaluation of Release and Exposure Potential

During the VSI, the oil skimmer on one of the two mill ponds was not functioning (Photo No. 8). The mill pond water was apparently being

released through the overflow (and to this outfall) without any treatment to remove the oil and grease. Thus, contamination of the surface waters apparently was occurring at that time. The soils, soil gas, and possibly the groundwater around this outfall also could be contaminated by oil and grease or other contaminants released from the mill ponds via this outfall.

4.7.7 AOC No. 7 - Backwash Area of Rock Creek

A. Unit Description

This backwash area of Rock Creek (Photo No. 16) is located at the juncture of the present Rock Creek channel with the former Rock Creek channel just to the southeast of the Amoco Landfarm. During high water events, it is also part of the backwaters of the Blue River. This old channel collects debris carried down Rock Creek or the Blue River during high water events. This area was observed to contain numerous old automobile tires, wood, porcelain fixtures, and various junk. It is uncertain how long this debris had been present at this location; however, the last major flooding would have been in May 1990. The May 1990 flood may have cleared out debris and/or brought in new debris. Additional debris would be carried in and out with seasonal high water events.

B. Waste Characteristics

This backwash area contained junk, wood, and debris, such as old automobile tires, apparently left behind by receding waters.

C. Migration Pathways, Evaluation of Release and Exposure Potential

During high water events, much of this debris would be carried further down Rock Creek, and probably into the Missouri River. It would be replaced in turn by debris carried down from upstream. Potential contamination of the soil, soil gas, and air cannot be assessed, but would be possible depending on the nature of the debris carried to this area by the particular flood event. No drums were noted during the VSI, however, the potential exists for this site to have been contaminated by compounds transported to this area in drums or other containers that later leaked.

4.7.8 AOC No. 8 - "Owl Gun Club" Shooting Park

A. Unit Description

The October 1991 Burns & McDonnell Phase I Environmental Assessment report prepared for the Mid-America Regional Council (MARC) on the South Riverfront Expressway right-of-way through the northern portion of the ARMCO site (Ref. No. 94) states that a clay pigeon shooting park known as the "Owl Gun Club" was formerly located in this area. Photocopies of the 1955 and 1964 aerial photographs clearly show two trap houses and roads associated with this shooting park. These features are much more distinct in the 1955 photograph than in the 1964 photograph. This may simply be due to the difference in contrast of the photocopies; however, the report

states that most of the northern property had been bought by ARMCO in 1957. Thus, the gun club may have closed at that time. No structures are visible in this area in the 1944 photo, and the 1974 photo shows that the area was being used for cropland. The EMSL report on the aerial photographs obtained by the U.S. EPA may provide further information on this site. The was no mention of this area in the U.S. EPA or MDNR files reviewed during the PA review of the ARMCO facility, thus it was not viewed during the VSI.

B. Waste Characteristics

Lead shotgun pellets.

C. Migration Pathways, Evaluation of Release and Exposure Potential

The surface soils in this area would have been contaminated by lead shot. Were this gun club to have been in frequent use for an extensive period of time, this surface contamination could be significant. Small lead shot used in trap shooting is easily oxidized, which increases mobility; therefore, surface and groundwater contamination could result.

5.0 REFERENCES

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17. Burns & McDonnell. Part B Permit Application for the Secure Storage Facility at ARMCO, Inc., Kansas City Works. October 1982.

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APPENDIX A

Photographs

ARMCO SITE PHOTOGRAPHS

Photograph Number : 1
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1050 hours
Direction of Photograph: SE
Photograph Subject: SWMU No. 12: AMOCO Landfarm (LT-1).

Photograph Number : 2
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1106 hours
Direction of Photograph: NW
Photograph Subject: SWMU No. 12: AMOCO Landfarm (LT-1).

ARMCO SITE PHOTOGRAPHS

Photograph Number : 3
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1122 hours
Direction of Photograph: NE
Photograph Subject: SWMU No. 2: Old Blue River "W" Landfill (LF-2), west end.

Photograph Number : 4
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1131 hours
Direction of Photograph: NE
Photograph Subject: SWMU No. 4: Location of former 1400 cubic yard waste pile.

ARMCO SITE PHOTOGRAPHS

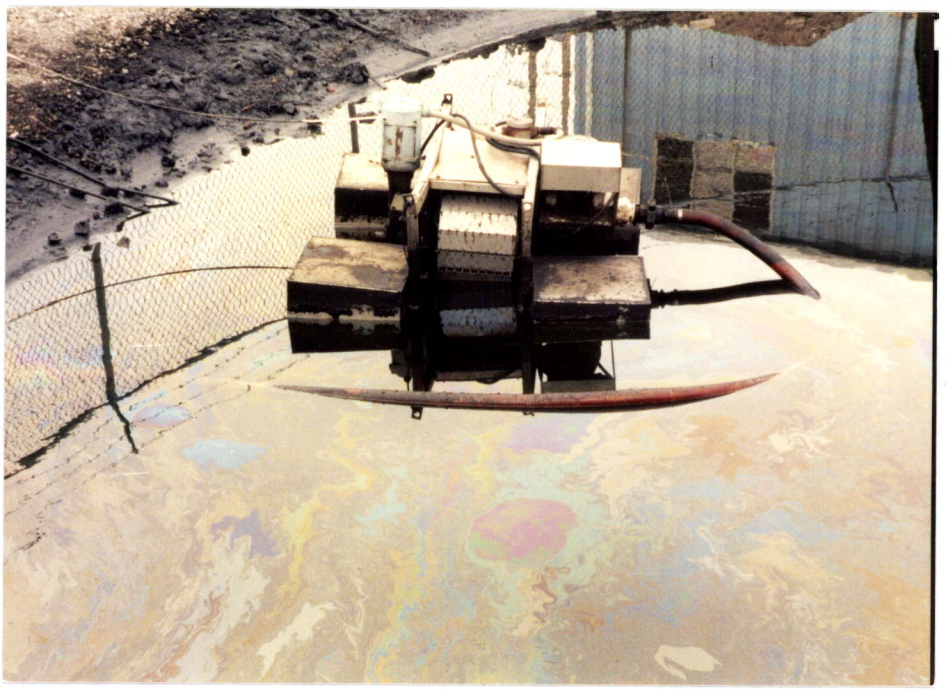
Photograph Number : 5
Photograph Date:5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1136 hours
Direction of Photograph: East
Photograph Subject: SWMU No. 1: RCRA Landfill.

Photograph Number : 6
Photograph Date:5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1147 hours
Direction of Photograph: East
Photograph Subject: SWMU No. 5: Rubble Landfill (LF-1).

ARMCO SITE PHOTOGRAPHS

Photograph Number : 7
Photograph Date:5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Subject: Rock Creek Railroad Tunnel.

Photograph Taken by: Jenna Mead
Photograph Time: 1153 hours
Direction of Photograph: West



Photograph Number : 8
Photograph Date:5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Subject: SWMU No. 22: Mill pond with oil sheen around nonfunctioning oil skimmer.

Photograph Taken by: Jenna Mead
Photograph Time: 1159 hours
Direction of Photograph: NW

ARMCO SITE PHOTOGRAPHS

Photograph Number : 9
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1345 hours
Direction of Photograph: East
Photograph Subject: AOC No. 3: ARMCO Sheffield Dam - PCB excavation area.

Photograph Number : 10
Photograph Date:5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1348 hours
Direction of Photograph: W
Photograph Subject: SWMU No. 18: Blooming Mill scale pit (STU-1).

ARMCO SITE PHOTOGRAPHS

Photograph Number : 11 ►
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1357 hours
Direction of Photograph: West
Photograph Subject: SWMU No. 17: Wire Mill rinsewater neutralization tank (STU-5).

◄
Photograph Number : 12
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1407 hours
Direction of Photograph: South
Photograph Subject: AOC No. 1: Abandoned Fuel Oil Storage Tank Area. Recovery well, pump and piezometer location.

ARMCO SITE PHOTOGRAPHS

Photograph Number : 13
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1505 hours
Direction of Photograph: South
Photograph Subject: SWMU No. 25: Roll Shop drum storage area. Drums of waste oil, Swarf (carbide grindings), and worn/broken carbide tooling near STA-4 of Roll Shop.

Photograph Number : 14
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1517 hours
Direction of Photograph: South
Photograph Subject: SWMU No. 26: Rod Mill drum storage area. Open and leaking drums of waste oil mixed with trash.

ARMCO SITE PHOTOGRAPHS

Photograph Number : 15
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic

Photograph Taken by: Jenna Mead
Photograph Time: 1505 hours
Direction of Photograph: East

Photograph Subject: SWMU No. 25: Roll Shop drum storage area and portable tank used to transport spent acids from Etch Lab holding tank (SWMU No. 15) and Roll Shop roll cleaning tank (SWMU No. 16) to the mill ponds (SWMU No. 22) for disposal.

Photograph Number : 16
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic

Photograph Taken by: Jenna Mead
Photograph Time: 1116 hours
Direction of Photograph: South

Photograph Subject: AOC No. 4: Backwash area of Rock Creek showing accumulation of automobile tires and assorted debris.

ARMCO SITE PHOTOGRAPHS

Photograph Number : 17
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1423 hours
Direction of Photograph: South

Photograph Subject: SWMU No. 3: South of Bar Fab Landfill showing concrete cap along Blue River.

Photograph Number : 18
Photograph Date: 5/20/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1548 hours
Direction of Photograph: East

Photograph Subject: SWMU No. 8: No. 2 Melt Shop dust storage tank, and SWMU No. 11: dust railcar loading area.

ARMCO SITE PHOTOGRAPHS

Photograph Number : 19 →
Photograph Date: 5/21/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 0958 hours
Direction of Photograph: South

Photograph Subject: SWMU No. 19:
Twelve Inch Mill scale pit (STU-2).

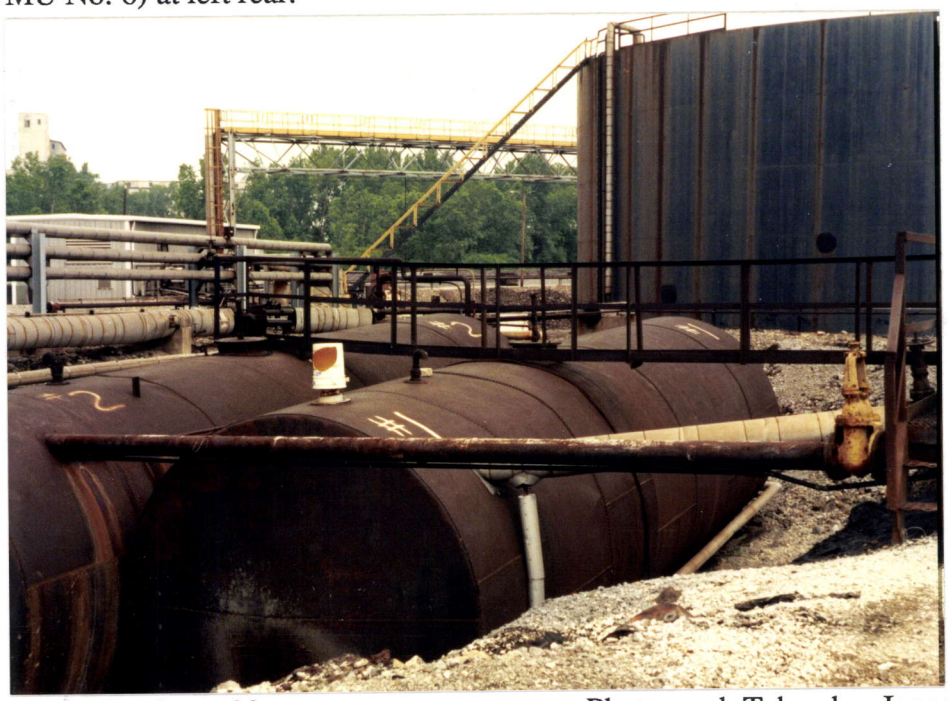
←

Photograph Number : 20
Photograph Date: 5/21/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1055 hours
Direction of Photograph: East

Photograph Subject: SWMU No. 15:
Etch Lab holding tank (STA-3).

ARMCO SITE PHOTOGRAPHS

Photograph Number : 21
Photograph Date: 5/21/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1102 hours
Direction of Photograph: NE
Photograph Subject: SWMU No. 24: Waste oil strainer and drum storage. Dust storage tank (SWMU No. 6) at left rear.



Photograph Number : 22
Photograph Date: 5/21/91
35mm; 400 ASA; Speed: Automatic
Photograph Taken by: Jenna Mead
Photograph Time: 1102 hours
Direction of Photograph: North
Photograph Subject: SWMU No 24: Waste Oil Storage Tanks (STA-1). Dust storage tank (SWMU No. 6) at right.

APPENDIX B

Field Notes

RFA for: Armco Inc
Midwestern Steel Division
7000 Roberts
Kansas City MO

Armco Env. Coord: - Charles Fillinger (816)242-5848

EPA: Katherine Bell (913)751-7450

MDNR: Frank Dolan 314-751-3176

TetraTech: Jenna Mead
Pam McKee (913)621-6041
(H+S) Caryl Olmstead

May 20, 1991

0930 Mead and McKee depart office for Armco
discuss safety issues on way

weather 64°
very overcast
little wind

0951 arrive Armco
0952 main office, let receptionist know we need to meet Charles Filinger.
Mr. Filinger has been contacted.

Frank Dolan (MDNR) already here and had met w/ Charles Filinger
Mead, McKee and Dolan consolidated equipment into station wagon
Armco had requested that we all (EPA, MDNR, Armco, and TT) travel in same vehicle

1003 met Katherine Bell (EPA) in parking lot.
drive around to back parking

5-20-91

lot, closer to Mr. Filinger office.

1009 discuss what we want to see first, purpose of visit etc.

1021 leave office
begin at east side of facility

1 + 2 tanks have not been deconned
~~but not~~ phone certified clean yet
other 2 have been certified

lagoons 7-8 ft deep
recirculated
outfall #42
oil skimmer

oil from river picked up and pumped to cooling pond (0&2)
oil skimmer removes

1041 begin tour at MO. river
have barge dock to receive scrap

Amoco landfarm area.
WWC put in wells several

5-20-91

years ago.

1045 at Amoco landfarm
≈5 acres (Filinger)

OWA-6 WWC well
4 inch dia
no lock, cap is broken, about 1/8 gone
apron, washed out about 3 inches under bottom of apron.

photo #0, 1, and 2 of monitoring well, all participants are witnesses. Pentex 35MM on automatic 400 ASA (JRM).

photo #3 (S)
landfarm
Rock creek WWTF in background.

1057 OWA-5
cap is in tact
wash out not as severe
photo #4 (NE)

5-20-91

1104 photo #5 (N) landfarm

south end of landfarm
built up from creek w/slag

Frank Dolan thinks probably
only the 2 monitoring wells.

1113 W landfill
old ox bow channel used as
landfill (baghouse dust) next

1115 backwater from Rock Creek
collects debris during high
water.
appears mostly trees and tires

1116 photo #6 (S)

1117 W landfill

levees alongside are being dug up
(slag) and processed and sold
by contractor (lessee) Hec co.
more valuable to Armco
as saleable material than
levee.

5-20-91

1122 photo #7 (NE)
west end of W landfill
taking up adjacent RR tracks

1125 photo #8 (E)
monitoring well for landfill.
locking cap on well casing

17 acres of wetland SE of
W landfill

1130 1987 waste pile
1131 photo #9 (NE)
area where waste pile had been
located.

1134 RCRA landfill
crownvetch vegetative cover

1136 photo #10 (E)
RCRA landfill
groundwater sampling
began filtering for lead.
in compliance file.

1140 Rubble landfill
earth, rock & similar material

5-20-91

still in use
plastic, wood, cloth, etc
should not be here
old fire brick
1147 photo #11 (E)
rubble landfill

1153 RR tunnel (W)
dewatering sumps
photo #12

1155 cooling ponds
must be dredged periodically
to remove mill scale

overflow weir on both ponds
meet in middle flow SSE
out outfall 042

1159 photo #13 (NW)
cooling pond oil sheen

1211 former fuel tanks used for
baghouse dust
#5 tank
first one used
originally dumped

5-20-91

ash in three top
then used screw-type
conveyer
finally pneumatic tube

1230 break for lunch

1320 stop for gas (for state car)

1325 Cygnotta dam on Blue River

1342 new outfall 004

1343 Armcos dam
Corps dam approx 500yd
upstream

1345 phot. # 14 (E) Sheffield
dam on Blue river
PCB excavation

scale pit Blooming mill
scale would settle out
shipped out by rail car

1348 photo #15 (W)
scale pit

5-20-91

1351 outfall 006
once per month grab sample

used to operate acid cleaning house, effluent thru 6
after closed down, state no longer requires same monitoring.

1354 sulfuric acid, no secondary containment, drained to basement, ate through city water line
some released thru outfall 006
what overflowed from STU5
rest contained here

1357 photo # 16 (W)
STU5

1402 ~~UST~~ Above ground fuel tank JRM area pump/well
probe measures thickness of oil on water table

April 28 report.

5-20-91

wells in place approx 1 yr.
had to replace pump
probe
control board
line that hooks into facility return line to cooling ponds.

1407 photo # 17 (S)
well & pump at ~~UST~~ Above ground fuel tank JRM

1409 baghouse loadout transfer station TS3

1412 photo # 18 (NE)
TS3 baghouse

800 hp blower

1415 TS1 transfer station for baghouse dust (2 hoppers)
photo # 19 (N)

1419 substation
4 PCB transformers stored
have been removed
must have electrician to go in

5-20-91

1423 south of bar fab landfill.
photo #20 (S)

K.C. split costs since city owns a portion

1434 TS4 bar joist bldg.

1437 haz waste container storage area
no drums remaining, no evidence of leaks & release
90 day storage

1446 tractor shed.
PCB transformer in secondary containment ≈ 2 ft
6 total spaces

photo #21 (N)
transformer

approx 2 dozen drums various many empty
roofing tar
degreaser conc.

5-20-91

1451 photo #22 (N) drums

electroplating sludge pond
property sold in 1982
probably to Skip Slyster
cleaned prior to sale.

1458 STA4 Rollshop
plating tank degreaser
pumped into tank on truck
take to cooling ponds to
adjust pH
800 gallons

1502 on other side of truck w/ tank
waste oil storage
soil stained extensively
6 drums on pallets

Swarf - roll shop waste

1505 photo # 23 drums - waste oil
photo # 24 tank on truck

1509 area where taking UST was removed.
need to check on removal.
unleaded gasoline.

5-20-91

1512 STU 3 rod mill
scale pit
effluent goes to cooling pond
residual lubricating oil
photo # Ø and 1 (N)

1514 drum storage adjacent to STU3
extensive soil staining

1517 photo #2 facing bld
photo #3 long view of drum

1538 day tank for baghouse
80,000 lb capacity
approx 60,000 lbs/day
unload to rail car daily
10 rail car/month
2-3/wk

1548 photo # 4 daytank/hopper

controls for day tank sets so
can't overfill, also prevents
dust from escaping during
loading operations

1549 photo #5 day tank/hopper

1551 No 2 Melt Shop STU 4
photo # 6

1559 drop C. Filinger off at his
office.

1604 F. Dolan and K. Bello
drop Mead and McKee
off at Ft oa

1604 off site for day

Pamela J. McKee
5/20/91

May 21, 1991

0845 overcast
occasional sprinkle
70°F.

0901 Mead McKee and Olmstead
on-site, changing to steel-toed
boots

0907 at reception area, C. Filinger's
line busy

0920 contacted Mr. Filinger, in his office

0925 leave office area

0929 Safety-Klean parts washer
photo #6
pipe shop 68 units

0937 boiler
1982 TCA to inject to boiler
would have required adding
at fuel farm.
will check later today

0944 Dec 1988 or (1989)
shut down pickle liquor operation

5-21-91

probably asbestos insulated

secondary containment
supposedly adequate to hold
all contents
possibly 9,000 gal

unsure if empty
photo #7 tanks (W) product

0950 photo #8 sulfuric tank (SW)

0952 photo #9 (W) tanks, sulfuric
area of leak

0958 scale pits at 12 inch mill scale
STU2
not cleaned will be when
bldg is razed

photo #10 (S) scale pit

only 2 furnaces operating
currently

1012 substation
PCB transformer storage
former storage, was in 100 yr

5-21-91

floodplain.
locked area main elec substation bldg.
5 Drums used non-PCB
transformer oil currently.

1084 other tractor shed (small)
3 Drums PCB ~~[illegible]~~

7 Drums
1088 photo #11 PCB drum storage (S)
photo #12 " " " "
4 liquid
1 solid
1 flush (solvent)

1044 lube oil tank former area UST
adjacent to new above ground
tank area
melt shop #2, north side (19" mill)
pulled as part of program to
eliminate USTs.

1048 etch shop hydrochloric

mixing tank to get
secondary containment
has been ordered

5-21-91

1053 photo # 13 (E)
mixing tank for hydrochloric
whole area
1055 photo # 14, 15 (E)
outside tank
metal etch

chromium collected rainwater
plt will go to cooling
2 other ponds

1102 waste oil bulk tanks (20,000 gal)
store for Radium (28,000 gal)

MDNR views as "special waste"

photo #16 + 17
drums to tank area
photo # 18
secondary containment

1109 baghouse failure (Armco will not
#2 melt shop permit photo)

area is very stained (strainer)
gravel, pretty well isolated
to straining area.

5-21-91

1125 at office
2 tanks at area at #2 melt shop
hydraulic and lube oil
asked for copy of registration

1140 broke for lunch
1230 back from lunch, on return
drove by previous bolt + nut
where oil quench and
electroplating pond had
been
property now owned by
Skip Dyster.

test of rainwater before going
to cooling ponds
pH
chromium
lead
cadmium

no contingency plan if exceed
limits, will just simply hold
until determine what to do.

5-21-91

Dec 1989

drums - Terracon
from cleaning house
this was acid bath used
to clean coils of wire
Terracon cleaned out sludge
and drummed
sampler to PDC, still waiting
on TCLP to determine which
PDC landfill will go to.

swarf - grindings from
carbide rolls. $2.50/#
$1200/drum.

1500 depart Armco.

5/21/91

APPENDIX C

List of SWMUs and AOCs Augmented with VSI Comments

ARMCO, INC. MIDWESTERN STEEL DIVISION

Solid Waste Management Units (SWMUs) and Areas of Concern List Prepared for VSI

LANDFILLS

RCRA Landfill - According to ARMCO's 1987 Post Closure Permit Application (PCPA), this landfill was in use from July 1980 to January 25, 1983, and was certified as closed on September 19, 1984. The two trenches are approximately 1,300 feet long and 650 feet long, respectively, and both are approximately 10 feet deep and 50 feet wide. Together they contain approximately 36,000 yd^3 of baghouse dust. Baghouse dust is generated in the electric arc furnaces at a rate of approximately 30 pounds per ton of steel produced, and is collected in the baghouse air pollution equipment. Results for E.P. Toxicity analyses on the two samples of baghouse dust analyzed in June 1982 showed them to be high in lead (160,000 and 190,000 $\mu g/\ell$), chromium (380 and 710 $\mu g/\ell$), and cadmium (6,250 and 7,890 $\mu g/\ell$). Though not a RCRA regulated metal of concern, this dust is also high in zinc (averaging 17 to 21 percent). In recent years, the dust has been shipped off site for recovery of the zinc content. Between 1981 and 1987, 11 groundwater monitoring wells have been installed in the area surrounding this landfill. Groundwater monitoring reports do not indicate any contamination of the groundwater.

> VSI Comments: The crown vetch covering on the landfill appeared to be in good condition.

"W" or Old Blue River Landfill - According to the PCPA, this landfill was in use from 1965 to 1980, and covers approximately 15 acres. The landfill is an old oxbow channel of the Blue River, and contains approximately 185,000 yd^3 of baghouse dust mixed with "general plant and office trash". Presumably, the non-baghouse waste is non-hazardous. ARMCO reported this landfill to the U.S. EPA in 1980. In 1984, it was placed on the Missouri Department of Natural Resource (MDNR) list of "Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri". No Superfund clean up has been initiated, or is planned, for this site.

> VSI Comments: The ARMCO levees in this area are being excavated and processed for slag aggregate. According to Mr. Fillinger of ARMCO, the levees are no longer needed due to improvements made by the Corps of Engineers (COE) along the Blue River.

South of Bar Fab Landfill - According to the PCPA, this landfill was in use from 1962 to 1965, and covers approximately five acres. It is located on a narrow strip of land bordered by the Blue River on the west and Interstate 435 on the east. It contains approximately 35,000 yd^3 of baghouse dust mixed with "general plant and office trash". ARMCO reported this landfill along with the "W" Landfill, but it is seldom mentioned in the U.S. EPA or MDNR files. Mr. Charles Fillinger of ARMCO stated that this landfill had been removed as of May 10, 1991 (personal communication, May 13, 1991).

VSI Comments: The statement regarding the removal of this landfill was in error. In May 1988, ARMCO became aware that the cover of this landfill had been disturbed, and notified the appropriate authorities. The disturbance was apparently from channelization work along the Blue River done by the Corps of Engineers between 1984 and 1986. The portion of this landfill along the river is now owned by the City of Kansas City, Missouri; the City paid for a part of the site remediation completed in December 1988. At that time, a concrete cap was applied to the west (river) side of the landfill, and an area on the east side of the landfill where a drainage culvert is located was also concreted to prevent erosion.

1987 Waste Pile - In March 1987, ARMCO amended their 1981 "Notification of Hazardous Waste Site" to add a waste pile of approximately 1,400 yd^3 of baghouse dust that they had discovered near the CERCLA "W" (Old Blue River) Landfill. According to a letter from ARMCO to MDNR dated November 2, 1988, it was removed and shipped for zinc recovery; however, there is no indication in the files that sampling was performed to confirm clean closure.

VSI Comments: No visible evidence remains of this waste pile; however, no sampling was performed when this pile was removed to ensure that no contamination remained.

Plant Rubble Landfill - According to the PCPA, this landfill was in use when the PCPA was written in 1987 and contains "non-putrescible rubble from Plant operations". It is located next to the RCRA landfill, and had been in use since 1980. As of 1987, this landfill contained approximately 86,000 yd^3 of material. It is described as being 1,350 feet long, 185 feet wide, and 15 feet deep.

VSI Comments: This landfill is supposed to contain only "earth, rock, and similar material", according to Mr. Fillinger. From the debris present on the surface, it is apparent that it also contains wood, plastic, cloth, and metal.

Note: There are references in the ARMCO RCRA files to the ARMCO North End Landfill or Union Wire Rope Fill Area. The location given for this landfill indicates that it is on the Union Wire Rope property, so it is not included in this list. A Removal Order was issued for this landfill in 1989 by the U.S. EPA.

DUST STORAGE TANKS

RCRA Permitted Baghouse Dust Storage Tanks - These four former fuel oil storage tanks were in use for storage of baghouse dust from January 1983 (when the RCRA Landfill stopped receiving the baghouse dust) to July 15, 1986 (when the baghouse dust began being shipped off site for zinc recovery). Each of the four tanks is 100 feet in diameter; three are 40 feet high, and the fourth is 30 feet high. The tanks have a combined storage capacity of 40,000 yds^3. Tanks 2, 3, and 5 were filled, and Tank 1 was partially filled when the May 1986 Compliance Evaluation Inspection (CEI) was performed. Originally, only the dust from the No. 2 Melt Shop was stored in the tanks. It was transported to the storage tanks from the No. 2 Melt Shop Baghouse by truck. Pneumatic lines were later installed to convey the dust directly to the tanks. The baghouse dust from No. 1 Melt Shop

began being stored in the tanks in approximately 1985. Prior to that time, it was being pelletized and reintroduced into the furnaces. Several minor (<2 yds^3) dust spills occurred during the years that these tanks were being filled, and citations were issued for these violations. Removal of the dust from the tanks began in 1987. Originally, the dust was trucked to the Bar Joist Building where it was loaded onto the railcars for shipment to the zinc recovery facility. Later, pneumatic lines were installed to transfer the dust from the tanks to the Bar Joist Building. Apparently when the pneumatic lines were installed, the dust began going into the "Day Tank" listed below. As of March 18, 1991, when Mr. Frank Dolan of MDNR visited the site, Tanks 3 and 5 had been emptied and cleaned; Tank 2 was empty and ready to be cleaned; and Tank 1 was in the process of being emptied. According to Mr. Dolan (personal communication, April 22, 1991), ARMCO plans to keep only one tank permitted in the event that it is needed. According to MDNR records, ARMCO plans to convert the tanks back to fuel oil storage.

> VSI Comments: The statement about pneumatic lines to empty the dust tanks is apparently in error. Mr. Fillinger stated that augers (screw conveyors) were used to empty the dust from the tanks into container trucks. The dust was then transported to the rail car loading area for shipment to the recycling facility. Tank 1 had been emptied the week prior to the VSI.

No. 1 Melt Shop Baghouse Dust Tank - According to the PCPA, this was a transfer station for baghouse dust located on the east side of the melt shop, and had been in use since 1962. As this melt shop closed in 1988, this SWMU is presumably no longer in use. The transfer station consisted of two steel tanks, each about 10 feet in diameter and 25.5 feet high that had a combined storage capacity of 86 yd^3. At the time of the 1983 compliance inspection, the baghouse dust from this melt shop was being pelletized and reintroduced into the electric arc furnaces. This procedure, designed to enrich the zinc content, adversely affected the quality of the steel and was discontinued prior to the 1986 compliance inspection. At that time, storage of the No. 1 Melt Shop baghouse dust in the tanks began.

> VSI Comments: This SWMU has been cleaned and closure was certified by Remcor on November 13, 1990. However, there was no indication in the files that samples were collected from the surrounding area to ensure that no contamination remained.

No. 2 Melt Shop Baghouse Dust Tank - According to the PCPA, this is a transfer station for the baghouse dust and is located at the northwest corner of the No. 2 Melt Shop Scrap Yard. It began operations in 1977, and consists of a steel tank 12 feet in diameter and 17.33 feet high, having a capacity of 50 yds^3. According to the 1989 CEI, the dust was being directly transferred from the baghouse to the railcar by pneumatic lines. Therefore, this transfer station may no longer be in use.

> VSI Comments: This is the same as the "Day Tank". It is located on the side of the No. 2 Melt Shop, and empties from the bottom into the top of the railcar. According to Mr. Fillinger, about 60,000 pounds of baghouse dust is generated daily. The tank is unloaded daily, and fills approxi-

mately 10 railcars per month. They ship two or three railcars of dust per week.

No. 1 Melt Shop Canopy Baghouse Dust Conveyor - According to the PCPA, this was a steel screw conveyor (12 inches in diameter and 65 feet long) that transferred baghouse dust from the No. 1 Melt Shop to an unspecified location. This was in use from 1977 until presumably 1988, when operations ceased at the No. 1 Melt Shop.

> VSI Comments: Clean closure of this SWMU was certified by Remcor on November 13, 1990, but apparently no sampling was conducted. The screw conveyor (auger) had been used to transfer the baghouse dust from No. 1 Melt Shop Dust Tank to a truck parked below. This auger is no longer in place.

Dust Railcar Loading Area - According to the PCPA, this area is located in the southwest corner of the Bar Joist/Longspan Complex, and has been in use since 1986. The PCPA describes this area as a "steel building, paved track area approximately 31 feet wide and 98 feet long". The quantity of dust present is described as being "approximately 100 cubic yards in railcar". This description appears to refer to the railcar itself while being filled with the baghouse dust.

> VSI Comments: This SWMU was used as a central dust loading area when both the No. 1 and the No. 2 Melt Shops were in operation. With the closure of the No. 1 Melt Shop, the railcar is now loaded directly beneath the No. 2 Melt Shop Dust Tank.

Day Tank (Rail Load Hopper) - This SWMU is mentioned in the 1989 CEI, and is described as a holding tank for approximately "two (2) working days" (before closure of the No. 1 Melt Shop) of baghouse dust prior to transfer to the railcar. This tank is presumably located at the Bar Joist Railcar Loading Area. The 1989 CEI reported that the day tank is filled by "dedicated ducting" from the baghouse collection bins and empties into the railcars by pneumatic/gravity flow.

> VSI Comments: This is the same as the No. 2 Melt Shop Dust Tank.

LANDFARM

AMOCO Landfarm - This site is located on the eastern portion of ARMCO's property, near the Missouri River. AMOCO Oil Company leased this land from ARMCO, and from 1976 to 1979 spread approximately 30,000 tons of petroleum refining waste over the ground. In a letter from AMOCO to ARMCO dated July 15, 1986, AMOCO "took responsibility for any actions needed because of placement by us of materials" at this site. AMOCO stated that they would be contacting ARMCO to arrange for the consultant AMOCO had hired to perform a site investigation "to characterize the site, so that appropriate cleanup and closure plans can be developed". The petroleum waste on this site is considered hazardous waste, but the site does not fall under CERCLA jurisdiction as petroleum waste is excluded from the U.S. EPA CERCLA mandate. Mr. Alan Hancock of the U.S. EPA RCRA Enforcement Group, who is working on the AMOCO Sugar Creek Site, states that this site is not covered by the Enforcement Action against AMOCO. He was unaware that this site existed, and says that as far as he knows, no work is being done by the Enforcement Group to

ensure cleanup of this site (personal communication, May 9, 1991). No records can be located at the U.S. EPA or MDNR offices to indicate that AMOCO performed a site investigation, or has remediated this site.

> VSI Comments: Two monitoring wells (OWA-5 and OWA-6) were located on the north (presumably downgradient) side of the landfarm. These wells were constructed of 4-inch diameter PVC, with PVC well caps. The cap on OWA-6 was broken and the ground had washed out about three inches beneath the well's concrete apron. Mr. Fillinger thought that the wells had been installed by Woodward-Clyde Consultants, and did not know whether they are still being monitored. Mr. Fillinger was not aware of any information regarding the work performed in this area by AMOCO's consultant.

ACID TANKS AND COOLING WATER

Pickle Liquor - This is sulfuric acid used to clean iron oxide from the steel. Since 1981, the 9,000 gallon tank of pickle liquor has been recharged by transferring it in 3,000 gallon batches to a cooling tank. Cooling to 34° F causes ferrous sulfate to precipitate out, thereby rejuvenating the solution. The ferrous sulfate that precipitates out of the solution is sold as product (a flocculent), and is not considered to be a hazardous waste. The 3,000 gallons of rejuvenated pickle liquor is then transferred to a holding tank until the entire 9,000 gallons has been treated. The final 3,000 gallon batch and the 6,000 gallons previously rejuvenated are then transferred to the original tank for continued use. According to a letter from ARMCO's attorneys to MDNR dated February 9, 1981, the spent pickle liquor was at that time being used by the City of Kansas City, Missouri to promote coagulation in its Blue River Sewage Treatment Plant. In the 1982 PCB Inspection Report, it mentions that "some of the treated acid rinse water goes to an area at Union Wire Rope and is aerated, then discharged into the Blue Valley Sewage Treatment Facility". The 1986 RCRA CEI mentions that in the event pickle liquor is unable to be regenerated due to the system being inoperative, it is sent to the Blueside Tannery for use in their wastewater treatment facility. The report did not indicate how often this might have happened. The 1988 CEI states that no pickle liquor had been sent off site since February 18, 1987.

> VSI Comments: According to Mr. Fillinger, this operation shut down in December 1989. The tanks had not been cleaned, and Mr. Fillinger did not know whether they still contained any liquids. These tanks are located outside, very near the Blue River. It was from this system that the large sulfuric acid leak of September 1987 occurred. According to Mr. Fillinger, the acid leaked from a connection and drained into the basement and corroded a city water line. Most of the acid was contained in STU-5 (Wire Mill Rinsewater Neutralization Tank); the overflow was released through outfall 006 into the Blue River.

Etch Lab Holding Tank - According to the PCPA, this is a 1,500 gallon fiberglass tank located above ground, outside, on the west side of the Etch Lab. It has been in use since 1977, and contains "neutralized etch solutions consisting of hydrochloric acid, sodium hydroxide, and rinse water". No indication is given as to the final disposition of the liquids from this tank.

VSI Comments: This tank receives the waste etch solution from the 350 gallon Etch Lab Mixing Tank. The Holding Tank is emptied into another tank on the back of a truck and carried to the mill ponds. The waste solution is used in the mill ponds to help neutralize the water.

Roll Shop Roll Cleaning Tank - According to the PCPA, this is a 75 gallon stainless steel process tank located at the east end of the Roll Shop. It has been in use since 1983 and contains "spent phosphoric acid cleaning solution". No indication is given as to the final disposition of the liquids from this tank.

VSI Comments: This tank is emptied into a tank on the back of a truck and carried to the mill ponds where the spent solution is used in the mill ponds to help neutralize the water. Six drums of waste oil and metal grindings were stored on pallets just outside the building at this location. The soil was extensively stained around the drums.

Blooming Mill Scale Pit - According to the PCPA, this is an approximately 95,000 gallon steel and concrete underground storage tank located at the north side of the Blooming Mill Building. The tank had been in use since 1955, and contained "recirculated cooling water from [the] mill water system, mill scale, [and] residual lubricating oil". According to the 1988 CEI, the Blooming Mill was due to be shut down along with the No. 1 Melt Shop and Twelve Inch Mill; therefore, this SWMU may no longer be in use.

VSI Comments: This SWMU has been inactive since December 1988, but has not been cleaned. The cooling water was recirculated back to the mill ponds when this scale pit was in operation. The PCPA lists this SWMU as an underground storage tank, but it is not actually underground. It is an open-air pit with a concrete bottom and steel sides. This is true of the other three scale pits as well.

Twelve Inch (12") Mill Scale Pit - According to the PCPA, this is an approximately 27,600 gallon concrete underground storage tank located at the east side of the Twelve Inch Mill Complex. The tank had been in use since 1948, and contained "recirculated cooling water from [the] millwater system, mill scale, [and] residual lubricating oil". According to the 1988 CEI, the Twelve Inch Mill was due to be shut down along with the No. 1 Melt Shop and the Blooming Mill; therefore, this SWMU may no longer be in use.

VSI Comments: This SWMU has been inactive since December 1988, but has not been cleaned. The cooling water was recirculated back to the mill ponds when this scale pit was in operation. According to Mr. Fillinger, this building may be demolished in the near future. ARMCO will have this SWMU cleaned prior to demolition of the building.

Rod Mill Scale Pit - According to the PCPA, this is an approximately 42,100 gallon steel and concrete underground storage tank located at the west end of the Rod Mill Complex. The tank has been in use since 1957, and contains "recirculated cooling water from [the] millwater system, mill scale, [and] residual lubricating oil".

VSI Comments: The cooling water from this SWMU is recirculated back to the mill ponds. A drum storage area containing approximately 20 drums of waste oil mixed with trash was noted outside the Rod Mill. No containment system protected the soil from leaks, and the soil showed extensive evidence of staining. Many of the drums were open, and one drum was noted to be leaking during the VSI.

No 2 Melt Shop Scale Pit - According to the PCPA, this is an approximately 171,100 gallon steel and concrete underground storage tank located at the northeast corner of the 19" Mill Building. The tank has been in use since 1977, and contains "recirculated cooling water from [the] millwater system, mill scale, [and] residual lubricating oil".

VSI Comments: The cooling water from this SWMU is recirculated back to the mill ponds.

Wire Mill Rinsewater Neutralization Tank - According to the PCPA, this is an approximately 10,000 gallon concrete underground storage tank located northwest of "Rod Cleaning (across road)". The tank was in use from an unknown date until 1983, and contained "rinse waters from hydrochloric acid wire cleaning operations, rinse water from sulfuric acid rod cleaning and lime for pH neutralization".

VSI Comments: This inactive SWMU is an open-air concrete pit. It was used to neutralize the sulfuric acid that leaked in September 1987. Overflow from this tank goes to outfall 006.

Etch Lab Mixing Tank - According to the PCPA, this is a 350 gallon polyethylene tank located inside the Etch Lab. The tank has been in use since 1977 and contains "hydrochloric acid, sodium hydroxide, [and] rinsewater".

VSI Comments: According to Mr. Fillinger, this tank is no longer used for elementary neutralization, which is the SWMU classification given in the PCPA. The spent etch solution is transferred to the Etch Lab Holding Tank (STA-3), and is eventually used in the mill ponds as a neutralizing agent.

PONDS

Mill Ponds - These two, very large, clay-lined ponds are used for cooling mill water. The ponding allows for sedimentation of fine mill scale composed primarily of ferric oxide. The ferric oxide is routinely sold as product. The ponds are irregular polygons approximately 900 feet long and between 250 and 540 feet wide. Analyses of the Mill Pond sludge in 1984 showed it to contain traces of methylene chloride, methyl ethyl ketone, carbon disulfide, bis (2-ethylhexyl) phthalate, acetone, phenol, and oil and grease. Oil and grease were found in concentrations of 4.7 to 9.9 percent. Had the concentration been 10 percent, this sludge would have been classified as a Missouri hazardous waste. Pedco's 1983 "Review of Revised Groundwater Monitoring Program" mentions "the Pond reportedly was used for the disposal of pickling liquor prior to its conversion to a mill water pond".

VSI Comments: According to Mr. Fillinger, the mill ponds are about seven or eight feet deep. One of the mill ponds (No.1) is scheduled to be emptied and cleaned soon. The cement industry purchases the mill scale and uses it to increase the iron content of the cement. During the VSI, the oil skimmer on one pond was not working and there was an extensive oil sheen on that pond. Overflow from the mill ponds enters outfall 042 to the Blue River. In October 1988 the No. 2 pond was emptied and cleaned. Analyses on the sludge indicated that it contained approximately 5 percent oil and grease.

Electroplating Sludge Pond - This two-celled pond is only mentioned in the 1982 PCB Inspection Report. The location of the pond is given as "next to two galvanizing plants". The photos of the pond show a fenced area with a fairly large cell, a small dam, and a small second cell. An ARMCO sign is also visible in the distance. The PCB Inspection Report mentions that the flow from the smaller cell is to the city sewer, and that ARMCO was attempting to have the electroplating sludge delisted as a hazardous waste. It is uncertain where these ponds were located, or whether the electroplating sludge might have been exempt. On October 18, 1981, U.S. EPA wrote ARMCO requesting clarification on several hazardous wastes listed on their August 18, 1980 "Notice of Hazardous Waste Activity", but not listed on their Part A Permit Application. One of these wastes was for electroplating waste sludges (F006). ARMCO's December 17, 1981 reply states that the electroplating waste sludges result from zinc plating (segregated basis) on carbon steel, and are therefore exempt. The letter further states that these "are the only electroplating operations in the Kansas City Works. No cyanide or cyanide salts are involved in the process." It should be noted that the 1987 CEI states that, as a condition of ARMCO's sale of the property formerly occupied by Vendo, ARMCO was required to dispose of nine, 55-gallon drums of cyanide contaminated waste resulting from plating operations at that site. It is unclear whether Vendo had been a part of ARMCO, or whether ARMCO had previously leased the property to Vendo.

VSI Comments: This area is no longer on ARMCO's property. It was located on Winchester Road, by the former Bolt and Nut Plant. A drive-by of the area indicated that the pond no longer existed.

WASTE OIL/SOLVENTS/FUEL OIL STORAGE

Safety-Kleen Units - According to the 1988 RCRA Compliance Evaluation Inspection, there were 78 of these units located around the plant; 54 of the units contained 30 gallons each of solvent, while the others ranged in size from 6 gallons to 250 gallons. The 1989 CEI reported that the Safety-Kleen units generated approximately 9,500 pounds per month of spent petroleum naphtha solvent (D001) and approximately 45 pounds per month of spent carb cleaning solvent (D001/F005). These solvents were collected for recycling by Safety-Kleen.

VSI Comments: According to Mr. Fillinger, there are now 68 Safety Kleen units at ARMCO, 54 of which are 20-gallon capacity units. A manifest from May 2, 1991 indicated that Safety Kleen received 27 containers for a total of 2,240 pounds of waste petroleum naphtha (D001). The D001 is also classified as D039 and D018 based on TCLP.

Waste Hydraulic and Lubricating Oils Storage - These oils are generated by routine equipment maintenance and are skimmed from wastewater treatment units. According to the 1987 CEI, these oils are stored in a dedicated 20,000 gallon tank until collection by Industrial Service Corporation of Kansas City. This report does not say whether this waste oil is being recovered, though it had been in previous years. According to the 1988 CEI, 19,400 gallons of waste oil were generated between April 1986 and November 1987. At that time, the waste oil was being collected by Radium Petroleum Company for shipment to their waste oil recovery facility. The 1982 PCB Inspection Report states that "used machine lubes were hauled away by a reclaimer and filtered and brought back as reusable oil sludge. The sludge and other unusable oils are stored in two railroad tank cars". No location is given for these tank cars. The Post-Closure Permit Application states that there are two 28,000-gallon above ground storage tanks for used oil. Apparently, the size and location of this SWMU has changed over the years.

> VSI Comments: This SWMU is composed of two former railroad tank cars (which appear to have a capacity of approximately 10,000 gallons each) located in an earthen pit near the four baghouse dust storage tanks. Waste oil is collected in drums around the facility and brought to this outdoor area. The drums are stored on the ground or on pallets without any form of secondary containment. The waste oil is then poured from the drums through a strainer and into the tanks. When the tanks are nearly full, ARMCO notifies Industrial Services (formerly known as Radium) to arrange pick-up.

Abandoned Fuel Oil Tank - According to a letter from MDNR to ARMCO dated February 24, 1989, the Corps of Engineers (COE) was working along the Blue River between the ARMCO Dam/PCB excavation and Truman Road in October 1988 when they saw an oil sheen on the river. This was traced to an abandoned fuel oil storage tank on ARMCO property. The storage tank was in service from 1951 to 1982, containing No. 6 fuel oil until 1962, and No. 2 fuel oil after that date. Analyses performed for the COE indicated the hydrocarbon contamination to be mostly No. 6 fuel oil. Further investigation by the Corps and by ARMCO's contractor, REMCOR, indicated that the area around this tank is indeed contaminated with hydrocarbons. According to the Remcor Preliminary Site Investigation of June 1989, 1.5 feet of oil saturated soil was encountered at one test boring location. REMCOR also determined there to be approximately 1.5 inches of free product floating on the groundwater at this site. Remcor suggested "historic spillage of petroleum products" as the origin of the contamination. According to Mr. Dan Jones of the COE (personal communication, May 3, 1991), the Corps is planning to clean up the area along the river. Mr. Jones understood that ARMCO was to put in a series of recovery wells to remediate this site. According to Mr. Eric Sappington of MDNR's Laboratory Services Program (LSP) (personal communication, May 13, 1991), MDNR records include a letter from Mr. Greg Schoen of MDNR's LSP to Mr. Charles Fillinger of ARMCO dated December 8, 1989, approving the work plan for hydrocarbon removal at the site. The letter also states that pumping and recovery data should be sent to the MDNR Regional Office in Independence, Missouri; however, MDNR files in Independence did not include this letter or any remediation data. It is uncertain whether remediation is in progress at the site.

VSI Comments: A six inch recovery well and two adjacent auxiliary wells have been installed on the ARMCO property between the tank and the Blue River. According to Mr. Fillinger, the wells were installed about a year ago, and he believed they were approximately 15 feet deep. Due to problems with the recovery system, the recovery well had only been pumping since February 1991. Pumping data for the first quarter had been submitted to the MDNR with their NPDES required data. The water from the recovery well is piped to the mill ponds and, according to Mr. Fillinger, no oil had been found in this water. This supposition is based on the fact that no detectable oil layer has been found in the downgradient piezometer during quarterly measurement readings. ARMCO did not have any information as to the depth or screened intervals of these wells, or how the recovery system worked; thus, the validity of this statement could not be evaluated. Mr. Fillinger said that in the fall of 1991, ARMCO, the COE, MDNR, and the City of Kansas City would be evaluating the remediation project; if no oil had been recovered, the project would probably be stopped. He did not believe that the COE or the City was planning to remediate the City's property along the Blue River.

Fuel Oil Storage Tank - It should be noted that Tank No. 4 located with the Baghouse Dust Storage Tanks contains fuel oil and is not under RCRA's mandate. Tanks 1, 2, 3, and 5 were formerly used for storage of fuel oil, and according to MDNR records will be converted back to fuel oil storage.

VSI Comments: According to Mr. Fillinger, all four baghouse dust tanks will not be converted back to fuel oil storage. It is likely that one or two will be cut up and used as scrap in the electric arc furnaces.

Underground Storage Tanks - According to Mr. Jim Harris (personal communication, May 6, 1991 and May 10, 1991), MDNR Water Pollution Control records indicate that three underground storage tanks were recorded for ARMCO. Tank 1 was a 10,000 gallon gasoline tank, Tank 2 was a 10,000 gallon lube oil tank, and Tank 3 was a 10,000 gallon hydraulic fuel ("Mobil Gear 6-34 Pyrogard D Invert Emulsion"). Their records indicate that ARMCO notified them on February 22, 1988 that use of the gasoline tank was discontinued in 1987 and the tank had been removed. Mr. Harris stated that another letter from ARMCO dated December 23, 1988 notified MDNR that Tanks 2 and 3 had been removed on December 19, 1988. A third letter from ARMCO dated November 6, 1989 stated that two, 550 gallon tanks had been closed as of December 1, 1988. The MDNR had not been notified of the existence of the two 550 gallon tanks, and their contents were unknown. The MDNR laboratory had no record of any spills from these tanks. No records were found of soil sampling at the time of the removal.

VSI Comments: All USTs have been removed at ARMCO and replaced with above ground storage tanks. More USTs existed than were registered with the MDNR, but open access was not allowed to the UST files during the VSI to determine the number or locations of these tanks. The 10,000 gallon unleaded gasoline tank had been located by the Blue River east of the Wilson Road bridge. The tank had leaked, but apparently no samples were collected to ensure clean closure. The lube oil and hydraulic fluid oil tanks had been located on the north side of the No. 2 Melt Shop by the 19-Inch Mill. Apparently no soil samples were collected when these tanks were removed either. Mr. Fillinger could not find any reference to the 550 gallon tanks mentioned by the MDNR.

Oil Quench Baths

Mr. Richard Laux of MDNR Water Pollution (personal communication, May 13, 1991) stated that at one time ARMCO had used oil baths to cool the newly formed steel in place of the water baths presently used. When the hot steel was placed in the bath, the oil overflowed and went into the storm sewers. It is uncertain how long this process continued or whether the oil might have contained PCBs.

> VSI Comments: Mr. Fillinger believed that these must have been at the former Bolt and Nut Plant on Winchester Road; therefore, this area could not be viewed as it is no longer owned by ARMCO.

HAZARDOUS WASTE STORAGE AREAS

Bar Joist Building Hazardous Waste Storage Area - According to the PCPA, this drum storage area was located at the north end of the Bar Joist Building from 1982 to 1984. Per the 1982 PCB Inspection Report, at that time (May 1982) there were 105, 55-gallon drums of paint sludge and five, 55-gallon drums of waste trichloroethylene (TCE) stored on pallets. The August 1982 CEI also mentions the five drums of TCE and 31 barrels of caustic sludge. According to the April 1, 1983 CEI, there were no hazardous wastes stored in this area. At that time, there were 32 empty drums stored in the Bar Joist Building for use in the event they were ever needed. According to the 1987 Post-Closure Permit Application, nine drums (contents not given) were stored there less than 90 days in 1987.

> VSI Comments: Nothing remains of the SWMU but a hazardous waste sign to mark its former location. No noticeable signs of leakage were present in the immediate area. Some oil staining of the dirt floor was apparent in the building, but may not have been associated with the SWMU.

Outside Hazardous Waste Storage Area - The August 1982 CEI mentions an outside storage area of approximately 130 drums of caustic sludge. The location of this outside storage area was not identified, but it was mentioned in context with the storage area at the Bar Joist Building. A handwritten note in the U.S. EPA files regarding the Settlement Conference held with ARMCO on January 14, 1983, refers to "caustic waste - drums on hill", and may be an indication of the location of this storage area. The 1982 CEI mentions that 48 of these drums were open, presumably for separation of the liquid fraction into closed drums. The report stated that the drums had been stored there for more than 90 days, and were to be moved to an inside storage area.

> VSI Comments: The location of this storage area could not be determined. Mr. Fillinger had not been aware of this storage area, but assumed that it must have been on the hill where the two tractor sheds are located. No obvious signs mark its location.

Tractor Shed Alkaline Storage - According to the 1982 PCB Inspection Report, 20 open drums of alkaline cleaner were being stored here. ARMCO was considering using the alkaline cleaner for neutralizing acid in the Wire Rope Division. The report also noted that ARMCO had two, 55-gallon drums of phosphoric acid cleaner on site (no location specified), but these were not considered to be "waste".

VSI Comments: The tractor shed no longer contains drums of alkaline cleaner; however, the shed did contain approximately two dozen other drums. Many of these were empty, others contained either roofing tar or degreaser concentrate.

Boiler Furnace Area - Per the December 1982 "Complaint, Compliance Order and Notice of Opportunity for Hearing" an inspection of Union Wire Rope (UWR) on August 27, 1982 found that UWR was sending approximately 50 gallons per month of waste 1,1,1-Trichloroethane (TCA) to ARMCO to be burned in the boiler furnace. When ARMCO met with the U.S. EPA for the Settlement Conference on January 14, 1983, they stated that this practice had been halted. The April 1, 1983 CEI states that TCA was no longer being received from Union Wire Rope. The report also states that "the boiler furnace was fed with No. 6 oil when waste oil and solvents were mixed with the fuel oil. The hopper used for dumping in waste oil had no roof, and some water could get in the system even if valves were closed." At the time, the area was described as containing about fifty 55-gallon drums; however, none were identified as hazardous waste.

VSI Comments: Neither Mr. Fillinger nor the boiler operators were aware of TCA having been added to the fuel oil. The boiler operator said that it must have been added to the fuel oil at the storage tanks, as there is no way to introduce it at the boilers.

PCBs

Main Substation Storage Area - According to the 1982 PCB Inspection Report, PCB oil was used in a number of transformers and capacitors on the site. There was a PCB storage-for-disposal area at the main substation. There were some empty drums, and two drums containing PCB (oil) for topping transformers. The PCB Inspection Report refers to a discussion on spill cleanup procedures with two ARMCO employees, and mentions "the only [PCB] spill they had was in 1960". No information was given as to the location or quantity of this spill.

VSI Comments: This secured area presently contains five drums of used, non-PCB transformer oil. This part of the plant is within the 100 year flood plain of the Blue River. The drums were stored on shelves several feet above the ground, which might have been sufficient to raise them above flood waters. This general area of the plant was flooded in May 1990; however, according to Mr. Fillinger, water did not enter this storage area. Neither Mr. Fillinger nor the electrician who showed us the former PCB storage were aware of the 1960 PCB spill.

Tractor Shed Storage Area - The 1982 PCB Report also states that four transformers containing PCB-oil were stored in the tractor shed. The 1987 Post-Closure Permit Application states that this area has been in use since 1983 for storage of waste PCBs, capacitors, and transformers pending disposal.

VSI Comments: There are actually two tractor sheds. The long tractor shed contains six PCB transformers in storage. The transformers were within a concrete secondary containment berm that was approximately two feet deep. This shed also contained approximately two dozen drums. Many of the drums were empty; others contained roofing tar or degreaser

concentrate. The small tractor shed contained four drums of liquid PCBs; one drum labeled as solid PCBs, which Mr. Fillinger thought was probably a PCB capacitor; and a drum of flush (solvent). The drums were within metal containment pans having approximately three inch sides. The PCB drums were within a fenced, but unlocked, area of the small shed.

No. 1 Melt Shop - In 1982, according to the PCB Report, there were 59 capacitors containing PCB oil stored here. There was also a "large bank" of PCB capacitors in service at this location. (The No. 1 Melt shop ceased operation in 1988.)

VSI Comments: According to Mr. Fillinger, all of the PCB capacitors have been removed from the No. 1 Melt Shop.

ARMCO Dam/PCB Excavation - This area is located along the Blue River, adjacent to ARMCO, approximately one-half mile downstream of Independence Avenue. It extends from the ARMCO Dam (also known as the Guinotte Dam) approximately 200 feet upstream to a sheet pile weir. PCB contaminated sediments were discovered and later excavated by the COE. No source for the PCB contamination could be determined. A handwritten note in the MDNR file also mentioned that in February 1976, PCBs (approximately 200 ppm) were found in Blue River sediments "downstream of the Sheffield Dam (ARMCO's most downstream head dam)".

VSI Comments: The ARMCO dam by the PCB excavation area is the Sheffield Dam. The Guinotte Dam is further downstream.

Pydraul Drums - A handwritten note in MDNR files mentioned that in September 1978, barrels of Pydraul (PCB based hydraulic fluid) were observed on ARMCO property during the Blue River Survey. No location or number of drums was given.

VSI Comments: Mr. Fillinger had no idea where these drums might have been located.

NPDES PERMITTED OUTFALLS

006 - According to the 1988 Modification to the NPDES Permit, this outfall contains treated wastewater from wiremill cleaning and coating processes. ARMCO stated in 1986, and again in a letter dated March 29, 1989, that this outfall does not contain treated wastewater but only "storm water, groundwater, steam condensate, and winter discharge of City water for freeze protection". ARMCO has been cited repeatedly by MDNR for noncompliance for the pH level of the water from this outfall. Several spills of sulfuric acid subsequently neutralized with lime or soda ash impacted the pH levels on the water at this outfall. The most severe spill mentioned in the MDNR files occurred on September 27, 1987, when between "1,000 and 10,000 pounds" (80,000 gallons per U.S. EPA's "Incident Notification Report") of sulfuric acid spilled when a line in a rod cleaning facility ruptured. These two numbers represent vastly different quantities and it is unknown which may be correct. The U.S. EPA was notified and dispatched the Technical Assistance Team (TAT) from Ecology and Environment (E&E). ARMCO was attempting to neutralize the acid, but the pH was still approximately 2.0 when E&E tested the water at outfall 006. ARMCO was placed under an Abatement Order by MDNR for these chronic violations in 1988. MDNR records contain letters from ARMCO stating that improvements have been made to eliminate the problems with this outfall.

VSI Comments: This outfall has been relocated further upstream of the Sheffield Dam. The pickle liquor process, which had been the source for previous sulfuric acid spills, is no longer active.

042 - Per the 1988 Modification, this outfall consists of "blowdown from [the] central settling pond for recirculation of hot steel mill wastewater. According to a letter from ARMCO to the MDNR dated July 7, 1990, groundwater treated through an oil/water separator should be added to the list of sources for this outfall. According to Mr. Eric Sappington of MDNR LSP (personal communication, May 13, 1991), their records contain a letter from MDNR dated December 20, 1990 agreeing to the addition of treated groundwater in this outfall.

VSI Comments: This outfall receives overflow from the two mill ponds. The water goes normally though an oil skimmer by the overflow for each pond, but the skimmer on Pond No. 1 was not operating during the VSI. The correspondence regarding the "treated groundwater" was rather confusing, and could be misinterpreted. The letter from the MDNR to ARMCO dated December 20, 1989, states: "It is understood that groundwater will be pretreated via an oil/water separator prior to discharge to the #042 treatment facility...". If the "treatment facility" is the mill ponds, then the water is not being *pretreated* prior to discharge into the mill ponds. It is being treated through the oil skimmer in the mill ponds.

004, 007, 009, 011, 015, 016, 020, 024, 026, 030 - According to the Permit, these outfalls are sources from once-through cooling water, storm water, groundwater, and steam condensate.

VSI Comments: It was not deemed necessary to view any of these outfalls.

002, 008, 010*, 012, 013*, 014*, 017, 018*, 019, 021*, 022, 023, 025, 027, 031, 043, 044 - According to the 1988 Permit, these outfalls consist of storm water flow only. In October 1990, ARMCO requested that the five asterisked outfalls be eliminated from the permit as they no longer existed. The MDNR files in Independence did not contain a more recent permit than the 1988 modification. However, according to Mr. Richard Laux (personal communication, May 13, 1991), the most recent permit was issued in January 1990, and this was modified in December 1990.

VSI Comments: It was not deemed necessary to view any of these outfalls.

046 - ARMCO requested that this new outfall (located by the railroad tunnel) and consisting of groundwater and storm water be added to the permit in July 1989.

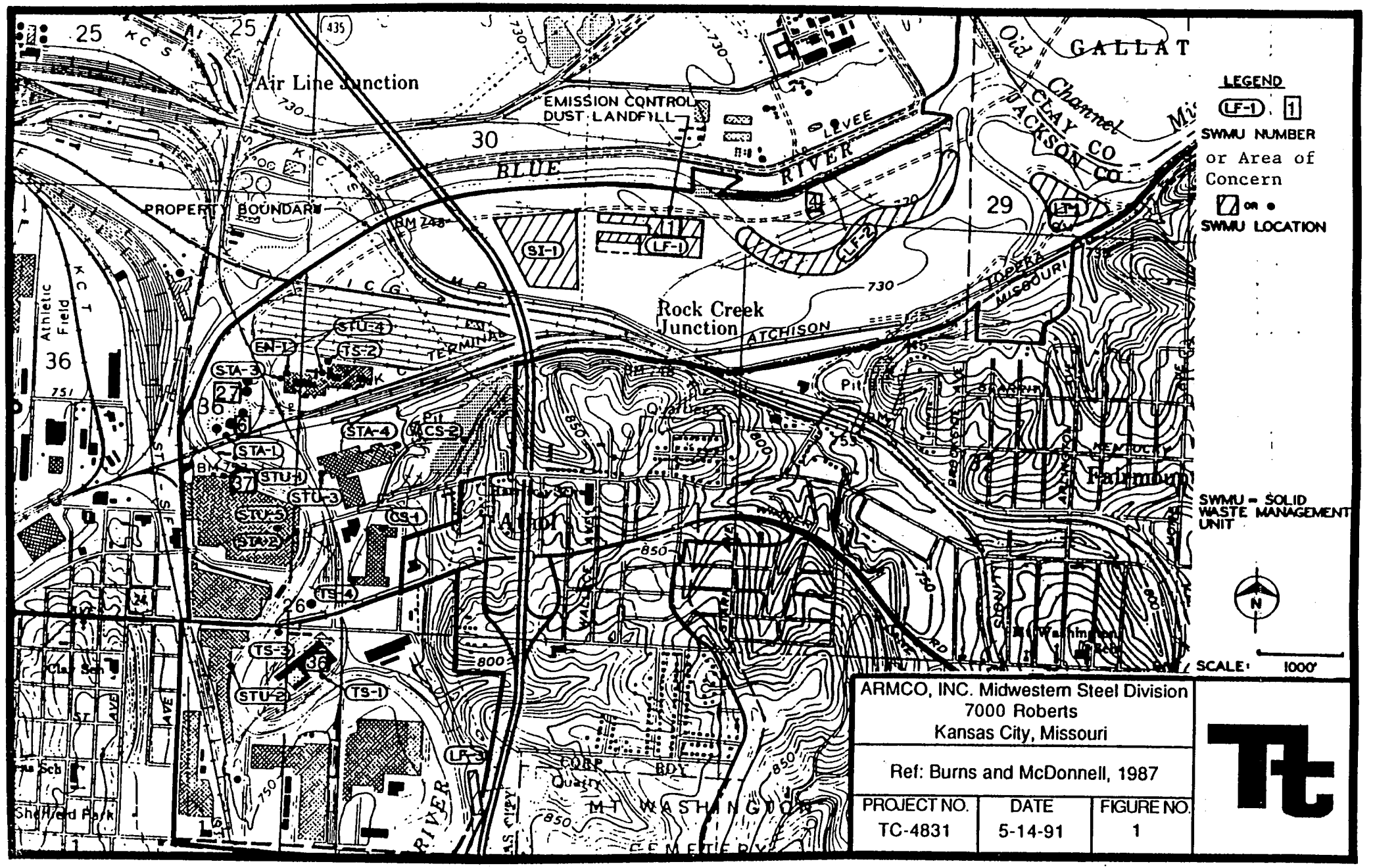
VSI Comments: The railroad tunnel and dewatering pumps were viewed. The water is discharged onto the ground approximately 80 feet from the pump site. It is uncertain whether the pumping necessary to keep the tunnel dewatered might cause the water in the adjacent mill ponds to be pulled down through the clay liner of the ponds. Sampling the water at this outfall was suggested to Mr. Fillinger by Mr. Dolan (MDNR).

Other outfalls have been removed from the permit over the years as the property has been sold or the outfalls have been eliminated. A number of outfalls were transferred to Union Wire Rope when it was assigned a separate facility identification number.

Solid Waste Management Units (SWMUs) and Areas of Concern at ARMCO, Inc. Midwestern Steel Division.
(Revised Version of the List Prepared for Site Visit.)

No.	B&M ID.	Solid Waste Management Units	Reason for Concern
1		RCRA Landfill	Baghouse Dust (Pb, Cr, Cd)
2	LF-2	Old Blue River "W" Landfill	Baghouse Dust (Pb, Cr, Cd)
3	LF-3	South of Bar Fab Landfill	Baghouse Dust (Pb, Cr, Cd)
4		1987 Waste Pile	Baghouse Dust (Pb, Cr, Cd)
5	LF-1	Plant Rubble Landfill	(Non-hazardous Per PCPA)
6		RCRA Permitted Baghouse Dust Storage Tanks	Baghouse Dust (Pb, Cr, Cd)
7	TS-1	No. 1 Melt Shop Baghouse Dust Tank	Baghouse Dust (Pb, Cr, Cd)
8	TS-2	No. 2 Melt Shop Baghouse Dust Tank	Baghouse Dust (Pb, Cr, Cd)
9	TS-3	No. 1 Melt Shop Canopy Baghouse Dust Conveyor	Baghouse Dust (Pb, Cr, Cd)
10	TS-4	Dust Railcar Loading Area	Baghouse Dust (Pb, Cr, Cd)
11		Day Tank (Rail Load Hopper)	Baghouse Dust (Pb, Cr, Cd)
12	LT-1	AMOCO Landfarm	Petroleum Waste
13	STA-2	Pickle Liquor	Sulfuric Acid (Metals)
14	STA-3	Etch Lab Holding Tank	Hydrochloric Acid, Sodium Hydroxide
15	STA-4	Roll Shop Roll Cleaning Tank	Phosphoric Acid
16	STU-1	Blooming Mill Scale Pit	Residual Lubricating Oil
17	STU-2	Twelve Inch (12") Mill Scale Pit	Residual Lubricating Oil
18	STU-3	Rod Mill Scale Pit	Residual Lubricating Oil
19	STU-4	No. 2 Melt Shop Scale Pit	Residual Lubricating Oil
20	STU-5	Wire Mill Rinsewater Neutralization Tank	Hydrochloric Acid
21	EN-1	Etch Lab Mixing Tank	Hydrochloric Acid, Sodium Hydroxide
22	SI-1	Mill Ponds	Oil/Grease/Solvent
23*		Electroplating Sludge Pond	(Exempt According to EPA Records)
24		Safety Kleen Units (78 around facility)	Solvents
25	STA-1	Waste Hydraulic and Lubricating Oil Storage	Waste Oil
26		Abandoned Fuel Oil Tank	No. 2 and No. 6 Fuel Oil
27		Fuel Oil Storage Tanks	Oil Storage
28		Underground Storage Tanks	Gasoline, Lube Oil, and Hydraulic Fluid
29		Oil Quench Baths	Hydrocarbons
30	CS-1	Bar Joist Building Hazardous Waste Storage Area	TCE, Caustic Sludge, Paint Sludge
31		Outside Hazardous Waste Storage Area	Caustic Sludge
32		Tractor Shed Alkaline Storage	Alkaline Cleaner
33		Boiler Furnace Area	TCA
34		Main Substation Storage Area	PCBs
35	CS-2	Tractor Shed Storage Area	PCBs
36		No. 1 Melt Shop	PCBs
37		ARMCO Dam/PCB Excavation	PCBs
38		Pydraul Drums	PCBs
39		Outfall 006	Sulfuric Acid (Metals)
40		Outfall 042	Hydrocarbons
41		Outfalls 004, 007, 009, 011, 015, 016, 020, 024, 026, 030	(Cooling/Storm/Groundwater)
42		Outfalls 002, 008, 010, 012, 013, 014, 017, 018, 019 021, 022, 023, 025, 027, 031, 043, 044	(Cooling/Storm/Groundwater)
43		Outfall 046	Stormwater and Groundwater

B&M ID. = Burns & McDonnell identification used in Post Closure Permit Application
LF = Landfill
SI = Surface Impoundment
LT = Landfarm
STA = Storage Tank, Above Ground
STU = Storage tank, Underground
CS = Container Storage Area
EN = Elementary Neutralization Unit
TS = Transfer Station
*Electroplating sludge was stated to be derived from zinc plating (segregated basis) on carbon steel, and was therefore exempt per 40 CFR 261.31 (Ref. Nos. 8, 9, and 26).



ARMCO, INC. Midwestern Steel Division 7000 Roberts Kansas City, Missouri		
Ref: Burns and McDonnell, 1987		
PROJECT NO. TC-4831	DATE 5-14-91	FIGURE NO. 1

APPENDIX D

Analytical Data Tables

Results of Metals EP Toxicity Analyses on Slag and Baghouse Dust Samples from Three Sampling Events at ARMCO.

Sample	EP Tox.	Jun. 1982	Jun. 1982	Jun. 1982	Jun. 1982	Feb. 1982	Feb. 1982	Jun. 1983	Jun. 1983
	Max. Conc.	82-5171	82-5172	82-5179	82-5180	No. 1 M.S.	No. 2 M.S.	No. 1 M.S.	No. 2 M.S.
Media	ug/L	Slag	Slag	Bag Dust	Bag Dust	Bag Dust	Bag Dust	Bag Dust	Bag Dust
Concentration (ug/L)									
Arsenic	5,000	<5	<5	16	8	5	5		
Cadmium	1,000	<20	<20	7890	6250	12,400	1,140	6,800	20
Chromium	5,000	30	20	710	380	20	20	30	200
Lead	5,000	240	210	190,000	160,000	26,000	28,400	112,000	117,000
Mercury	200	<0.5	<0.5	<0.5	1.4	2	4.3		
Selenium	1,000	35	22	33	23	10	8		
Silver	5,000	<20	<20	<20	<20	30	30		
Barium	100,000	No Data	No Data	<5,000	<5,000	30	80		

Results on Metals TCLP Analysis on ARMCO Baghouse Dust Samples, March 1, 1990.

Sample	TCLP	No. 2 M.S.
Media	Max. Conc.	Bag Dust
Concentration ug/L		
Cadmium	1,000	29
Chromium	5,000	<250
Lead	5,000	123,000

Note: The June 1982 samples were collected by MDNR for analysis by the MDNR Laboratory Services Program.
The February 1982, June 1983, and March 1990 samples were collected and analyzed by ARMCO.

Kansas City, Missouri
March 1, 1990

TO: C. J. Fillinger
RCRA Coordinator
Works Engineering

FROM: K. L. Clond

SUBJECT: Leachate Test of Electric Furnace Baghouse Dust

A TEP leachate test was run on baghouse dust from #2 Melt Shop. The results are expressed in mg/L.

The results are as follows:

	Non-hazardous	Tested
Cr	<5.0	<0.25
Pb	<5.0	123.
Cd	<1.0	0.029

Kenneth L. Clond

Kenneth L. Clond
Associate Spectochemist

ARMCO INC.
GENERAL OFFICES · MIDDLETOWN, OHIO 45043

February 8, 1982

Mr. Gil Eaton
Rob Smith Associates, Inc.
1402 Conshohocken Road
Norristown, PA 19401

re: Kansas City-Electric Furnace
Dust-Leachate Analysis

Dear Gil:

Armco Research ran leach tests on the Kansas City Electric Furnace Baghouse dust from both #1 and #2 shops. The following is the data from the tests:

Parameter	Analysis, Mg/l	
	#1 Shop	#2 Shop
Arsenic	0.005	0.005
Barium	0.03	0.08
Cadmium	12.4	1.14
Chromium (Total)	0.02	0.02
Lead	26.0	28.4
Mercury	0.002	0.0043
Selenium	0.01	0.008
Silver	0.03	0.03

Please let me know if you have any questions.

Harold E. McCune

Harold E. McCune
Senior Engineer
Environmental Engineering

HEMc:mg

cc: D. Allison
J. Barker
R. Davis

ARMCO

RECEIVED
JUN 21 1983
WASTE
MANAGEMENT PROGRAM

Kansas City Works
June 15, 1983

TO: Leland H. Scott
RCRA Coordinator
Works Engineering

FROM: J. C. Hayslip

SUBJECT: Leachate Test of Electric Furnace Dust

A T.E.P. Leachate test was run on baghouse dust from both the #1 and #2 Melt Shops. The results are expressed in mg/L. The results are as follows:

	#1 Melt Shop	#2 Melt Shop
Cr	.03	.2
Pb	112	117
Cd	6.8	.02

J. C. Hayslip

JCH/bb

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
LABORATORY SERVICES PROGRAM

Hazardous Waste Monitoring Report
Armco, Inc.
June 2, 1982

DEPARTMENT OF NATURAL RESOURCES
Div. of Environmental Quality
Kansas City Regional Office

AUG 23 1982

WPCP APCP R.A.
PDWSP SWMP CLER.
FILE #

INTRODUCTION

At the request of the Waste Management Program a monitoring survey was conducted of Armco, Inc. in Jackson County at Kansas City, Missouri. Sampling during the period from 1300 to 1400 June 2, 1982 was conducted by Larry Alderson of the Laboratory Services Program, accompanied by Gene Holcomb and Richard Nixon of the Kansas City Regional Office.

METHODS

The following four samples were collected of waste located on Armco, Inc. property:

1) 82-5171 - slag
2) 82-5172 - slag
3) 82-5179 - Bag dust recently dumped
4) 82-5180 - Bag dust past dumpings

All samples were carried to the Divisional Laboratory in Jefferson City for analyses of E.P. toxicity metals.

Procedures used in the analyses were in accordance with methods outlined in the Missouri Hazardous Waste Management Commission Regulation 10 CSR 25-4.010 (5).

RESULTS

	Sample Number	Date Collected	E.P. Toxicity Metals (ug/l) As	Cd	Cr	Pb	Hg	Se	Ag	Ba
Slag	82-5171	6-2-82	<5	<20	30	240	<0.5	35	<20	--
	82-5172	6-2-82	<5	<20	20	210	<0.5	22	<20	--
ag Dust	82-5179	6-2-82	16	7890	710	190,000	<0.5	33	<20	<5000
	82-5180	6-2-82	8	6250	380	160,000	1.4	23	<20	< 5000

Submitted by Larry Alderson

Larry Alderson, Environmental Specialist II
Laboratory Services Program

Date August 17, 1982

Approved by James H. Long

James H. Long, Director
Laboratory Services Program

cc: Dave Bedan, Waste Management Program
Bill Hills, Regional Administrator, Kansas City Regional Office

LA/sk

ARMCO GROUNDWATER SAMPLE RESULTS FOR DISSOLVED AND TOTAL METALS

Date Sampled	Well Number	Total Cd (mg/L)	Dissolved Cd (mg/L)	Total Pb (mg/L)	Dissolved Pb (mg/L)	Total Cr (mg/L)	Dissolved Cr (mg/L)
5/8/89	9		ND (0.005)		ND(0.005)		ND (0.01)
3/22/89	2	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.010)	ND (0.010)
	2 (1)	<0.002	<0.002	0.0076	<0.005 avg.	0.0087	0.0073
	3	ND (0.005)	ND (0.005)	0.035	ND (0.005)	ND (0.010)	ND (0.010)
	3 (1)	<0.002	<0.002	0.047	<0.005 avg.	0.014	0.0055
	6	ND (0.005)	ND (0.005)	0.049	ND (0.005)	ND (0.010)	ND (0.010)
	6 (1)	<0.002	<0.002	0.038	<0.005 avg.	0.058	0.012 avg.
	9	ND (0.005)	ND (0.005)	ND(0.005)	ND (0.005)	ND (0.010)	ND (0.010)
	9 (1)	<0.002	<0.002	0.0054	<0.005 avg.	0.017	<0.005
	10	ND (0.005)	ND (0.005)	ND(0.005)	ND (0.005)	ND (0.010)	ND (0.010)
	10 (1)	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005
10/4/88	2	ND (0.005)	ND (0.005)	0.014	ND (0.005)	ND (0.03)	ND (0.03)
	3	ND (0.005)	ND (0.005)	0.040	ND (0.005)	ND (0.03)	ND (0.03)
	6	ND (0.005)	ND (0.005)	0.018	ND (0.005)	ND (0.03)	ND (0.03)
	9	ND (0.005)	ND (0.005)	0.014	ND (0.005)	ND (0.03)	ND (0.03)
	10	ND (0.005)	ND (0.005)	ND(0.005)	ND (0.005)	ND (0.03)	ND (0.03)
4/8/88	6	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.03)	ND (0.03)
	10	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.03)	ND (0.03)
	15	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.03)	ND (0.03)
4/7/88	2	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.03)	ND (0.03)
	9	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.03)	ND (0.03)
4/6/88	3	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.03)	ND (0.03)
	7	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.03)	ND (0.03)
1/28/87	10	<0.005		<0.01		<0.010	
1/27/87	2	<0.005		0.019/0.026 (2)		<0.010/0.010 (2)	
	2 (1)		<0.002		<0.005		<0.005
	3	<0.005		0.020/0.029		<0.010	

(1) Split samples collected by MDNR

(2) Min/Max values reported for this particular sampling event

ARMCO GROUNDWATER SAMPLE RESULTS FOR DISSOLVED AND TOTAL METALS

Date Sampled	Well Number	Total Cd (mg/L)	Dissolved Cd (mg/L)	Total Pb (mg/L)	Dissolved Pb (mg/L)	Total Cr (mg/L)	Dissolved Cr (mg/L)
1/27/87	3 (1)		<0.002		<0.005		<0.005
	6	<0.005		0.021/0.029		<0.010	
	7	<0.005		0.030/0.034		0.010/0.011	
	7 (1)		<0.002		<0.005		<0.005
	9	<0.005		<0.01		<0.010	
	9(1)		<0.002		<0.005		<0.005
7/25/86	2		<0.005		0.018/0.021		<0.01
	3		<0.005		0.014/0.019		<0.01
	5		<0.005		0.015/0.018		<0.01
	6		<0.005		0.016/0.019		<0.01
	7		<0.005		0.023/0.029		<0.01
	8		<0.005		0.010/0.012		<0.01
	9		<0.005		0.019/0.021		<0.01
	10		<0.005		0.013/0.014		<0.01
4/29/86	2	<0.005		<0.010/0.011		<0.010/0.014	
	3	<0.005		<0.010		<0.010/0.010	
	5	<0.005		<0.010/0.010		<0.010/0.015	
	6	<0.005		<0.010		<0.010	
	7	<0.005		<0.010/0.010		<0.010/0.015	
	8	<0.005		<0.010		<0.010	
	9	<0.005		<0.010/0.012		<0.010/0.015	
	10	<0.005		<0.010		<0.010/0.011	
1/20/86	2		<0.005		0.017/0.026		<0.01
	3		<0.005				
	5		<0.005		0.015/0.020		<0.01
	6		<0.005		0.010/0.014		<0.01
	7		<0.005		0.014/0.019		<0.01/0.013

(1) Split samples collected by MDNR

(2) Min/Max values reported for this particular sampling event

ARMCO GROUNDWATER SAMPLE RESULTS FOR DISSOLVED AND TOTAL METALS

Date Sampled	Well Number	Total Cd (mg/L)	Dissolved Cd (mg/L)	Total Pb (mg/L)	Dissolved Pb (mg/L)	Total Cr (mg/L)	Dissolved Cr (mg/L)
1/20/86	8		<0.005		<0.01/0.012		<0.01
	9		<0.005		0.013/0.021		<0.01
	10		<0.005		<0.01		<0.01
10/30/85	6		<0.005		0.014/0.019		<0.01
	8		<0.005		<0.01/0.012		<0.01
	9		<0.005		<0.01		<0.01
	10		<0.005		<0.01		<0.01
10/29/85	2		<0.005		<0.01/0.013		<0.01
	3		<0.005		0.015/0.021		<0.01/0.011
	5		<0.005		0.010/0.017		<0.01
	7		<0.005		<0.01/0.017		<0.01
7/31/85	2		<0.01		<0.025		<0.025
	3		<0.01		<0.025		<0.025
	5		<0.01		<0.025		<0.025
	6		<0.01		<0.025		<0.025
	7		<0.01		<0.025		<0.025
	8		<0.01		<0.025		<0.025
	9		<0.01		<0.025		<0.025
	10		<0.01		<0.025		<0.025
4/29/85	7	0.0042/0.0044		0.019/0.029		<0.010	
4/10/85	2		<0.005		<0.005		<0.01
	3		<0.005		0.015		<0.01
	5		<0.005		0.01		<0.01
	6		<0.005		0.006		<0.01
	7		<0.005		0.013		<0.01
	8		<0.005		0.008		<0.01
	9		<0.005		0.007		<0.01

(1) Split samples collected by MDNR

(2) Min/Max values reported for this particular sampling event

ARMCO GROUNDWATER SAMPLE RESULTS FOR DISSOLVED AND TOTAL METALS

Date Sampled	Well Number	Total Cd (mg/L)	Dissolved Cd (mg/L)	Total Pb (mg/L)	Dissolved Pb (mg/L)	Total Cr (mg/L)	Dissolved Cr (mg/L)
4/10/85	10		<0.005		<0.005	<0.01	
1/29/85	2	0.0033/0.0047		0.034/0.043		<0.010	
	3	0.0067/0.0077		0.059/0.065		<0.010	
	6	0.0047/0.0057		0.049/0.053		<0.010	
	7	0.0044/0.0051		0.052/0.056		<0.010	
	9	0.0030/0.0041		0.033/0.035		<0.010	
	10	0.0021/0.0026		0.026/0.032		<0.010	
10/23/84	2	<0.01		<0.025		<0.01	
	3	<0.01		<0.025		<0.01	
	10	<0.01		<0.025		<0.01	
8/15/84	2	<0.01		0.05/0.08		<0.01	
	3	<0.01		0.18/0.23		0.02	
	6	<0.01		<0.025		<0.01	
	9	<0.01		<0.025		<0.01	
	10	<0.01		<0.025		<0.01	
4/24/84	6	<0.01		<0.025		<0.01	
	10	<0.01		<0.025		<0.01	
1/26/84	2	<0.01		<0.025		<0.01	
	3	<0.01		<0.025		<0.01	
	5	<0.01		<0.025		<0.01	
	6	<0.01		<0.025		<0.01	
	9	<0.01		<0.025		<0.01	
10/27/83	2	<0.01		<0.025		<0.01	
	3	<0.01		<0.025		<0.01	
	5	<0.01		<0.025		<0.01	
	6	<0.01		<0.025/0.025		<0.01	
	9	<0.01		<0.025		<0.01	

(1) Split samples collected by MDNR

(2) Min/Max values reported for this particular sampling event

ARMCO GROUNDWATER SAMPLE RESULTS FOR DISSOLVED AND TOTAL METALS

Date Sampled	Well Number	Total Cd (mg/L)	Dissolved Cd (mg/L)	Total Pb (mg/L)	Dissolved Pb (mg/L)	Total Cr (mg/L)	Dissolved Cr (mg/L)
7/28/83	2	<0.01		<0.025		<0.01	
	3	<0.01		<0.025		<0.01	
	5	<0.01		<0.025		<0.01	
	6	<0.01		<0.025		<0.01	
	9	<0.01		<0.025		<0.01	
4/27/83	2	0.01/0.015		<0.025		<0.01	
	3	0.01/0.015		<0.025		<0.01	
	5	<0.01		<0.025		<0.01	
	9	<0.01		<0.025		<0.01	
1/10/83	1	<0.01		<0.025		<0.01	
	2	<0.01		<0.025		<0.01	
	3	<0.01		<0.025		<0.01	
	4	<0.01		<0.025		<0.01	
10/27/82	1	0.002		0.06		0.08	
	2	0.007		0.1		0.1	
	3	0.003		0.04		0.13	
	4	0.002		0.05		0.08	
9/16/82	1	0.02		0.1		0.00	
	2	0.01		0.11		0.00	
	3	0.01		0.07		0.00	
	4	0.01		0.04		0.00	
8/17/82	1	0.004		0.04		0.00	
	2	0.005		0.05		0.02	
	3	0.008		0.02		0.02	
	4	0.01		0.05		0.02	
7/19/82	1	0.00		0.02		0.00	
	2	0.00		0.02		0.00	

(1) Split samples collected by MDNR

(2) Min/Max values reported for this particular sampling event

ARMCO GROUNDWATER SAMPLE RESULTS FOR DISSOLVED AND TOTAL METALS

Date Sampled	Well Number	Total Cd (mg/L)	Dissolved Cd (mg/L)	Total Pb (mg/L)	Dissolved Pb (mg/L)	Total Cr (mg/L)	Dissolved Cr (mg/L)
7/19/82	3	0.00		0.01		0.00	
	4	0.00		0.01		0.00	
6/22/82	1	0.00		0.02		0.00	
	2	0.00		0.02		0.00	
	3	0.00		0.01		0.00	
	4	0.00		0.01		0.00	
5/18/82	1	0.00		0.02		0.00	
	2	0.00		0.02		0.00	
	3	0.00		0.02		0.00	
	4	0.00		0.02		0.00	
4/21/82	1	0.00		0.02		0.01	
	2	0.00		0.02		0.01	
	3	0.00		0.02		0.01	
	4	0.00		0.02		0.01	
3/16/82	1	0.00		0.02		0.00	
	2	0.00		0.03		0.00	
	3	0.01		0.02		0.00	
	4	0.01		0.02		0.00	
2/8/82	1	0.00		0.01		0.00	
	2	0.00		0.01		0.00	
	3	0.00		0.01		0.00	
	4	0.00		0.01		0.00	
1/5/82	1	0.00		0.01		0.01	
	2	0.00		0.01		0.01	
	3	0.00		0.01		0.01	
	4	0.00		0.01		0.01	
11/23/81	1	0.000		0.03		0.00	

(1) Split samples collected by MDNR

(2) Min/Max values reported for this particular sampling event

ARMCO GROUNDWATER SAMPLE RESULTS FOR DISSOLVED AND TOTAL METALS

Date Sampled	Well Number	Total Cd (mg/L)	Dissolved Cd (mg/L)	Total Pb (mg/L)	Dissolved Pb (mg/L)	Total Cr (mg/L)	Dissolved Cr (mg/L)
11/23/81	2	0.000		0.02		0.00	
	3	0.005		0.02		0.00	
	4	0.005		0.02		0.01	
10/22/81	1	0.00		0.03		0.01	
	2	0.00		0.02		0.01	
	3	0.006		0.02		0.01	
	4	0.00		0.02		0.01	
9/28/81	1	0.00		0.06		0.02	
	2	0.00		0.03		0.02	
	3	0.00		0.05		0.02	
	4	0.00		0.05		0.02	
8/27/81	1	0.00		0.01		0.00	
	2	0.00		0.02		0.01	
	3	0.00		0.02		0.01	
	4	0.00		0.01		0.01	
7/29/81	1	0.00		0.02		0.00	
	2	0.00		0.03		0.01	
	3	0.00		0.02		0.01	
	4	0.00		0.01		0.01	
7/14/81	1	0.00		0.02		0.01	
	2	0.00		0.02		0.01	
	3	0.00		0.02		0.01	
	4	0.00		0.02		0.01	

(1) Split samples collected by MDNR

(2) Min/Max values reported for this particular sampling event

MCLs are as follows:
Cadmium: 0.01 mg/L
Chromium: 0.05 mg/l
Lead: 0.05 mg/L

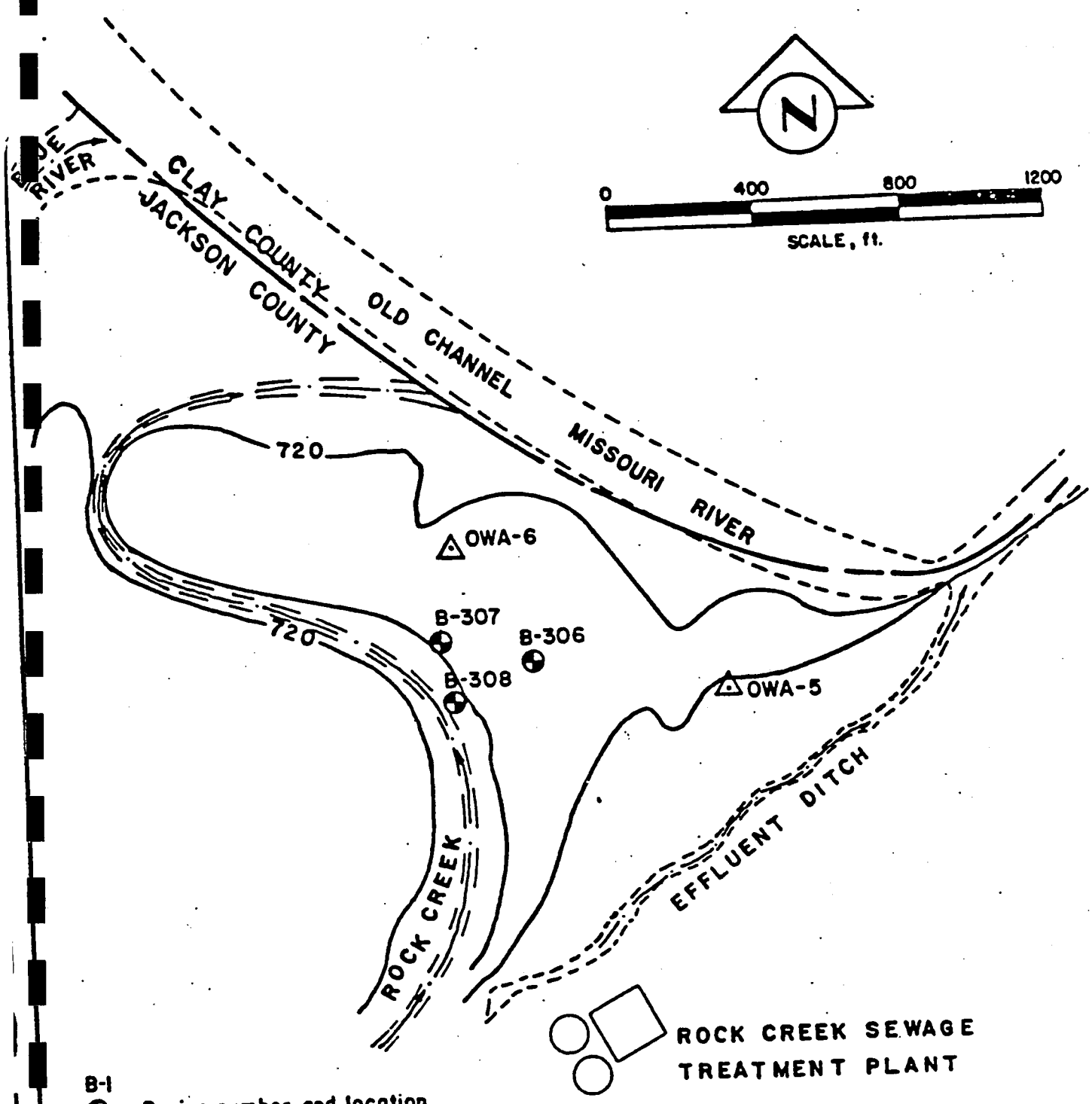
ARMCO GROUNDWATER SAMPLE RESULTS FOR RADIOACTIVE PARTICULATES

Date Sampled	Well Number	Radium	Gross Alpha Particles	Gross Beta Particles
Maximum Contaminant Levels (MCLs)		5 pCi/L	15 pCi/L	4 millirems*
10/29/85	7	<1 pCi/L	<2 pCi/L	<3 pCi/L
7/31/85	7	<1 pCi/L	<2 pCi/L	10±6 pCi/L
4/29/85	7	<1 pCi/L	<2 pCi/L	2±2 pCi/L
10/23/84	10	<1 pCi/L	<2 pCi/L	6±2 pCi/L
8/15/84	10	<1 pCi/L	<2 pCi/L	<3 pCi/L
4/24/84	6	<1 pCi/L	<2 pCi/L	7±2 pCi/L
	10	<1 pCi/L	18±5 pCi/L	12±2 pCi/L
4/5/84	2	20±3 pCi/L	92±29 pCi/L	43±7 pCi/L
1/26/84	3	10±2 pCi/L	9±7 pCi/L	31±6 pCi/L
	5	<1 pCi/L	9±6 pCi/L	10±5 pCi/L
	6	4±2 pCi/L	30±18 pCi/L	11±6 pCi/L
	9	15±3 pCi/L	17±10 pCi/L	50±7 pCi/L
10/27/83	2	<1 pCi/L	<2 pCi/L	6±2 pCi/L
	3	<1 pCi/L	31±17 pCi/L	13±3 pCi/L
	5	<1 pCi/L	9±8 pCi/L	6±2 pCi/L
	6	<1 pCi/L	7±3 pCi/L	<3 pCi/L
	9	<1 pCi/L	4±2 pCi/L	<3 pCi/L
7/28/83	2	2±1 pCi/L	<2 pCi/L	6±2 pCi/L
	3	3±1 pCi/L	<2 pCi/L	5±2 pCi/L
	5	1.4±0.9 pCi/L	<2 pCi/L	6±2 pCi/L
	6	1.1±0.8 pCi/L	18±10 pCi/L	143±3 pCi/L
	9	3±1 pCi/L	<2 pCi/L	9±2 pCi/L
4/27/83	2	2±1 pCi/L	5±3 pCi/L	10±2 pCi/L
	3	<1 pCi/L	<2 pCi/L	7±2 pCi/L
	5	<1 pCi/L	<2 pCi/L	5±2 pCi/L
	9	<1 pCi/L	<2 pCi/L	5±2 pCi/L
1/31/83	1	<2 pCi/L	<2 pCi/L	3±2 pCi/L
	2	<2 pCi/L	<2 pCi/L	4±2 pCi/L
	3	<2 pCi/L	3±2 pCi/L	8±2 pCi/L
	4	<2 pCi/L	<2 pCi/L	3±2 pCi/L

* Millirems cannot be converted to pCi/L unless the exact concentration and type of specific radionuclides present in the groundwater are known.

APPENDIX E

Amoco Landfarm



B-1
⊕ – Boring number and location

OWA-1
△ – Observation well number and location.

AMOCO OIL REFINERY SUGAR CREEK, MISSOURI SLUDGE LAND FARM — ARMCO SITE	PROJECT NO. K80-73
WOODWARD-CLYDE CONSULTANTS CONSULTING ENGINEERS, GEOLOGISTS, AND ENVIRONMENTAL SCIENTISTS CENTRAL REGION	
DRN. BY: R Lee 11-18-80 CHKD. BY: [illegible]	SITE PLAN FIG NO. 1

Document 76
Pgs. 13

Amoco Oil Company
200 East Randolph Drive
P.O. Box 6110A
Chicago, Illinois 60680

Certified Mail P-471 298 668
Return Receipt Requested

August 31, 1987

Mr. Michael J. Sanderson
RCRA Branch Chief
United States Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, Kansas 66101

Dear Mr. Sanderson:

Transmittal of Landfarm Data
Sugar Creek Former Refinery, Sugar Creek, Missouri

Knowing that you are in the process of evaluating solid waste management units at Amoco's former refinery, we are submitting at this time results (three copies) of soil chemical analyses gathered during Phase I of the Site Investigation conducted in January of 1987. A total of twenty-five borings were completed in three Solid Waste Management Units (SWMUs); the inactive sludge landfarm, the filter solids landfarm, and the landfarm located on adjacent property owned by Armco Steel. This submittal is part of our on-going program to characterize regulated facilities. The information will also be included in a more comprehensive Report on Solid Waste Management Units, as part of the Amoco Facility Investigation Program.

Two sets of analytical data are enclosed. The first set of tables presents the results of chemical analyses on certain samples from the soil borings, per the Site Investigation Work Plan, submitted February 9, 1987. The second set of tables presents the results of the Priority Pollutant analyses for Volatile Organic Compounds (VOCs) and Base Neutral, Acid Extractable Compounds (BNAs). A list of abbreviations accompanies the data tables for reference.

The geology of the landfarm areas was discussed in our report, Refinery-Wide Geology, Hydrology, and Groundwater Quality Investigation dated May 29, 1987. Volume II, Drawing 2A, shows the locations of the borings drilled in the filter solids landfarm and the inactive sludge landfarm. Locations for the borings advanced in the landfarm on nearby property owned by Armco Steel is shown in the figure provided herein. Volume III, Appendix A, includes the boring logs for all borings in the SWMUs (PB31-PB61).

Three copies of this report are also being sent to Mr. Nicholas A. DiPasquale, Program Director, Waste Management Program, Missouri Department of Natural Resources (MDNR).

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RCRA Branch

Please contact Ron Ginson at (312) 856-7834 if there are any questions concerning this submittal.
Sincerely,

J. G. Huddle
Director, Environmental
Control and Planning
MC 1203

RWG/rwg

Attachment

Certified Mail P-471 298 669
Return Receipt Requested
N. A. DiPasquale, MDNR

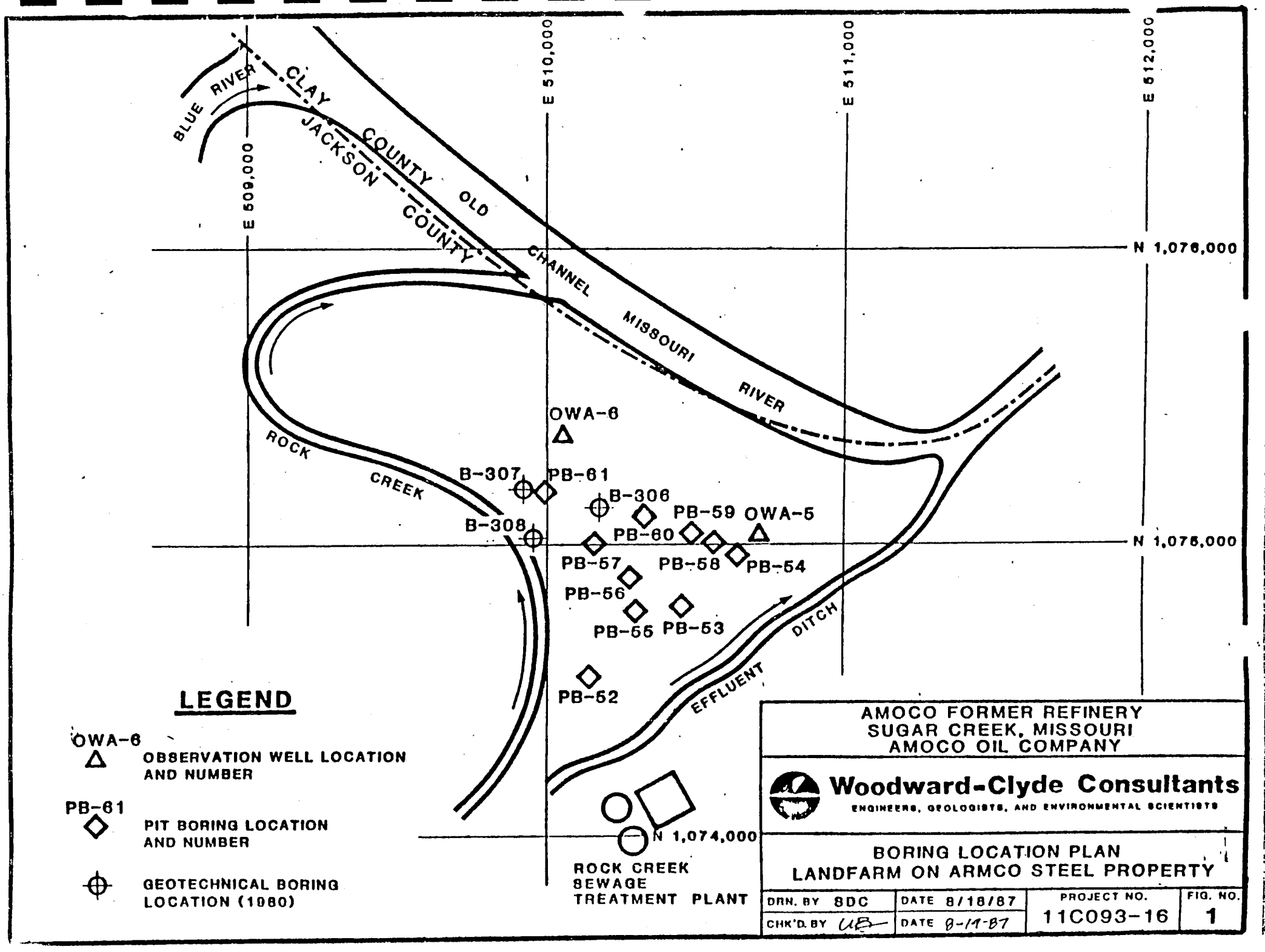
SUMMARY OF CHEMICAL ANALYSIS RESULTS

PB31 through PB61

FILTER SOLIDS LANDFARM

INACTIVE SLUDGE LANDFARM

LANDFARM LOCATED ON NEARBY PROPERTY OWNED BY ARMCO STEEL


BLUE RIVER
CLAY COUNTY
JACKSON COUNTY
OLD CHANNEL
MISSOURI RIVER
ROCK CREEK
EFFLUENT DITCH
E 509,000
E 510,000
E 511,000
E 512,000
N 1,076,000
N 1,075,000
N 1,074,000
OWA-6
B-307
PB-61
B-306
PB-59
OWA-5
B-308
PB-60
PB-57
PB-58
PB-54
PB-56
PB-55
PB-53
PB-52
ROCK CREEK SEWAGE TREATMENT PLANT
LEGEND
OWA-6
OBSERVATION WELL LOCATION AND NUMBER
PB-61
PIT BORING LOCATION AND NUMBER
GEOTECHNICAL BORING LOCATION (1980)
AMOCO FORMER REFINERY
SUGAR CREEK, MISSOURI
AMOCO OIL COMPANY
Woodward-Clyde Consultants
ENGINEERS, GEOLOGISTS, AND ENVIRONMENTAL SCIENTISTS
BORING LOCATION PLAN
LANDFARM ON ARMCO STEEL PROPERTY
DRN. BY SDC
DATE 8/18/87
CHK'D. BY UB
DATE 8-19-87
PROJECT NO. 11C093-16
FIG. NO. 1

LIST OF ABBREVIATIONS

Abbreviation	Description
ELEV	Elevation
MSL	Mean Sea Level
FT	Feet
O & G	Oil and Grease
TPFH	Total Petroleum Fuel Hydrocarbons
FLUOR	Fluoranthene
PAHs	Total Polynuclear Aromatic Hydrocarbons (Sum of concentrations of benzo(a)anthracene, chyrsene, phenanthrene)
FS LFARM SOIL	Filter Solids Landfarm Soil
ND(0.1)	Not detected with a detection limit of 0.1 mg/kg
IN LANDFARM	Inactive Sludge Landfarm
{NC)	Boring not completed
ARMCO LANDFARM	Landfarm located on adjacent property owned by Armco Steel
---	Analysis not performed
NGVD	National Geodetic Vertical Datum

TABLE 1
SUMMARY OF CHEMICAL ANALYSIS RESULTS
LANDFARM BORINGS (PB31-PB61)

SAMPLE NUMBER	LOCATION	ELEV (MSL)	DEPTH (FT)	ARSENIC (ug/kg)	CHROMIUM (ug/kg)	LEAD (ug/kg)	MERCURY (ug/kg)	O & G (ug/kg)	TPHC (ug/kg)	FLUOR (ug/kg)	PYRENE (ug/kg)	ANTHRACENE (ug/kg)	BENZENE (ug/kg)	PAHs (ug/kg)
PB4901	IN LANDFARM	727.6	0.5	6	93	575	ND(0.1)	1500	790	---	---	---	---	---
PB4903	IN LANDFARM	726.6	1.5	4	17	51	ND(0.1)	200	ND(100)	---	---	---	---	---
PB4905	IN LANDFARM	725.6	2.5	6	17	24	ND(0.1)	150	ND(100)	---	---	---	---	---
PB4907	IN LANDFARM	724.1	4	6	47	223	ND(0.1)	190	ND(100)	---	---	---	---	---
PB4909	IN LANDFARM	719.1	9	2	7	7	ND(0.1)	110	ND(100)	---	---	---	---	---
PB5001	IN LANDFARM	727.2	0.5	13	360	2620	0.6	420	220	---	---	---	---	---
PB5003	IN LANDFARM	726.2	1.5	4	16	64	ND(0.1)	280	120	---	---	---	---	---
PB5004	IN LANDFARM	725.7	2	4	18	51	ND(0.1)	500	250	---	---	---	---	---
PB5006	IN LANDFARM	724.7	3	4	14	14	ND(0.1)	160	ND(100)	---	---	---	---	---
PB5008	IN LANDFARM	722.7	5	4	103	644	ND(0.1)	2600	1800	---	---	---	---	---
PB51	IN LANDFARM(NC)	727.6												
PB5201	ARMCO LANDFARM	727.9	0.5	14	1090	5710	0.5	9500	7600	---	---	---	---	---
PB5203	ARMCO LANDFARM	726.9	1.5	8	1060	5610	0.7	14000	13000	---	---	---	---	---
PB5205	ARMCO LANDFARM	725.9	2.5	1	610	3000	0.2	5800	5800	---	---	---	---	---
PB5206	ARMCO LANDFARM	725.4	3	6	16	8	ND(0.1)	150	ND(120)	---	---	---	---	---
PB5208	ARMCO LANDFARM	723.4	5	6	18	9	ND(0.1)	170	ND(120)	---	---	---	---	---
PB5301	ARMCO LANDFARM	727.2	0.5	29	710	4720	0.3	11000	10000	---	---	---	---	---
PB5303	ARMCO LANDFARM	726.2	1.5	27	980	6220	0.8	17000	16000	---	---	---	---	---
PB5304	ARMCO LANDFARM	725.7	2	13	360	2370	0.2	4600	3800	---	---	---	---	---
PB5306	ARMCO LANDFARM	724.7	3	6	16	67	ND(0.1)	200	ND(120)	---	---	---	---	---
PB5308	ARMCO LANDFARM	722.7	5	6	65	490	ND(0.1)	1700	1400	---	---	---	---	---
PB5401	ARMCO LANDFARM	727.7	0.5	17	920	4330	0.4	9100	6500	---	---	---	---	---
PB5403	ARMCO LANDFARM	726.7	1.5	11	800	3600	0.4	6500	6400	---	---	---	---	---
PB5405	ARMCO LANDFARM	725.7	2.5	ND(1)	550	2600	0.2	3300	3300	---	---	---	---	---
PB5406	ARMCO LANDFARM	725.2	3	4	32	133	ND(0.1)	420	230	---	---	---	---	---
PB5408	ARMCO LANDFARM	723.2	5	3	14	23	ND(0.1)	260	ND(120)	---	---	---	---	---

TABLE 1
SUMMARY OF CHEMICAL ANALYSIS RESULTS
LANDFARM BORINGS (PB31-PB61)

SAMPLE NUMBER	LOCATION	ELEV (MSL)	DEPTH (FT)	ARSENIC (ug/kg)	CHROMIUM (ug/kg)	LEAD (ug/kg)	MERCURY (ug/kg)	O & G (ug/kg)	TPH (ug/kg)	FLUOR (ug/kg)	PYRENE (ug/kg)	ANTHRACENE (ug/kg)	PERYLENE (ug/kg)	PAHs (ug/kg)
PB5501	ARMCO LANDFARM	727.6	0.5	18	980	4220	0.4	16000	11000	---	---	---	---	---
PB5504	ARMCO LANDFARM	726.1	2	9	460	2100	0.3	9500	9500	---	---	---	---	---
PB5506	ARMCO LANDFARM	725.1	3	13	27	82	ND(0.1)	520	360	---	---	---	---	---
PB5508	ARMCO LANDFARM	723.1	5	ND(1)	19	27	ND(0.1)	250	ND(120)	---	---	---	---	---
PB5509	ARMCO LANDFARM	719.1	9	9	370	1430	0.2	4000	4000	---	---	---	---	---
PB5601	ARMCO LANDFARM	728.0	0.5	14	1210	5220	0.2	9100	8800	---	---	---	---	---
PB5603	ARMCO LANDFARM	727.0	1.5	4	30	93	ND(0.1)	330	200	---	---	---	---	---
PB5606	ARMCO LANDFARM	725.5	3	9	115	624	ND(0.1)	2700	1900	---	---	---	---	---
PB5608	ARMCO LANDFARM	723.5	5	6	19	28	ND(0.1)	200	ND(120)	---	---	---	---	---
PB5609	ARMCO LANDFARM	719.5	9	7	31	126	ND(0.1)	2500	2300	---	---	---	---	---
PB5701	ARMCO LANDFARM	728.1	0.5	22	1200	5220	0.3	28000	28000	---	---	---	---	---
PB5703	ARMCO LANDFARM	727.1	1.5	9	75	386	ND(0.1)	2300	2300	---	---	---	---	---
PB5705	ARMCO LANDFARM	726.1	2.5	10	440	1900	0.4	5900	5100	---	---	---	---	---
PB5708	ARMCO LANDFARM	723.6	5	6	30	130	ND(0.1)	410	270	---	---	---	---	---
PB5710	ARMCO LANDFARM	715.6	13	6	5	7	ND(0.1)	180	ND(120)	---	---	---	---	---
PB5801	ARMCO LANDFARM	728.6	0.5	18	1210	5220	0.3	10000	9500	---	---	---	---	---
PB5803	ARMCO LANDFARM	727.6	1.5	8	354	1600	0.1	330	150	---	---	---	---	---
PB5806	ARMCO LANDFARM	726.1	3	6	100	365	ND(0.1)	550	370	---	---	---	---	---
PB5808	ARMCO LANDFARM	724.1	5	8	295	1350	0.2	11000	9200	---	---	---	---	---
PB5809	ARMCO LANDFARM	720.1	9	6	21	61	ND(0.1)	1900	820	---	---	---	---	---
PB5901	ARMCO LANDFARM	728.2	0.5	17	1020	4660	0.5	7900	6800	---	---	---	---	---
PB5904	ARMCO LANDFARM	726.7	2	4	28	98	ND(0.1)	3800	3700	---	---	---	---	---
PB5907	ARMCO LANDFARM	724.7	4	9	291	1300	0.1	9000	7200	---	---	---	---	---
PB5909	ARMCO LANDFARM	719.7	9	6	17	48	ND(0.1)	220	ND(120)	---	---	---	---	---
PB5910	ARMCO LANDFARM	715.7	13	1	17	27	ND(0.1)	350	190	---	---	---	---	---
PB6001	ARMCO LANDFARM	728.1	0.5	20	1080	4460	0.2	62000	62000	---	---	---	---	---
PB6003	ARMCO LANDFARM	727.1	1.5	5	21	63	0.4	11000	11000	---	---	---	---	---
PB6005	ARMCO LANDFARM	726.1	2.5	6	134	482	0.1	3300	2800	---	---	---	---	---
PB6007	ARMCO LANDFARM	724.6	4	6	25	18	ND(0.1)	200	ND(120)	---	---	---	---	---
PB6008	ARMCO LANDFARM	723.6	5	4	23	27	ND(0.1)	250	ND(120)	---	---	---	---	---
PB6101	ARMCO LANDFARM	728.3	0.5	14	2130	9680	0.2	51000	49000	---	---	---	---	---
PB6103	ARMCO LANDFARM	727.3	1.5	9	630	2720	0.1	52000	37000	---	---	---	---	---
PB6105	ARMCO LANDFARM	726.3	2.5	9	453	2170	0.1	3400	3400	---	---	---	---	---
PB6107	ARMCO LANDFARM	724.8	4	6	34	104	ND(0.1)	250	140	---	---	---	---	---
PB6108	ARMCO LANDFARM	723.8	5	8	125	505	ND(0.1)	820	540	---	---	---	---	---

APPENDIX F

Underground and Above Ground Tanks
and
Spill Information

IV. PREVIOUS SPILLS

Spills previous to the 1973 SPCC plan were described in Section 4 of that plan thus:

"4. A brief description of recent spills as they relate to subsequent changes which mitigate against recurrence;

The largest known spill of material into the Blue River from the Armco operation occurred in January, 1971, as a result of the inept pumping of oil at the 12-inch merchant mill. Changes accomplished to minimize the likelihood of a recurrence include piping and drainage changes, reinstruction of personnel, oil removal facilities in scale pits, and elimination of heavy oil in mill areas. Additionally, mill water drainage is scheduled for connection to a mill water recirculation lagoon in 1975.

More recently, spills have been generally of limited extent and have included oil and acid. In all known situations these events have resulted from minor operating accidents (centrifuge malfunction causing a spill of 100 to 150 gallons of oil on April 7, 1971; a cobble in the No. 2 Rod Mill causing a spill of 50 to 100 gallons of oil on April 2, 1971); and operator carelessness (100 to 150-gallon oil spill May 20, 1971; overflowing acid April 12, 1972; spent acid May 31, 1972; dilute acid February 19, 1973).

Two more recent spills have prompted amendments to the 1973 plan thus:

Amendment No. 1 under Item 2e, dated June 30, 1975 -

"e. Waste oil from the Bolt & Forged Products Department is stored in a tank trailer of a nominal 5,000 gallons capacity. Periodically, this waste is hauled to a recovery system. A concrete pit large enough to hold the contents of the tank will be constructed at the site. This pit when completed in October of 1975 will assure that any oil lost by spillage or rupture is retained."

The above retention structure is in service.

Amendment No. 2 under Item 2d, dated July 18, 1978 -

"d. No. 2 Rod Mill roughing mill oil cellar (45,000-gallon capacity) and finishing mill oil cellar (30,000-gallon capacity). These facilities recirculate oil to the mill and are not tributary to the Blue River."

Amendment No. 2 represents a revision in the drainage from the finishing mill oil cellar.

IV. PREVIOUS SPILLS (CONTINUED)

Other spills are a matter of record.

We have made very substantial progress in reducing these occurrences by reinstruction, modification of piping and drain systems, and provision of waste collection and holding facilities.

Most recently we have virtually eliminated the oil seepage to the river through outfall #039. This seepage of oil was the subject of a Finding of Violation and Order from EPA against Armco issued July 31, 1980. In this instance the problem was that the shallow ground water table was floating a pool of oil acquired from an unknown source and trapped underground. The action taken was to tap this pool and pump it out.

V. PRINCIPAL SPILL POTENTIAL

FACILITY	TOTAL QUANTITY OF OIL (GALS.)	RATE OF FLOW, GPM	DIRECTION OF FLOW	PREVENTIVE SYSTEMS	MAP SYMBOL
North Tank Farm	4,117,000 (#4 @ 2,350,000 & #1 @ 1,767,000) (3 @ 2,350,000 empty)	Massive	W 300'	Dikes	A
Blooming Mill Billet Mill 10" Mill	11,400	1,000	N 100'	Scale Pit	B
Blooming & Billet Mills	8,850	1,000	N 100'	Dike	C
Billet Cooling Bed	1,000	200	E 50'	Scale Pit	D
Rod Mill	80,100	1,000	SW 400'	Scale Pit	E
Car Bottom Furnace Tank	20,000*	200	W 1900'	Dike	F
East Yard Diesel Tank	8,000	100	W 2000'	Dike	G
KCS Ingot Yard Tank	840,000*	Massive	W 200'	Dike	H
12-Inch Mill	15,000	1,000	E 30'	Scale Pit	I
Cold Forging	27,000	200	NE 800'	Dike & Basement	J
12-Inch Mill Tank	508,000*	Massive	N 600'	Dike	K
Vendo Tanks	42,000* (2 @ 21,000)	200	NW 250'	Dike	L
Twelfth Street	114,000* (2 @ 36,000 &* 1 @ 42,000) *	200	N 350'	Dike	M
U.W.R. Coil Yard Tank	21,000	200	N 700'	Dike	
UWR Bulk Lub. Strge. Sys.	24,000	100	SW 2000'	"	
No. 6 Oil Loops - from North Tank Farm to:		Boiler House, Soaking Pits, Ten-Inch Mill, Rod Mill, #2 Melt Shop			A,B,C, D,E
No. 2 Oil Supply - from North Tank Farm to:		Magnaflux Department			A,B
No. 2 Oil Supply - from KCS Ingot Yard to:		Ball Department			H

*Tank(s) Empty

MAP
A
B
C
D
E
F
G
H
I
J
K
L
M
BLUE RIVER

VII. FACILITY DRAINAGE

AREA	FACILITY	GALLONS	COMMENT
Blooming Mill	Oil Cellar	4,200	drains to scale pit
Billet "	" "	4,200	" " " "
Ten-Inch	Mill Drive	3,000	" " " "
Blooming & Billet Mills	Bulk Lube Oil	8,850	diked
Billet Cooling Bed	Hyd. Oil	1,000	pumped to scale pit
Ingot Buggy	Diesel Fuel	300	drains to scale pit
No. 2 Melt Shop	Oil Cellar	10,000	drains to scale pit
" " " "	Caster Hyd.	1,500	" " " "
" " " "	Cooling Bed Hyd.	500	pumped to scale pit
" " " "	Bulk Lube Oil	10,000	buried, coated, anode
" " " "	" Hyd. "	10,000	" " "
" " " "	Diesel Fuel	2,000	" " "
" " " "	" "	2,000	remote site, undiked
No. 2 Rod Mill	A Oil Cellar	45,000	sump
" " " "	F Oil Cellar	30,000	drains to compactor sump
" " " "	Reformer Hyd.	3,600	" " " "
" " " "	Compactor Hyd.	1,500	pumped to scale pit
" " " "	Diesel Fuel	2,000	steel enclosure
Twelve-Inch Mill	Oil Cellar	15,000	sump, pumped to scale pit
	Locker Room* Heating Oil	4,230	buried
	Shipping Office* Heating Oil	2,538	"
No. 2 Wire Mill	Bundling Oil Dip	2,700	diked, empty
	Heat Treat Oil 2 @	500	" , to be emptied
Masonry Shop	Diesel Fuel*	300	tank plugged

*Tank(s) Empty

VII. FACILITY DRAINAGE - CONTINUED

AREA	FACILITY	GALLONS	COMMENT
Brick Shed	Diesel Fuel*	300	to be diked
East Yard	" "	8,000	diked
E. Railroad Patch	Gasoline	400	remote site, undiked
Hot Shop	Bulk Lube Oil	10,000	buried
Cold Forging	Heat Treat Oil	16,000	diked
" "	Lube Oil	6,000	in basement
" "	Waste Oil	5,000	trailer, diked
Viking Bldg.	Boiler Fuel Oil*	2,000	buried
Bar Fab	Heating*	10,000	"
Locomotive Shop	Diesel Fuel	11,000	"
Bar Joist	Heating Fuel Oil	20,000	"
No. 1 Melt Shop Lab	Boiler Fuel Oil*	4,230	"
Electric Shop	" " " *	2,000	"
Ice House	Gasoline	10,000	buried (regular)
" "	"	"	" (no-lead)
Vendo	Boiler Fuel Oil	10,000	buried, abandoned, empty
"	Heating Fuel Oil	42,000	diked, empty
Twelfth Street	Heating Oil*	42,000	" " , abandoned
	" " *	2 @ 36,000	"
	Gasoline	2,000	buried
Union Wire Rope	Heating Oil East Yard	21,000	diked
	Heating Oil adjac. Bldg. 33		buried, abandoned
	Heating Oil* Bldg. 47	12,000	buried, abandoned
	Gasoline	1,100	buried
	Kerosene	500	diked
	Diesel Fuel	500	"
	Rope Lubricant	24,000	"

*Tank(s) Empty

EPA REGION VII
DATE: 05/02/91

EMERGENCY PLANNING AND RESPONSE BRANCH
INCIDENT NOTIFICATION REPORT

>>>>>>>>>> THE FOLLOWING FIRST NOTIFICATION REPORTS REFLECT DATA COMPILED BY THE EPA PRIOR TO INVESTIGATION. <<<<<<<<<<

CASE NUMBER / RPT-DATE / RPT-TIME	RESPONSIBLE PARTY / INCIDENT LOCATION / CITY, ST., (CNTY)	MATERIAL (quantity)	SOURCE / CAUSE / WATERWAY AFFECTED
12289MM 1050 / 12/28/89 / 1143 HRS.	ARMCO INC / , MO (JACKSON)	LUBE OIL (10 gallons)	FIXED FACILITY / UNKNOWN / BLUE RIVER

NATURE OF INCIDENT : WASTE TREATMENT HOLDING PIT (SCALE PIT).
RESPONSE ACTION : USING SORBENT TO CLEAN UP. CONTAINED BY ICE IN RIVER

05220RDW1120 / 05/22/90 / 1120 HRS.	UNKNOWN (ALLEGED ARMCO STEEL) / HARDIN, MO ()	UNKNOWN RED DUST (unknown)	UNKNOWN / EQUIPMENT FAILURE / NONE

NATURE OF INCIDENT : SAYS RED DUST W/CEDAR-LIKE ODOR IS SETTLING IN AREA. ALSO HAPPENED 2 YRS AGO.
RESPONSE ACTION : REPORTED TO MDNR - WILL NOTIFY REGIONAL OFFICE.

21062C1420 / 06/21/82 / 1420 HRS.	ARMCO / AT PLANT / INDEPENDENCE, MO (JACKSON)	CHLOROTHENE NU ~3 GAL/DAY (3 gallons)	FIXED FACILITY / UNKNOWN / SANITARY SEWER

NATURE OF INCIDENT : SOLVENT USED TO CLEAN PRODUCT DISPOSED OF BY POUR-ING DOWN DRAIN.
RESPONSE ACTION : REF TO MDNR TO CHECKON SCENE.

19072S0820 / 07/19/82 / 820 HRS.	BLUE RIVER BY ARMCO / KANSAS CITY, MO (JACKSON)	UNKNOWN (unknown)	OTHER / UNKNOWN / RIVER

NATURE OF INCIDENT : UNK MATL CAUSED LARGE FISH KILL. EPA & MO DEPT OF CONSERV. ON SCENE.
RESPONSE ACTION : EPA TOOK SAMPLE OF WATER. CASE PENDS.

11050TJC1400 / 11/05/90 / 1400 HRS.	ARMCO STEEL, 24 HIGHWAY BRIDGE / KANSAS CITY, MO (JACKSON)	UNKNOWN (unknown)	UNKNOWN / UNKNOWN / LITTLE BLUE RIVER

NATURE OF INCIDENT : WATER IN RIVER IS DARK AND FISH ARE DYING.
RESPONSE ACTION : NOTIFIED MDNR, LARRY ALDERSON - KCMO

12111L1425 / 11/12/81 / 1425 HRS.	ARMCO / PLANT SITE / KANSAS CITY, MO (JACKSON)	#6 OIL (10 gallons)	FIXED FACILITY / UNKNOWN / RIVER

NATURE OF INCIDENT : SMALL AMT IN BLUE RIVER NOT ENOUGH TO CLEAN,BUT PLACED A BOOM IN PLACE.
RESPONSE ACTION : MDNR NOTIFIED.

14042D1500 / 04/14/82 / 1500 HRS.	ARMCO / AT PLANT / KANSAS CITY, MO (JACKSON)	LUBE OIL (10 gallons)	UNDERGROUND TANK / UNKNOWN / RIVER

NATURE OF INCIDENT : VALVE LEFT OPEN DURING TRANSFER OPERATION.
RESPONSE ACTION : MDNR WILL FOLLOW UP.

20082S1330 / 08/20/82 / 1330 HRS.	ARMCO / 7000 ROBERTS / KANSAS CITY, MO (JACKSON)	LUBRICATING OIL (50 gallons)	FIXED FACILITY / UNKNOWN / RIVER

NATURE OF INCIDENT : PUMP SYSTEM CONTROL VALVEFAILED & MATL TO BLUE RIVER. MATL CLEANED UP.
RESPONSE ACTION : CONTAINED W/BOOM & PUMPED OUT W/SKIMMER& W/STRAW.

EPA REGION VII
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EMERGENCY PLANNING AND RESPONSE BRANCH
INCIDENT NOTIFICATION REPORT

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CASE NUMBER / RPT-DATE / RPT-TIME	RESPONSIBLE PARTY / INCIDENT LOCATION / CITY, ST., (CNTY)	MATERIAL (quantity)	SOURCE / CAUSE / WATERWAY AFFECTED
03277MAC1605 / 03/27/87 / 1605 HRS.	ARMCO / ARMCO NEAR BAGHOUSE / KANSAS CITY, MO (JACKSON)	ELECTRIC FURNACE DUST K061 (unknown)	FIXED FACILITY / UNKNOWN / NONE

NATURE OF INCIDENT : IMPROPER PLACEMENT OF BAGHOUSE ELECTRIC FURNACE DUST K061
RESPONSE ACTION : CLEANED UP AND WILL RECYCLE IN FURNACE THEY WILL CONTACT MODNR

02028GH1125 / 02/02/88 / 1125 HRS.	ARMCO INC / ARMCO OUTFALL #8 ON BIG BLUE R / KANSAS CITY, MO (JACKSON)	RECIRCULATION OIL/H20 MIX (unknown)	FIXED FACILITY / UNKNOWN / RIVER

NATURE OF INCIDENT : PUMP FAILURE AT BLOOMING MILL, CENTRAL MILL WATER CONTAINED SOME OIL
RESPONSE ACTION : PLACED BOOMS TO CONTAIN SHEEN, WILL SHUT OFF FLOW

02298C1120 / 02/29/88 / 1120 HRS.	ARMCO INC / 7000 ROBTS RD., ARMCO INC. / KANSAS CITY, MO (JACKSON)	LUBE OIL (50 gallons)	OTHER / UNKNOWN / RIVER

NATURE OF INCIDENT : SCALE PIT PUMP FAILURE CAUSING OVERFLOW
RESPONSE ACTION : BOOMS ACROSS BIG BLUE RIVER. ABSORBENT MAT'L REMOVED WHEN NECESSARY

09277KT1715 / 09/27/87 / 1715 HRS.	ARMCO INC. / 7000 ROBERTS ROAD / KANSAS CITY, MO (JACKSON)	SULFURIC ACID (80000 gallons)	FIXED FACILITY / UNKNOWN / STORM SEWER

NATURE OF INCIDENT : SUPPLY LINE BROKE SPILL- ING ACID TO CONTAINMENT WHICH OVERFLOWED TO STORMSEW
RESPONSE ACTION : CO. RESPONDED ATTEMPTED NEUTRALIZATION WITH LIME EPA-TAT ONSCENE KCRO FOLLOW-

02298KT1120 / 02/29/88 / 1120 HRS.	ARMCO INC. / 7000 ROBERTS ROAD / KANSAS CITY, MO (JACKSON)	LUBE OIL (50 gallons)	FIXED FACILITY / UNKNOWN / RIVER

NATURE OF INCIDENT : PROCESS PUMP WAS SHUT OFFCAUSING SYSTEM TO OVER- FLOW AND DISCHARGE TO BIG
RESPONSE ACTION : RP ATTEMPTED CLEAN- UP WITH SORBENTS.

08125GK0920 / 08/12/85 / 920 HRS.	ARMCO STEEL / 7000 ROBERTS / KANSAS CITY, MO (JACKSON)	#2 DIESEL (50 gallons)	FIXED FACILITY / UNKNOWN / RIVER

NATURE OF INCIDENT : 50 GALLONS OF #2 DIESEL FUEL WAS LOST TO BLUE RIVER. COMPANY IS CLE
RESPONSE ACTION : COMPANY IS CLEANING UP THE SPILL.

12056MR1545 / 12/05/86 / 1545 HRS.	ARMCO STEEL / 7000 ROBERTS ROAD / KANSAS CITY, MO (JACKSON)	SULFURIC ACID (50 gallons)	FIXED FACILITY / UNKNOWN / RIVER

NATURE OF INCIDENT : ACID SPILL IN PLANT RAN ONTO STREET AND INTO SEWER OUTFALL #6. PH WAS <2
RESPONSE ACTION : COMPANY NEUTRALIZED MATERIAL WITH LIME. & STABILIZED PH. EERREFERRED TO WPCP.

01277GS11420 / 01/27/87 / 1420 HRS.	ARMCO STEEL / 7000 ROBERTS ROAD / KANSAS CITY, MO (JACKSON)	WASTE LUBE OIL (20 gallons)	FIXED FACILITY / UNKNOWN / RIVER

NATURE OF INCIDENT : 20 GALS. SPILLED. SOURCE UNKNOWN.
RESPONSE ACTION : MATERIAL TRAPPED BY ICE AND ABSORBED.

EPA REGION VII
DATE: 05/02/91

EMERGENCY PLANNING AND RESPONSE BRANCH
INCIDENT NOTIFICATION REPORT

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CASE NUMBER / RPT-DATE / RPT-TIME	RESPONSIBLE PARTY / INCIDENT LOCATION / CITY, ST., (CNTY)	MATERIAL (quantity)	SOURCE / CAUSE / WATERWAY AFFECTED
01277JW1405 / 01/27/87 / 1405 HRS.	ARMCO STEEL / BLUE RIVER NEAR ARMCO'S OUTFAL / KANSAS CITY, MO (JACKSON)	WASTE OIL (20 gallons)	FIXED FACILITY / UNKNOWN / STORM SEWER
NATURE OF INCIDENT : FROM ARMCO'S OUTFALL #15 EXACT SOURCE HAS NOT BEEN DETERMINED			
RESPONSE ACTION : ARMCO IS CLEANING UP W/ABSORBENT PADS. OIL IS BEING TRAPPED BY ICE.			
03277SB1620 / 03/27/87 / 1620 HRS.	ARMCO STEEL / 7000 ROBERTS ROAD / KANSAS CITY, MO (JACKSON)	KO 61 BAGHOUSE DUST (2200 pounds)	OTHER / UNKNOWN / NONE
NATURE OF INCIDENT : RESPONSIBLE PARTY REPORTSSPILLING ~ 2000 # KO 61 BAGHOUSE DUST.			
RESPONSE ACTION : MATERIAL CLEANED UP BY RESPONSIBLE PARTY			
02028GS11140 / 02/01/88 / 1140 HRS.	ARMCO STEEL / ARMCO STEEL FACILITY / KANSAS CITY, MO (JACKSON)	MILL COOLING WATER (6500 gallons)	FIXED FACILITY / UNKNOWN / RIVER
NATURE OF INCIDENT : PUMP FAILED ON COOLING WATER SYSTEM CAUSING DISCHARGE OF WATER TO BLU			
RESPONSE ACTION : NO CLEAN-UP POSSIBLE			
02298LA1235 / 02/29/88 / 1235 HRS.	ARMCO STEEL / 7000 ROBERTS ROAD / KANSAS CITY, MO (JACKSON)	LUBE OIL (50 gallons)	FIXED FACILITY / UNKNOWN / RIVER
NATURE OF INCIDENT : PUMP FAILURE CAUSED THE LOSS OF OIL TO THE BIG BLUE RIVER.			
RESPONSE ACTION : ARMCO PERSONNEL ARE USING SORBENT MATER-IAL TO REMOVE OIL.			
08178GH1505 / 08/17/88 / 1505 HRS.	ARMCO STEEL / ARMCO STEEL / KANSAS CITY, MO (JACKSON)	OTHER (unknown)	FIXED FACILITY / OTHER / NONE
NATURE OF INCIDENT : FIXED FAC			
RESPONSE ACTION :			
11188JP11615 / 11/18/88 / 1615 HRS.	ARMCO STEEL / ARMCO STEEL / KANSAS CITY, MO (JACKSON)	OTHER (unknown)	OTHER / UNKNOWN / NONE
NATURE OF INCIDENT : ANONYMOUS CALLER REPORTEDILLEGAL CONSTRUCTION AT ARMCO ABANDONED UNCONTRO-LLE			
RESPONSE ACTION : KCRO INVESTIGATED. NO EVIDENCE OF CON- STRUCTION IN RESTRICTED AREA.			
11188H1600 / 11/18/88 / 1600 HRS.	ARMCO STEEL / ARMCO STEEL / KANSAS CITY, MO (JACKSON)	UNKNOWN (unknown)	FIXED FACILITY / UNKNOWN / NONE
NATURE OF INCIDENT : FIXED FAC			
RESPONSE ACTION : NONE			
04021BM 0910 / 04/02/91 / 910 HRS.	ARMCO STEEL / ~100 YD N OF ARMCO'S TERMINAL / KANSAS CITY, MO (JACKSON)	BLACK, TAR LIKE MATL (100 gallons)	UNKNOWN / UNKNOWN / NONE
NATURE OF INCIDENT : UNKNOWN			
RESPONSE ACTION : MDNR & KCMO HEALTH DEPT HAVE SEARCHED, THEY WERE UNABLE TO LOCATE THE SPILL.			

>>>>>>>>>> THE FOLLOWING FIRST NOTIFICATION REPORTS REFLECT DATA COMPILED BY THE EPA PRIOR TO INVESTIGATION. <<<<<<<<<<

CASE NUMBER RPT-DATE RPT-TIME	RESPONSIBLE PARTY INCIDENT LOCATION CITY, ST., (CNTY)	MATERIAL (quantity)	SOURCE CAUSE WATERWAY AFFECTED
11188RS31600 11/21/88 750 HRS.	ARMCO STEEL PLATING 12TH & WINCHESTER KANSAS CITY, MO (JACKSON)	OTHER (unknown)	FIXED FACILITY UNKNOWN NONE

NATURE OF INCIDENT : ODORS COMING FROM ABAN- DONED PLATING BUSINESS. ACTION FORK LIFT CO. WOR
RESPONSE ACTION : EER ADVISED KCRO WHOWERE AWARE OF THE SITUATION.

10146MR1300 10/14/86 1300 HRS.	ARMCO UNION WIRE ROPE 2100 MANCHESTER AVE. KANSAS CITY, MO (JACKSON)	HYDROCHLORIC ACID (25 gallons)	FIXED FACILITY UNKNOWN NONE

NATURE OF INCIDENT : FORKLIFT PUNCTURED ACID LINE INSIDE CONTAINMENT DIKE. NO RELEASE OUTSIDEOF
RESPONSE ACTION : NEUTRALIZED WITH LIMESTONE BY RESPON-SIBLE PARTY.

09277GK1710 09/27/87 1710 HRS.	ARMCO, INC. 7000 ROBERTS KANSAS CITY, MO (JACKSON)	SULFURIC ACID (650 gallons)	FIXED FACILITY UNKNOWN RIVER

NATURE OF INCIDENT : STORAGE TANK PIPELINE FAILED.
RESPONSE ACTION : LIME BEING APPLIED BUT PH LESS THAN 1 AT OUTFALL TO THE RIVER.

05248G1600 05/24/88 0 HRS.	ARMCO, INC. LAND FILL ON BANK OF BLUE RIVE KANSAS CITY, MO (JACKSON)	K061 WASTE (unknown)	OTHER UNKNOWN NONE

NATURE OF INCIDENT : HAZARDOUS WASTE SITE. ON BLUE RIVER. 24TH & 24 HWY.
RESPONSE ACTION : P O ACTION

06129TJC1450 06/12/89 0 HRS.	ARMCO, INC. 7000 ROBERTS KANSAS CITY, MO (JACKSON)	#6 & #2 FUEL OIL (unknown)	FIXED FACILITY UNKNOWN NONE

NATURE OF INCIDENT : DURING SOIL SAMPLING THE COMPANY DISCOVERED #6 AND#2 FUEL OIL IN THE GROUND -
RESPONSE ACTION : PENDING

09105MR1122 09/10/85 1122 HRS.	ARMCO-UNION WIRE ROPE 2100 MANCHESTER KANSAS CITY, MO (JACKSON)	65% SULFURIC ACID (100 gallons)	FIXED FACILITY UNKNOWN NONE

NATURE OF INCIDENT : SULFURIC ACID SPILLED WHILE UNLOADING RAIL CAR.
RESPONSE ACTION : RESPONSIBLE PARTY NEUTRALIZED WITH LIME

02130BM 1720 02/13/90 1720 HRS.	REMCOR ARMCO STEEL, 7000 ROBERTS STREET KANSAS CITY, MO (JACKSON)	PCB'S (unknown)	FIXED FACILITY DUMPING LITTLE BLUE RIVER

NATURE OF INCIDENT :
RESPONSE ACTION : MDNR INVESTIGATING.

03201GH 1645 03/20/91 1645 HRS.	UNION WIRE ROPE/ARMCO/HECKETT ARMCO STEEL PLANT, KANSAS CITY, MO (JACKSON)	UNKNOWN BLACK SANDY (unknown)	FIXED FACILITY DUMPING NONE

NATURE OF INCIDENT : MATL GENERATD BY UNION WIRE HAULD TO ARMCO BY SHAW & SONS (WRECKING & HAULING)
RESPONSE ACTION : KEVIN WEIDMAN OF MDNR RESPOND.

>>>>>>>>>> THE FOLLOWING FIRST NOTIFICATION REPORTS REFLECT DATA COMPILED BY THE EPA PRIOR TO INVESTIGATION. <<<<<<<<<<

CASE NUMBER RPT-DATE RPT-TIME	RESPONSIBLE PARTY INCIDENT LOCATION CITY, ST., (CNTY)	MATERIAL (quantity)	SOURCE CAUSE WATERWAY AFFECTED
04149M1140 04/14/89 1140 HRS.	UNKNOWN ARMCO STEEL KANSAS CITY, MO (JACKSON)	GREEN SOIL (unknown)	FIXED FACILITY UNKNOWN NONE

NATURE OF INCIDENT : UNION MEMBERS WORKING FOR MASSMAN CONSTRUCTION EMCOUNTERED GREEN SOIL.
RESPONSE ACTION : DISPATCHED TAT, KWOKA. DID NOT FIND ANYTHING TO INDICATE A WORPLACE PROBLEM.

03071GH 1530 03/07/91 1530 HRS.	ARMCO STEEL 100 YARDS NORTH NORTH TERMINAL YARD OFFC UNKNOWN, MO ()	THICK RUBBERY - TAR MATL (100 gallons)	UNKNOWN UNKNOWN NONE

NATURE OF INCIDENT : TAR MATERIAL BETWEEN RAILROAD TRACKS.
RESPONSE ACTION : NOTIFIED MDNR.